BASIC ASSESSMENT FOR THE PROPOSED CONSTRUCTION AND OPERATION OF THE 132KV/400KV ON-SITE MAIN TRANSMISSION SUBSTATION (MTS) AND ASSOCIATED INFRASTRUCTURE LOCATED NEAR DEALESVILLE IN THE TOKOLOGO LOCAL MUNICIPALITY, LEJWELEPUTSWA DISTRICT IN THE FREE STATE PROVINCE

Prepared for: South Africa Mainstream Renewable Power Developments (Pty) Ltd

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REPORT SIGN OFF AND APPROVALS

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(Project Manager)

Stuart Heather-Clark
(Reviewer)

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EXECUTIVE SUMMARY

Introduction and Project Description

South Africa Mainstream Renewable Power Developments (Pty) Ltd ('Mainstream') is proposing the development of (1) Main Transmission Substation (MTS), three (3) powerlines (namely 1 x 132kV powerline and 2 x 400kV powerlines), one (1) Li-Ion Battery Energy Storage System (BESS), the associated electrical infrastructure, (the 'proposed development') that will connect to the authorised Solar Energy Facilities i.e. Kentani, Klipfontein, Klipfontein 2, Leliehoek, Sonoblomo, Braklaagte, Boschrand 2, Meeding, Irene and Braambosch, collectively known as the Kentani Cluster located near the town of Dealesville, Tokologo Local Municipality (Lejweleputswa District) in the Free State Province.

The Kentani Cluster consists of eleven (11) solar PV projects and associated electrical infrastructure (including a powerline), each of which received their own Environmental Authorisation (EA) in 2016 from the then Department of Environmental Affairs (DEA) [now referred to as the Department of Forestry, Fisheries and the Environment (DFFE)]. The proposed MTS, BESS and associated infrastructure [i.e., eleven (11) powerlines] will service eleven (11) of Mainstream's solar PV projects authorised as part of the Kentani Cluster.

The proposed development will also involve the re-routing of eight (8) 132kV powerlines within the grid connection corridor which has been authorised as part of the Kentani Cluster, making provision for this routing in the new proposed.

It should be noted that on 28 October 2021, the Minister of Mineral Resources and Energy, Gwede Mantashe announced the Preferred Bidders of the Round 5 Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) and six (6) of the aforementioned Solar Energy Facilities received Preferred Bidder status.

These Solar Energy Facilities have now become Strategic Infrastructure Projects 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

It should be noted that the proposed MTS and BESS will be located within the authorised Klipfontein PV facility (14/12/16/3/3/2/722). Three (3) powerlines [i.e. two (2) 400kV and one (1) 132kV powerlines] fall outside of the authorised corridor and therefore will be assessed as part of the Basic Assessment (BA) process for the MTS (i.e., this application).

Moreover, the proposed MTS, BESS and powerlines are located within the Kimberly Renewable Energy Development Zone and Central Strategic Transmission Corridor, as defined and in terms of the procedures laid out in Government Notices No. 113 and No. 145 which were formally gazetted on 16 February 2018 and 26 February 2021 respectively.

The proposed construction of the project infrastructure requires Environmental Authorisation (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.

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

Need and Desirability

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. 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).

This proposed development, along with the Kentani Cluster projects, are viewed in a positive context due to the potential for employment creation within the local community. The proposed development is located in the Central Strategic Transmission Corridor, a current requirement of the REIPPPP is that 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.

The cumulative effect of the proposed development 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 Kentani cluster, will address electricity constraints within both the local and district Municipalities by generating, distributing and evacuation a continued realisable source of electricity.

Improved electrification and an increased supply to houses and businesses is a strategic objective of both the Lejweleputswa District Municipality, as well as the Tokologo Local Municipality.

National Environmental Management Act (Act No. 107 of 1998) (NEMA) Regulations

The EIA Regulations 2014 (as amended) promulgated in terms of Chapter 5 of 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 Environmental Authorisation (EA) has been obtained from the Competent Authority. Such an EA, which may be granted subject to 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 wind farms trigger activities listed in Listing Notices 1, 2 and 3 (see Table 2-1), it is necessary that a full SEIA process is undertaken for the Department of Forestry, Fisheries, and the Environment (DFFE) to consider the application in terms of NEMA. However, taking into consideration the fact that the proposed MTS and its associated infrastructure is located within the Kimberly Renewable Energy Development Zone (REDZ), a BA process for the application for EA must be undertaken as per GN R114 of 2018 which comprises a shortened timeframe of 57 days for decision-making.]

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)	*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.*	*The proposed 132 kilovolt powerline will connect the proposed MTS to the authorised Kentani Solar PV on-site substation (14/12/16/3/3/2/724) and will be approximately 4km in length.* *The two (2) proposed 400 kV powerlines that will loop-in and loop-out of the proposed MTS and will be approximately 2km in length.* *The remaining eight (8) 132 kV from the authorised Solar PV Developments will*

No.	Activity description	Description of activity in relation to the proposed project
		also reroute within the authorised corridor to connect to the proposed MTS.
12(ii)(a)(c)	*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.*	*The proposed projects will require the placement of linear infrastructure, i.e., access roads and overhead power lines with a combined physical footprint of more than 100 m^2.* *As the site consists of a number drainage lines and watercourses, one or more roads and/or powerlines will cross these watercourses or drainage lines or be within 32 m thereof.*
19	*The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles, or rock of more than 10 cubic metres from a watercourse.*	*The proposed projects will involve the construction of internal roads, upgrades to existing roads and laying of underground cables within the project area, which will require the removal infilling of soil from a watercourse in excess of 10 m^3.*
24(ii)	*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 8 m.*	*The project will involve the construction of access roads up to 8m wide, that can accommodate large vehicles transporting transformers and other electrical equipment to the proposed MTS site.*
27	*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.*	*The proposed construction of the proposed MTS and BESS will require the clearance of an area of 1 hectare (ha) or more, but less than 20ha, of indigenous vegetation.*
28(ii)	*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 outside an urban area, where the total land to be developed is bigger than 1 hectare.*	*The MTS, BESS and associated powerline infrastructure are situated on land currently used for agriculture and the footprint of the substation and BESS is larger than 1 hectare. The footprint of the substation site will be 64 hectares, while the BESS will be 4 hectares*

No.	Activity description	Description of activity in relation to the proposed project
56(i)(ii)	*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.*	*Existing roads will be upgraded/ widened to up to 8mand lengthened by more than 1km if required and where possible.*
GN R984 (Listing Notice 2)		
4	*The development and related operation of facilities or infrastructure, for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of more than 500 cubic metres.*	*The proposed MTS requires transformer oil to insulate, suppress corona discharge and arcing, and to serve as a coolant. Storage facilities require a capacity of > 500 m³.*
9	*The development of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex.*	*The proposed loop-in-loop-out power lines will have a capacity of 400 kilovolts. The power lines are approximately 800m in length.*
15	*The clearance of an area of 20 hectares or more of indigenous vegetation*	*The footprint of the proposed MTS is 64 hectares, while the BESS will be 4 hectares*
GN R985 (Listing Notice 3)		
4 (b) (i) (ee)	*The development of a road wider than 4 metres with a reserve less than 13,5 metres in the (b) Free State outside urban areas (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans*	*A temporary road corridor up to 8 m will be impacted during the construction phase. This will be rehabilitated after the completion of construction activities to allow for a permanent 4-6 m wide road surface with side drains on one or both sides where necessary.* *Most of the site constitutes indigenous vegetation.*
12 (b) (ii) (iv)	*The clearance of an area of 300 square metres or more of indigenous vegetation in the (b) the Free State (ii) Within critical biodiversity areas identified in bioregional plans; (iv) Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland.*	*The development of substation, BESS and powerline infrastructure will require the clearance of more than 300 m² of indigenous vegetation.*
14 (b) (i) (ff)	*The development of infrastructure or structures with (ii) infrastructure or structures with a physical footprint of 10*	*The development of the substation, powerline and BESS infrastructure and Internal roads with a physical footprint in excess of 10 m² will*

No.	Activity description	Description of activity in relation to the proposed project
	square metres or more in the (b) Free State where such development occurs in a (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans	*be required within and adjacent to watercourses and will traverse CBAs in places.*
18(b)(ee)(hh)	*The widening of a road by more than 4 metres and the lengthening of a road by more than 1 kilometre in the (b) Free State (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans, (hh) Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland.*	*Existing roads may require widening of up to 6 m (up to 15 m during construction) and/or lengthening by more than 1 km, to accommodate the movement of vehicles, in areas containing indigenous vegetation.*

Details of alternatives

A comprehensive design process has been undertaken to inform the site proposed for the MTS, BESS as well as the corridors being proposed for the associated powerlines. No location, layout, BESS technology alternatives or powerline corridor alternatives are therefore being considered and assessed.

Location of the activity:

The proposed project is located approximately 2,5km north-west of the town of Dealesville in the Tokologo Local Municipality, within the Lejweleputswa District Municipality of the Free State Province. The proposed project will be located on the following properties / farm portions:

- Remaining Extent of the Farm Klipfontein No. 305 (F00400000000030500000);
- The Farm Leliehoek No. 748 (F00400000000074800000);
- The Farm Overschot No. 31 (F00400000000003100000)
- Remainder of the Farm Oxford No. 1030 (F00400000000103000000);
- Portion 1 of the Farm Walkerville No. 1031 (F00400000000103100001)[1]; and
- Remainder of the Farm Walkerville No. 1031 (F00400000000103100000).

Project Technical information Summary

[1] Property / farm portion traversed by proposed 33kv powerline which will connect to Kentani onsite substation (14/12/16/3/3/2/724). 33kV powerline does however not require authorisation.

Table ii includes technical and project-specific details of the key infrastructure components and support services that will be required to support the operations of the MTS, BESS and grid connection infrastructure. See Table 4-1 for the proposed layout which has been assessed in this BAR for the construction and operation of the MTS, BESS and grid connection infrastructure.

Table ii: Technical details of the proposed project

Component	Details		
Project footprint			
Project footprint:	**68 ha in extent. The MTS and BESS will be placed with this footprint**		
Project footprint co-ordinates		Latitude	Longitude
	A	28° 39.856'S	25° 43.609'E
	B	28° 40.095'S	25° 44.228'E
	C	28° 40.324'S	25° 44.090'E
	D	28° 40.276'S	25° 43.968'E
	E	28° 40.319'S	25° 43.594'E
	F	28° 40.266'S	25° 43.434'E
Main Transmission Substation			
MTS capacity:	132/400 kilovolt (kV)		
MTS footprint:	Approximately 64 hectares (ha) (i.e., 800m x 800m)		
MTS co-ordinates:	To be determined		
Powerlines			
Connection from the proposed MTS to the existing Eskom 400kV powerline			
Powerline capacity:	Two (2) 400kV overhead powerlines		
Powerline length:	Approximately 800m		
Powerline corridors width	300 m (150 m on either side of centre line)		
Powerline servitude	55 m per 1x 400kV power line		
Powerline co-ordinates	**Powerline 1**		
		Latitude	**Longitude**
	Start	28° 39.930'S	25° 43.250'E
	End	28° 40.027'S	25° 43.536'E
	Powerline 2		
		Latitude	**Longitude**
	Start	28° 39.953'S	25° 43.241'E

Component	Details		
	End	28° 40.048'S	25° 43.527'E
Powerline pylons:	Monopole or Lattice pylons, or a combination of both where required		
Powerline pylon height:	Maximum 40 m		
Minimum conductor ground clearance	8.1 m		
Distance between conductors	Between 2.4 m and 4 m		
Connection from the proposed MTS to the authorised Kentani on-site substation (14/12/16/3/3/2/724)			
Powerline capacity:	One (1) 132kV powerlines		
Powerline length:	Approximately 4 km		
Powerline corridors width	300 m (150 m on either side of centre line)		
Powerline corridors width	300 m (150 m on either side of centre line)		
Powerline servitude	32m per 1x 132kV power line		
Powerline co-ordinates	**Powerline 3**		
		Latitude	**Longitude**
	Start	28° 37.914'S	25° 43.372'E
	End	28° 40.038'S	25° 43.533'E
Powerline pylons:	Monopole or Lattice pylons, or a combination of both where required		
Powerline pylon height:	Maximum40 m		
Minimum conductor ground clearance	8.1 m		
Distance between conductors	Between 2.4 m and 3.8 m		
Connection from the proposed MTS to the 75MW Sonoblomo PV facility (14/12/16/3/3/2/723)			
Powerline capacity:	One (1) 33kv powerline		
Powerline Servitude	32m per 1x 132kV power line		
Powerline length:	Approximately 2 km		
Powerline corridors	No corridor is considered		
Powerline corridors width	300 m (150 m on either side of centre line)		
Powerline co-ordinates	**Powerline 4**		
		Latitude	**Longitude**
	Start	28° 37.914'S	25° 43.372'E
	End	28° 37.228'S	25° 44.296'E

Component	Details
Powerline pylons:	Monopole or Lattice pylons, or a combination of both where required
Powerline pylon height:	Maximum 32 m
Minimum conductor ground clearance	8.1 m
Distance between conductors	Between 2.4 m and 3.8 m
Supporting Infrastructure	
Road servitude and access roads	Approximately 4-8 meters wide, connecting to the R64 provincial route
Solid state (Lithium-ion) BESS	Will occupy an area of up to 4ha within the project footprint (co-ordinates to be determined
Operations and Maintenance (O&G) Building	The O&M Building will be located within the project footprint and will be 1ha in extent.
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. Mainstream 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	

Public Participation Process undertaken

A newspaper advertisement announcing the commencement of the BA process and inviting I&APs to register on the project database was placed in the "Bloemnuus" newspaper on 04 November 2021. In addition to the advertisement, site notices for the project were placed on the boundaries of the application sites and at the Dealesville Police Station and Tokologo Local Municipality. These posters contained brief details of the proposed project and process and the contact details of the consultant. 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, Statutory Organisations the Local Municipality, the District Municipality, relevant conservation bodies and non-governmental organisations (NGO's), as well as neighbouring landowners and the surrounding community. Public Participation has been undertaken in accordance with Chapter 6 (Public Participation Process) of the EIA Regulations, 2014 (as amended) and in accordance with GN R 145 (26 February 2021)

Although the proposed powerlines are linear activities, they are within the EGI Central Corridor and as such have servitude agreements in place with Mainstream. As the agreements contain personal landowner consents are included in this BA.

The landowners and/or occupants of the affected farm portions, on which the proposed powerlines are proposed, have been notified. A notification letter for the BA Process was compiled and circulated

on the 17th of November 2021. The purpose of the notification letter was to notify I&APs of the BA process and invite them to participate and comment on the DBAR.

This BA Report is available for review and comment period from 18 November 2021 to 10 January 2021 in order to provide Interested and 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/mainstream-mts-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/mainstream-mts-ba).**

A copy of the report and appendices have also been placed at the following location:

Name of Location	Contact Details	Address
Dealesville Primary School	051 811 0026	1 Brand Street, Dealesville

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 (BAR), comments should reach SLR no later than 10 January 2021.

SLR Consulting (South Africa) (Pty) Ltd

Attention: Liandra Scott-Shaw

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

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

The Table provides a summary of the findings of the specialist studies (or statements) that were undertaken as part of this BA Process. No negative impacts of high significance are anticipated to occur as a result of this project provided the stipulated management actions are implemented effectively.

The overall negative impacts range between insignificant, very low negative to medium negative in nature after mitigation is applied. The medium impacts are associated with the visual and cultural landscape themes as the MTS and associated infrastructure will further add to the intrusion of the existing electrical infrastructure in the Dealesville area.

While the overall impacts of the project on the receiving environment range between insignificant, very low negative to medium negative, 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.

Specialist	Phase/s	Issue	Description of Impact	Impact Rating Without Mitigation	Impact Rating With Mitigation
Agriculture	**Pre-Construction Construction Operation Decommissioning**	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 very low. 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 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.		**Low -**	**Low -**
Aquatic	**Construction Decommissioning**	Loss of aquatic species including any Species of Special Concern	Potential loss of protected or listed aquatic species, however none were observed on site	**Low -**	**Insignificant**
		Damage or loss of riparian systems and disturbance of waterbodies in the construction / decommissioning phase	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 crossings are made or large hard engineered surfaces are placed within these systems (incl the Proposed buffer). Loss can also include a functional loss, through change in vegetation type via alien encroachment for example	**Medium -**	**Very Low +**
		Water quality changes (increase in sediment, organic loads, chemicals or eutrophication	During construction & decommissioning 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,	**Medium -**	**Very Low +**

Specialist	Phase/s	Issue	Description of Impact	Impact Rating Without Mitigation	Impact Rating With Mitigation
			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 fuel storage facility must be given.		
	Operation	Hydrological regime or Hydroperiod changes (Quantity changes such as abstraction or diversion)	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.	**Medium -**	**Very Low +**
Terrestrial Ecology	**Construction Decommissioning**	Loss of natural vegetation	There will be localised disturbance of natural habitat within the footprint of tower structures during the construction phase. This is evaluated only for the areas within the footprint of the proposed power line, on the basis that all other infrastructure will be located within areas where authorisation has already been obtained	**Medium -**	**Low -**
	Operation	Invasion by alien invasive plant species	There are a variety of alien invasive plant species that occur in the general geographical area. Disturbance will promote the opportunity for invasion by any of these species. Local invasion will degraded habitat and may spread further into	**Medium -**	**Very Low -**

Specialist	Phase/s	Issue	Description of Impact	Impact Rating Without Mitigation	Impact Rating With Mitigation
			surrounding areas. This may lead to more extensive loss of indigenous habitat and biodiversity and long-term control issues.		
Avifauna	**Construction**	Habitat destruction during construction & maintenance	The impact of habitat destruction will be of Low significance both pre and post mitigation. The amount of habitat to be transformed for the MTS substation and the associated power lines is relatively small in this landscape and the habitat is not particularly unique or limited in availability. We recommend several mitigation measures which will slightly reduce the impact significance, but not sufficiently to reduce below Low.	**Low -**	**Low -**
		Disturbance of birds during construction	We judge the significance of this impact to be Low for both pre and post mitigation. Disturbance of birds typically reaches significant levels when the receptor is a breeding site for a sensitive species, or some other important feature, such as a roost. We have identified no such features on site.	**Low -**	**Low -**
	Operation	Collision of birds with overhead cables	We judge the significance of this impact to be Medium pre and Low post mitigation. Several regionally Red Listed bird species which are known to be susceptible to collision with overhead power lines occur in the study area, including Ludwig's Bustard, Blue Crane and Secretary Bird. The significance of this risk is slightly diminished by the	**Medium -**	**Low -**

Specialist	Phase/s	Issue	Description of Impact	Impact Rating Without Mitigation	Impact Rating With Mitigation
			placement of the proposed power line within a corridor of existing power lines (some of which are higher above the ground than the proposed line and will provide some shielding for birds in flight).		
		Electrocution of birds perched on power lines	The significance of bird electrocution on the proposed power lines will be of Low significance pre mitigation since the proposed pylon structures have phase-phase and phase-earth clearances greater than 1800mm so even vultures and large eagles can perch safely without bridging these critical clearances. It is recommended as a precautionary measure that the standard Eskom Bird Perch be fitted to all pole tops to further provide safe perching substrate well above dangerous hardware. It is also essential that if any of the pylon structures are changed we are given opportunity to assess the electrocution risk of the new structure and design mitigation.	**Low -**	**Low -**
Heritage	**Construction**	Destruction of archaeological resources	Archaeological resources may be damaged during the construction period when grubbing and/or excavations for foundations, roads and other infrastructure occurs. The impacts are direct and will occur during the construction phase only. Because of the limited cultural significance of the archaeological materials, the intensity is medium and the extent limited to the site.	**Medium -**	**Low -**

Specialist	Phase/s	Issue	Description of Impact	Impact Rating Without Mitigation	Impact Rating With Mitigation
	Construction Operation Decommissioning	Impacts to the cultural landscape	Impacts to the cultural landscape relate to the visual intrusion of the new electrical infrastructure into the rural cultural landscape. In this instance, however, it must be noted that a large amount of electrical infrastructure is already present in the landscape. This infrastructure includes many powerlines and two large substations, one of which lies close to the proposed development area. The impacts will occur for as long as the power line and substation remain present (i.e. long term). Because they will be visible from beyond the development area, the extent is rated as local. The position of the MTS alongside the R64 is notable in this instance because it will be very much in the public eye. During the construction and decommissioning phases the significance would be driven more by the amount of activity on site, while during operation it is driven mostly by the long-term during of the impact.	**Medium -**	**Medium -**
Palaeontology	**Construction Decommissioning**	Destruction of fossil heritage	The excavations and site clearance of the powerline will involve extensive excavations into the superficial sediment cover as well as into the underlying bedrock. These excavations will change the existing topography and may destroy and seal-in fossils at or below the ground surface. These fossils will then no longer be available for research.	**High -**	**Low -**

Specialist	Phase/s	Issue	Description of Impact	Impact Rating Without Mitigation	Impact Rating With Mitigation
			According to the Geology of the project site there is a Very High possibility of finding fossils during construction.		
Visual	**Construction**	Powerline affecting potential alteration of the visual character and sense of place and Potential visual impact on receptors in the study area	• Large construction vehicles, equipment and construction material stockpiles will alter the natural character of the study area and expose visual receptors to impacts associated with construction. • Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. • Dust emissions and dust plumes from increased traffic on gravel roads serving the construction site may evoke negative sentiments from surrounding viewers. • Surface disturbance during construction would expose bare soil resulting in visual scarring of the landscape and increasing the level of visual contrast with the surrounding environment. • Vegetation clearance required for the construction of the proposed substation is expected to increase dust emissions and alter the natural character of the surrounding area, thus creating a visual impact. • Temporary stockpiling of soil during construction may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.	**Low -**	**Low -**
	Operation		• Carefully plan to mimimise the construction period and avoid construction delays.	**High -**	**Medium -**

Specialist	Phase/s	Issue	Description of Impact	Impact Rating Without Mitigation	Impact Rating With Mitigation

			• Minimise vegetation clearing and rehabilitate cleared areas as soon as possible.
			• Maintain a neat construction site by removing rubble and waste materials regularly.
			• Position storage / stockpile areas in unobtrusive positions in the landscape, where possible.
			• Make use of existing gravel access roads where possible.
			• Limit the number of vehicles and trucks travelling to and from the construction site, where possible.
			• Unless there are water shortages, ensure that dust suppression techniques are implemented:
			  ○ on all access roads;
			  ○ in all areas where vegetation clearing has taken place;
			  ○ on all soil stockpiles.		

	Decommissioning		• Vehicles and equipment required for decommissioning will alter the natural character of the study area and expose visual receptors to visual impacts. • Decommissioning activities may be perceived as an unwelcome visual intrusion. • Dust emissions and dust plumes from increased traffic on the gravel roads serving the decommissioning site may evoke negative sentiments from surrounding viewers. • Surface disturbance during decommissioning would expose bare soil resulting in visual scarring of the	**Low -**	**Low -**

Specialist	Phase/s	Issue	Description of Impact	Impact Rating Without Mitigation	Impact Rating With Mitigation
			landscape and increasing the level of visual contrast with the surrounding environment. • Temporary stockpiling of soil during decommissioning may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.		

Based on the results of the impact assessment undertaken by the respective specialists, as summarised in the table below, the impacts associated with the proposed project can be kept to acceptable levels after the implementation of the appropriate mitigation measures. 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.

Environmental Impact Assessment Statement

In terms of Section 31 (n) of 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 DFFE to take a decision.

Furthermore, it is the opinion of the EAP that based on the findings of the BA, that the proposed development should be granted an EA and allowed to proceed, provided the following conditions are adhered to:

- All feasible and practical mitigation measures recommended by the various specialists must be incorporated into the Generic Environmental Management Programmes (EMPr) if it is not provided for, and implemented, where applicable;
- Where applicable, monitoring should be undertaken to evaluate the success of the mitigation measures recommended by the various specialists.
- The final layout must be submitted to the DFFE for approval prior to commencing with the activity.

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;
- The MTS, BESS and Associated Grid Infrastructure has been identified as environmentally acceptable and will not result in significant impacts, provided that the recommended mitigation measures are implemented and the placement of these sites avoids the identified sensitive and 'no-go' areas;
- A cumulative impact assessment of similar developments in the area was undertaken by the respective specialists. Based on their findings, the cumulative impacts associated with the proposed development can be kept low after the implementation of mitigation measures and no fatal flaws have been identified and thus the proposed development should proceed from a cumulative impact assessment perspective; and
- Through the implementation of mitigation measures, together with adequate compliance monitoring, auditing and enforcement thereof by the appointed Environmental Control Officer (ECO) as well as the competent authority, the potential detrimental impacts associated with the proposed development can be mitigated to acceptable levels.

SLR requests that Part C of the generic EMPrs are not authorised as the section will need to be updated once specialist walkthroughs have been undertaken and specific management plans are in place.

CONTENTS

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ACRONYMS AND ABBREVIATIONS

Acronym / Abbreviation	Definition
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
DBAR	- Draft Basic Assessment Report
DFFE	- Department of Forestry, Fisheries and Environment
DM	- District Municipality
DoE	- Department of Energy
DWS	- Department of Water and Sanitation
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
I&AP(s)	- Interested and/or Affected Party/Parties
IBA(s)	- Important Bird Area(s)
IDP	- Integrated Development Plan
IEP	- Integrated Energy Plan
IFC	- International Finance Corporation
IPP(s)	- Independent Power Producers
IRP	- Integrated Resource Plan

Acronym / Abbreviation	Definition
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
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
PV	- Photovoltaic
RDP	- Rural Development Plan
REDZ	- Renewable Energy Development Zone
REIPPP	-Renewable Energy Independent Power Producer Procurement Programme
RE	- Renewable Energy
SA	- South Africa
SACAA	- South African Civil Aviation Authority
SAHRA	- South African Heritage Resources Agency
SAHRIS	- South African Heritage Resources Information System

Acronym / Abbreviation	Definition
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
SWMP	- Storm Water Management Plan
VIA	- Visual Impact Assessment
VU	- Vulnerable
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 for the proposed construction and operation of the 132kV/400kV on-site Main Transmission Substation (MTS) and associated infrastructure located near Dealesville in the Tokologo Local Municipality, Lejweleputswa District in the Free State Province

1. INTRODUCTION

1.1 PROJECT BACKGROUND

South Africa Mainstream Renewable Power Developments (Pty) Ltd ('Mainstream') is proposing the development of (1) Main Transmission Substation (MTS) three (3) powerlines (namely 1 x 132kV powerline and 2 x 400kV powerlines), and one (1) Li-Ion Battery Energy Storage System (BESS), the associated electrical infrastructure, (the 'proposed development') that will connect to the authorised Solar Energy Facilities i.e. Kentani, Klipfontein, Klipfontein 2, Leliehoek, Sonoblomo, Braklaagte, Boschrand 2, Meeding, Irene and Braambosch, collectively known as the Kentani Cluster located near the town of Dealesville, Tokologo Local Municipality (Lejweleputswa District) in the Free State Province. The proposed development will also involve the re-routing of eight (8) 132kV powerlines within the grid connection corridor which has been authorised as part of the Kentani Cluster, making provision for this routing in the new proposed (Figure 1-1). The proposed development will also involve the re-routing of eight (8) 132kV powerlines within the grid connection corridor which has been authorised as part of the Kentani Cluster, making provision for this routing in the new proposed MTS.

It should be noted that on 28 October 2021, the Minister of Mineral Resources and Energy, Gwede Mantashe announced the Preferred Bidders of the Round 5 Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) (See Section2.2.7 for explanation on the REIPPPP) and six (6) of the aforementioned Solar Energy Facilities received Preferred Bidder status i.e.:

- Kentani Solar PV
- Klipfontein Solar PV
- Klipfontein 2 Solar PV
- Leliehoek Solar PV
- Sonoblomo Solar PV
- Braklaagte Solar PV

These Solar Energy Facilities have now become Strategic Infrastructure Projects 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 (IRP2010) and support bio-fuel production facilities.

- SIP 10 Expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development. 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 Kentani Cluster consists of eleven (11) solar PV projects and associated electrical infrastructure (including a powerline), each of which received their own Environmental Authorisation (EA) in 2016 from the then Department of Environmental Affairs (DEA) [now referred to as the Department of Forestry, Fisheries and the Environment (DFFE)]. The proposed MTS and associated infrastructure [i.e., eleven (11) powerlines] will service eleven (11) of Mainstream's solar PV projects authorised as part of the Kentani Cluster.

It should be noted that the proposed MTS and BESS will be located within the authorised Klipfontein PV facility (14/12/16/3/3/2/722), which is proposed on the Remaining Extent of the Farm Klipfontein No. 305 (SG Code: F00400000000030500000). Of the eleven (11) powerlines, eight (8) are 132kV powerlines which are located within the authorised corridor, and which have been included as part of the authorised solar PV developments. The remaining powerlines [i.e. two (2) 400kV and one (1) 132kV powerlines] fall outside of the authorised corridor and therefore will be assessed as part of the Basic Assessment (BA) process for the MTS and BESS (i.e., this application).

Considering the above, it is important to note that the location of the proposed MTS, BESS and the corridors being proposed for the powerlines have previously been assessed as part of the development footprint for the Kentani Cluster of solar PV developments, each of which received their own EA in 2016[2].

Moreover, the proposed MTS, BESS and powerlines are located within the Kimberly Renewable Energy Development Zone and Central Strategic Transmission Corridor, as defined and in terms of the procedures laid out in Government Notices 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, Mainstream has appointed SLR Consulting (South Africa) Pty Ltd as the Independent Environmental Assessment Practitioner (EAP) to undertake the required BA process for the proposed project.

[2] It should be noted that the validity period of the EA issued for the Klipfontein Solar PV Energy Facility in 2016 was extended by the Holder of the EA in April 2021 (14/12/16/3/3/2/722/AM1). The EA issued in 2016 is now valid until 06 June 2026 (i.e., EA lapses on 06 June 2026).

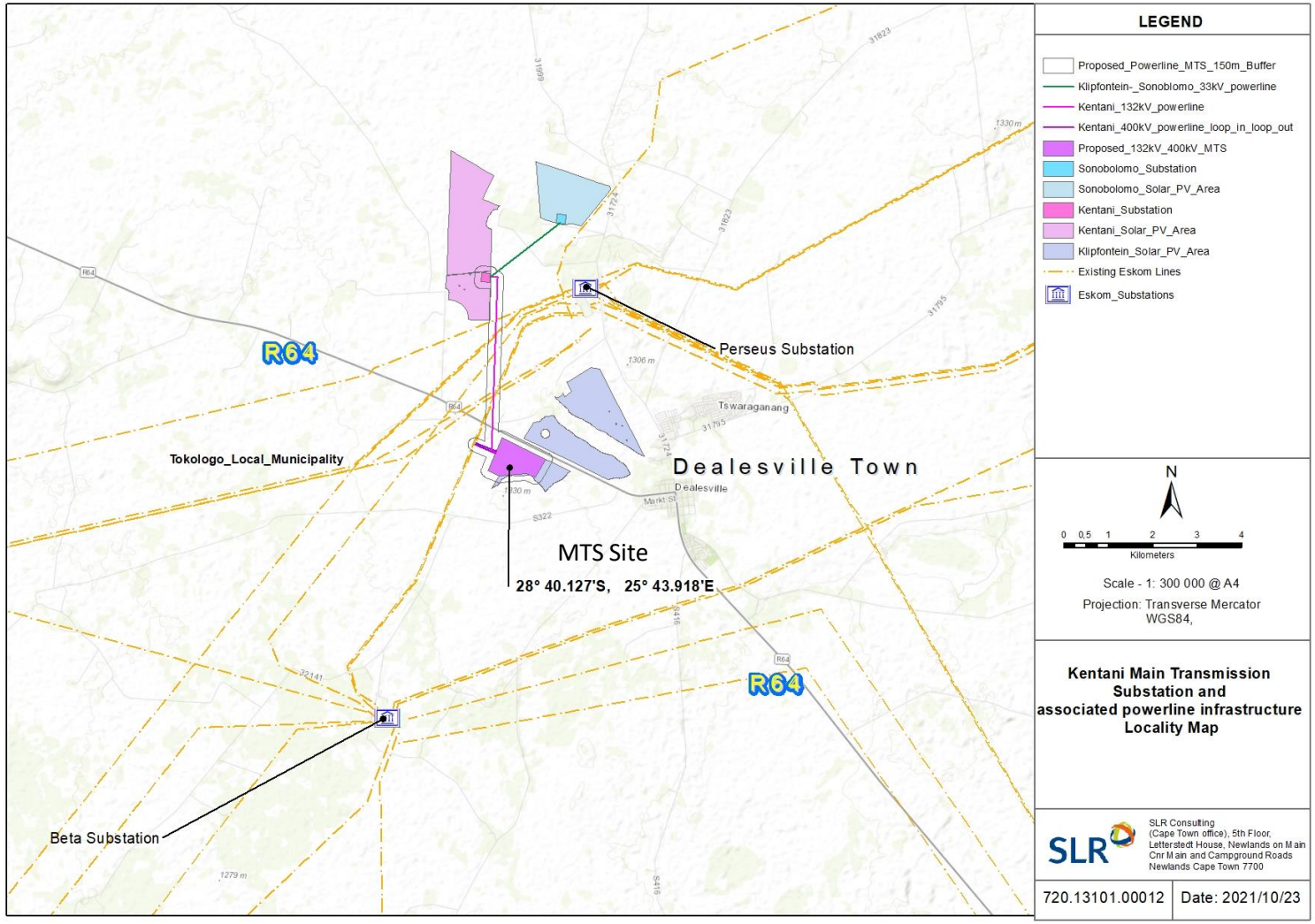

Figure 1-1: Locality Map for the Proposed Grid Connection Infrastructure

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 132kV/400kV MTS and associated infrastructure. The BA Report has been compiled in accordance with Appendix 1 ('Basic Assessment Report) of the 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 18 November 2021 to 10 January 2022 in order to provide Interested and 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/). The report can also be downloaded without any data charges using internet-capable mobile phones from the corresponding data free website (https://slrpublicdocs.datafree.co/public-documents). A copy of the report and appendices have also been placed at the following location:

Name of Location	Contact Details	Address
Dealesville Primary School	051 811 0026	1 Brand Street, Dealesville

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 (BAR), comments should reach SLR no later than 10 January 2022.

SLR Consulting (South Africa) (Pty) Ltd

Attention: Liandra Scott-Shaw

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

Tel: (011) 467 0945

E-mail: lscottshaw@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;
- It is assumed that the grid connection corridor identified for the construction and operation of the grid connection infrastructure by Mainstream 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 process for EA would need to be undertaken and submitted to the relevant competent authority.

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
Chapter 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.
Chapter 2	***Applicable Legislation, Policies and/or Guidelines*** Outlines the key legislative requirements applicable to the proposed project.
Chapter 3	***BA Process Approach and 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.
Chapter 4	***Project Details*** Provides general project information and presents a description of the proposed project. Provides an overview of the need and desirability for the proposed project.
Chapter 5	***Public Participation*** Describes the Public Participation Process and Public Participation undertaken to date
Chapter 6	***Alternatives*** Provides an overview of the alternatives considered for the proposed project.
Chapter 7	***Description of the affected environment*** Describes the existing biophysical and social environment that could potentially be affected by the proposed project.
Chapter 8	***Impact Assessment*** Describes key issues and impacts associated with the proposed project.
Chapter 9	***Conclusion and Recommendations*** *Compares the environmental impacts and risks of the project alternatives.*
Chapter 10	***References*** *Provides a list of the references used in compiling this report.*
Appendices	Appendix 1: Curricula Vitae of the Project Team Appendix 2: EAP and Specialists Declaration & Undertaking Appendix 3: Authority Consultation Appendix 4: Maps Appendix 5 Specialist Studies

Section	Contents
	Appendix 6: Public Participation Appendix 7: Environmental Management Programme(s) Appendix 8: Additional Information Appendix 9: Battery Energy Storage System Risk Matrix

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 107 of 1998 (As Amended) (NEMA)

NEMA, as amended, establishes principles, and provides a regulatory framework for decision-making on matters affecting the environment. Section 2 of NEMA sets out a range of environmental principles that are to be applied by all organs of state 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 equitably. 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 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

The EIA Regulations 2014 (as amended) promulgated in terms of Chapter 5 of 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 Environmental Authorisation (EA) has been obtained from the Competent Authority. Such an EA, which may be granted subject to 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, 2 and 3 (see Table 2-1), it is necessary that a full SEIA process is undertaken for the Department of Forestry, Fisheries, and the Environment (DFFE) to consider the application in terms of NEMA. However, taking into consideration the fact that the proposed MTS and its associated infrastructure is located within the Kimberly Renewable Energy Development Zone (REDZ),

a BA process for the application for EA must be undertaken as per GN R114 of 2018 which comprises a shortened timeframe of 57 days for decision-making.]

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)	*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.*	*The proposed 132 kilovolt powerline will connect the proposed MTS to the authorised Kentani Solar PV on-site substation (14/12/16/3/3/2/724) and will be approximately 4km in length.* *The two (2) proposed 400 kV powerlines that will loop-in and loop-out of the proposed MTS and will be approximately 2km in length.* *The remaining eight (8) 132 kV from the authorised Solar PV Developments will also reroute within the authorised corridor to connect to the proposed MTS.*
12(ii)(a)(c)	*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.*	*The proposed projects will require the placement of linear infrastructure, i.e., access roads and overhead power lines with a combined physical footprint of more than 100 m^2.* *As the site consists of a number drainage lines and watercourses, one or more roads and/or powerlines will cross these watercourses or drainage lines or be within 32 m thereof.*
19	*The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles, or rock of more than 10 cubic metres from a watercourse.*	*The proposed projects will involve the construction of internal roads, upgrades to existing roads and laying of underground cables within the project area, which will require the removal infilling of soil from a watercourse in excess of 10 m^3.*
24(ii)	*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 8 m.*	*The project will involve the construction of access roads up to 8m wide, that can accommodate large vehicles transporting transformers and other electrical equipment to the proposed MTS site.*
27	*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—*	*The proposed construction of the proposed MTS and BESS will require the clearance of an area of 1 hectare (ha) or more, but less than 20ha, of indigenous vegetation.*

No.	Activity description	Description of activity in relation to the proposed project
	(i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	
28(ii)	*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 outside an urban area, where the total land to be developed is bigger than 1 hectare.*	*The MTS, BESS and associated powerline infrastructure are situated on land currently used for agriculture and the footprint of the substation and BESS is larger than 1 hectare. The footprint of the substation site will be 64 hectares, while the BESS will be 4 hectares*
56(i)(ii)	*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.*	*Existing roads will be upgraded/ widened to up to 8mand lengthened by more than 1km if required and where possible.*
GN R984 (Listing Notice 2)		
4	*The development and related operation of facilities or infrastructure, for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of more than 500 cubic metres.*	*The proposed MTS requires transformer oil to insulate, suppress corona discharge and arcing, and to serve as a coolant. Storage facilities require a capacity of > 500 m³.*
9	*The development of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex.*	*The proposed loop-in-loop-out power lines will have a capacity of 400 kilovolts. The power lines are approximately 800m in length.*
15	*The clearance of an area of 20 hectares or more of indigenous vegetation*	*The footprint of the proposed MTS is 64 hectares, while the BESS will be 4 hectares*
GN R985 (Listing Notice 3)		
4 (b) (i) (ee)	*The development of a road wider than 4 metres with a reserve less than 13,5 metres in the (b) Free State outside urban areas (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans*	*A temporary road corridor up to 8 m will be impacted during the construction phase. This will be rehabilitated after the completion of construction activities to allow for a permanent 4-6 m wide road surface with side drains on one or both sides where necessary.* *Most of the site constitutes indigenous vegetation.*

No.	Activity description	Description of activity in relation to the proposed project
12 (b) (ii) (iv)	*The clearance of an area of 300 square metres or more of indigenous vegetation in the (b) the Free State (ii) Within critical biodiversity areas identified in bioregional plans; (iv) Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland.*	*The development of substation, BESS and powerline infrastructure will require the clearance of more than 300 m² of indigenous vegetation.*
14 (b) (i) (ff)	*The development of infrastructure or structures with (ii) infrastructure or structures with a physical footprint of 10 square metres or more in the (b) Free State where such development occurs in a (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans*	*The development of the substation, powerline and BESS infrastructure and Internal roads with a physical footprint in excess of 10 m² will be required within and adjacent to watercourses and will traverse CBAs in places.*
18(b)(ee)(hh)	*The widening of a road by more than 4 metres and the lengthening of a road by more than 1 kilometre in the (b) Free State (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans, (hh) Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland.*	*Existing roads may require widening of up to 6 m (up to 15 m during construction) and/or lengthening by more than 1 km, to accommodate the movement of vehicles, in areas containing indigenous vegetation.*

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

The Minister may by notice in the Gazette publish a list of waste management activities 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 unlit 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 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 NEM:WA will need to be considered in this regard.

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

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 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 are triggered by the grid infrastructure establishment at of the proposed project, therefore, no air emissions license 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 1998

Chapter 4 of the National Water Act No 36 of 1998 (as amended), requires proponents to proposed developments to submit applications to the competent authority (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 by 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. An application for a Water Use License (WUL) or General Authorisation (GA) has been lodged with the Department of Water and Sanitation (Reference Number: 27/2/2/C852/15/3).

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	*Impeding or diverting the flow of water in a watercourse*	The proposed MTS and associated grid connection corridors assessed in this BAR fall within the Zone of Regulation (i.e., 500 m radius) of a wetland. As a result, is it possible that the construction and operation of the MTS and grid connection infrastructure may potentially lead to an impediment or alteration of beds, banks, course of the freshwater resources present within the study area. Mainstream as the proponent will be required to submit an application for a Water Use License (WUL) or General Authorisation (GA) Registration to the Regional Head of the Department Water and Sanitation (DWS) in the Free State Province prior to the construction phase of the proposed project.
i	*Altering the bed, banks, course, or characteristics of a watercourse*	

2.1.6 National Heritage Resources Act 1998

The National Heritage Resources Act, 1999 (No. 25 of 1999) (NHRA) provides for the identification, assessment, and management of the heritage resources of South Africa. 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:

"(a) The construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
(c) Any development or other activity which will change the character of a site;
(i) exceeding 5 000 m² in extent".

The NHRA 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 Heritage Impact Assessment (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 (No. 73 of 1989) (now replaced by 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.

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 provides a summary of other applicable legislation.

Table 2-3: Additional applicable legislation

Applicable legislation	Relevance
National Environmental Management: Biodiversity Act, 2004 (No. 10 of 2004)	The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA), as amended, aims to provide for the management and conservation of South Africa's biodiversity within the framework of 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: The management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act, 1998; 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.

Applicable legislation	Relevance
	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. A permit will be required to engage in restricted activities for the proposed project in accordance with Section 88 of the Act. DESTEA will be the Competent Authority for the application.
Conservation of Agricultural Resources Act, 1983 (No. 43 of 1983)	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 and 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. 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.
Subdivision of Agricultural Land Act, 1970 (Act No. 70 of 1970), as amended	The Subdivision of Agricultural Land Act, 1970 (Act No. 70 of 1970), as amended provides for the subdivision of all agricultural land within the Republic thereby prohibiting certain activities from being undertaken without consent from relevant authority, 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 10 years is regulated by the Act.

Applicable legislation	Relevance
National Forests Act, 1998 (No. 84 of 1998)	The National Forest Act (NFA) empowers the Minister of 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 grid connection corridor is required in order to ascertain the presence and distribution of NFA-listed tree species. No NFA-listed trees have been confirmed within the grid connection corridor by the Terrestrial Biodiversity Specialist (refer to Appendix 8.1).
National Veld and Forest Fire Act, 1998 (No. 10 of 1998)	The National Veld and Forest Fire Act (NVFA) in Chapter 4 requires landowners to prepare and maintain firebreaks, as well as the role of adjoining landowners and the fire protection association in an area. 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. 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 for the duration of the project life cycle of the proposed project is made available.
Occupational Health and Safety Act, 1993 (No. 85 of 1993) and Major Hazard Installation Regulations	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. The construction and operation of the proposed project will include activities that are deemed as hazards and/risk 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.

Applicable legislation	Relevance
Hazardous Substances Act, 1973 (Act No. 15 of 1973)	The Hazardous Substances Act, 1973 (Act No. 15 of 1973) (HAS) 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. The Act provides for the division hazardous substances or products into four 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. 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. 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.
Municipal Systems Act, 2000 (Act No. 32 of 2000)	The Municipal Systems Act, 2000 (Act N. 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. 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.

Applicable legislation	Relevance
The Spatial Planning and Land Use Management Act, 2013 (No. 6 of 2013) (SPLUMA)	The Spatial Planning and Land Use Management Act, 2013 (Act No. 6 of 2013) 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. The current zoning of the project site is agriculture; thus, a rezoning application would be required to change the zoning of the site from agriculture to special purpose for the placement of the grid connection infrastructure, i.e., Transmission Lines and Main Transmission substation, etc.
Civil Aviation Act, 2009 (Act No. 13 of 2009)	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). 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 development 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. The SACAA will be provided with the BAR of the proposed project for their comment during the 30-day review and comment period.
National Traffic Act, 1996 (No. 93 of 1996)	The Act and the National Traffic Regulations, 2000 provide certain limitations on vehicle dimensions and 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.

Applicable legislation	Relevance
	A permit application in terms of Section 81 of the Act will be required for the transportation of key infrastructure components (i.e., transformers, pylons, etc.) and machinery (i.e., tractor-loader backhoes, etc.) to the project site during the construction phase of the proposed project.
Free State Nature Conservation Ordinance Act, 1969 (Act No. 8 of 1969)	Chapter 4 and Section 30 of the Act prohibits any persons from removing indigenous species listed in Schedule 6 of the Act without a valid permit from the relevant authority. This Act finds relevance to the proposed project on the basis that protected plant species in terms of the Act may be present within the grid connection corridors and floral permits will be required from the relevant authority prior to the commencement of the construction phase for the removal of identified protected plant species. Mainstream will be required to obtain permits from the relevant authority for the removal of protected indigenous plant species in terms of the Act following the completion of the final site walkdown survey of the grid connection corridor and prior to the commencement of the construction phase.

2.2 KEY INTERNATIONAL, NATIONAL, REGIONAL AND LOCAL 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 (CO_2); Methane (CH_4); Nitrous Oxide (N_2O); Hydrofluorocarbons (HFCs); Perfluorinated Compounds (PFCs) and Sulfur Hexafluoride (SF_6). 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 periodically[3]. South Africa is the world's 14th largest emitter of greenhouse gases and accounts for the highest emissions of CO_2 in Africa[4]. 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 CO_2 annually, with 279.9 million tonnes of this as a result of electricity generation[5].

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).

Taking the above into consideration, the integration of the approved Kentani Cluster[6] projects into the grid will contribute at least 275 MW_{ac} of electricity from renewable energy (namely solar 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 CO_2 into the atmosphere. From this perspective, taking the information above into consideration, the proposed MTS will support the development of the Kentani Cluster Projects, 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 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.

[3] What is the Kyoto Protocol? | UNFCCC. Accessed on 7 April 2021

[4] The Carbon Brief Profile: South Africa | Carbon Brief. Accessed on 7 April 2021

[5] https://ourworldindata.org/co2/country/south-africa. Accessed on 7 April 2021

[6] The Kentani Cluster consists of eleven (11) solar PV projects and associated electrical infrastructure (including a powerline), each of which received their own Environmental Authorisation (EA) in 2016

By prioritising the procurement of electricity from renewable energy technologies through the Integrated Resources Plan (IRP) and the REIPPPP, government has begun acting on the obligations of the Paris Agreement. Authorising the development of the MTS, will allow the integration of the approved Kentani Cluster projects into the grid will contribute at least 275 MW_{ac} of electricity from renewable energy (namely solar energy), will thus aid the South African government in reaching its target to peak with greenhouse gas emissions by 2025. From this perspective, the proposed project aligns with the Paris Agreement, as well as any subsequent updates thereto.

The legislation/policies presented in the sections below take into consideration, the integration of the approved renewable energy (namely solar energy) projects which require the proposed MTS 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 CO_2 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 Energy White Paper, 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 still 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 2010.

2.2.5 Integrated Energy Plan, 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 (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 at 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.

2.2.6 Integrated Resources Plan, 2019

The IRP, published in 2010 and promulgated in March 2011 and is a subset of the IEP is an electricity capacity plan which aims to provide an indication of the country's electricity demand, how this demand will be supplied and what it will cost. The recent IRP 2019 supports a diverse energy mix and presents policy interventions to ensure energy security for South Africa's electricity supply. Following the promulgation of the IRP 2010, a total of 18 000 MW of new generation capacity has been committed which comprises 9 564 MW of coal power from the Medupi and Kusile power stations, and 1 332 MW from the Ingula Pump Storage Project, 6 422 MW from renewable energy facilities and Independent Power Producers (IPPs), 1 055 MW from Open Cycle Gas Turbine Peaking Plants that will use diesel[7]. Through the IRP 2019, government recognises that coal will continue to play a significant role in electricity generation given the abundance of coal reserves.

2.2.7 Renewable Energy Independent Power Producer Procurement Programme

The Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) is a competitive tender process that was launched to facilitate private sector investment into grid-connected renewable energy generation. 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 Independent Power Producers. Technologies such as solar photovoltaic amongst others are currently considered under the programme as IRP 2019 has made an allocation for the procurement of up to 6 000 MW from solar PV facilities.
The programme evaluates projects through various criterion which include job creation, local content, enterprise development and socio-economic development. It should be noted that on 28 October 2021, the

[7] https://www.miningreview.com/energy/what-you-need-to-know-south-africas-integrated-resource-plan-2019/. Accessed on 7 April 2021.

Minister of Mineral Resources and Energy, Gwede Mantashe announced the Preferred Bidders of the Round 5 REIPPPP and six (6) Solar Energy Facilities received Preferred Bidder status i.e.:

- Kentani Solar PV
- Klipfontein Solar PV
- Klipfontein 2 Solar PV
- Leliehoek Solar PV
- Sonoblomo Solar PV
- Braklaagte Solar PV

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). The Kentani Cluster Project will provide employment opportunities[8] for the duration of the construction and operation phase of the project to local communities within the vicinity of the study area.

(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.

[8] This will be subject to all four solar PV facilities and grid connection infrastructure being granted environmental authorisations by the DFFE and awarded preferred bidder status under the REIPPPP.

2.2.8 Renewable Energy Development Zones and Strategic Transmission Corridors

In 2015, the DFFE (then known as the DEA), through the Council for Scientific and Industrial Research (CSIR), embarked on a programme of Strategic Environmental Assessments (SEAs) for large-scale developments to support Strategic Integrated Projects (SIPs). The intention of the SEAs was to pre-assess environmental sensitivities within development areas at a regional scale in order to simplify site-specific EIAs when they are undertaken and to focus the assessment on addressing the specific sensitivities of the site. The outcome of the programme led to the identification of eight (8) Renewable Energy Development Zones (REDZ) meant for the development of large-scale wind and solar renewable energy facilities in terms of SIP 8: Green Energy in Support of the South African Economy, as well as the associated Strategic Transmission Corridors meant for the development of grid connection infrastructure (power lines and substation) in terms of SIP 10: Electricity Transmission and Distribution. Following the undertaking of further SEAs by the CSIR, the DFFE (through GN R144 which was published on 26 February 2021) identified three (3) additional REDZs for the development of large-scale wind and solar renewable energy facilities. These three (3) additional REDZs are within the Mpumalanga, North West, and Western Cape Provinces. The additional REDZs which have been identified and formally gazetted include the Emalahleni REDZ (REDZ 9), Klerksdorp REDZ (REDZ 10) and Beaufort West REDZ (REDZ 11). Furthermore, in 2021 the DFFE issued GN R383 (published on 29 April 2021) which identifies two (2) additional Strategic Transmission Corridors within the Northern Cape and KwaZulu-Natal Provinces for the development of large-scale grid connection infrastructure. The identified Strategic Transmission Corridors include the Expanded Western Corridor and Expanded Eastern Corridor.

Should a proposed renewable energy project (such as this project) fall within one (1) of the eleven (11) REDZs which have formally been gazetted in South Africa, a BA process can be followed instead of a full Scoping and EIA process. In addition, a reduced decision-making timeframe (namely 57 days, as opposed to 107 days) for processing of applications for EA by the competent authority (namely the DFFE) will be applicable. With regards to the Strategic Transmission Corridors, a BA process and reduced decision-making timeframe will also be applicable should the entire extent of the grid connection infrastructure (power lines and /or substations) being proposed be located within one (1) of the Strategic Transmission Corridors which have formally been gazetted in South Africa.

The proposed MTS and powerlines are located within the Kimberly Renewable Energy Development Zone (REDZ) and Central Strategic Transmission Corridor, as defined and in terms of the procedures laid out in Government Notices No. 113 and No. 145 which were formally gazetted on 16 February 2018 and 26 February 2021, respectively.

The Strategic Environmental Assessment (ESA) for Electricity Grid Infrastructure (EGI) in South Africa has identified five (5) Strategic Transmission Corridors, which are considered integral in the support of large-scale electricity transmission and distribution infrastructure. The proposed MTS and associated infrastructure fall within the Central Strategic Transmission Corridor (Figure 2-1)

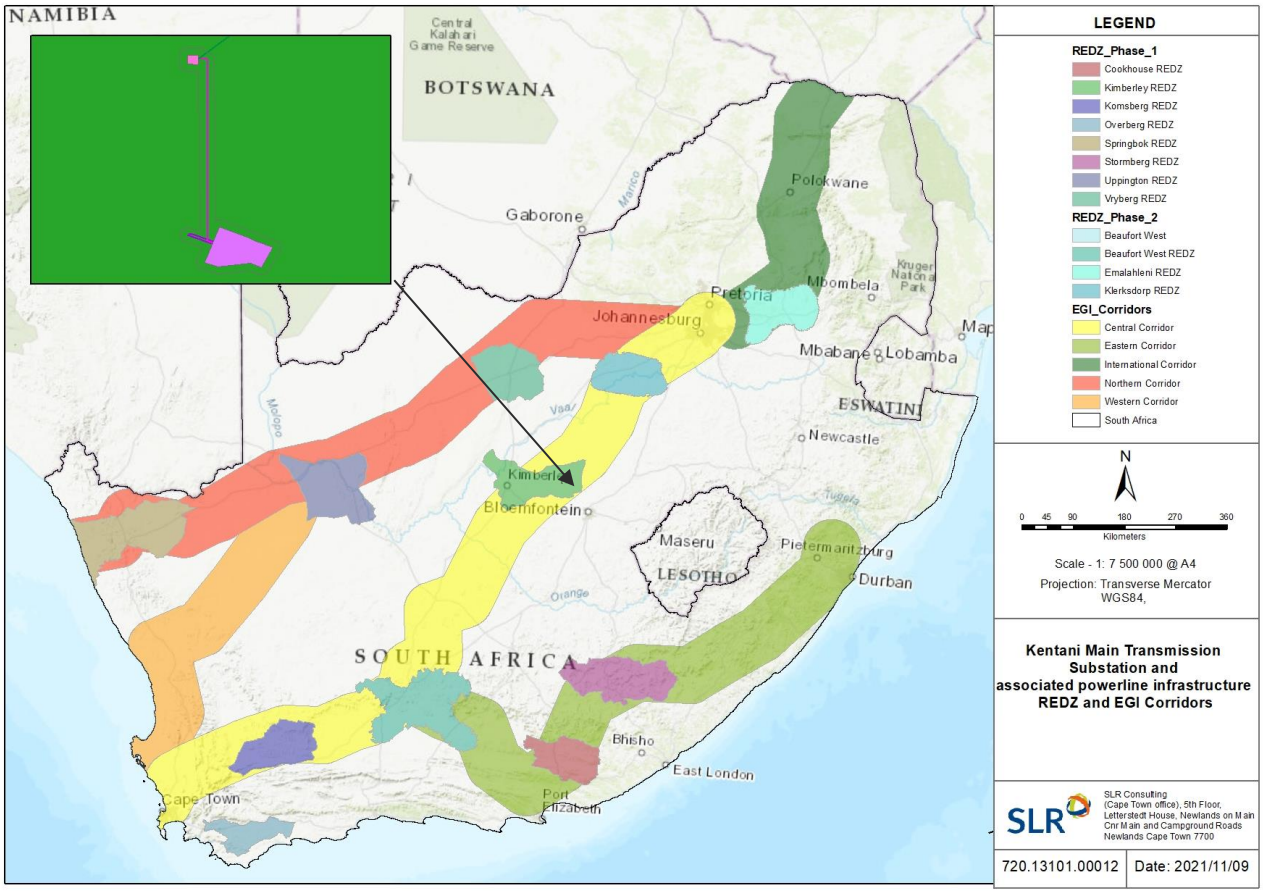

Figure 2-1: REDZ and EGI Corridors

Under the draft National Infrastructure Plan 2050 (GN R 711)[9], 18 Strategic Integrated Projects (SIPs) have been developed to promote fast-tracked development and growth of social and economic infrastructure across the country.

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 (IRP2010) and support bio-fuel production facilities.
- SIP 10 Expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development. 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

Since six (6) of the solar projects within the Kentani Cluster has obtained Preferred Bidder status, the proposed development will indirectly contribute to SIP 8 and SIP 10. as well as future REIPPPP bidding rounds for the remainder of the projects within the Kentani Cluster. The development of the MTS and associated infrastructure is desirable for the following reason:

9

- The proposed MTS and associated infrastructure will assist in the evacuation of additional energy generated by the authorised Kentani Cluster solar projects which include BESS; AND
- This is turn will supply power into the national Eskom grid making it more reliable.

If the MTS is not constructed the authorised Kentani Cluster projects may be limited in their ability to evacuate electricity into the Eskom National Grid.

2.2.9 Transmission Development Plan 2021 - 2030

According to the Transmission Development Plan 2021 - 2030, the Free State is South Africa's most centrally located province. It has borders with most other provinces and has Lesotho as its eastern neighbour. For decades, mining and agriculture made up the economic foundations of the province, however, the mining sector's productivity has been steadily declining. This has negatively impacted the economy and with it, employment numbers.

Important road and rail links traverse the province, including two of the busiest national highways, the N1 (Cape Town-Johannesburg) and the N3 (Durban-Johannesburg). There are plans to leverage this advantage by creating development corridors, the promotion of manufacturing, warehousing, and storage opportunities. The Harrismith Logistics Hub (HLH) on the N3 is at the centre of these plans. The Free State Development Corporation (FDC) is searching for investors in areas such as Harrismith and Botshabelo. The province has a number of development plans including several public infrastructure delivery projects. These programmes will not only improve services but will also benefit local suppliers and boost the construction sector. The current transmission network is shown in the figure below. The 765 kV network is primarily used to transmit power through the province to the Cape.

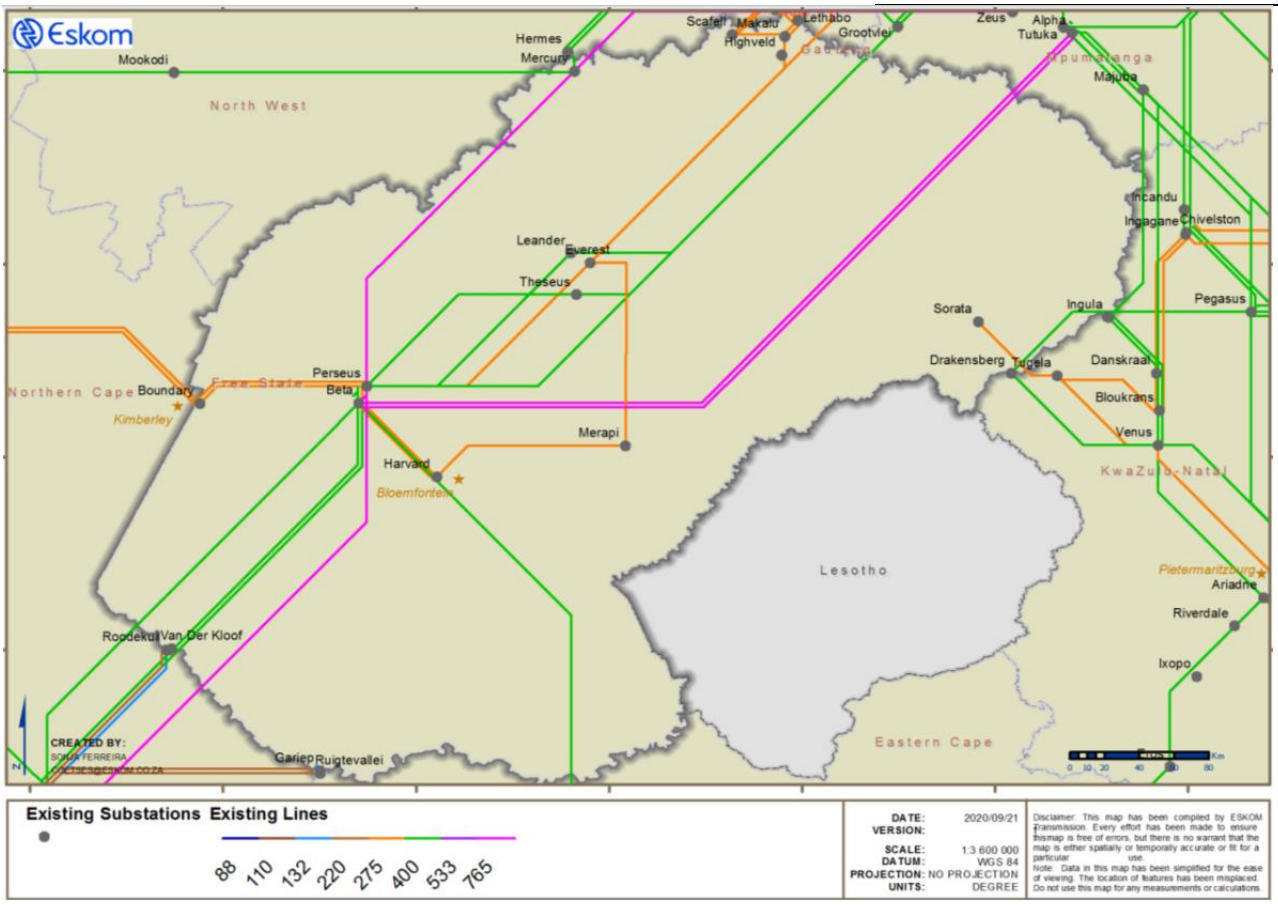

Figure 2-2: Current Free State transmission network (Transmission Development Plan 2021 – 2030)

Generation

The power supply into the Free State is predominantly sourced from Lethabo Power Station and Mpumalanga via 400 kV and 275 kV transmission lines. Lethabo Power Station is a coal-fired power station located in the Vaal Triangle area of the Free State. It has a generating capacity of 3 558 MW. IPPs have shown interest in solar generation in the province, especially in its western parts. Approximately 203 MW of IPPs (PV and small hydroelectric plants) have been integrated into the grid since the inception of the REIPPPP. The current composition of the RE in the Free State is 199 MW PV plants and 4.4 MW hydroelectric plants.

Load Forecast

The Free State's economic mix is predominantly comprised of mining, commercial customers, and residential customers. The provincial load peaked at around 1 499 MW in 2019, and it is forecasted to grow steadily at approximately 1.7% annually, from 1 650 MW in 2021 to 1 918 MW by 2030. The Free State comprises three customer load networks (CLN), namely Sasolburg, Bloemfontein, and Welkom. The Welkom CLN consumed approximately 41.3% of the load. Sasolburg and Bloemfontein CLNs make up the remaining 58.7% of the demand in the province.

Planned Projects

The major projects for the Free State mainly involve overlaying the existing 275 kV networks with 400 kV networks to increase the power transfers into the respective load centres. Most notably are the projects planned for future Independent Power Producers, which includes the 500 MVA 400/132 kV substation required near Dealesville (this proposed project?) which will be to enable the connection of the IPPs located in the province within the current TDP period based on the generation assumptions.

2.2.10 Free State Provincial Growth and Development Strategy, 2005 – 2014

The objectives of the Free State Provincial Growth and Development Strategy include the following:

- Stimulate economic development;
- Develop and enhance the infrastructure for economic growth and social development;
- Poverty alleviation through human and social development;
- Ensure a safe and secure environment for all the people of the province; and
- Promote effective and efficient governance and administration.

The proposed project is aligned to the objectives of the Free State Provincial Growth and Development Strategy, as the implementation of the project will stimulate the local economy within the towns Boshof and Dealesville. Stimulation of the local economy will be as a result of the creation of employment and business opportunities for residents within the vicinity of the project area. The project will require numerous support services which can be rendered by Small Medium and Micro Enterprises (SMMEs) within the surrounding area during the construction and operation phase. Support services that will be required and can be provided by the SMMEs within the project area include, waste and sewage removal, security services, transportation of staff and the supply of construction material (i.e., sand and cement).

2.2.11 Lejweleputswa District Municipality Integrated Development Plan, 2021 - 2022

The Lejweleputswa District Municipality IDP states, “Economic development opportunities are the key determinant of the settlement pattern and also the distribution pattern of industrial areas in the district. Economic development typically responds to the availability of environmental capital (e.g. water, suitable agricultural soil, mining resources, etc.) and infrastructural capital (e.g. roads, electricity, bulk engineering services, etc.)”. The IDP has identified two specialisation hubs within the district municipality, these include the Jewellery Hub as well as the Solar Energy Hub.

2.2.12 Tokologo Local Municipality Integrated Development Plan, 2020 – 2021

The Tokologo Local Municipality IDP, 2020 – 2021 indicates that the municipality has a 27.5 % unemployment rate, which is equivalent to 18 277 residents. The IDP further indicates that approximately 561 households within the municipal area do not have access to electricity. The proposed project will integrate power generated from the solar facilities into the grid, this will add much needed capacity to the grid and positively contribute towards the electrification of households without electricity within the municipal area. The employment opportunities associated with the proposed project will contribute towards the stimulation of the local economy through the creation of employment and business opportunities for unemployment residents within the municipal area. Taking into consideration the need for electricity within the municipality and the high unemployment rate, the implementation of the project will enable the municipality in realising some of

its key objectives as outlined in the IDP. As a result, the proposed project is considered to be in alignment with the IDP of the Tokologo Local Municipality.

3. BA PROCESS APPROACH

3.1 DETAILS OF THE APPLICANT

The applicant for the project is the South Africa Mainstream Renewable Power Developments (Pty) Ltd. Details are provided in Table 3-1 below.

Table 3-1: Details of the Applicant

Component	Description
Company Name:	South Africa Mainstream Renewable Power Developments (Pty) Ltd
Address:	4th Floor Mariendahl House Newlands on Main Corners Main & Campground Roads Claremont 7800
Responsible person:	Eugene Marais
Tel:	021 657 4045
Fax:	073 871 5781
E-mail:	eugene.marais@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. 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 2014, as amended (see Appendix 2).

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 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.

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	SACNASP (*Pri.Sci. Nat*) SAWEA	7	Management of the EIA process, including process review, specialist study review, management of the public participation process and report compilation

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, a number of specialists have been appointed for the proposed project 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	David Hoare Consulting (Pty) Ltd	David Hoare
Aquatic Ecology	Envirosci (Pty) Ltd	Brian Colloty
Avifauna	Wild Skies Consulting (Pty) Ltd	Jon Smallie
Soils, Agriculture and Land Potential	Johann Lanz	Johann Lanz
Heritage	Asha Consulting (Pty) Ltd	Jayson Orton
Palaeontology	Banzai Environmental (Pty) Ltd	Elize Butler
Visual	SiVEST SA (Pty) Ltd	Kerry Schwartz

3.5 BA PROCESS

The proposed MTS and powerlines are located within the Kimberly Renewable Energy Development Zone and Central Strategic Transmission Corridor, as defined and in terms of the procedures laid out in Government

Notices No. 113 and No. 145 which were formally gazetted on 16 February 2018 and 26 February 2021 respectively.

3.5.1 Objectives

In accordance with Appendix 1 to 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 that an informed, transparent, and accountable decision-making process can be made 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 with DFFE on 20 October 2021[10]. The form provided DFFE with an overview and the legislative requirements and approach to BA process of the proposed project.

SLR indicated that a meeting would not be required and DFFE agreed (please see Appendix 3 for correspondence).

3.5.3 Application for Environmental Authorisation

An 'Application Form for Environmental Authorisation' was submitted to DFFE on **18 November 2021** at the same time as making this draft version of the BAR available for review and comment. PP activities completed to date in support of the application for Environmental Authorisation for the proposed project are outlined below:

[10] Reference number: 2021-10-0017

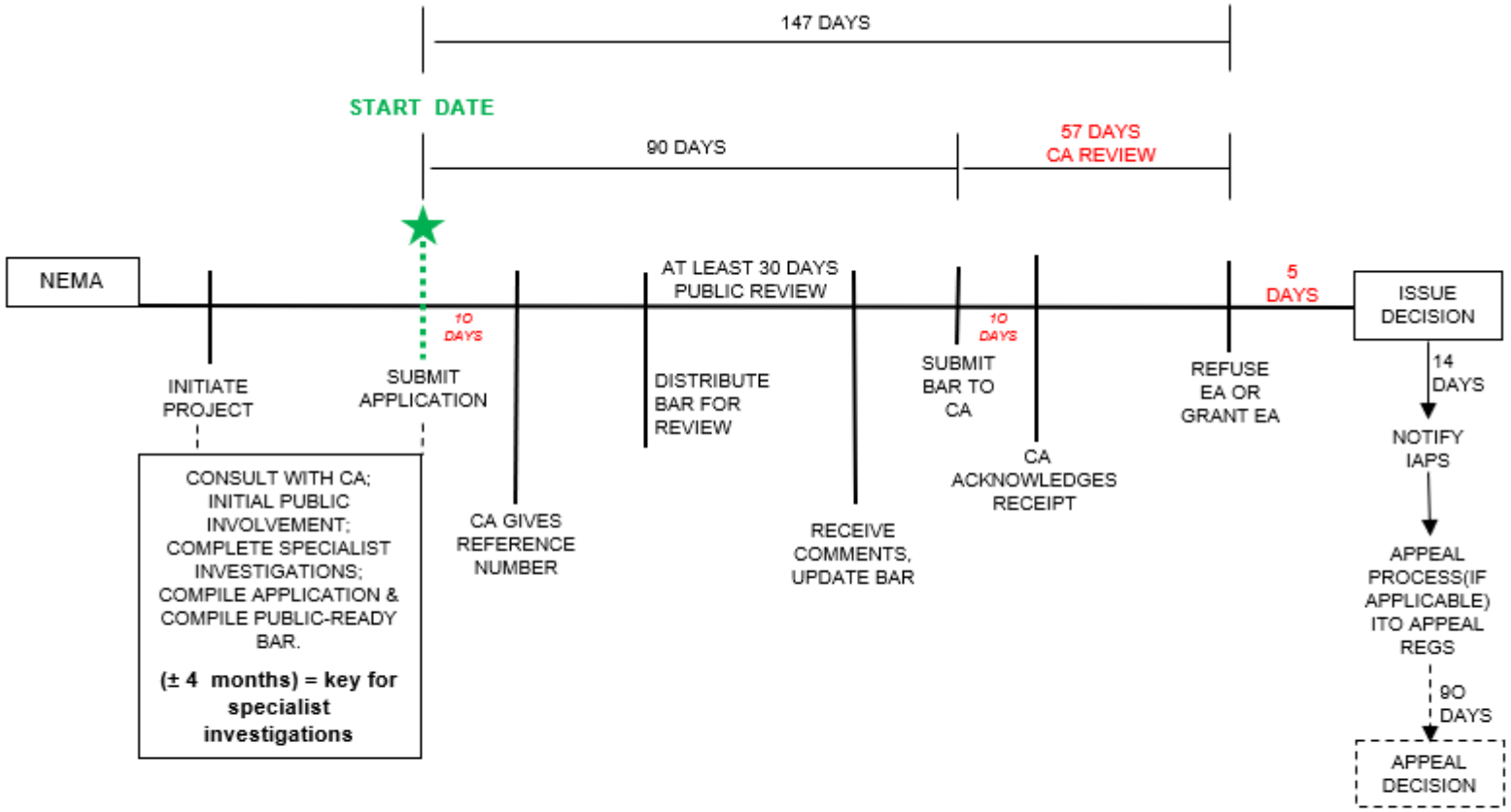

Figure 3-1: Generic REDZ Basic Assessment Process

3.5.4 Compilation of the BAR

This BAR has been prepared in compliance with Appendix 1 of the EIA Regulations 2014 (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, 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	Location in report
2(a)	*(i & ii) Details and expertise of the Environmental Assessment Practitioner (EAP) who prepared the report, including a CV.*	**Section 3.3**
(b)	*The location of the activity, including:*	**Section4.5 And Appendix 8**
	(i) (i) the 21-digit Surveyor General code of each cadastral land parcel; or	
	(ii) (ii) where available, the physical address and farm name	
	(iii) (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	
(c)	*A plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is:*	
	(i) a linear activity, a description, and coordinates of the corridor in which the proposed activity or activities is to be undertaken;	
(d)	*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;*	**Sections 1, 2, 3 and 4**
	(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	
	(ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools or frameworks, and instruments;	
(e)	*A description of the policy and legislative context within which the development is proposed including -*	**Section 2**
	(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;	
	(ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools or frameworks, and instruments;	
(f)	*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;*	**Section 4**
(g)	*A motivation for the preferred site, activity, and technology alternative;*	**Section 6**

Appendix 1	Content of Basic Assessment Report	Location in report
(h)	*A full description of the process followed to reach the proposed preferred activity, site, and location within the site, including:*	**Sections 5, 6, 7,8 and 9**
	(i) details of all the alternatives considered;	
	(ii) details of the public participation process undertaken in terms of Regulation 41 of the Regulations, including copies of the supporting documents and inputs;	
	(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;	
	(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	
	(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 *(aa) can be reversed;* *(bb) may cause irreplaceable loss of resources; and* *(cc) can be avoided, managed, or mitigated.*	
	(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;	
	(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;	
	(viii) the possible mitigation measures that could be applied and level of residual risk;	
	(ix) the outcome of the site selection matrix;	
	(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and	
	(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity.	
(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 -*	**Sections 3, 7 and 8**
	(i) a description of all the environmental issues and risks that were identified during the environmental impact assessment process; and	
	(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;	
(j)	*An assessment of each identified potentially significant impact and risk, including -*	**Section 8.2**
	(i) cumulative impacts;	

Appendix 1	Content of Basic Assessment Report	Location in report
	(ii) the nature, significance and consequences of the impact and risk;	
	(iii) the extent and duration of the impact and risk;	
	(iv) the probability of the impact and risk;	
	(v) the degree to which the impact and risk can be reversed;	
	(vi) the degree to which the impact and risk can be avoided, managed, or mitigated;	
	(vii) the degree to which the impact and risk can be avoided, managed, or mitigated;	
(k)	*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;*	**Sections 8.3 and 8.4.2** **Appendix 7**
(l)	*An environmental impact statement which contains -*	**Section 9**
	(i) a summary of the key findings of the environmental impact assessment;	
	(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	
	(iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;	
(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;*	
(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;*	
(o)	*A description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;*	
(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;*	
(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;*	
(r)	*An undertaking under oath or affirmation by the EAP in relation to:*	**Appendix 2**
	(i) the correctness of the information provided in the report;	
	(ii) the inclusion of comments and inputs from stakeholders and interested and affected parties; and	
	(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;	

Appendix 1	Content of Basic Assessment Report	Location in report
(t)	*Any specific information required by the competent authority; and*	N/A
(u)	*Any other matter required in terms of Section 24(4)(a) and (b) of the Act.*	N/A

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 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**Error! Reference source not found.** below. The detailed findings of the specialists relating to the outcome of the Site Sensitivity Verification is set out in Appendix 6). Where required, the specialist studies were undertaken with the requirements of GN R320 and GN R1150 and any updates thereto. Where no protocols have been provided, the specialist assessment will be 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		
	SSV Report in terms of GN 320 of 20 March 2020	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				
MTS	x		x	
POWERLINES (400kV & 132kV)	x		x	
Plant theme				
MTS	x	x		
POWERLINES (400kV & 132kV)	x	x		
Aquatic				
MTS	x	x		
POWERLINES (400kV & 132kV)	x	x		
Animal theme				
MTS	X		x	
POWERLINES (400kV & 132kV)	x		x	
Birds				
MTS	x			x
POWERLINES (400kV & 132kV)	x		x	

Report	Site Sensitivity Verification Report	Level of impact assessment and relevant legislation		
	SSV Report in terms of GN 320 of 20 March 2020	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
Agriculture				
MTS	x		x	
POWERLINES (400kV & 132kV)	x	x		
Heritage (incl. Palaeo)				
MTS	x			x
POWERLINES (400kV & 132kV)	x			x
Palaeo				
MTS	x			x
POWERLINES (400kV & 132kV)	x			x
Visual				
MTS	x			x
POWERLINES (400kV & 132kV)	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 Chapter 8). 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 show the site sensitivity map produced from the outcomes of the specialist studies undertaken

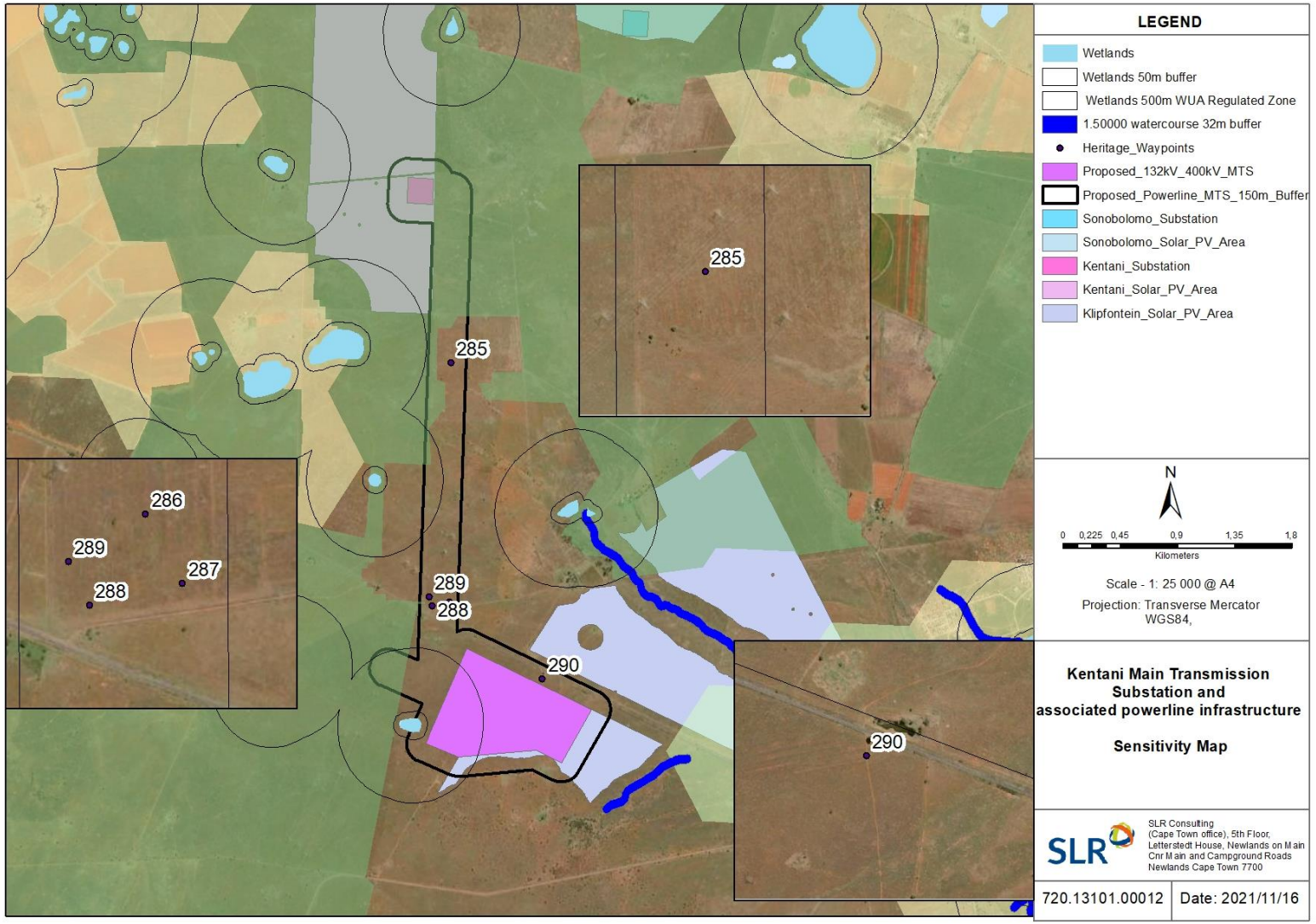

Figure 3-2: Site Sensitivity Map based on Specialist findings

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 (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 19. 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).

Other than the 11 (eleven) Mainstream projects, there are currently no other approved renewable energy EA applications within a 30km radius of the project site (Figure 3-3). The cumulative impacts assessed will therefore be the collective impact of the other Mainstream projects with the proposed project.

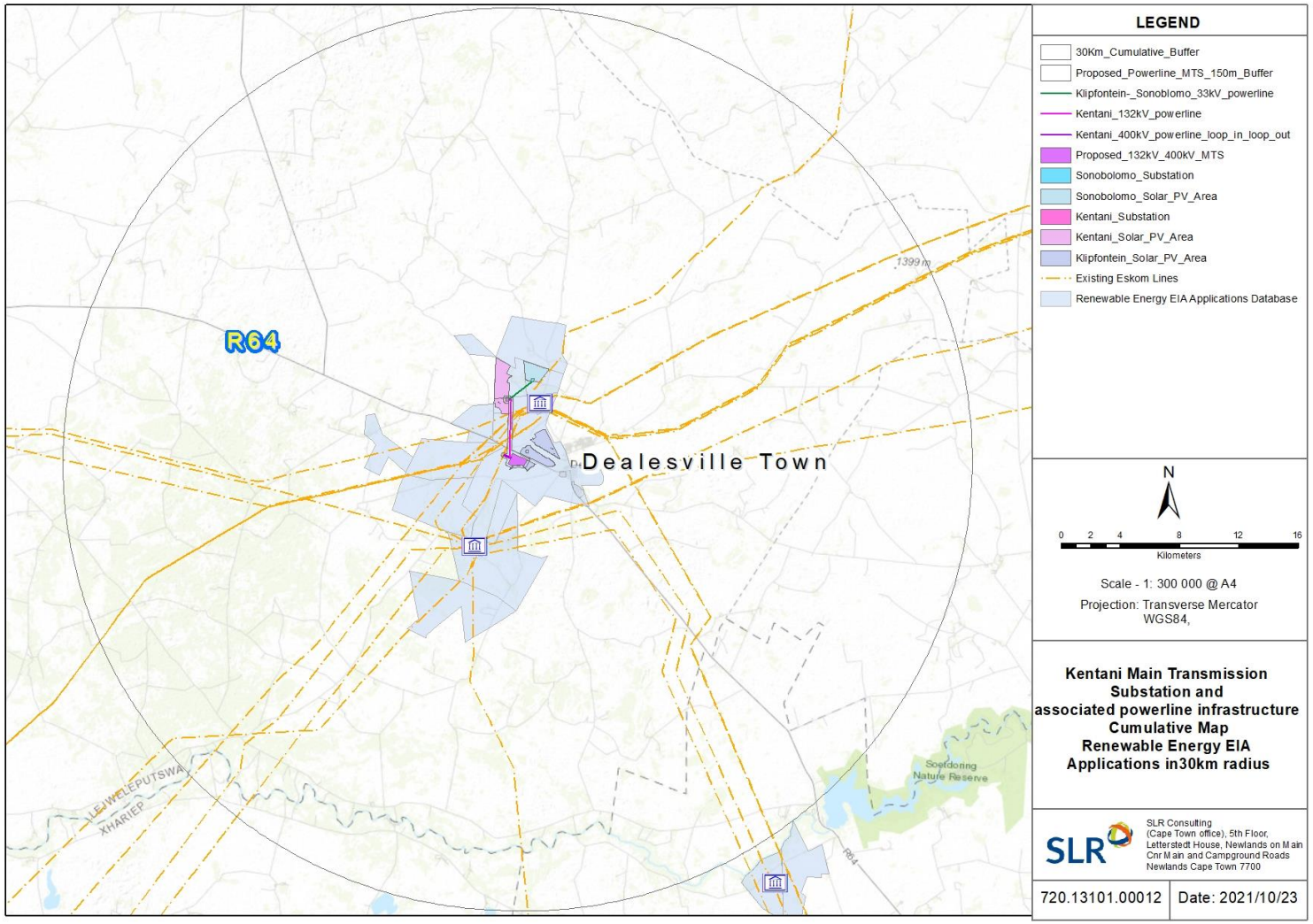

Figure 3-3: Map showing Mainstream Renewable Energy applications within 30 km of the proposed project.

4. PROJECT DETAILS

4.1 BACKGROUND

As mentioned in the introduction, Mainstream is proposing to add a 132kV/400kV MTS, BESS and associated electrical infrastructure to their authorised Kentani Cluster of solar PV developments near the town of Dealesville.

It should be noted that on 28 October 2021, the Minister of Mineral Resources and Energy, Gwede Mantashe announced the Preferred Bidders of the Round 5 Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) (See Section2.2.7 for explanation on the REIPPPP) and six (6) of the aforementioned Solar Energy Facilities received Preferred Bidder status i.e.:

- Kentani Solar PV
- Klipfontein Solar PV
- Klipfontein 2 Solar PV
- Leliehoek Solar PV
- Sonoblomo Solar PV
- Braklaagte Solar PV

These Solar Energy Facilities have now become Strategic Infrastructure Projects 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 (IRP2010) and support bio-fuel production facilities.
- SIP 10 Expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development. 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 Kentani Cluster consists of eleven (11) solar PV projects and associated electrical infrastructure (including a powerline), each of which received their own Environmental Authorisation (EA) in 2016 from the Department of Environmental Affairs (DEA) [now referred to as the Department of Forestry, Fisheries and the Environment (DFFE)]. The proposed MTS and associated infrastructure [i.e., eleven (11) powerlines] will service eleven (11) of Mainstream's solar PV projects authorised as part of the Kentani Cluster.

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It should be noted that the proposed MTS and BESS will be located within the authorised Klipfontein PV facility (14/12/16/3/3/2/722), which is proposed on the Remaining Extent of the Farm Klipfontein No. 305

(SG Code: F00400000000030500000). Of the eleven (11) powerlines, eight (8) are 132kV powerlines which are located within the authorised corridor, and which have been included as part of the authorised solar PV developments. The remaining powerlines [i.e., two (2) 400kV and one (1) 132kV powerlines] fall outside of the authorised corridor and therefore will be assessed as part of the Basic Assessment (BA) process for the MTS and BESS (i.e., this application).

The proposed MTS will occupy a footprint of approximately 64 hectares (ha) (i.e., 800m x 800m) and the proposed Lithium-Ion Battery Energy Storage System (BESS) with occupy up to 4 ha. The area occupied by the proposed power lines is unknown at this stage. In addition, the proposed MTS will have a capacity of 132/400 kilovolt (kV), while the associated powerlines will have capacities of up to 400kV, 132kV and 33kV respectively. The powerlines and BESS associated with the MTS and which are being proposed as part of this application and BA process are as follows:

1. Two (2) 400kV overhead powerlines (approx. 2km in length) that will connect the proposed MTS to the existing Eskom 400kV powerline, located approx. 1km west of the proposed MTS site, via a Loop-In-Loop Out (LILO) connection;

2. One (1) 132kV powerline (approx. 4.5km in length) that will connect the proposed MTS to the authorised Kentani on-site substation (14/12/16/3/3/2/724), located approx. 4km north-west of the proposed MTS site; and

3. Li-Ion Battery Energy Storage System (BESS) up to 4 ha in extent within the assessed site footprint

Additionally, there is one (1) 33kv powerline (approx. 2km in length) being proposed and will connect the authorised 75MW Sonoblomo PV facility (14/12/16/3/3/2/723), which is located approximately 5km north of the proposed MTS site, to the authorised Kentani on-site substation (14/12/16/3/3/2/724) (approx. 4km north-west of proposed MTS site). This powerline is not subject to the Basic Assessment study as it does trigger the need for an Application for Environmental Authorisation, however, the powerline has been considered by the specialist team.

As mentioned above, the proposed development will also involve the re-routing of eight (8) 132kV powerlines within the grid connection corridor authorised as part of the Kentani Cluster and making provision for this routing in the new proposed MTS. The remaining two (2) 400kV powerlines and one (1) 132kV powerline fall outside of the authorised corridor and will be assessed as part of the BA process for the MTS (i.e., this application).

Powerline corridors with widths of 300m (150m on either side of centre line) are being proposed and assessed for the proposed 400kV and 132kV powerlines which form part of this BA process (i.e., this application). This is to allow flexibility when routing the powerlines within the authorised corridor (should the EA be granted). No corridor is however being considered for the proposed 33kV powerline.

A road in the servitude under the proposed powerlines as well as an access road (approx. 4-8m wide) to the R64 provincial route will also be required.

A solid state (Lithium-ion) BESS will be required and will occupy an area of up to 4ha within the project footprint. The batteries will be used to store ‘energy’. The batteries to be used are already assembled prior to delivery and come as ‘plug and play’ modular units.

Considering the above, it is important to note that the location of the proposed MTS, BESS as well as the corridors being proposed for the powerlines have previously been assessed as part of the development footprint for the Kentani Cluster of solar PV developments, each of which received their own EA in 2016.

Moreover, the proposed MTS, BESS and powerlines are located within the Kimberly Renewable Energy Development Zone and Central Strategic Transmission Corridor and is integral to the requirements laid out in the Transmission Development Plan (2021 – 2030), and objectives outlined across a number of National, Provincial and Local plans and strategies (see Section 3.2).

4.2 NEED & DESIRABILITY

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. 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).

4.2.1 Motivation

The proposed development, along with the Kentani Cluster projects, are viewed in a positive context due to the potential for employment creation within the local community. The proposed development is located in the Central Strategic Transmission Corridor, a current requirement of the REIPPPP is that 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.

The cumulative effect of the proposed development 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 Kentani cluster, will address electricity constraints within both the local and district Municipalities by generating, distributing and evacuation a continued realisable source of electricity.

Improved electrification and an increased supply to houses and businesses is a strategic objective of both the Lejweleputswa District Municipality, as well as the Tokologo Local Municipality.

4.3 GENERAL DESCRIPTION OF THE PROJECT AREA AND SURROUNDING LAND USES

4.3.1 Site Suitability

The identification and selection of the site as a suitable area for the development of the proposed infrastructure was based on the availability of a grid connection point (i.e., the ESKOM's existing powerline). In addition, the topography, extent of land available for the development and the surrounding land uses play a role in the site selection for the development. 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 MTS and associated grid connection infrastructure. The site affected by the proposed development have not been considered for alternative land uses, i.e., crop production or urban development, etc. Furthermore, the grid connection corridors do not infringe on areas earmarked for mining development, i.e., there is no conflict of surface rights.

ii. Terrain

The study is generally flat, this terrain provides suitable conditions for the optimal placement of MTS and associated grid connection infrastructure.

iii. Environmental Sensitivities

The MTS footprint and grid connection corridors have been identified and are being assessed through this BA process. Through the assessment of a 150 m wide and up to 4 km long 132kV grid and up to 800m 400kV grid connection corridors, any identified sensitive environmental features present can be avoided and the development optimally placed in the area. The assessment of a wider grid connection corridor is in line with the mitigation hierarchy – avoid, minimise, and mitigate.

With regards to ecological sustainability, the proposed development 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. As mentioned above, the sensitivity of the proposed development site is low.

The activities proposed along with the environmental impacts identified as part of the BA process can be managed and mitigated to acceptable levels should the mitigation measures proposed be implemented and monitored. Considering the aforementioned it can thus be stated that the inclusion of the proposed development provides for a practicable and acceptable environmental solution**.** A summary of provincial and local planning policies in the Free State Province aligned to the proposed project as well the suitability of the study area for the development of solar PV facilities and grid connection infrastructure are described below. The proposed construction and operation of the proposed project is considered to be in alignment with provincial and local planning policies of the Free State Province although the contributions to planning objectives from the proposed project will be negligible.

4.3.2 Location of the Activity

The proposed project is located approximately 2,5km north-west of the town of Dealesville in the Tokologo Local Municipality, within the Lejweleputswa District Municipality of the Free State Province (as shown in Figure 4-1). The proposed project will be located on the following properties / farm portions:

- Remaining Extent of the Farm Klipfontein No. 305 (F00400000000030500000);
- The Farm Leliehoek No. 748 (F00400000000074800000);
- The Farm Overschot No. 31 (F00400000000003100000)
- Remainder of the Farm Oxford No. 1030 (F00400000000103000000);
- Portion 1 of the Farm Walkerville No. 1031 (F00400000000103100001)[11]; and
- Remainder of the Farm Walkerville No. 1031 (F00400000000103100000).

[11] Property / farm portion traversed by proposed 33kv powerline which will connect to Kentani onsite substation (14/12/16/3/3/2/724). 33kV powerline does however not require authorisation.

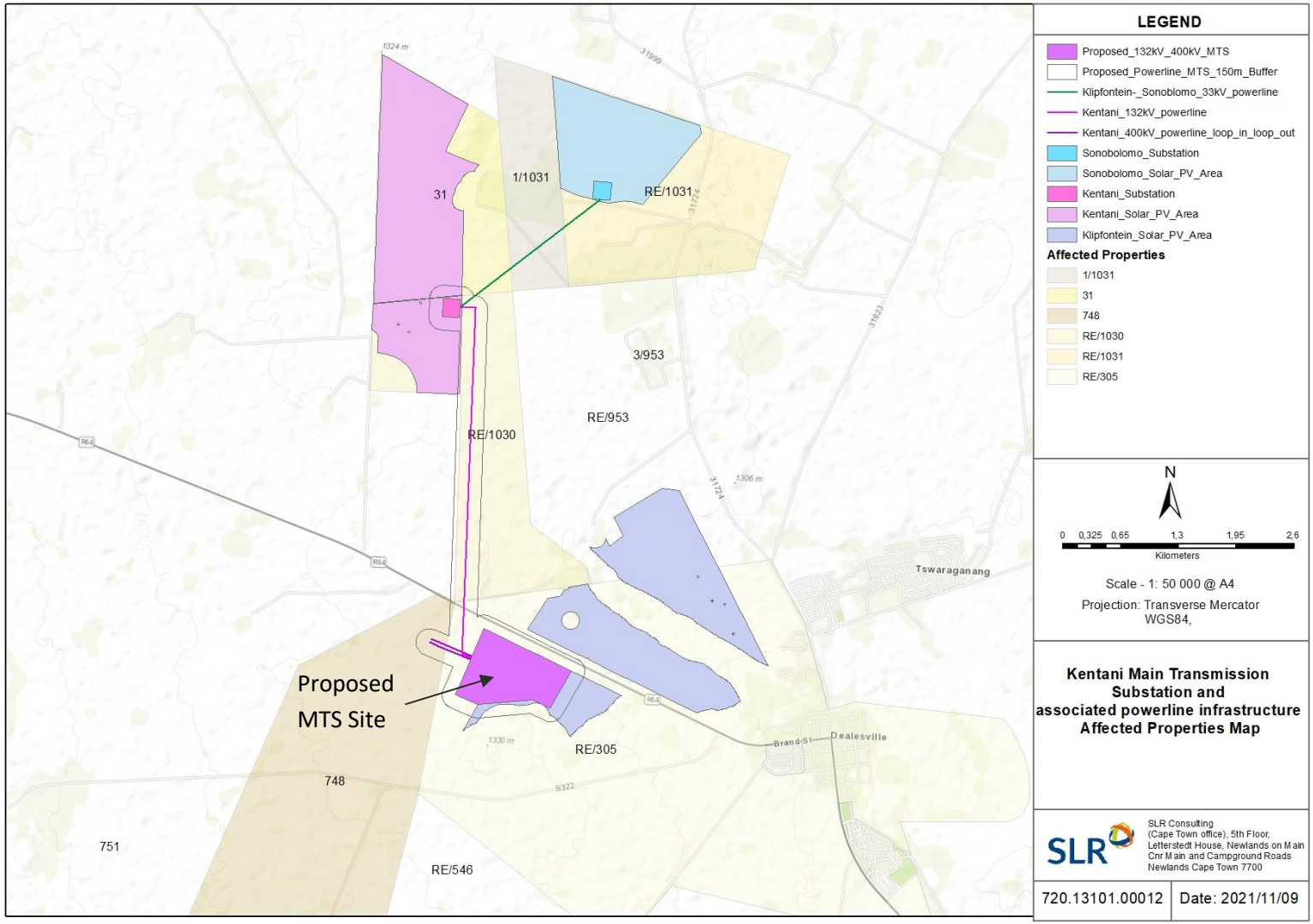

Figure 4-1: Affected Properties

4.4 PROJECT OVERVIEW

4.4.1 Main Transmission Substation

The proposed MTS will occupy a footprint of approximately 64 hectares (ha) (i.e., 800m x 800m). This footprint is proposed to allow for items such as oil traps and pylon configuration of incoming power lines, as well as the possibility of future expansion in response to an increased demand for electrical power, and the integration of lines into the MTS and Eskom's optimum substation site size is 800m X 800m (or 64 ha). The area that would be affected by the proposed power lines is unknown at this stage. In addition, the proposed MTS will have a capacity of 132/400 kilovolts (kV) and will comprise of standard substation electrical equipment, i.e., transformers, busbars, operation and control room, workshop, and storage area.

4.4.2 Powerlines

The powerlines associated with the MTS and which are being proposed as part of this application and BA process are as follows (Figure 4-5):

1. Two (2) 400kV overhead powerlines (approx. 800m in length) that will connect the proposed MTS to the existing Eskom 400kV powerline, located approximately 1km west of the proposed MTS site, via a Loop-In-Loop Out (LILO) connection;
2. One (1) 132kV powerline (approx. 4km in length) that will connect the proposed MTS to the authorised Kentani on-site substation (14/12/16/3/3/2/724), located approx. 4km north of the proposed MTS site; and
3. One (1) 33kv powerline (approx. 2km in length) that will connect the authorised 75MW Sonoblomo PV facility (14/12/16/3/3/2/723), which is located approximately 5km north of the proposed MTS site, to the authorised Kentani on-site substation (14/12/16/3/3/2/724) (approx. 4km north-west of proposed MTS site).

The designs of the 132kV and 400kV pylon towers to be used for this project have not as yet been determined. However, Sections 4.4.2.1 and 4.4.2.2 describe typical pylon tower designs. The types of pylon to be used for both 132kV and 400kV powerlines depend on the topography and the alignment of the grid connection corridor.

4.4.2.1 132kV Powerline Pylon Towers

Typical 132kV pylon designs are monopole-type or lattice-type pylons. The design will depend on whether the pylons will be placed within a straight section within the grid connection corridor, or at bends (Figure 4-2 - Figure 4-3).

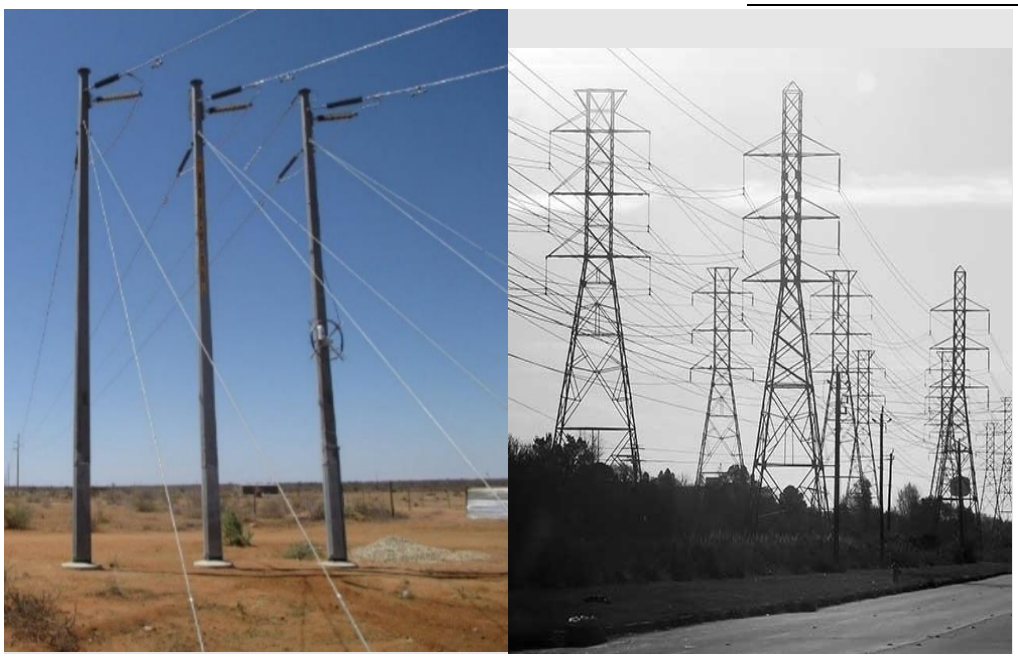

Figure 4-2: Typical 132kV monopole type (left) or lattice-type pylons (right) design

4.4.2.2400kV Powerline Pylon Towers

Similarly, typical 400kV pylon tower designs include the Guyed V type, Cross-Rope suspension type and self-supporting type withthe design depending on whether the pylons will be placed within a straight section within the grid connection corridor, or at bends (Figure 4-3)

Figure 4-3: Typical 400kV Guyed V type (left) and Cross-Rope suspension (middle) and self-supporting (right) design

4.4.3 Battery Energy Storage System

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 project footprint. The batteries to be used are already assembled prior to delivery and come as 'plug and play' modular units and will be compliant with all local laws and regulations as well as health and safety requirements governing battery facilities (Figure 4-4).

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

4.4.4 Access

Access would be provided via a road in the servitude under the proposed powerlines as well as an access road (approx. 4-8m wide) to the R64 provincial route. It should be noted that powerline corridors with widths of 300m (150m on either side of centre line) are being proposed and assessed for the proposed 400kV and 132kV powerlines as part of the BA process. This is to allow flexibility when routing the powerlines within the authorised corridor (should the EA be granted). No corridor is, however, being considered for the proposed 33kV powerline.

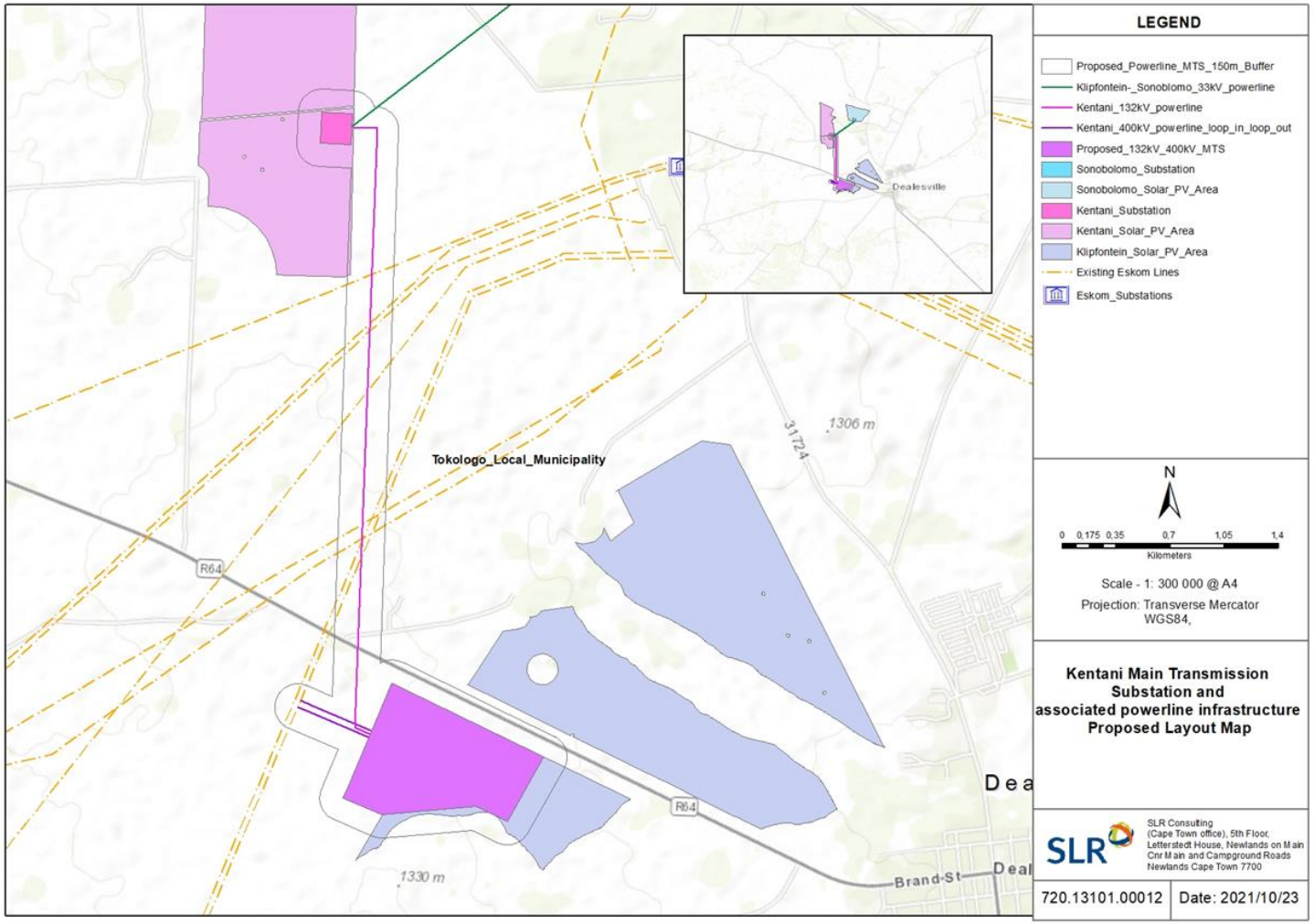

Figure 4-5: Proposed Site Layout

4.4.5 Service Provision

4.4.5.1Water 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 water would be required for the following uses:

- 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., powerline pylons and MTS, 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 MTS.

4.4.5.2Waste Management

Wastewater: Effluent will be generated during the construction and operation phase of the proposed project. A Service Level Agreement will be reached with a registered service provider for the collection of sewage from site using a honey sucker truck and 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 Operations and Maintenance Buildings. The recycled water will be used for domestic applications within the site, i.e., watering vegetation, etc.

Solid Waste: There will be solid waste 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 or 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.

4.4.5.3Air 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.

4.4.5.4Traffic

A traffic study was not identified in the Screening Tool output, however, there will be some traffic during the construction phase of the proposed project for the delivery of project components, machinery, and labour. The transportation route has not yet been determined but is most likely to be one of the following routes:

- Durban via Harrismith and Vereeniging
- East London via Bloemfontein and Kroonstad; and
- Cape Town via Beaufort West, Bloemfontein, and Kroonstad.

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.

4.4.5.5Schedule and Life of Project

It is anticipated that after construction, ESKOM will own and operate the MTS until Eskom require the MTS to be decommissioned.

4.5 SUMMARY OF THE PROJECT AND TECHNICAL INFORMATION

Table 4-1 includes technical and project-specific details of the key infrastructure components and support services that will be required to support the operations of the MTS, BESS and grid connection infrastructure. See Table 4-1 for the proposed layout which has been assessed in this BAR for the construction and operation of the MTS, BESS and grid connection infrastructure.

Table 4-1: Technical details of the proposed project

Component	Details		
Project footprint			
Project footprint:	**68 ha in extent. The MTS and BESS will be placed with this footprint**		
Project footprint co-ordinates		Latitude	Longitude
	A	28° 39.856'S	25° 43.609'E
	B	28° 40.095'S	25° 44.228'E
	C	28° 40.324'S	25° 44.090'E
	D	28° 40.276'S	25° 43.968'E
	E	28° 40.319'S	25° 43.594'E
	F	28° 40.266'S	25° 43.434'E
Main Transmission Substation			
MTS capacity:	132/400 kilovolt (kV)		
MTS footprint:	Approximately 64 hectares (ha) (i.e., 800m x 800m)		
MTS co-ordinates:	To be determined		
Powerlines			
Connection from the proposed MTS to the existing Eskom 400kV powerline			
Powerline capacity:	Two (2) 400kV overhead powerlines		
Powerline length:	Approximately 800m		
Powerline corridors width	300 m (150 m on either side of centre line)		
Powerline servitude	55 m per 1x 400kV power line		
Powerline co-ordinates	**Powerline 1**		
		Latitude	**Longitude**
	Start	28° 39.930'S	25° 43.250'E
	End	28° 40.027'S	25° 43.536'E

Component	Details		
	Powerline 2		
		Latitude	**Longitude**
	Start	28° 39.953'S	25° 43.241'E
	End	28° 40.048'S	25° 43.527'E
Powerline pylons:	Monopole or Lattice pylons, or a combination of both where required		
Powerline pylon height:	Maximum 40 m		
Minimum conductor ground clearance	8.1 m		
Distance between conductors	Between 2.4 m and 4 m		
Connection from the proposed MTS to the authorised Kentani on-site substation (14/12/16/3/3/2/724)			
Powerline capacity:	One (1) 132kV powerlines		
Powerline length:	Approximately 4 km		
Powerline corridors width	300 m (150 m on either side of centre line)		
Powerline corridors width	300 m (150 m on either side of centre line)		
Powerline servitude	32m per 1x 132kV power line		
Powerline co-ordinates	**Powerline 3**		
		Latitude	**Longitude**
	Start	28° 37.914'S	25° 43.372'E
	End	28° 40.038'S	25° 43.533'E
Powerline pylons:	Monopole or Lattice pylons, or a combination of both where required		
Powerline pylon height:	Maximum40 m		
Minimum conductor ground clearance	8.1 m		
Distance between conductors	Between 2.4 m and 3.8 m		
Connection from the proposed MTS to the 75MW Sonoblomo PV facility (14/12/16/3/3/2/723)			
Powerline capacity:	One (1) 33kv powerline		
Powerline Servitude	32m per 1x 132kV power line		
Powerline length:	Approximately 2 km		
Powerline corridors	No corridor is considered		
Powerline corridors width	300 m (150 m on either side of centre line)		
Powerline co-ordinates	**Powerline 4**		
		Latitude	**Longitude**

Component	Details		
	Start	28° 37.914'S	25° 43.372'E
	End	28° 37.228'S	25° 44.296'E
Powerline pylons:	Monopole or Lattice pylons, or a combination of both where required		
Powerline pylon height:	Maximum 32 m		
Minimum conductor ground clearance	8.1 m		
Distance between conductors	Between 2.4 m and 3.8 m		
Supporting Infrastructure			
Road servitude and access roads	Approximately 4-8 meters wide, connecting to the R64 provincial route		
Solid state (Lithium-ion) BESS	Will occupy an area of up to 4ha within the project footprint (co-ordinates to be determined		
Operations and Maintenance (O&G) Building	The O&M Building will be located within the project footprint and will be 1ha in extent.		
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. Mainstream 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. PUBLIC PARTICIPATION

The key steps in the Public Participation Process are tabulated below:

Table 5-1: Public Participation Process

Process	Description
Stakeholder Identification and registration of I&APs	• 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	• Submissions of questions / queries or information requests to SLR via email, SMS or telephonically • Availability of DBAR on online platform • Availability of DBAR at Dealesville Primary School
Advert and Notifications	• Site Notices placed on site in October 2021 • Advert placed in Bloemnuus on 04 November 2021 • Notifications regarding BA process and availability of project report for public review to be sent via email or SMS notifications
Comment on the BA Report	• Availability of the BA Report for a 30-day comment period from the day email and SMS 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	• Comments and Response Report (C&RR), including all comments received, and included within the Final BA Report for decision making

5.1 NEWSPAPER ADVERTISEMENT AND SITE NOTICES

A newspaper advertisement announcing the commencement of the BA process and inviting I&APs to register on the project database was placed in the "Bloemnuus" newspaper on 04 November 2021 (see Appendix 6A).

In addition to the advertisement, site notices for the project were placed on the boundaries of the application sites and at the Dealesville Police Station and Tokologo Local Municipality. These posters contained brief details of the proposed project and process and the contact details of the consultant (See Appendix 6A).

5.2 WRITTEN NOTIFICATION TO AUTHORITIES AND LANDOWNERS

5.2.1 Interested and Affected Parties (I&APs)

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, Statutory Organisations the Local Municipality, the District Municipality, relevant conservation bodies and non-governmental organisations (NGO's), as well as neighbouring landowners and the surrounding community. A copy of the I&AP Register is included as Appendix 7 of this report.

5.2.2 Landowner Consent and Notification

Public Participation has been undertaken in accordance with Chapter 6 (Public Participation Process) of the EIA Regulations, 2014 (as amended) and in accordance with GN R 145[12] (26 February 2021)

Although the proposed powerlines are linear activities, they are within the EGI Central Corridor and as such have servitude agreements in place with Mainstream. As the agreements contain personal landowner consents are included in this BA.

The landowners and/or occupants of the affected farm portions, on which the proposed powerlines are proposed, have been notified. The notifications will be included as Appendix 6 of the FBAR and will be submitted to the DEFF for consideration together with the FBAR for comment.

Please see the Table in Appendix 7 which provides details regarding the landowners / occupiers (affected and 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.

[12] Identification of Procedures to be Followed When Applying for or Deciding on an Environmental Authorisation Application for the Development of Electricity Transmission and Distribution Infrastructure when occurring in Renewable Energy Development Zone

5.2.3 Notification of BAR for Public Comment

A notification letter for the BA Process was compiled and circulated to all identified I&APs by sms or email, where required, on the 17th of November 2021. The purpose of the notification letter was to notify I&APs of the BA process and invite them to participate. Furthermore, the notification letter invited comments from I&APs on the DBAR. A copy of the Notification Letter is included as Appendix 6 of this report.

This BA Report is available for review and comment period from 18 November 2021 to 10 January 2021 in order to provide Interested and 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/mainstream-mts-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-documentsmainstream-mts-ba/). A copy of the report and appendices have also been placed at the following location:

Name of Location	Contact Details	Address
Dealesville Primary School	051 811 0026	1 Brand Street, Dealesville

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 (BAR), comments should reach SLR no later than 10 January 2021.

SLR Consulting (South Africa) (Pty) Ltd

Attention: Liandra Scott-Shaw

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

Tel: 073 6587955

E-mail: lscottshaw@slrconsulting.com

5.2.4 Review of the Draft Basic Assessment 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 D 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. Telephonic follow-up will be undertaken throughout the 30-day DBAR comment and review period in order to provide them with ample opportunity to comment on the application.

6. ALTERNATIVES

A comprehensive design process has been undertaken to inform the site proposed for the MTS, BESS as well as the corridors being proposed for the associated powerlines. No location, layout, BESS technology alternatives or powerline corridor alternatives are therefore being considered and assessed.

6.1 LOCATION ALTERNATIVES

No other locations are being considered for the placement of the MTS and associated infrastructure as this has been indicated by Eskom to be central to their requirements for the greater Dealesville area. The objective of this application is to alleviate current and future network constraints in the area. The MTS will assist in de-loading the main sub-transmission network and improve the voltage regulation in the area. 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.

6.2 ACTIVITY ALTERNATIVES

The purpose of the proposed project will connect Mainstream's authorised solar PV projects to the grid. As a result, no other activity alternatives could be considered for the proposed project.

6.3 DESIGN AND LAYOUT ALTERNATIVES

The assessment of a 150 m wide grid connection corridor will provide sufficient extent for the placement of grid connection infrastructure whilst avoiding sensitive environmental features present within the study area. Furthermore, Mainstream will consider the use of either Monopole or Steel-Lattice Pylons for the 132 kV transmission line associated with the proposed project. The types of pylons to be used for the transmission line is dependent on the outcome of the detailed geotechnical and pegging surveys of the grid connection corridor which will be undertaken post the BA process, i.e. after a decision has been issued by the Competent Authority but prior to the commencement of the construction phase. Each of the pylons will be up to 40 m in height, depending on the topography of the study area and will meet the minimum height clearances from the ground as well as from surrounding infrastructure.

The environmental impacts associated with the Monopole and Steel-Lattice Pylons will be similar for the proposed project throughout the project lifecycle. The selection of the preferred design for the pylons will be subject to outcomes from detailed technical studies that will be undertaken post the BA process following the necessary agreements being concluded with ESKOM.

6.4 TECHNOLOGY ALTERNAITVES

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.
The proposed project includes the development of a solid-state Li-Ion Battery Energy Storage System (BESS) that will occupy an area of up to 4ha within project footprint. As the batteries to be used are already assembled prior to delivery and come as 'plug and play' modular units they are favourable over alternative

technologies such as Vanadium flow and redox flow (See Appendix 9 for comparison of Battery Technologies and their associated risks).

Li-Ion was chosen as the preferred BESS technology type, as BESS using this type of technology is limited to a 6h duration with less energy shortfalls in comparison to the Li-Ion. The underlying battery cells of flow batteries degrade too fast, requiring full replacement much earlier than the 20-year lifetime of the plant. Hence, the Applicant chose to utilise Li-Ion BESS technology as part of the proposed project.

6.5 NO-GO ALTERANTIVE

6.5.1 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

6.5.2 Aquatic

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.

6.5.3 Terrestrial Ecology

Under the 'no-go' alternative, the current land use consisting of livestock grazing would continue. 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.

6.5.4 Avifauna

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.

6.5.5 Heritage, Archaeology and Palaeontology

Environmental and heritage legislation requires the consideration of the 'no-go' option. The 'no-go' alternative means that the proposed project would not be able to connect the energy development in the area 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 Heritage and Palaeontology specialists did not identify any heritage hot spots and did not identify any 'no-go' areas during the survey.

6.5.6 Visual

The project has 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.

7. DESCRIPTION OF THE BASELINE ENVIRONMENT

7.1 CLIMATE

The proposed project area is associated with summer rainfall, and a cool – temperate climate. Average monthly temperatures are lowest in July (1°C) and highest in December and January (32°C). Average monthly rainfall is lowest in July (3 mm) and highest in January (71 mm). The area is associated with high extremes between maximum summer and minimum winter temperatures, and frequent occurrence of frost. Refer to fig in text.

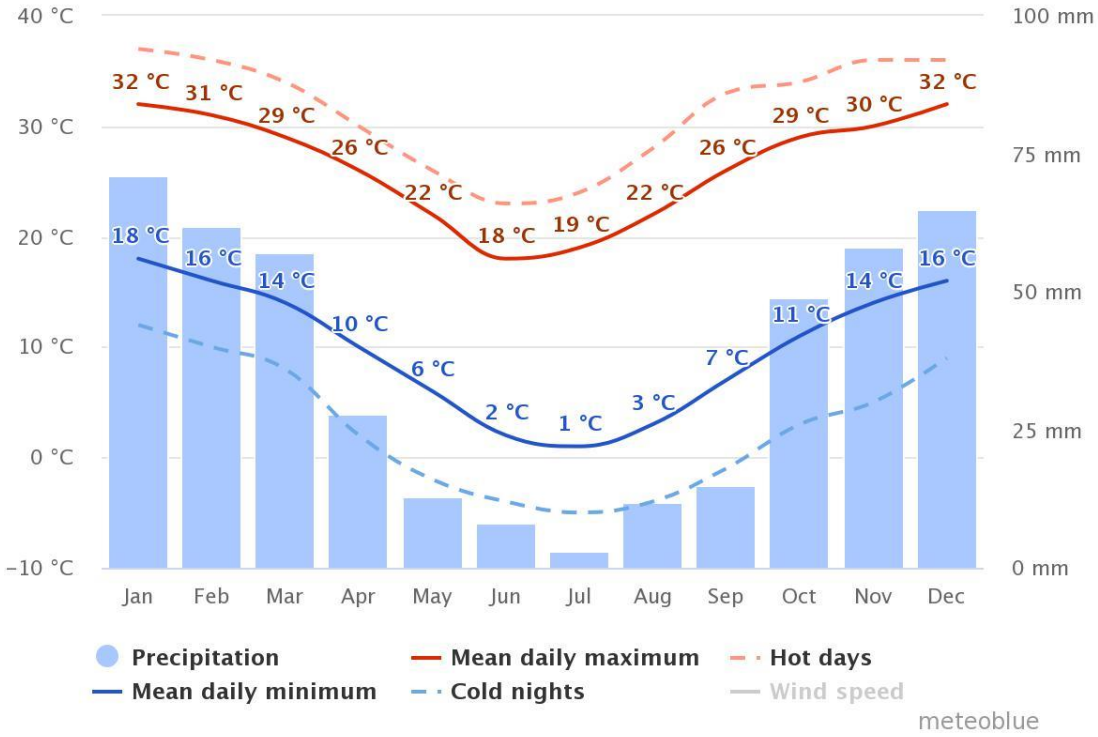

Figure 7-1: Average temperature and rainfall in Dealesville modelled over 30 years[13]

13 Source: **https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/dealesville_republic-of-south-africa_1011624**

7.2 SOCIO-ECONOMIC PROFILE

7.2.1 District and Local Municipality

The proposed project falls within the Lejweleputswa District Municipality (LDM) in the Free State Province. The municipality is a Category C municipality situated in the north-western part of the Free State. The district municipality is 32 287 km^2 in extent, and makes up almost a third of the province, and consists of the following five local municipalities, with approximately 18 towns distributed throughout. The main economic sectors within the municipality entails mining, construction, transport, electricity and trade.

The proposed project is located within the Tokologo Local Municipal (TLM). The TLM is a Category B municipality located within the Lejweleputswa District in the western Free State Province. The municipal area comprises 9 326 km^2 which is equivalent to 29 % of the LDM geographical area. Major towns present within the TLM include, Boshof, Dealesville and Hertzogville.

7.2.2 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 (see Table 7-1).

Table 7-1: Population growth estimates[14]

Area	Size in km^2	Population 2011	Population 2016	Growth in population (%)
Free State Province	**129 825**	**2 745 590**	**2 834 714**	**3.25**
Lejweleputswa DM	*32 287*	*624 746*	*646 920*	*0.8*
Tokologo LM	9 326	28 986	29 149	1.6

The number of households in the study area has increased on all levels (see Table 7-2). The proportionate increases in households were greater than the increases in population on all levels, and greater than the increase in households on a national level. The average household size has shown a decrease on all levels, which means there are more households, but with less members.

[14] Source : Census 2011, Community Development Survey 2016

Table 7-2: Household sizes estimates[15]

Area	Households 2011	Households 2016	Average household size 2011	Average household size 2016
Free State Province	823 316	946 639	3.33	2.99
Lejweleputswa DM	182 247	217 911	3.4	3.0
Tokologo LM	8 698	9 831	3.3	3.0

It is critical for any government to ensure that its citizens have access to basic services, including housing, the majority of the population within the TLM live in formal dwellings.

7.2.3 Education

The TLM has a lower attendance of schooling for the population aged 5-24 years. This municipality has the lowest schooling attendance when compared to the other local municipalities within the LDM.

Table 7-3: Population aged 5–24 years attending an educational institution[16]

	2011		2016	
	Number	Percentage contribution	Number	Percentage contribution
Free State Province	736 002	73.1	804 016	75.2
Lejweleputswa DM	158 066	70.7	170 825	73.6
Tokologo LM	7 001	66.5	7 392	69.6

7.2.4 Employment

Unemployment in general and amongst females is a major challenge in the TLM and it is likely that the relatively weak economy will result in further pressure on employment. Unemployment in the Tokologo Municipality was estimated at approximately 27.5 % in 2016 which is roughly the same as the 2011 rate (Table 7-4).

Table 7-4: Unemployment rate[17]

Employment status	Gender		Total
	Male	Female	
Employed	4464	2155	6618
Unemployed	1059	1445	2504
Not Economically active	3542	5572	9155
Unemployment rate	**19.2**	**40.1**	**27.5**

[15] Source : Census 2011, Community Development Survey 2016

[16] Source Tokologo Local Municipality , Integrated Development Plan 2020/2021

[17] Source Tokologo Local Municipality , Integrated Development Plan 2020/2021

7.2.5 Access to Basic Services

Access to basic services such as water, sanitation and electricity relate to standard of living according to SAMPI (Statistics South Africa, 2014). Households that use paraffin, candles, or nothing for lighting; or fuels such as paraffin, wood, coal, dung or nothing for cooking or heating; have no piped water in the dwelling or on the stand and do not have flush toilets can be described as deprived in terms of these basic services. On a municipal level most, households get their water from a regional or local water scheme. 83% of the households within the TLM has access to piped water inside their dwellings, compared to 94% of households within LDM that have access to piped water inside their dwellings. The main source of water within the TLM is the municipality.

In terms of sanitation, 42,3 % of the households have pit latrine/ toilet with ventilation pipe, while 36,2% of the population have toilets that flush. The percentage of flush toilets is significantly lower as compared to the overall percentage of households with flush toilets (82.6%) within the LDM.

Access to electricity for lighting purposes give an indication of whether a household has access to electricity, as poor households sometimes only use electricity for lighting, but use other sources of energy for heat and cooking. More than 90% of households in the area have access to electricity for cooking and lighting purposes.

7.3 BIOPHYSICAL ENVIRONMENT

7.3.1 Topography and Geology

The geology[18] underlying the proposed project area comprises of quaternary-age surface deposits made up of surface limestones and a thick mantle of aeolian sand. These generally unconsolidated sediments occur as thin deposits in the area especially along small perennial and non-perennial watercourses. Sediments include pedocretes, colluvial slope deposits, sheet wash, alluvium, spring accumulations and aeolian sand (Rossouw, 2014). The proposed project is located within an elevation of approximately 1 200 – 1 320 m above sea level with slopes less than 1%. The proposed project area is characterised by gentle undulating plains with occasional Karoo koppies.

7.3.2 Soils and Land Potential

The DEA Screening Tool report for the area indicates the following ecological sensitivities:

Theme	Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
Agriculture Theme		x		

[18] Mainstream commissioned a preliminary geotechnical investigation in October 2020 for all 11 Solar projects. The Report is included in Appendix 5.

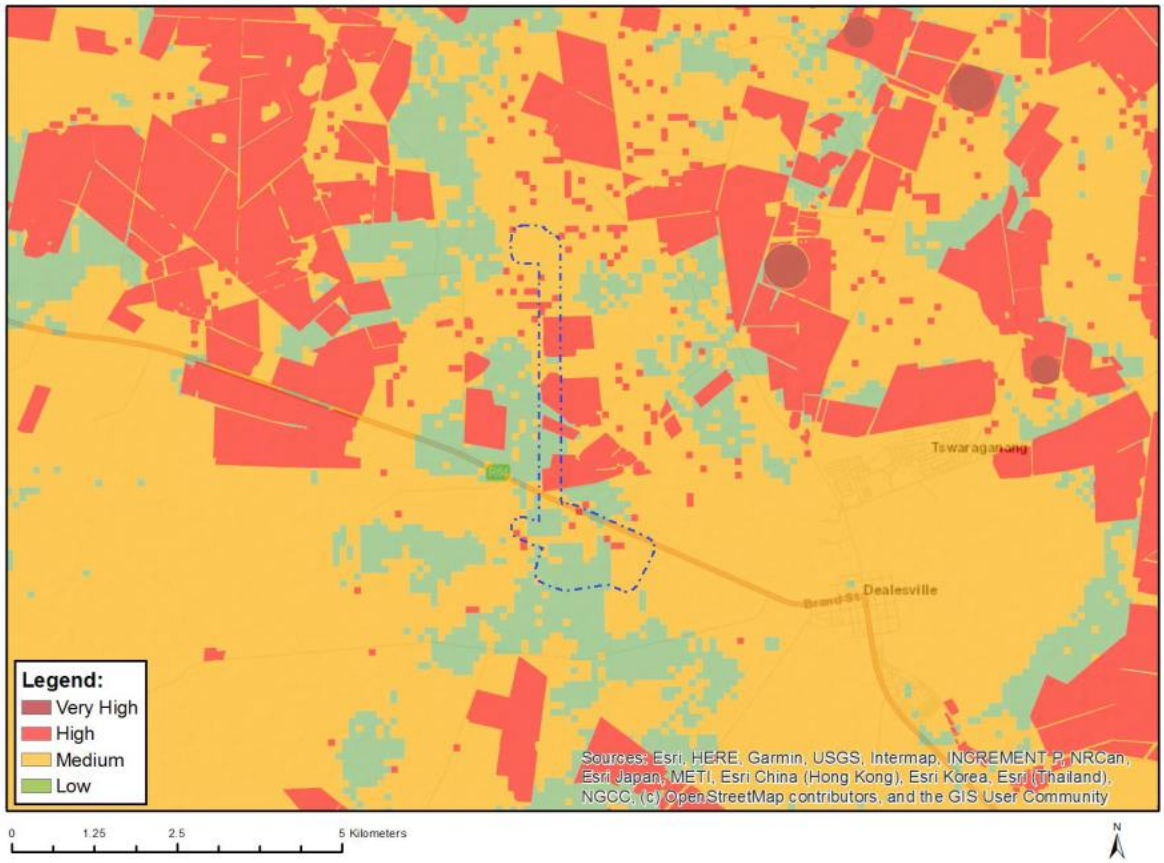

Figure 7-2: The footprint within which the proposed development will be located (blue outline) overlaid on agricultural sensitivity, as given by the screening tool (green = low; yellow = medium; red = high; dark red = very high). The MTS will be located within the area to the south of the R64 road. The footprint north of that is the power line corridor

Land capability is the combination of soil suitability and climate factors. The area has a land capability classification, on the 8-category scale, of Class 6 - non-arable, moderate potential grazing land. The limitations to agriculture are predominantly climatic low moisture availability with high variability of rainfall but also include soil depth.

The soil type characteristic of the proposed project area and surrounds consist of moderately deep to deep, sands to loamy sands of the Hutton soil form on underlying rock or hard-pan carbonate and shallow to deep sandy clay loams of the Valsrivier and Swartland soil forms on underlying clay, and shallow loamy sands of the Mispah soil form on underlying hard-pan carbonate or rock. These soils fall into the Duplex, Calcic, and Lithic soil groups according to the classification of Fey (2010). The MTS footprint is classified as a Class 6 land capability type and should therefore be of medium agricultural sensitivity. The footprint of the powerline corridor is classified as cultivated land and therefore indicated as high agricultural sensitivity. However, cultivation within the powerline corridor has been abandoned, probably because it was too marginal. Therefore, the powerline corridor should no longer be classified as cultivated land or a land with high agricultural sensitivity. This is insignificant in the context that the powerline corridor would not have an impact on cultivated land.

7.3.3 Freshwater Resources

The DEA Screening Tool report for the area indicates the following ecological sensitivities:

Theme	Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
Aquatic Theme	x			

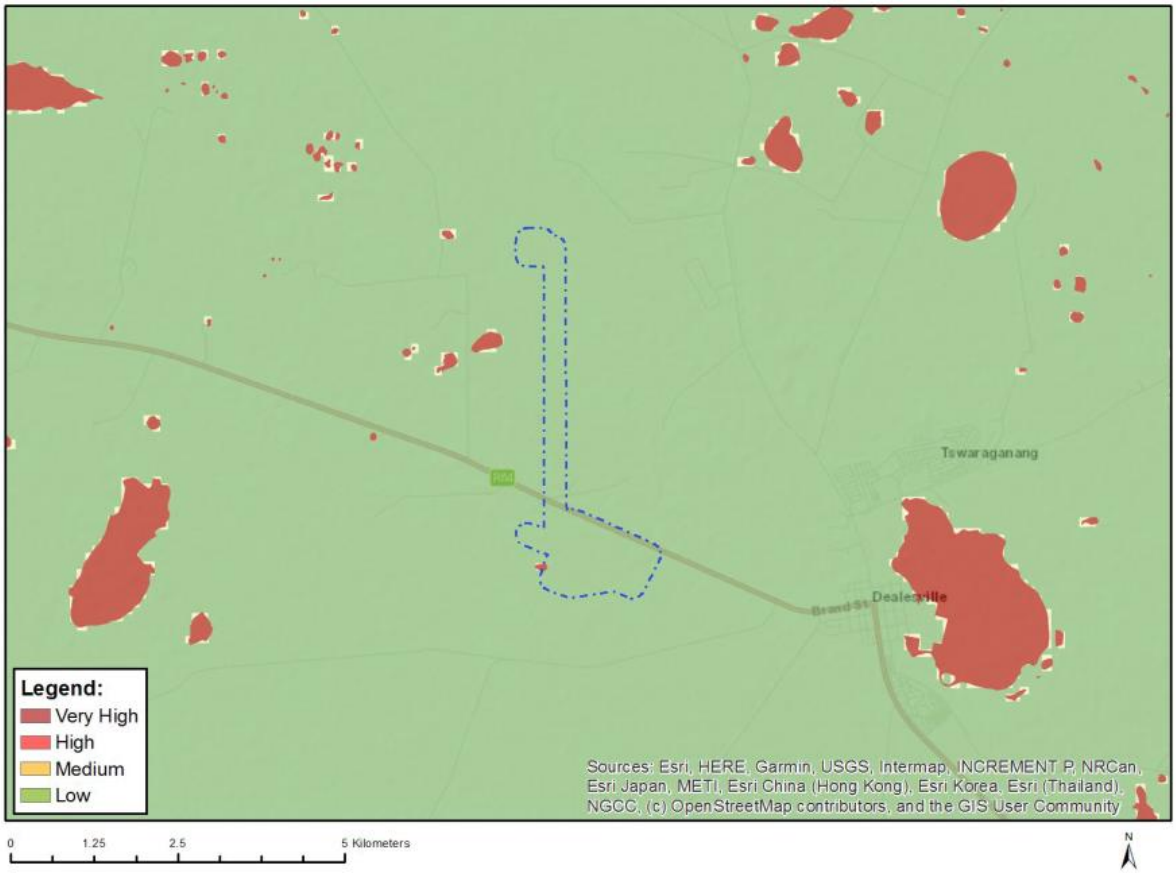

Figure 7-3: The classification of the development site according to the DFFE National Screening Tool

The study area contained a variety of aquatic features mainly associated with the Depression / Pan Hydrogeomorphic class of aquatic / wetlands systems found within the greater region. These ranged >1ha to 8ha in size (Figure 7-4). Similarly, some of these could include freshwater habitats, while the larger systems were dominated by saline soils and / or water columns (when inundated).

Figure 7-4: One the larger pans located near (ca 900m) of the proposed Substation

The other aquatic features observed were as follows (Figure 7-5)

- Non perennial rivers with or without riparian vegetation. These ranged from narrow channels to broad er 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 areas.
- Minor drainage lines (Figure 7-6), with no obligate aquatic vegetation.
- Dams with no wetland or aquatic features mostly used for watering of livestock. Several pans previously assessed in the 2014/2015 assessments was converted into dams but still contain wetland elements (Figure 7-5).

Little in the way of drainage occurs within the development areas, thus the number of water course were limited. These that do occur drain, forming part of a tributary of the Modder River, associated with the C52 h and C52K Quinary Catchments of the Highveld Ecoregion in the Orange Catchment Management Agency (Figure 7-6). Due to this limited connectivity via watercourses, the study area was not included in any National Freshwater Ecosystems Priority Areas (NFEPAs) or Strategic Water Resource Areas, although due to the presence of the pans, the pans in the region were included into National Wetland Cluster, NSBA (2018) spatial layers.

With regard the proposed buffers (50m), none of the proposed infrastructure (substation sites and gird corridors), will be affected.

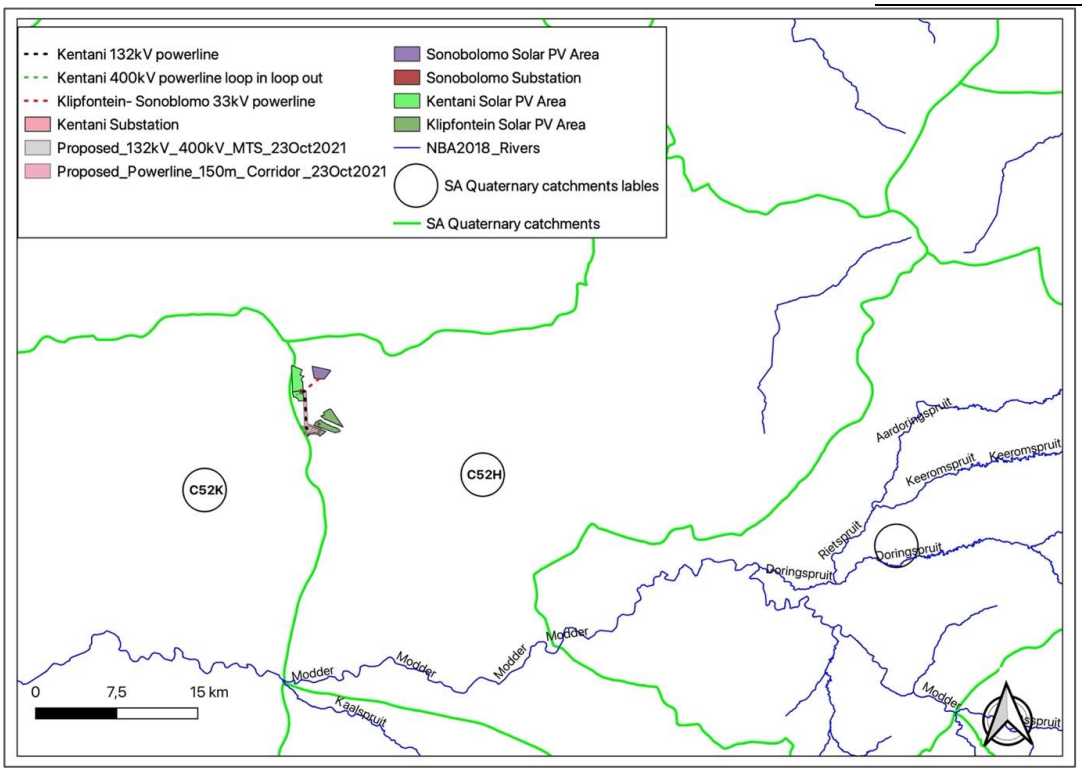

Figure 7-5: Locality map indicating the various quaternary catchments and mainstem rivers[19]

Figure 7-6: The minor drainage above the MTS site, with farm dams in the background (left) and one the larger pans located near (ca 900m) of the MTS (right)

Figure 7-7 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 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

19 (Source DWS and NGI)

7-7). A baseline map was then refined using the 2021 survey data, when near the proposed infrastructure (Figure 7-8).

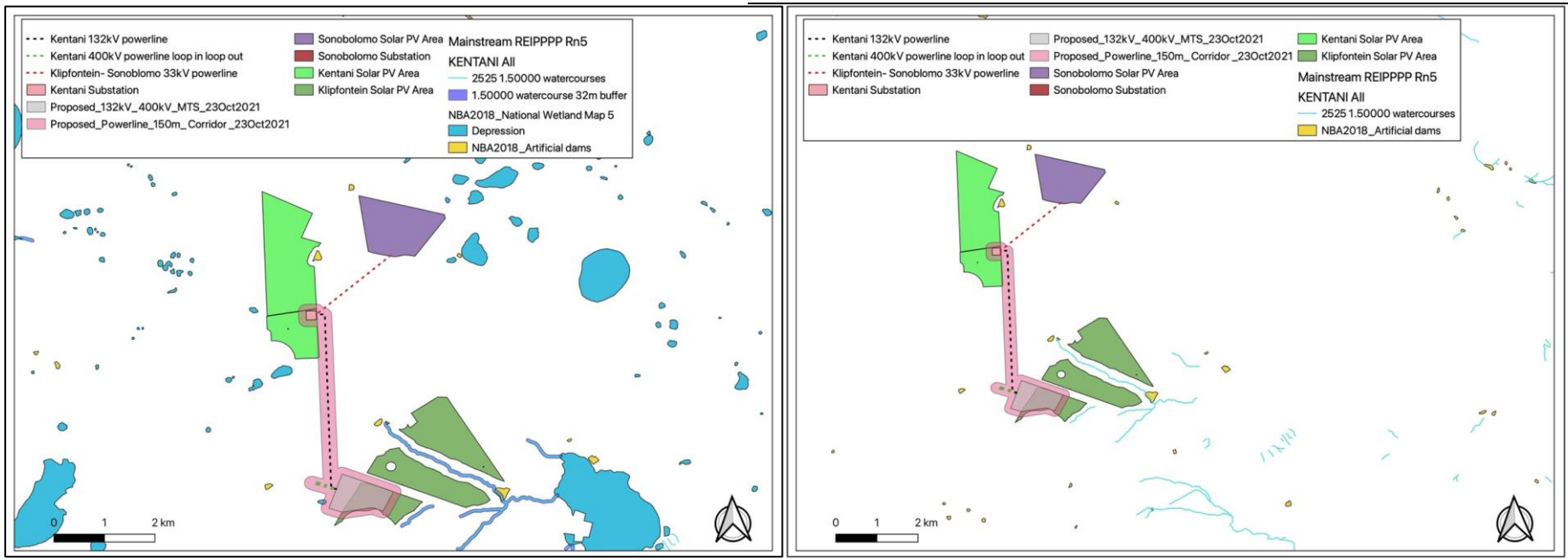

Figure 7-7: National Wetland Inventory wetlands and waterbodies (van Deventer *et al.*, 2020) (left), Watercourses indicated by the 1:50 000 topocadastral NGI data (right)

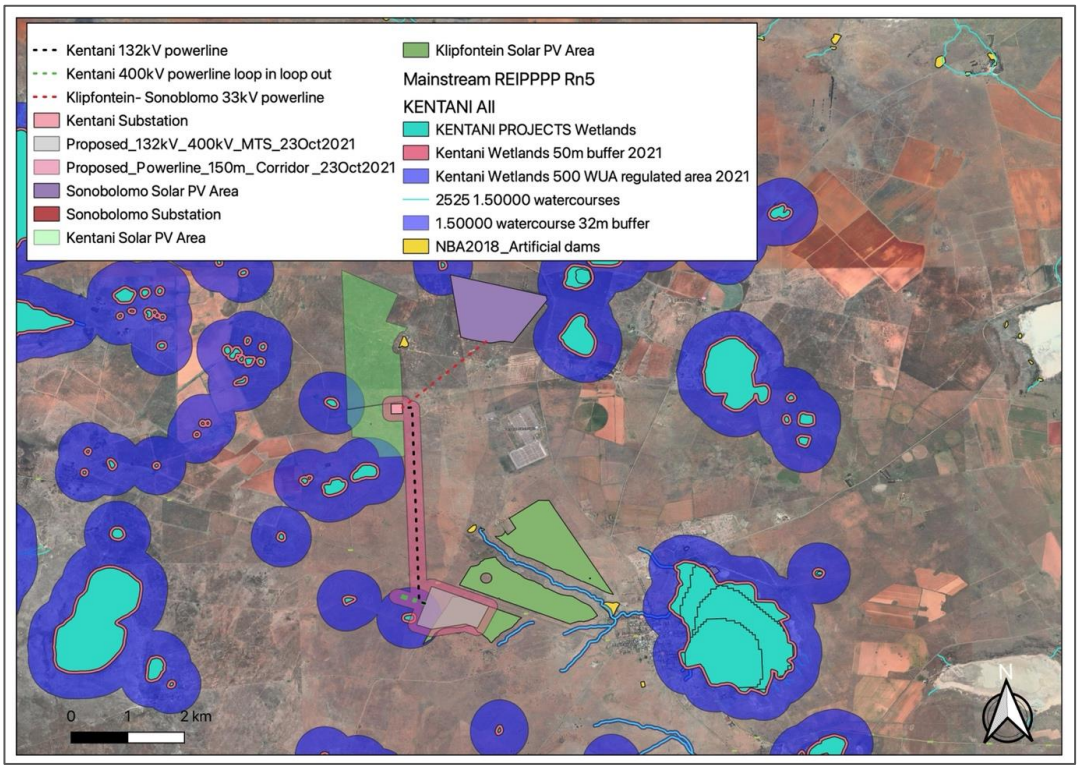

Figure 7-8: Confirmed and delineated waterbodies in relation to the proposed infrastructure as well as any of the regulated WUA areas

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).

The PES scores were revised for the country and based on newer models, aspects of functional importance as well as direct and indirect impacts have been included (DWS, 2014). The new PES system incorporates Ecological Importance (EI) and Ecological Sensitivity (ES) separately as opposed to Ecological Importance and Sensitivity (EIS) in the old model, although the new model is still heavily centred on rating rivers using broad fish, invertebrate, riparian vegetation and water quality indicators. The Recommended Ecological Category (REC) is still contained within the new models, with the default REC being B, when little or no information is available to assess the system or when only one of the above-mentioned parameters are assessed or the overall PES is rated between a C or D.

All the systems assessed by DWS (2014) on a Subquaternary level within the study area were rated as PES = D or Largely Modified within the greater region (SQ3155). 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. Overall, these catchment areas and subsequent rivers / watercourses are 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 pans and depression, range from PES = B (Largely natural) to C (Moderately Modified), link to changes to their catchments being modified by agricultural encroachment.

The DFFE screening tool indicated that small Very High aquatic sensitivity features were located within the greater region (pans), while the remainder of the areas (MTS) were rated a Low (Figure 7-3).

The presence of these Very High Sensitivity features was confirmed during this assessment (See Appendix 2 of the Aquatic Report for Verification Statement), as delineated in Figure 7-8.

The study area is also not located within an International Bird Area (IBA) or a Strategic Water Resource Area but is located within a listed Threatened Ecosystems.

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7.3.4 Terrestrial Ecology

The terrestrial environment of the site is described in broad detail, including the broad-scale vegetation patterns in the area, as well as the different faunal communities that are present in the area (Figure 7-9)

The DEA Screening Tool report for the area indicates the following ecological sensitivities:

Theme	Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
Animal Species Theme			X	
Plant Species Theme				X
Terrestrial Biodiversity Theme	X			

Animal Species theme

Sensitivity features are indicated as follows:

Sensitivity	Feature(s)
Low	Low Sensitivity
Medium	Aves- Neotis ludwigii

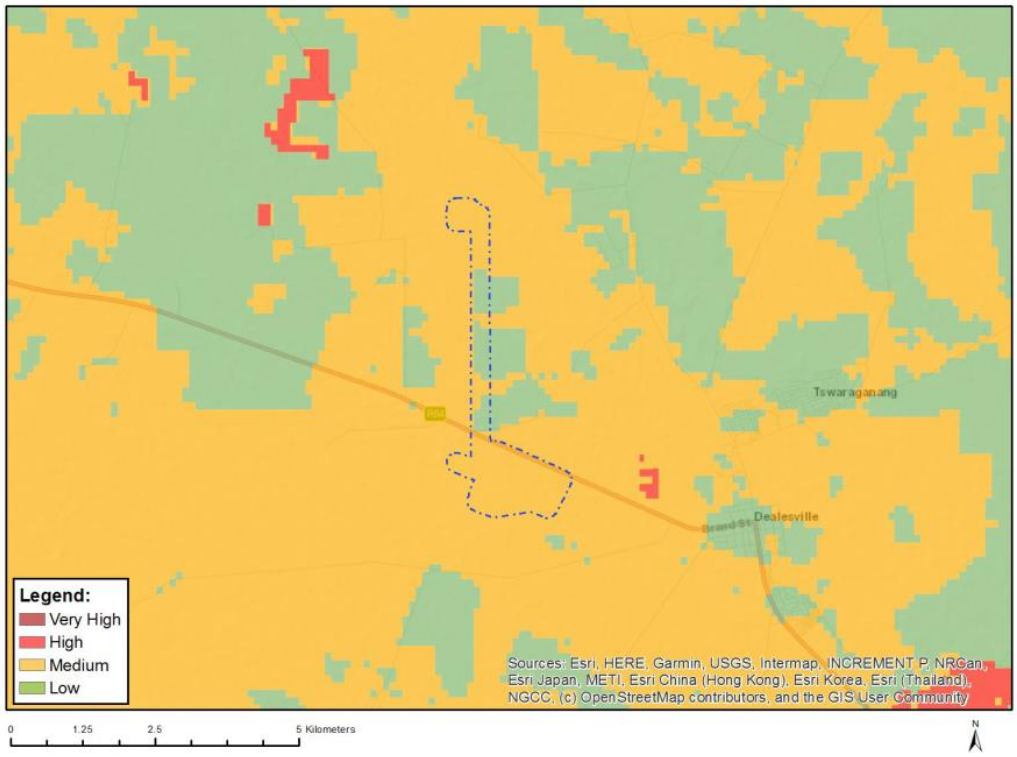

Figure 7-9: The classification of the development site according to the DFFE National Screening Tool

Plant Species theme

Sensitivity features are indicated as follows:

Sensitivity	Feature(s)
Low	Low Sensitivity

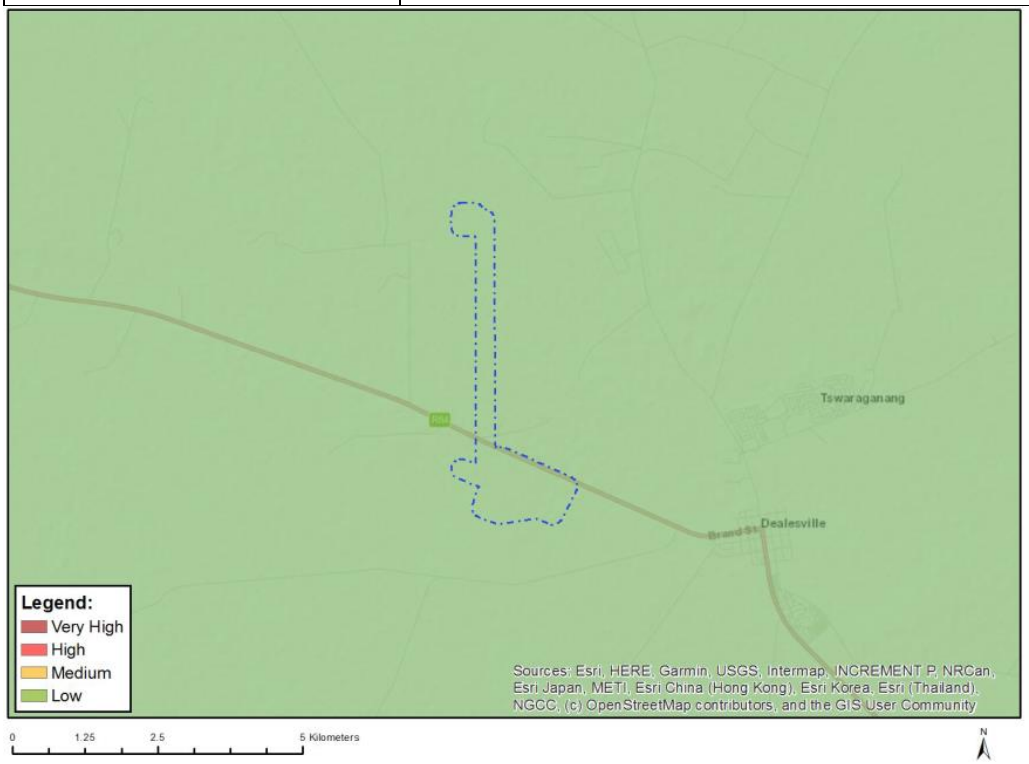

Figure 7-10: The classification of the development site according to the DFFE National Screening Tool

Terrestrial Biodiversity theme

Sensitivity features are indicated as follows: figure ref??

Sensitivity	Feature(s)
Very High	Critical biodiversity area 1
Very High	Endangered Ecosystem

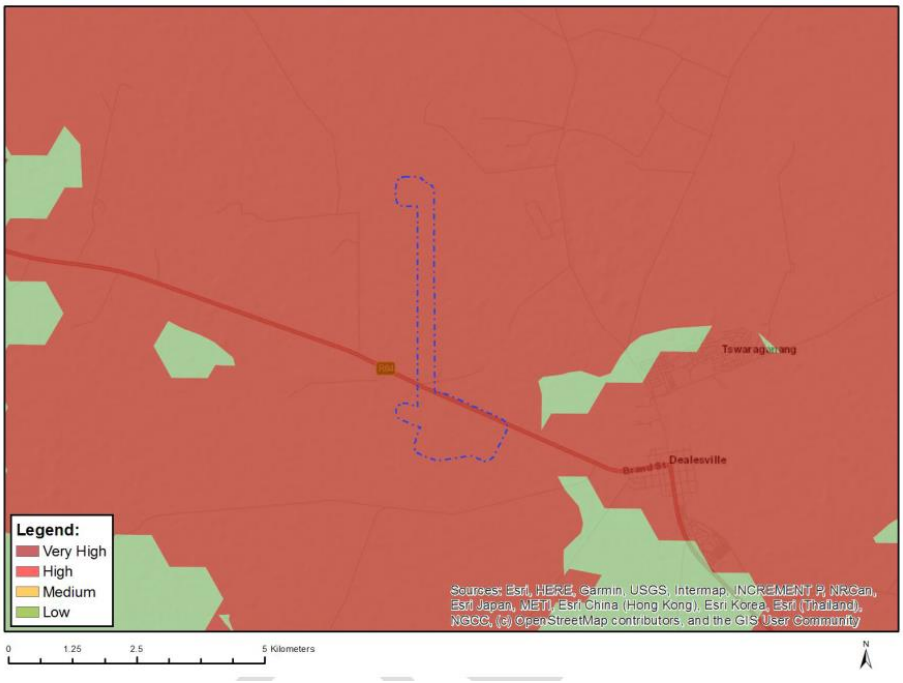

Figure 7-11: The classification of the development site according to the Terrestrial theme in the DFFE National Screening Tool

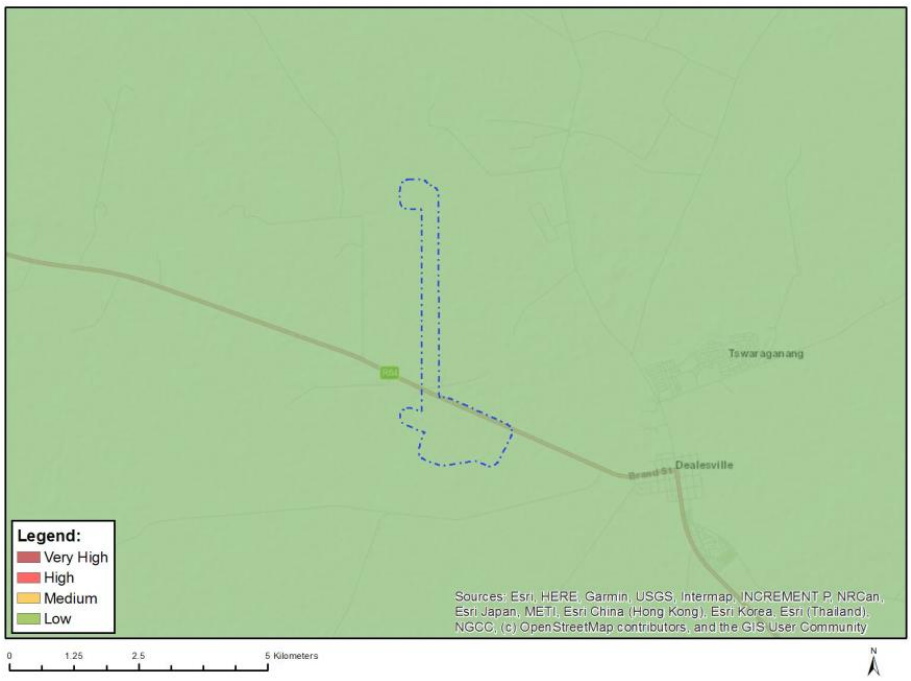

Figure 7-12: The classification of the development site according to the Plant theme in the DFFE National Screening Tool

7.3.4.1Broad Vegetation Patterns

The proposed project area is characterised by one (1) vegetation type, Vaal-Vet Sandy Grassland. The Vaal-Vet Sandy Grassland has been classified as endangered and falls within the Dry Highveld Grassland Bioregion (Figure 7-13 and Figure 7-14). Key environmental variables / ecosystem drivers

in these all grasslands are the amount of rainfall, intensity and type of grazing, frequency and season of fire, soil nutrient status, and soil texture. Key threats are related to fire and grazing mismanagement, cultivation and transformation of grasslands, soil erosion, and invasion by alien invasive plants. The site is predominantly grassland vegetation interspersed with some isolated thorn trees in places.

A total of only 36 plant species were recorded during the field survey (Appendix 1). Some of these are listed for the vegetation type, but they do not represent a typical example of the vegetation type. The diversity of shrubs and low trees, and the presence of species such as Albuca setosa, suggest that the vegetation is an intermediate to the Vaalbos Rocky Shrubland vegetation type, which occurs about 6 km to the west, especially in places where there is surface rockiness. The species composition also suggests some similarities with the other main grassland vegetation type in the general area, namely Western Free State Clay Grassland, with the soil properties probably determining the local species composition (sand vs clay).

Vaal-vet Sandy Grassland (Gh10)

Distribution

North-West and Free State Provinces: South of Lichtenburg and Ventersdorp, stretching southwards to Klerksdorp, Leeudoringstad, Bothaville and to the Brandfort area north of Bloemfontein. Altitude 1 220–1 560 m, generally 1 260–1 360 m.

Vegetation & Landscape Features

Plains-dominated landscape with some scattered, slightly irregular undulating plains and hills. Mainly low-tussock grasslands with an abundant karroid element. Dominance of *Themeda triandra* is an important feature of this vegetation unit. Locally low cover of *T. triandra* and the associated increase in *Elionurus muticus*, *Cymbopogon pospischilii* and *Aristida congesta* is attributed to heavy grazing and/or erratic rainfall.

Important Taxa

Graminoids	*Anthephora pubescens (d), Aristida congesta (d), Chloris virgata (d), Cymbopogon caesius (d), Cynodon dactylon (d), Digitaria argyrograpta (d), Elionurus muticus (d), Eragrostis chloromelas (d), E. lehmanniana (d), E. plana (d), E. trichophora (d), Heteropogon contortus (d), Panicum gilvum (d), Setaria sphacelata (d), Themeda triandra (d), Tragus berteronianus (d), Brachiaria serrata, Cymbopogon pospischilii, Digitaria eriantha, Eragrostis curvula, E. obtusa, E. superba, Panicum coloratum, Pogonarthria squarrosa, Trichoneura grandiglumis, Triraphis andropogonoides.*
Herbs	*Stachys spathulata (d), Barleria macrostegia, Berkheya onopordifolia var. onopordifolia, Chamaesyce inaequilatera, Geigeria aspera var. aspera, Helichrysum caespititium, Hermannia depressa, Hibiscus pusillus, Monsonia burkeana, Rhynchosia adenodes, Selago densiflora, Vernonia oligocephala.*
Geophytic Herbs	*Bulbine narcissifolia, Ledebouria marginata.*
Succulent Herb	*Tripteris aghillana var. integrifolia.*
Low Shrubs	*Felicia muricata (d), Pentzia globosa (d), Anthospermum rigidum subsp. pumilum, Helichrysum dregeanum, H. paronychioides, Ziziphus zeyheriana.*

Endemic Taxa

Herb	*Lessertia phillipsiana.*

Figure 7-13: Vegetation map

Figure 7-14: View south across the proposed substation site from R64.

7.3.4.2Key ecological drivers

Vaal-Vet Sandy Grassland falls within the Dry Highveld Grassland Bioregion. Key environmental variables / ecosystem drivers in these all grasslands are the amount of rainfall, intensity and type of grazing, frequency and season of fire, soil nutrient status, and soil texture. Key threats are related to fire and grazing mismanagement, cultivation and transformation of grasslands, soil erosion, and invasion by alien invasive plants.

Dry Highveld Grasslands (including Vaal-Vet Sandy Grassland) occupy the central plateau of the country extending over much of the Free State, and into the North West Province, with smaller areas in the Eastern and Northern Cape as well as Gauteng. They occur at mid-altitudes of 1 300 -1 600 masl, where the topography is mostly flat to undulating, broken occasionally by rocky ridges, small outcropping mountains and river valleys. They are adapted to a temperate climate with 20 - 50 days of frost a year, and a strongly seasonal summer rainfall of 400 – 550 mm rainfall per annum. The underlying geology is dominated by sandstones and mudstones, giving rise to deep, red soils. Dolerite sheets are associated with shallower, stony soils. In the west, including within the study area, shallow red sands occur over layers of calcrete. The underlying geology is an important determinant of biodiversity, with dolerite areas tending to give rise to ecologically sensitive plant communities with higher levels of local diversity.

The vegetation is dominated by semi-arid sweetveld that is drought-adapted. Plant growth and interactions are driven by environmental limitations (water) rather than competition (Hoare 2009). The plant species show a significant amount of reproduction from seed. Perennial plants persist vegetatively from year to year but new plants establish after droughts from dormant seeds. This dynamic will not be affected by the project.

Grazing is an important ecosystem driver. The unpredictable semi-arid climate, combined with nutrient- rich (unleached) soils, results in nutritious sweetveld. Although these grasslands are slow-growing (due to low rainfall), it can support animal production year-round, which means that it is vulnerable to over-grazing. Where over-grazing occurs, it shifts the plant species composition and structure from a forb-rich grassland to a grassy karroid dwarf shrubland. Healthy grassland in these areas has a high cover of palatable grass species, such as *Themeda triandra*, *Digitaria eriantha* and *Anthephora pubescens*, and few or no karroid shrubs. The proposed project will not affect the grazing status and regime of the area - it is expected that untransformed areas will continue to be grazed as currently.

Fire is not as important in these dryer grasslands as in other more moist grassland areas, and is also less of an ecological factor than grazing. Fuel loads take some time to build up and, because of the slower growth rates, the vegetation takes a longer time to recover from fire. The proposed project will not affect the fire regime of the area and it is expected that the land managers will continue to manage in the same way after construction as currently. The vegetation does not reach a stature that would require burning within the servitude in a different manner to the current regime.

Invasion by alien plant species is an important risk factor in these dry grasslands, as with any grassland area in South Africa. No major nodes of invasion were observed on site, but invasive species that could possibly become problematic due to local disturbance include the grasses, *Arundo donax*, *Pennisetum setaceum*, *Sorghum halepense*, the herbaceous species, *Argemone ochroleuca*)seen on site), *Cirsium vulgare*, *Datura ferox*, *Datura stramonium*, *Salsola kali*, *Solanum eleagnifolium*, *Xanthium spinosum*, *Xanthium strumarium*, the succulents, *Agave americana*, *Echinopsis spachiana*, *Opuntia aurantiaca*, *Opuntia ficus-indica*, *Opuntia fulgida*, *Opuntia humifusa*, *Opuntia imbricata*, *Opuntia spinulifera*, *Opuntia stricta*, and the shrubs / woody species, *Tamarix ramosissima*, *Gleditisia triacanthos*, ***Prosopis glandulosa***, *Robinia pseudoacacia*, *Atriplex nummularia*, *Cotoneaster* sp., *Nicotiana glauca*, *Populus x canescens*, *Ailantus altissima*, *Sesbania punicea*, and ***Melia azeradach***, Disturbance associated with construction is alsmost certain to provide opportunity to invasive species to colonise the site.

Loss of habitat and fragmentation of habitat are disruptive to ecological processes and also lead to local loss of biodiversity. This is why the vegetation type is listed as Endangered, due to high rates of transformation across the geographical range of the vegetation type. Locally, the main factors leading to transformation are urbanisation, infrastructure and cultivation. Both cultivation and utilities infrastructure occur within the study area. The current proposal with lead to additional localised loss of habitat.

7.3.4.3Conservation status of broad vegetation types

According to scientific literature (Driver *et al*., 2005; Mucina *et al*., 2006), as shown in Table 7-5 and Figure 7-15, the vegetation type is listed as Endangered. The National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011), published under the National Environmental Management: Biodiversity Act (Act No. 10, 2004), lists national vegetation types that are afforded protection on the basis of rates of transformation. The thresholds for listing in this legislation are higher than in the scientific literature, which means there are fewer ecosystems listed in the National Ecosystem List versus in the scientific literature. The vegetation type is listed in the National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011).

Table 7-5: Conservation status of different vegetation types occurring in the study area.

Vegetation Type	Conservation status	
	Driver *et al*. 2005; Mucina *et al*., 2006	National Ecosystem List (NEM:BA)
Vaal-vet Sandy Grassland	**Endangered**	**Endangered**

Parts of the site under the powerline are natural grassland and other parts are secondary grassland in previously cultivated areas. On the basis of historical aerial imagery, confirmed in the field, the previously cultivated areas have a well-established secondary growth that structurally resembles the original grassland, although it is poorer in species composition and diversity. The primary grasslands, which are within the CBA1 areas, have higher biodiversity value, but the secondary and degraded grasslands are of lower value.

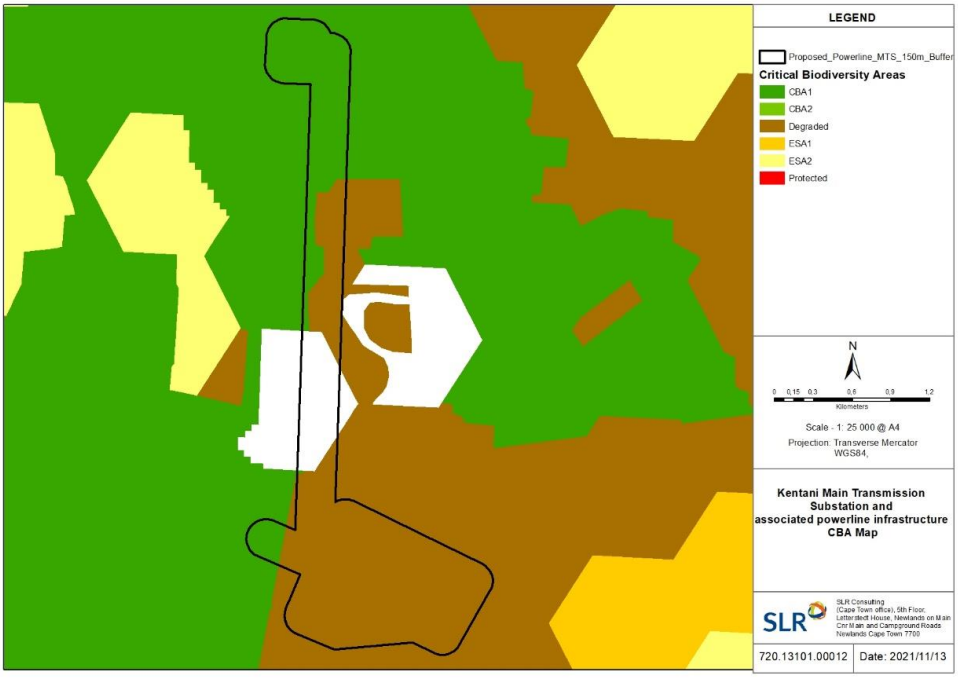

Figure 7-15: Critical Biodiversity Areas within the broad study area that includes the proposed infrastructure.

7.3.4.4Red List plant species of the study area

Listed plant species previously recorded in the Free State were obtained from the South African National Biodiversity Institute (SANBI) website. These are listed in Appendix 2. There are seven threatened species on this list and a total of 35 species of conservation concern that occur in the Free State, but none of them have a geographical distribution that could include the site. **There are therefore no threatened, near threatened or rare species that occur in the study area.**

7.3.4.5Biodiversity Conservation Plans

The Free State CBA map (Figure 7-15) classifies the natural vegetation of the province according to conservation value in decreasing value, as follows:

1. Protected
2. Critical Biodiversity Area One (Irreplaceable Areas) (RED)
3. Critical Biodiversity Area Two (Important Areas) (ORANGE)
4. Ecological Support Area (GREEN)
5. Other Natural Area (YELLOW)

This shows features within the study area within one of these classes, as follows:

1. CBA1 Areas: The northern parts of the grid corridor (see Figure 7-15).

Parts of the study area are previously cultivated. However, the location of these previously cultivated areas has been taken into account in assigning habitats to Critical Biodiversity Areas. Those areas that have been previously cultivated have very little overlap with areas assigned to CBA1 areas (see Figure 6). However, the CBA1 areas are within the area in which parts of the powerline will be placed, for which an impact of low significance after mitigation has been assessed (see Figure 7-16).

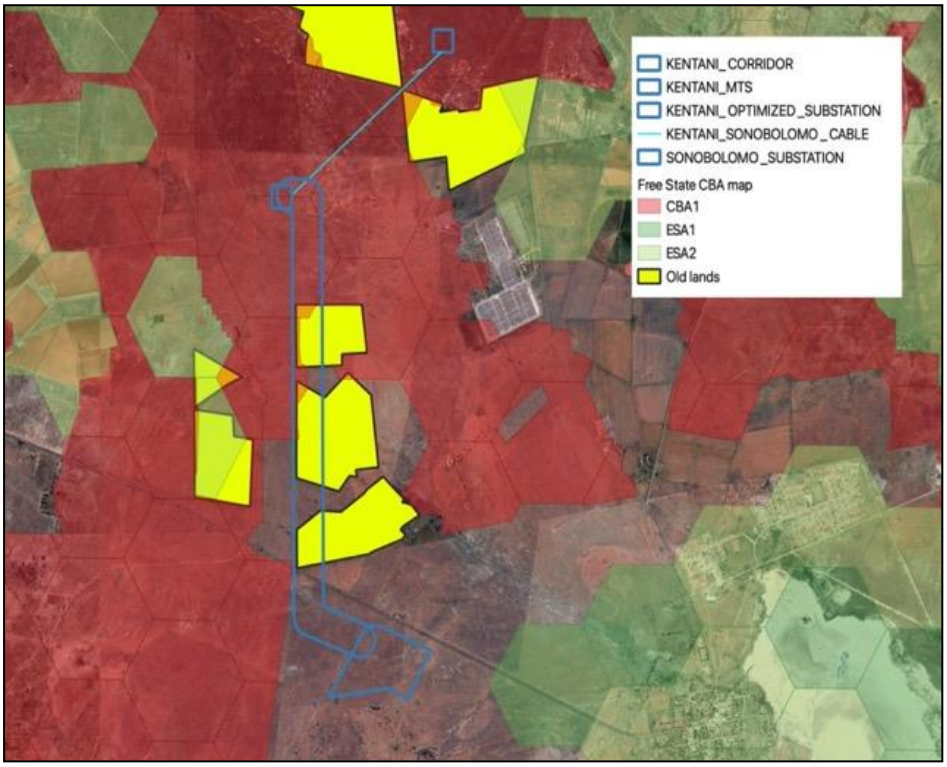

Figure 7-16: Previously cultivated areas in proximity to Critical Biodiversity Areas within the broad study area that includes the proposed infrastructure

7.3.4.6Other important patterns in the study area

The following applies to the study area:

1. No Ecological Support Areas (ESAs) occur within the footprint of the proposed infrastructure.
2. The study area is not within any protected area.
3. According to the National Protected Area Expansion Strategy, the study area is not within any area earmarked for future conservation.
4. There are no indigenous forests within the study area.
5. The site is not within any Freshwater Ecosystem Priority Areas.
6. The site is not within any Strategic Water Source Areas.

7.3.4.7Avifauna

The study area and immediate environment is classified as Low to Medium sensitivity for avifauna, according to the DFFE online screening tool (Figure 7-9). 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, 20 October 2020), namely listed on the IUCN Red List of

We examined the Screening Tool output and found the following:

- MTS Substation – Animal Theme is classed as Medium sensitivity (Figure 7-9), with Ludwig's Bustard highlighted. Avian Theme is not rated.
- The various power lines – Animal Theme is classed as Medium sensitivity (Figure 7-9), again with Ludwig's Bustard highlighted. Avian Theme is not rated.

The environmental sensitivity of the proposed development area for the "Animal Theme" and by implication the "Avian Theme" (although not rated by the tool) was established by our own work as follows:

- desk top analysis, using all available data sources (specified in Section 2.4 of the Avifauna Report); and
- field survey on site as described in Section 2.3 of the Avifauna Report (Appendix 5)

Based on our work we confirm that the site is of Medium sensitivity for avifauna.

Avifaunal community

The first and second Southern African Bird Atlas Projects (Harrison *et al*, 1997; and **www.sabap2.adu.org.za**) recorded a combined total of approximately 273 bird species in the broader area within which the proposed project is located. These are the species which could occur on the proposed site if conditions are right, but they have not all necessarily been confirmed on the site. Included amongst these 273 species are a number of regionally and globally Red Listed bird species and a number of endemics. These species are the priority bird species for this assessment and are presented in Table 7-7. A brief field survey recorded 19 bird species (Table 7-6), including most importantly a pair of Secretarybird *Sagittarius serpentarius*.

Table 7-6: 19 bird species were recorded on the site

Common name	*Taxonomic Name*	Regional, Global, Endemic[20]	SABAP 1	SABAP 2	Specialist survey
Secretarybird	*Sagittarius serpentarius*	VU, VU	1	1	1

[20] Regional: Red Data regional (Taylor et al, 2015). CR- Critically Endangered; EN-Endangered; VU-Vulnerable; NT-Near-threatened; LC-Least concern

Common name	*Taxonomic Name*	Regional, Global, Endemic[20]	SABAP 1	SABAP 2	Specialist survey
Lark, Large-billed	*Galerida magnirostris*	NE	1	1	1
Starling, Pied	*Lamprotornis bicolor*	SLS	1	1	1
Chat, Ant-eating	*Myrmecocichla formicivora*		1	1	1
Cisticola, Desert	*Cisticola aridulus*		1	1	1
Courser, Double-banded	*Rhinoptilus africanus*		1	1	1
Dove, Laughing	*Spilopelia senegalensis*		1	1	1
Dove, Red-eyed	*Streptopelia semitorquata*		1	1	1
Fiscal, Southern (Common)	*Lanius collaris*		1	1	1
Francolin, Orange River	*Scleroptila gutturalis*		1	1	1
Kestrel, Greater	*Falco rupicoloides*		1	1	1
Lapwing, Crowned	*Vanellus coronatus*		1	1	1
Lark, Eastern Clapper	*Mirafra fasciolata*		1	1	1
Lark, Spike-heeled	*Chersomanes albofasciata*		1	1	1
Pipit, African	*Anthus cinnamomeus*		1	1	1
Sparrow-weaver, White-browed	*Plocepasser mahali*		1	1	1
Sparrow, Southern Grey-headed	*Passer diffusus*		1	1	1
Swallow, Greater Striped	*Cecropis cucullata*		1	1	1
Korhaan, Northern Black	*Afrotis afraoides*			1	1

Important Bird Areas

No Important Bird and Biodiversity Areas (IBA's) exist on or close to the site. The closest is the Soetdoring Nature Reserve approximately 30km south-east of the site. This is too far to be relevant to this study.

Coordinated Avifaunal Roadcounts

Two to three Coordinated Avifaunal Roadcount (CAR) routes are located close enough to the proposed site for their data to be relevant (Figure 7-17). The most relevant of these are: FS55 and FS65, which are both situated less than 3km from the proposed site at their closest point. CAR counts are a vehicle-based census of birds (focussed on large terrestrial species) performed twice annually (in winter and summer) by volunteer birdwatchers. The purpose is to provide population data for use in science, especially conservation biology, by determining findings about the natural habitats and the birds that use them. Relevant bird species recorded regularly on the FS55 and FS65 routes include Blue Crane *Grus paradisea*, Northern Black Korhaan *Afrotis afraoides*, Secretarybird, and White Stork *Ciconia ciconia*.

Global: IUCN, 2021

Endemic: E-Endemic; NE-Near-endemic; SLS-Endemic to South Africa, Lesotho, Swaziland; BSLS=Endemic to Botswana, SA, Lesotho, Swaziland

SABAP1, 2 = Southern African Bird Atlas Project 1 and 2. '1' denotes presence, not abundance

Specialist site visit = recorded on the specialists site visit in September 2021

Coordinated Waterbird Counts

Coordinated Waterbird Counts (CWAC) consist of a programme of mid-summer and midwinter censuses at a large number of South African wetlands. The counts are conducted by citizen scientists at more than 400 wetlands around the country and provide a useful source of information on wetland bird species in South Africa. No CWAC sites exist close enough to the proposed site to be relevant.

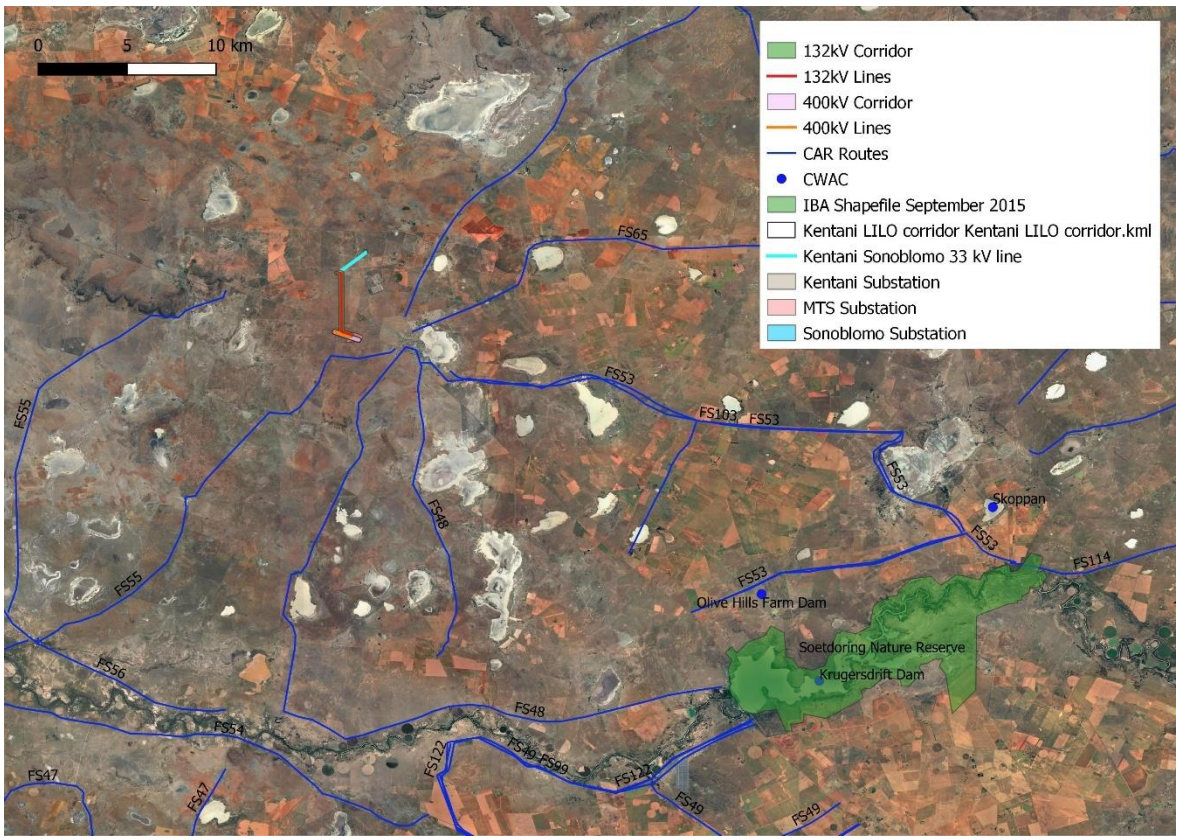

Figure 7-17: Coordinated Avifaunal Roadcount (CAR) routes

Three main ecological groups of bird species are relevant to this assessment:

1. Raptors – including White-backed Vulture, Martial *Polemaetus bellicosus* and Tawny Eagles *Aquila rapax*, Black Harrier *Circus maurus*, and Lanner Falcon *Falco biarmicus*. These species will occur throughout the site and will be at some risk of collision with the power line and electrocution on the power line.

2. Large terrestrial species – including Ludwig's Bustard *Neotis ludwigii*, Blue Crane, Secretarybird, Kori Bustard *Ardeotis kori*. These species will occur mostly in the more open areas and will be at high risk of collision with overhead cables.

3. Small terrestrial species – such as pipits, larks, coursers, pratincoles, plovers, and many others. These species will occur on the site and be at risk of habitat destruction and disturbance.

Table 7-7: Priority bird species for the site.

Common name	*Taxonomic name*	Regional, Global, Endemic[21]	SAB AP1	SAB AP2	Specialist survey	Likelihood of occurring on site	Potential impacts
Vulture, White-backed	*Gyps africanus*	CR, CR		1		Probable, confirmed nearby	Electrocution, collision
Harrier, Black	*Circus maurus*	EN, EN, NE	1	1		Possible	Collision, habitat destruction, disturbance
Bustard, Ludwig's	*Neotis ludwigii*	EN, EN	1	1		Possible	Collision, habitat destruction, disturbance
Stork, Yellow-billed	*Mycteria ibis*	EN, LC	1			Unlikely	-
Eagle, Martial	*Polemaetus bellicosus*	EN, VU	1			Possible	Electrocution, collision
Eagle, Tawny	*Aquila rapax*	EN, VU	1			Possible	Electrocution, collision
Courser, Burchell's	*Cursorius rufus*	VU, LC	1	1		Possible	Habitat destruction, disturbance
Falcon, Lanner	*Falco biarmicus*	VU, LC	1	1		Possible	Collision, habitat destruction, disturbance
Stork, Black	*Ciconia nigra*	VU, LC	1	1		Unlikely	-
Tern, Caspian	*Hydropogne caspia*	VU, LC	1	1		Unlikely	-
Pelican, Pink-backed	*Pelecanus rufescens*	VU, LC	1			Unlikely	-
Secretarybird	*Sagittarius serpentarius*	VU, VU	1	1	1	Confirmed	Collision, habitat destruction, disturbance
Pipit, African Rock	*Anthus crenatus*	NT, LC, SLS		1		Possible	Habitat destruction, disturbance
Flamingo, Greater	*Phoenicopterus roseus*	NT, LC	1	1		Unlikely	-
Roller, European	*Coracias garrulus*	NT, LC	1	1		Possible	Habitat destruction, disturbance
Stork, Abdim's	*Ciconia abdimii*	NT, LC	1	1		Possible	Collision, habitat destruction, disturbance
Bustard, Kori	*Ardeotis kori*	NT, NT	1	1		Possible	Collision, habitat destruction, disturbance
Flamingo, Lesser	*Phoeniconaias minor*	NT, NT	1	1		Unlikely	-
Pratincole, Black-winged	*Glareola nordmanni*	NT, NT	1	1		Possible	Habitat destruction, disturbance
Plover, Chestnut-banded	*Charadrius pallidus*	NT, NT		1		Possible	Habitat destruction, disturbance
Crane, Blue	*Grus paradisea*	NT, VU	1			Possible	Collision, habitat destruction, disturbance

[21] Regional: Red Data regional (Taylor et al, 2015). CR- Critically Endangered; EN-Endangered; VU-Vulnerable; NT-Near-threatened; LC-Least concern
Global: IUCN, 2021
Endemic: E-Endemic; NE-Near-endemic; SLS-Endemic to South Africa, Lesotho, Swaziland; BSLS=Endemic to Botswana, SA, Lesotho, Swaziland
SABAP1, 2 = Southern African Bird Atlas Project 1 and 2. '1' denotes presence, not abundance

Common name	*Taxonomic name*	Regional, Global, Endemic[21]	SAB AP1	SAB AP2	Specialist survey	Likelihood of occurring on site	Potential impacts
Duck, Maccoa	*Oxyura maccoa*	NT, VU	1			Unlikely	-
Korhaan, Blue	*Eupodotis caerulescens*	LC, NT, SLS	1	1		Possible	Collision, habitat destruction, disturbance
Sandpiper, Curlew	*Calidris ferruginea*	LC, NT	1			Possible	Habitat destruction, disturbance
Egret, Slaty	*Egretta vinaceigula*	NA, VU	1	1		Unlikely	-
Swallow, South African Cliff	*Petrochelidon spilodera*	BSLS	1	1		Possible	Habitat destruction, disturbance
Bulbul, Cape	*Pycnonotus capensis*	E	1	1		Possible	Habitat destruction, disturbance
Buzzard, Jackal	*Buteo rufofuscus*	NE	1	1		Possible	Habitat destruction, disturbance
Chat, Sickle-winged	*Emarginata sinuata*	NE	1	1		Possible	Electrocution, habitat destruction, disturbance
Cisticola, Cloud	*Cisticola textrix*	NE	1	1		Possible	Habitat destruction, disturbance
Flycatcher, Fairy	*Stenostira scita*	NE	1	1		Possible	Habitat destruction, disturbance
Flycatcher, Fiscal	*Melaenornis silens*	NE	1	1		Possible	Habitat destruction, disturbance
Lark, Large-billed	*Galerida magnirostris*	NE	1	1	1	Confirmed	Habitat destruction, disturbance
Lark, Melodious	*Mirafra cheniana*	NE	1	1		Possible	Habitat destruction, disturbance
Thrush, Karoo	*Turdus smithi*	NE	1	1		Possible	Habitat destruction, disturbance
Warbler, Namaqua	*Phragmacia substriata*	NE	1	1		Possible	Habitat destruction, disturbance
White-eye, Cape	*Zosterops virens*	NE	1	1		Possible	Habitat destruction, disturbance
Canary, Black-headed	*Serinus alario*	NE	1			Possible	Habitat destruction, disturbance
Prinia, Karoo	*Prinia maculosa*	NE	1			Possible	Habitat destruction, disturbance
Tit-Babbler (Warbler), Layard's	*Sylvia layardi*	NE		1		Possible	Habitat destruction, disturbance
Starling, Pied	*Lamprotornis bicolor*	SLS	1	1	1	Confirmed	Habitat destruction, disturbance
Lark, Eastern Long-billed	*Certhilauda semitorquata*	SLS	1			Possible	Habitat destruction, disturbance
Prinia, Drakensberg	*Prinia hypoxantha*	SLS	1			Possible	Habitat destruction, disturbance

7.4 HERITAGE RESOURCES (ARCHEOLOGY, PALEAONTOLOGY, CULTURAL LANDSCAPE)

The DEA Screening Tool report for the area indicates the following ecological sensitivities:

Theme	Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
Archaeological and Cultural Heritage Theme		x		
Palaeontology Theme		x		

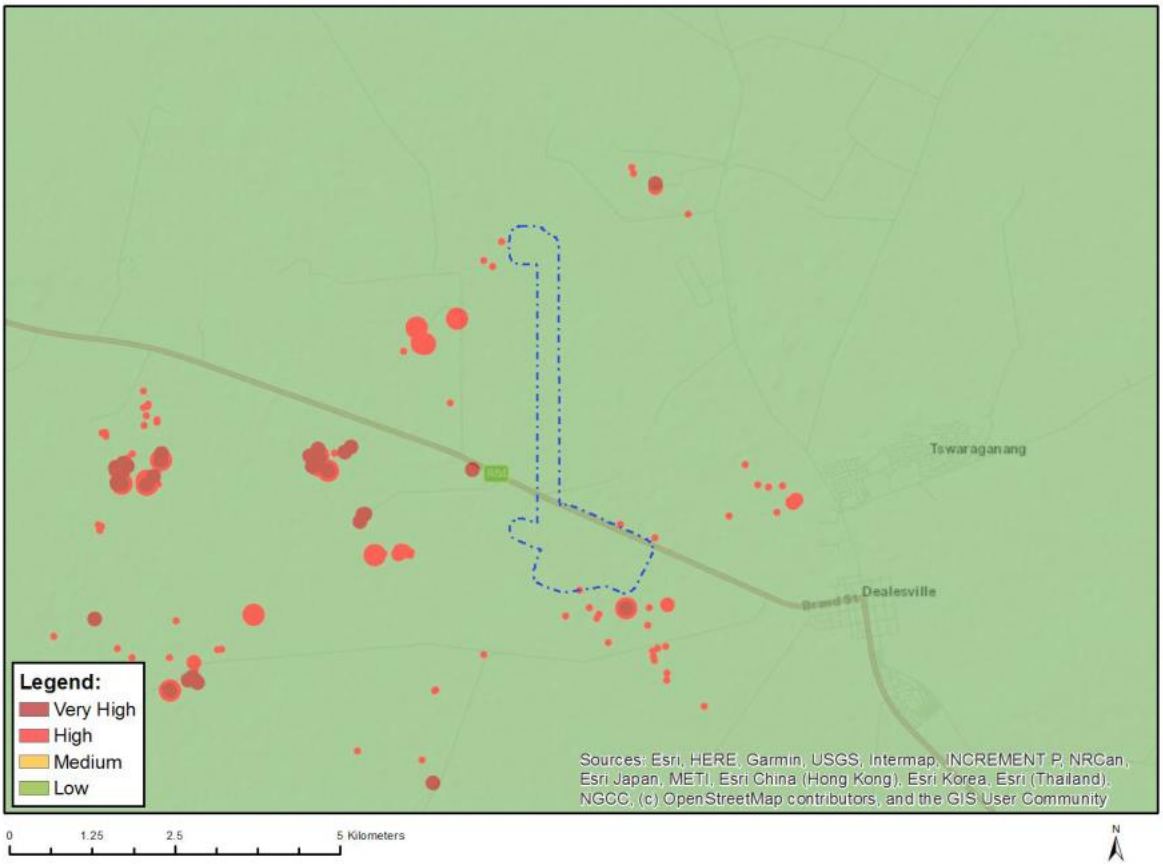

Figure 7-18: The classification of the development site according to the DFFE National Screening Tool

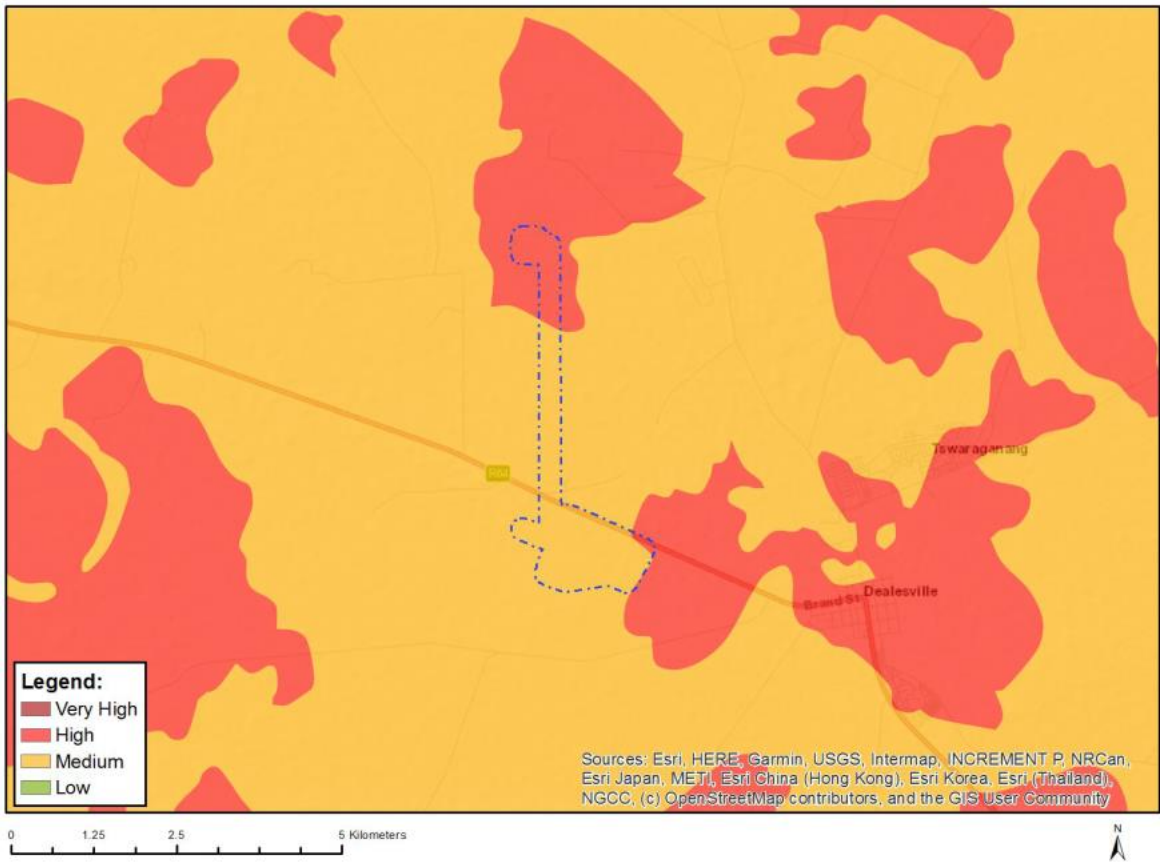

Figure 7-19: The classification of the development site according to the DFFE National Screening Tool

7.4.1 Archaeology

Stone Age material occurs widely across southern Africa, while the Iron Age, which only occurred within the last 2000 years, is present only in the eastern parts where summer rainfall allowed for the cultivation of summer crops. Stone-walled settlements dating to the Iron Age have been widely documented in parts of the Free State and adjacent Northern Cape (Maggs 1976a, 1976b) but the Iron Age appears to be absent from the vicinity of Dealesville. Later Stone Age stone-built dwellings are known from along the Riet River about 100 km to the southwest (Humphreys 1972, 2009). With the exception of the rich MSA deposits of Florisbad (Kuman *et al.* 1999) and the MSA and LSA stone artefact assemblages from Erfkroon (Churchill *et al.* 2000), significant archaeological resources appear to be quite rare in this flat, open and well-grassed landscape. Archaeological material is, however, more common along the major rivers where artefacts are revealed in the river terrace gravels.

Webley (2010) surveyed an area to the southeast of the present development area and reported a complete absence of archaeological material. She further noted that stone suitable for the manufacture of flaked tools was not present and that the quantity of other rock available on the surface was insufficient to allow for the construction of stone dwellings. Hutten's (2011) survey of land to the north of Boshoff showed similar results but in that case a pan was present with a large scatter of MSA and LSA artefacts present alongside it. The same applied to a survey immediately west of the present development area where many thousands of artefacts were found adjacent to a pan (Orton 2016a). This demonstrates the preference to settle close to water sources that is prevalent across much of the relatively dry interior of southern Africa. Orton's (2015) survey of large areas surrounding and to the south of the present development area showed heritage

resources to be quite common. They included built structures, artefact scatters and a number of rock engravings. The vast majority of resources were located in close proximity to the rock outcrop areas closer to Dealesville, while further south into the grasslands the archaeology dropped off significantly. The majority of artefacts located by Orton (2015) were attributable to Pleistocene-aged Middle Stone Age (MSA) background scatter and were associated with gravel exposures. They did not constitute *in situ* living sites. However, some artefacts dating to the Holocene Later Stone Age (LSA) were also noted. To the north of the present development area, Kaplan (2020, 2021) found similar artefacts ascribable to the MSA, with higher densities being present alongside pans.

Rock engravings occur widely in the interior of South Africa where suitable rock exists. Many sites are located in the Free State with the National Museum, Bloemfontein (2014) listing numerous examples that may be visited by the public. However, no sites seemed to be on record for the Dealesville area prior to Orton's (2015; see also Orton 2016b) survey. He located engravings dating within the last 2000 years and attributable by their geometric style to the Khoekhoe as well as figurative engravings done by the San. The former were found on a small dolerite hill 2 km west of the southern end of the present development area where flaked stone artefacts and ground patches on the dolerite were also recorded. Dolerite rocks with shallow grinding grooves and ground cupules have also been recorded in the area (Orton 2016a, b).

The remains of a historical stone-walled kraal also occur alongside the engraved outcrop described above (Orton 2015). Another stone-walled kraal and house ruin where recorded by Orton (2016a, b) to the west of the proposed MTS footprint, while Kaplan (2020) found stone-walled ruins to the north of the proposed powerline corridor.

7.4.1.1Site Assessment

The northernmost 1.1 km of the proposed powerline corridor were found to be free of gravel and stone artefacts. However, from this point southwards, ephemeral gravel patches and occasional stone artefacts attributable to background scatter were noted. The northernmost occurrence of gravel is indicated in Figure 7-20, along with all other recorded finds. A few background scatter finds are shown in
Figure 7-21. An interesting observation was made within the MTS site. Here, an old excavation was found that showed the presence of a hornfels gravel lag deposit beneath the present soily surface (Figure 7-23). There were relatively few gravel clasts on the surface away from this excavation showing that their origin, at least in this area, is a buried layer beneath the surface. Very few artefacts were located within this area (Figure 7-23) suggesting that the density of artefacts within this gravel lag is low at this point. It is impossible to extend this prediction over a wider area because there are other factors (e.g. past hornfels gravel exposures) affecting artefact density that cannot be accounted for.

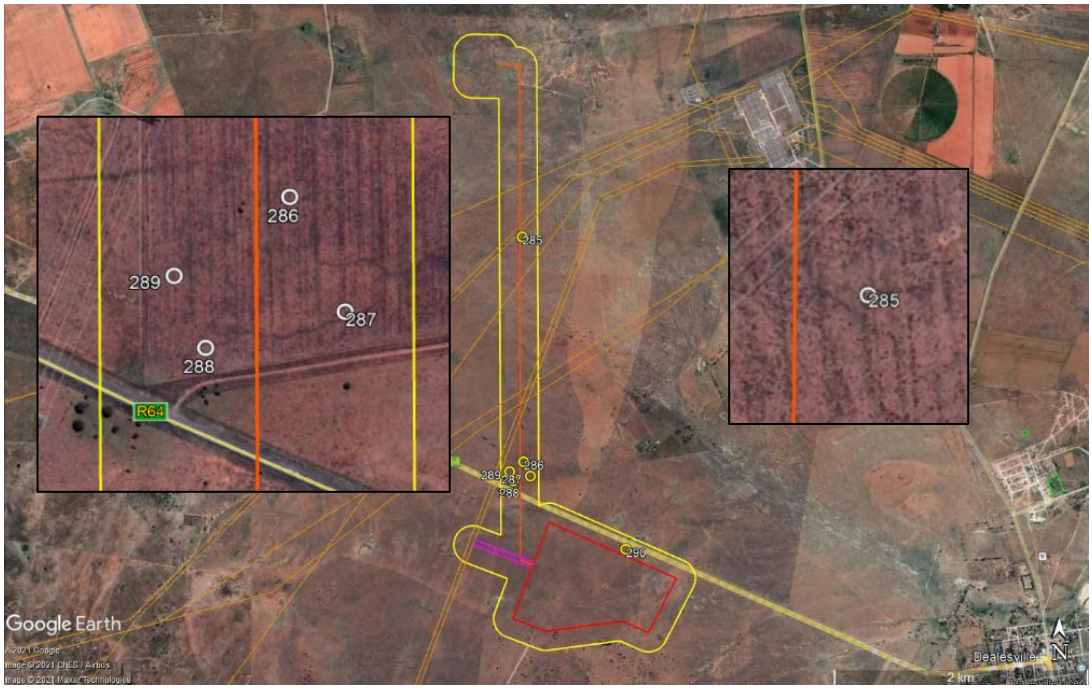

Figure 7-20: Aerial view of the development area showing the distribution of finds recorded during the survey. "First gravel" marks the place where the first clasts were seen while moving towards the south.

Figure 7-21: Selection of background scatter artefacts found during the survey. 1 = MSA proximal blade. 2 = MSA point with broken tip. 3 = flake. 4 = flake showing black hornfels in recent break at tip. 5, 6, 8 = cores. 7 = handaxe with broken tip.

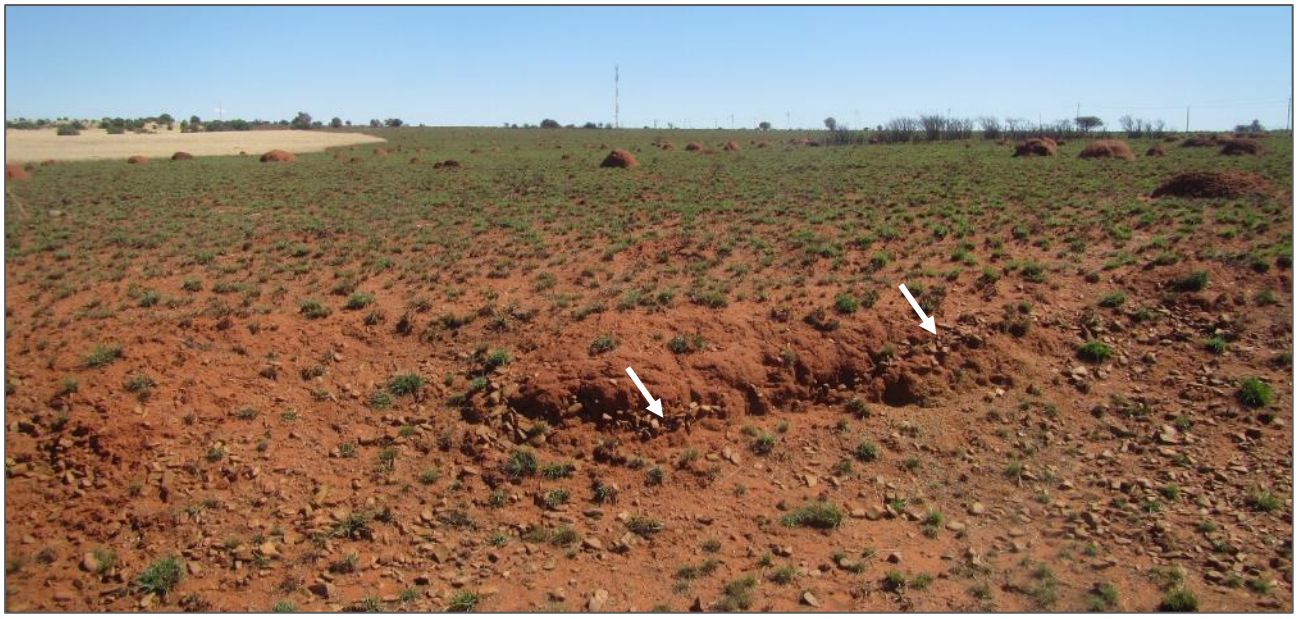

Figure 7-22: View of the section of an excavation in the centre of the MTS site. A gravel lag deposit is evident beneath the surface (arrowed), while in the grassy area above there were minimal clasts present.

Figure 7-23: Close-up of the subsurface hornfels gravel lag deposit. Beneath the gravel is dolerite. Scale in 1 cm and 5 cm intervals (left) and Stone artefacts found in the gravels in the excavation. Scale in 1 cm and 5 cm intervals (right)

Five locations were recorded as Stone Age sites because they had sufficiently high artefact densities to not be purely the result of background scatter. While they do not reflect *in situ* living sites, it is likely that they were originally deposited in this area but have been redistributed by natural processes and ploughing over time. All were located in close proximity to the R64, four of them to its north within the powerline corridor and one of them to the south just outside of the MTS site (Figure 7-20). The four to the north are best regarded as points demarcating a single larger scatter of material. The locations and descriptions of these sites are provided in Table 7-8.

Table 7-8: List of sites recorded during the survey.

Waypoint	Location	Description	Significance (Grade)
285	S28 38 38.7 E25 43 28.8	A possible stone feature with 10 rocks that are almost submerged beneath the surface. A few other rocks are also present in the vicinity. The orientation of the rocks in approximately NE-SW. The location is within an old ploughed field. All these factors together suggest that the site is not a grave mound and can safely be ignored.	None
286	S28 39 36.0 E25 43 29.3	A large and quite widespread scatter of heavily weathered and patinated hornfels stone artefacts. The scatter includes flakes, blades, cores and bifacial artefacts. The artefacts are likely mostly MSA, but some ESA pieces are also present. The latter include a very large flake of about 19 cm and some bifacial artefacts.	Low-medium (GPB)
287	S28 39 39.6 E25 43 31.2	A scatter of heavily weathered and patinated hornfels stone artefacts including various flakes, blades and cores.	Low (GPC)
288	S28 39 40.8 E25 43 26.3	A scatter of heavily weathered and patinated hornfels stone artefacts including various flakes and blades.	Low (GPC)
289	S28 39 38.5 E25 43 25.2	A scatter of heavily weathered and patinated hornfels stone artefacts including various flakes and blades.	Low (GPC)
290	S28 39 58.3 E25 43 58.9	A scatter of heavily weathered and patinated hornfels stone artefacts including various flakes, blades and cores as well as one probable LCT.	Low (GPC)

The largest scatter was at waypoint 286 (Figure 7-24), although it is likely that the material at waypoint 286 to 289 simply reflects patches of a larger occurrence, since artefacts were present thinly throughout this area. At waypoint 286 a variety of flakes, blades, cores and some bifacial artefacts were found. It is likely that all the bifacial pieces were handaxes (also known as large cutting tools [LCTs]) but breakage and weathering make a definitive ascription difficult. The small size of the bifacial artefacts (Figure 22 shows a distinctive one) may suggest an ascription to the so-called Fauresmith. Herries (2011:17) states that "LCTs are not distinctive only of the Acheulian and their persistence in some assemblages should not be used to equate them with the Acheulian but [should be seen] simply as a surviving ESA [Early Stone Age] element in an otherwise MSA assemblage." This works well in the present context where the majority of diagnostic artefacts are clearly from the MSA. These include blades and points, although the characteristic faceted platforms are not visible due to the amount of surface weathering and patination present. In a general sense, many of the artefacts appear similar to those illustrated from Kanteen Kopje and ascribed there to the Fauresmith (Kuman *et al.* 2020).

Figure 7-24: Stone artefacts from waypoint 286. Scale in 1 cm and 5 cm intervals.

Figure 7-25: A small LCT from waypoint 286 showing both faces and both edges. Scale in 1 cm and 5 cm intervals.

Waypoints 287 to 289 showed similar artefacts but in smaller numbers and with fewer bifacial items. Figure 23 shows two artefacts from waypoint 287, while Figure 7-27 shows the ground surface at nearby waypoint 288 with flakes present amongst the surface gravel.

Figure 7-26:: Two artefacts from waypoint 287. On the left is a very large flake with marks originating from being ploughed over and to the right is a small probable LCT. Scales in 1 cm and 5 cm intervals.

Figure 7-27: View of the surface at waypoint 288 with flakes and gravel clasts visible.

The last site was a scatter located further to the southeast at waypoint 290. This scatter was fairly similar in content to those described above but of lower density. Figure 7-28 shows a selection of finds from this scatter.

Figure 7-28: Artefacts from waypoint 290. On the left is a probable LCT and some flakes and blades, while a core is shown to the right. Scale in 1 cm and 5 cm intervals.

7.4.1.2Graves

Orton (2015, 2016a, 2016b) has located several farm graveyards in the area as well as one isolated grave. No graves were seen during the recent survey.

7.4.2 Historical aspects and the Built environment

Historical resources will be primarily associated with farmsteads, although most are likely to be fairly recent, perhaps dating to the late 19th or early 20th centuries. Several such resources – buildings, ruins and artefact scatters (the latter two both covered under archaeology) were located in the area by Orton (2015). The town of Dealesville is relatively recent, dating to 1899 (Raper n.d.). It was laid out on the farm Klipfontein belonging to John Henry Deale and was awarded municipal status in 1914.

The second Anglo-Boer War (1899-1902) played a significant role in South African History, particularly in the interior of the country. Many battles were fought between the British and Boer forces. Significant battles in proximity to the present development area include the Battles of Modder River and Magersfontein 100 km to the southwest and west respectively, the Battle of Paardeberg 60 km to the southwest and the Battle of Driefontein just outside Bloemfontein, some 60 km to the southeast. Graves, graveyards and memorials across the central interior of South Africa serve as reminders of the war.

7.4.2.1Site Assessment

No historical sites were located in or close to the development area. The MTS and associated infrastructure would be located some 2.4 km west of the western edge of Dealesville. The town has few, if any, significant historical structures.

7.4.2.2Cultural Landscapes and Scenic Routes

The grasslands of the central interior of South Africa do have a particular character but this landscape type is very widespread and the Dealesville area is not special for any particular reason. In addition, it is noted that the landscape in and around the development area is visually very strongly dominated by electrical infrastructure. The R64 which links (from west to east) Kimberley, Boshof, Dealesville and Bloemfontein is

the primary road traversing the area. The road is not a tourist route and, because it does not cross an especially scenic landscape, is not regarded as a scenic route of any significance.

7.4.2.3Statement of significance and provisional grading

Section 38(3)(b) of the NHRA requires an assessment of the significance of all heritage resources. In terms of Section 2(vi), ''cultural significance'' means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. The reasons that a place may have cultural significance are outlined in Section 3(3) of the NHRA (see Section 2 above).

The archaeological resources are deemed to have up to low-medium cultural significance at the local level for their scientific value.

The cultural landscape is largely a rural landscape with minimal aesthetic value. It is of low cultural significance at the local level.

7.4.3 Summary of heritage indicators

Archaeological materials are non-renewable and easily disturbed heritage resources.

- Indicator: Significant archaeological materials should not be disturbed without appropriate study.

The landscape in this instance is dominated by electrical infrastructure. Nevertheless, new infrastructure provides further visual intrusion into the cultural landscape.

- Indicator: The proposed project should not dominate views from multiple directions.

7.4.4 Palaeontology

The proposed 132kV/400kV On-site MTS and associated infrastructure near Dealsville in the Free State is depicted on the 1:250 000 2824 Kimberley Geological Map (1993) (Council of Geoscience, Pretoria) (Figure 7-29).

The area is underlain by Quaternary sediments mantling the Jurassic dolerite, and the Tierberg Formation of the Ecca Group (Karoo Supergroup). According to the PalaeoMap on the South African Heritage Resources Information System (SAHRIS) database, the Palaeontological Sensitivity of the Jurassic dolerite is Zero as it is igneous in origin, that of the Quaternary superficial sediments is low but locally high, while the Tierberg Formation has a High Palaeontological Sensitivity (Almond and Pether, 2009; Almond *et al*., 2013) (Figure 7-29).

As seen on the topographical and Google Earth Images the relief of the proposed project is low. The area is also extensively mantled by superficial alluvium and calcrete soils. Fossils are found in widespread bedding planes in the Tierberg Formation, Ecca Group (Karoo Supergroup) which are not widespread present in the proposed development footprint.

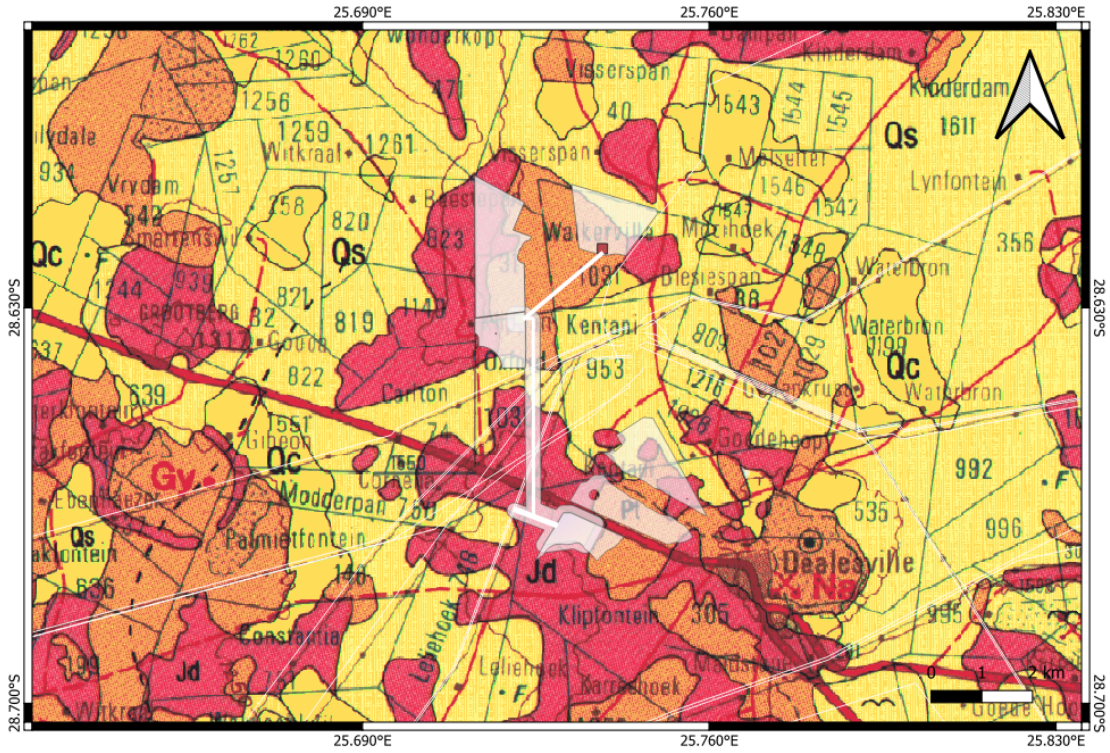

Figure 7-29: Extract of the 1:250 000 2824 Kimberley Geological Map (1993) (Council of Geoscience, Pretoria) indicating (in white) the proposed Mainstream 132kV/400kV On-site MTS and associated infrastructure near Dealsville in the Free State.

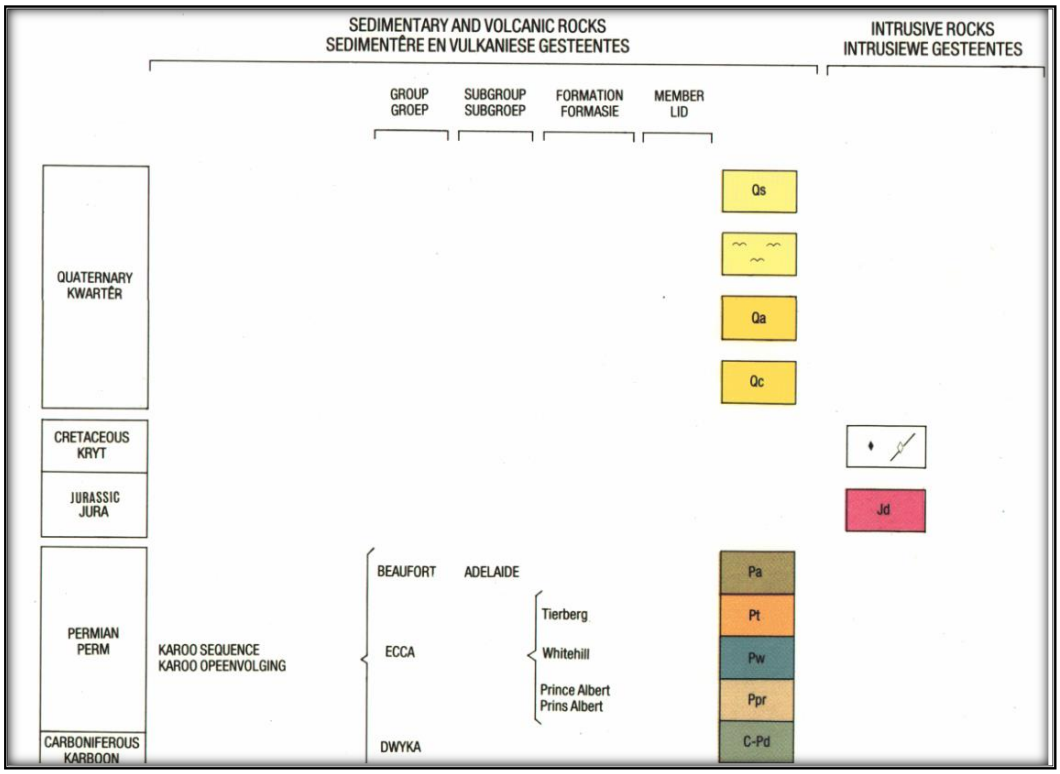

Figure 7-30: Legend of 250 000 2824 Kimberley Geological Map (1993) (Council of Geoscience, Pretoria).

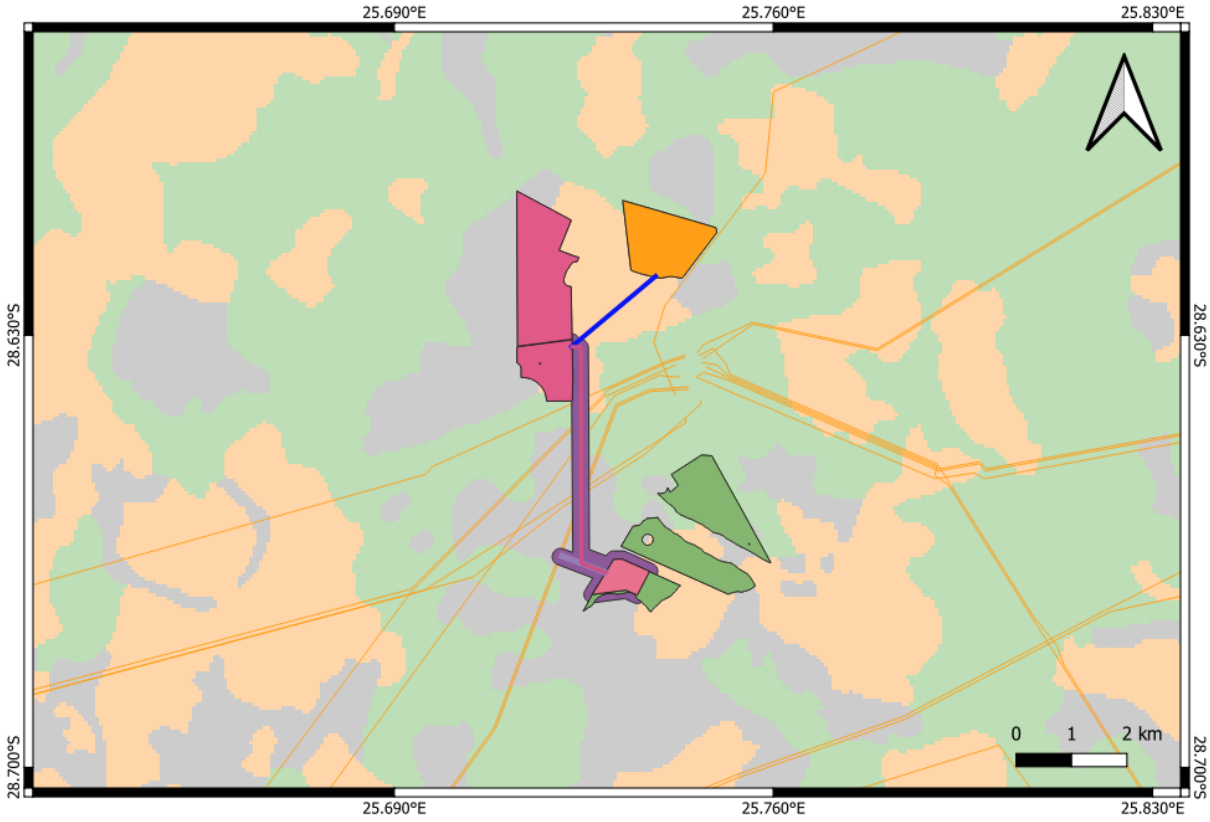

Figure 7-31: Legend to Map and short explanation of the development and surrounding sediments (Modified from the 1:250 000 2824 Kimberley Geological Map (1993) (Council of Geoscience, Pretoria). Formations present in the development is indicated in bold

Symbol	Stratigraphy	Lithology
Qs	**Quaternary**	**Sand: Red ab=nd grey Gravel, Diamondiferous in places**
Qa	Quaternary	Alluvial diamondiferous gravel
Qc	Quaternary	Calcrete, calcified pandune and surface limestone.
Qc	Quaternary	Calcrete
Jd	**Jurassic**	**Dolerite**
Pt	**Tierberg Formation, Ecca Group, Karoo Supergroup**	**Sandstone, siltstone, mudstone**
C-Pd	Dwyka Group, Karoo Supergroup	Tillite, sandstone, shale

7.4.4.1Site Assessment

Large areas of the proposed Mainstream 132kV/400kV On-site MTS and associated infrastructure are underlain by Jurassic dolerite while a small portion of the development is underlain by the Tierberg Formation (Ecca Group, Karoo Supergroup). According to the PalaeoMap on the South African Heritage Resources Information System (SAHRIS) database, the Palaeontological Sensitivity of Jurassic dolerite is Zero

as it is igneous in origin while that of the Tierberg Formation is High (Almond and Pether, 2009; Almond *et al*., 2013).

A site-specific field survey of the proposed MTS and associated grid infrastructure was conducted on foot and by motor vehicle on 11 September and 27 October 2021.

No visible evidence of fossiliferous outcrops were found (Figure 7-32 to Figure 7-35). For this reason, an overall low palaeontological sensitivity is allocated to the development footprint. The scarcity of fossil heritage at the proposed development footprint indicates that the impact of the proposed electrical infrastructure will be of a low significance in palaeontological terms. It is therefore considered that the proposed development is feasible and will not lead to detrimental impacts on the palaeontological reserves of the area. The construction of the development may thus be authorised in its whole extent, as the development footprint is not considered sensitive in terms of palaeontological resources.

Figure 7-32:Flat topography and grassy vegetation of the proposed site with no fossiliferous outcrops GPS coordinates S-28,629167 and E25,736944 (left) Flat topography, very short grass with a few trees. No fossiliferous outcrops. GPS coordinates S-28,668333 and E25,757778

Figure 7-33: Existing powerlines in grass veld. No fossiliferous outcrops GPS coordinates S-28,662222 and E25,736944 (left) and View over development towards the north. Note the flat topography and grassy vegetation. No fossiliferous outcrops GPS coordinates S-28,664167 and E25,728889.

Figure 7-34:Flat topography and grassy vegetation of the proposed site with no fossiliferous outcrops GPS coordinates S-28,682500 and E25,720000 (left) and Flat topography and high grassy vegetation with

isolated trees in the proposed footprint. No fossiliferous outcrops GPS coordinates S-28,696389 and E25,715000

Figure 7-35:View towards the south with electricity infrastructure in the background. No fossiliferous outcrops GPS coordinates S-28,716111 and E25,700833 (left) and East of the R64 an unfossiliferous outcrop of the Tierberg Formation (Ecca Group, Karoo Supergroup) is present. No fossils were discovered GPS coordinates S-28,620000 and E25,749722

7.5 VISUAL PROFILE

In assessing visual sensitivity, the proposed development was examined in relation to the Landscape Theme of the National Environmental Screening Tool to determine the relative landscape sensitivity for this type of development. The tool does not however identify any landscape sensitivities in this respect.

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 judgements 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 or nature-based tourism) which may be based on this aesthetic appeal.

In order to assess the visual sensitivity of the broader area, SiVEST has developed a matrix based on the characteristics of the receiving environment which, according to the Guidelines for Involving Visual and Aesthetic Specialists in the EIA Processes, indicate that visibility and aesthetics are likely to be 'key issues' (Oberholzer: 2005) (see Section 6 of the Visual Report in Appendix 6).

7.5.1 Topography

The general area in the vicinity of the power line and substation assessment corridor is characterised by relatively flat to slightly undulating terrain (Figure 7-36).

Figure 7-36: View northwards across the study area showing relatively flat terrain.

The power line and substation assessment corridors are characterised by relatively flat terrain no significant topographic features (Figure 7-37 and Figure 7-38).

Maps showing the topography and slopes within and in the immediate vicinity of the combined assessment area are provided in Figure 7-39 and Figure 7-40 below.

Figure 7-37: View north-west across the power line assessment corridor showing gently undulating terrain.

Figure 7-38: View south across the proposed substation site from R64.

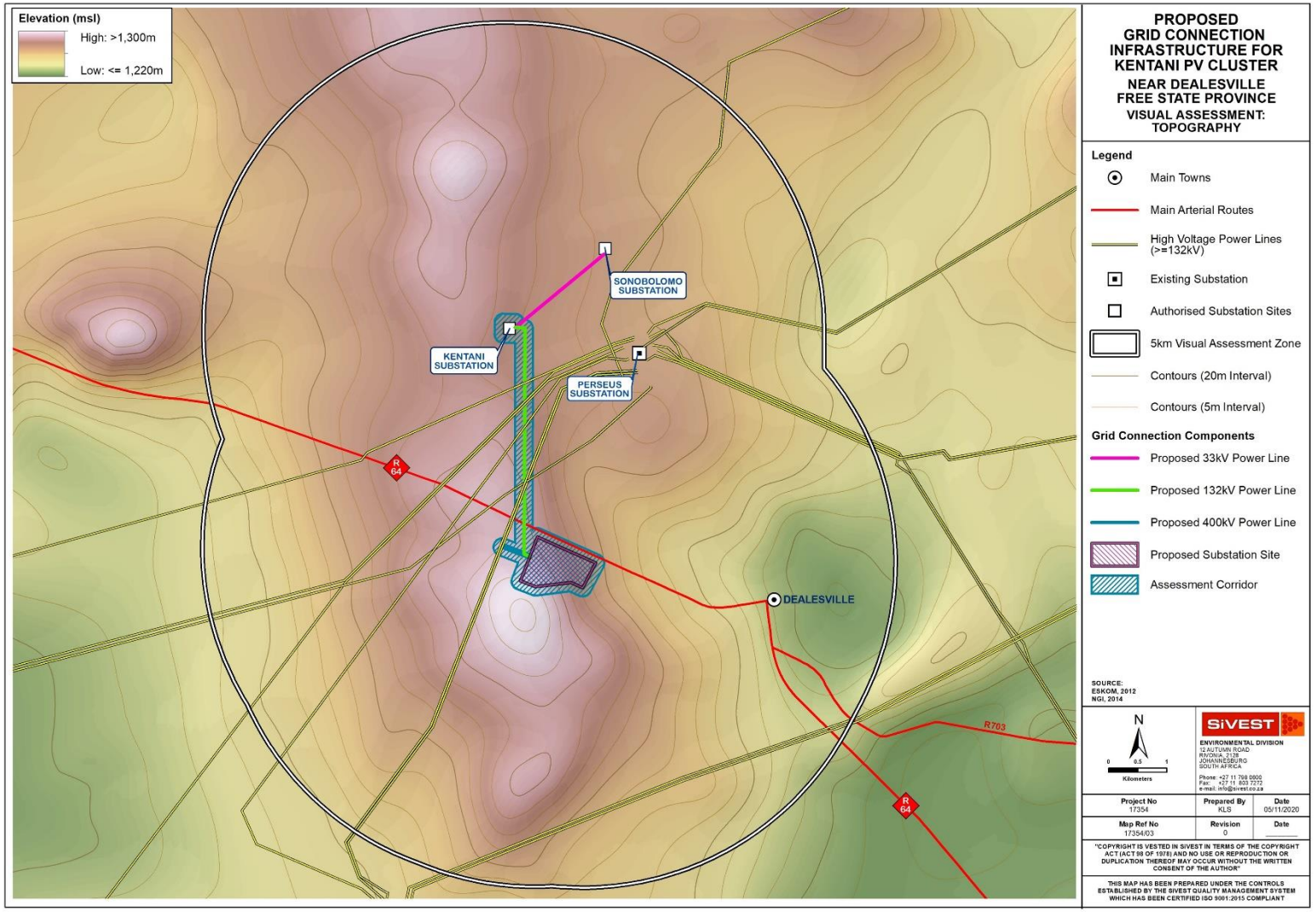

Figure 7-39: Topography within the study area

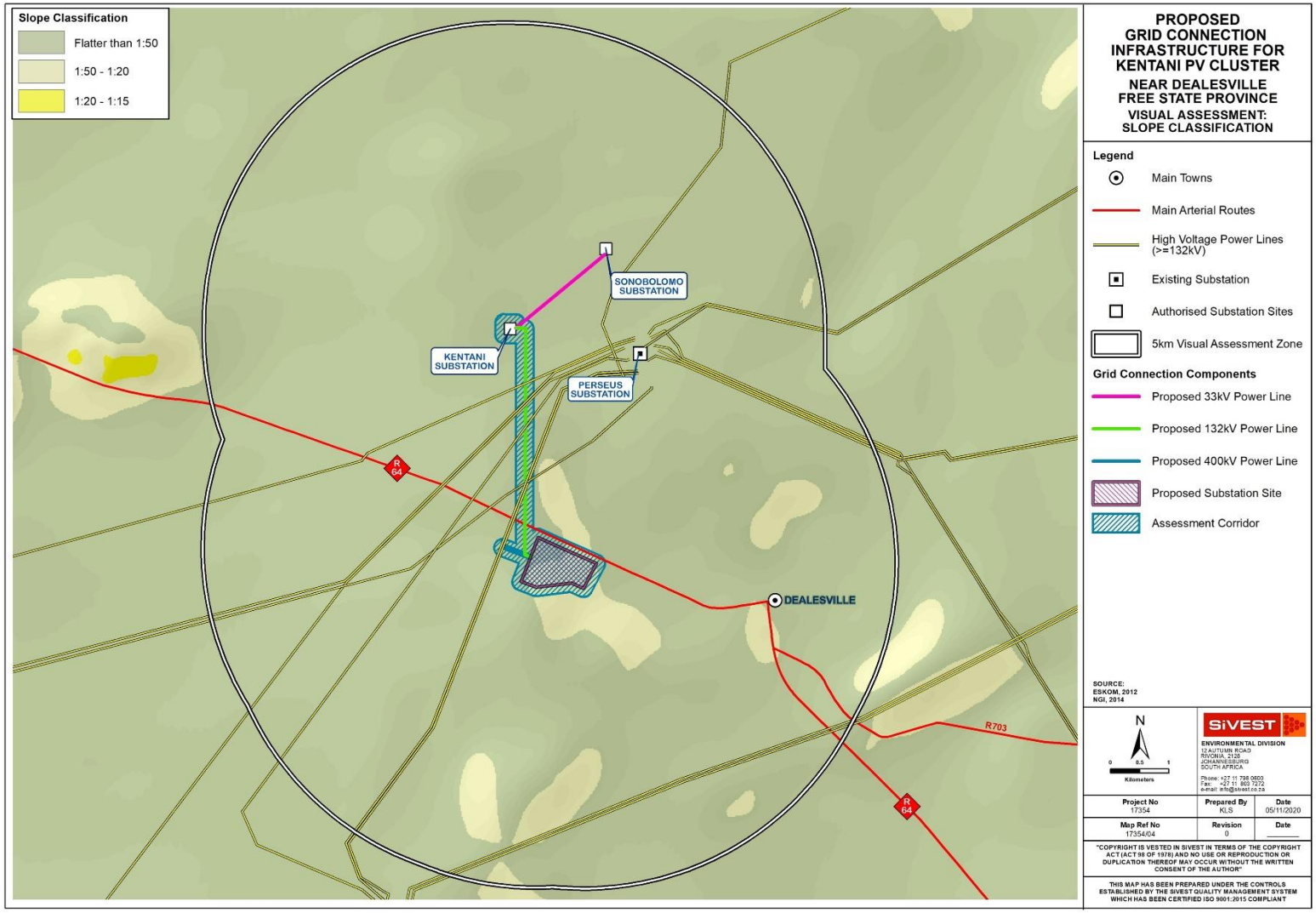

Figure 7-40: Slope Classification in the study area.

7.5.2 Visual Implications

Areas of flatter relief, including plains and slightly higher-lying plateaus are characterised by wide ranging vistas. Bearing in mind that power lines and substations are very large structures (potentially up to 22m in height), these structures could be visible from a considerable area around the site. Localised topographic variations may limit views of power line from some parts of the study area, but across the remainder of the study area there would be very little topographic shielding to lessen the visibility of the steel structures of the proposed on-site substation from many of the locally occurring receptor locations.
GIS technology was used to undertake a preliminary visibility analysis for the proposed power lines and substation based on the project information provided by Mainstream. This analysis was based on points placed at 250 m intervals along the centre line of the corridor alternatives, and the centre point of the substation site and assumes a tower height of 22 m. The resulting viewshed indicates the geographical area from where the proposed power lines and substation sites would theoretically be visible, i.e. the zone of visual influence or viewshed. This analysis is based entirely on topography (relative elevation and aspect) and does not take into account any existing vegetation cover or built infrastructure which may screen views of the proposed development. In addition, detailed topographic data was not available for the broader study area and as such the viewshed analysis does not take into account any localised topographic variations which may constrain views. This analysis should therefore be seen as a conceptual representation or a worst-case scenario.

The results of this analysis, as per Figure 7-41 below, show that elements of the proposed grid connection infrastructure would be highly visible from many parts of the study area, and very few areas are outside the viewshed for the proposed power lines and substation site.

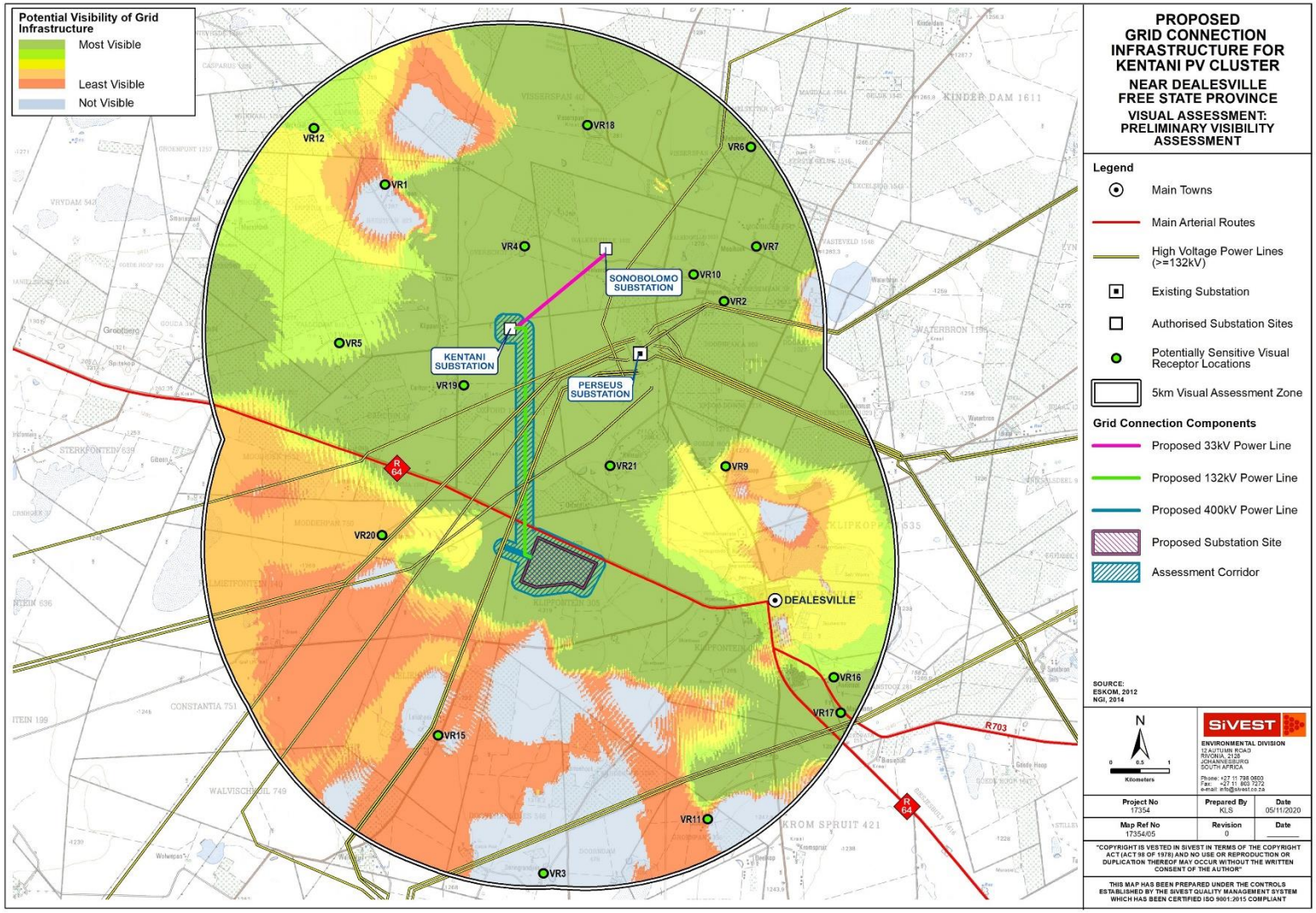

Figure 7-41: Potential visibility of power lines and substation.

7.5.3 Vegetation

According to Mucina and Rutherford (2012), much of study area is covered by the Vaal-Vet Sandy Grassland vegetation type, which tends to occur plains-dominated landscapes. This vegetation type largely comprises low tussock grassland (Figure 7-42) with an abundant karroid element. Also present in the south-eastern and south-western sectors of the study area is the Western Free State Clay Grassland vegetation type which is commonly found in flat bottomlands which support dry, species-poor grassland with embedded salt pans (Playas).

Figure 7-42: Grasslands typical across much of the study area.

Significant areas of the natural vegetation cover have however been partly removed or transformed by cultivation as well as the presence of tall exotic trees scattered in clusters across the study area and around farmsteads (Figure 7-43 and Figure 7-44). Vegetation classifications across the study area are shown in Figure 7-43 below.

Figure 7-43: Example of scattered trees in the landscape.

Figure 7-44: Tall trees providing screening around a farm house north-east of the power line assessment corridor.

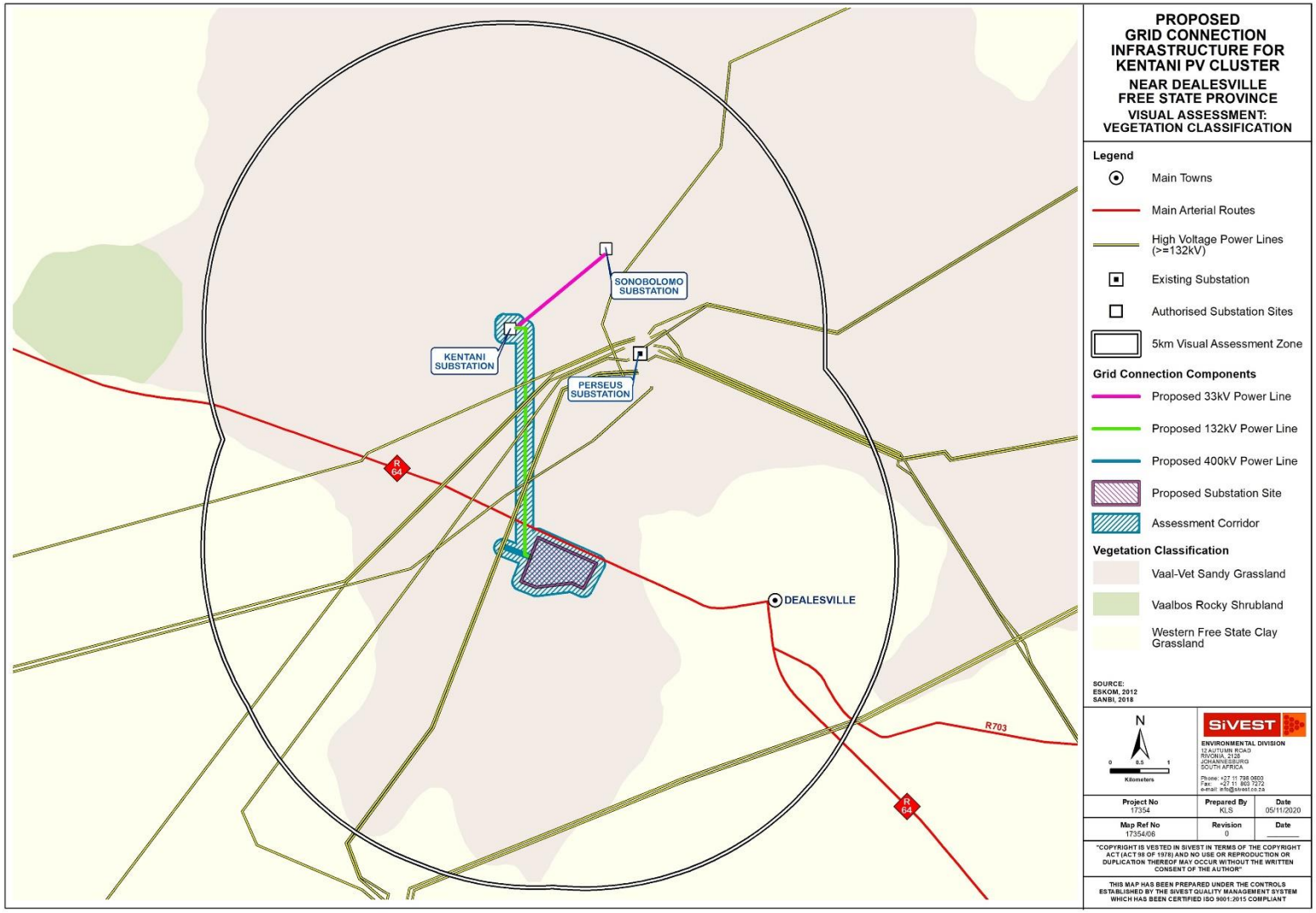

Figure 7-45: Vegetation Classification in the study area.

7.5.3.1 Visual Implications

The proposed development will contrast significantly with the predominant vegetative cover in the area, although scattered trees and shrubs will provide some limited degree of screening. However, tall trees planted around farmhouses in the area may restrict views from these receptor locations thus potentially reducing impacts experienced by the potentially sensitive receptors in the area.

7.5.4 Land Use

According to the South African National Land Cover dataset (Geoterraimage 2020), much of the visual assessment area is classified as “Grassland” interspersed with significant areas of “Cultivation”. Small tracts of forested land and numerous water bodies are scattered throughout the study area (Figure 7-46).

Commercial agriculture is the dominant activity in much of the study area, with the main focus being maize cultivation (Figure 7-47) and livestock grazing. Farm properties in much of the study area are relatively large, resulting in a low density of rural settlement characterised by scattered farmsteads. Built form associated with these areas is limited to farmsteads (Figure 7-48), including farm worker’s dwellings and ancillary farm buildings, gravel access roads, telephone and electricity lines and fences.

High levels of human influence are however visible in the eastern sector of the study area. Perseus Substation (Figure 7-49) located to the east of the assessment corridor is a prominent anthropogenic feature in the landscape. In addition, the extensive network of high voltage power lines associated with this substation and with Beta Substation to the south, forms a major visual component in the landscape (Figure 7-50).

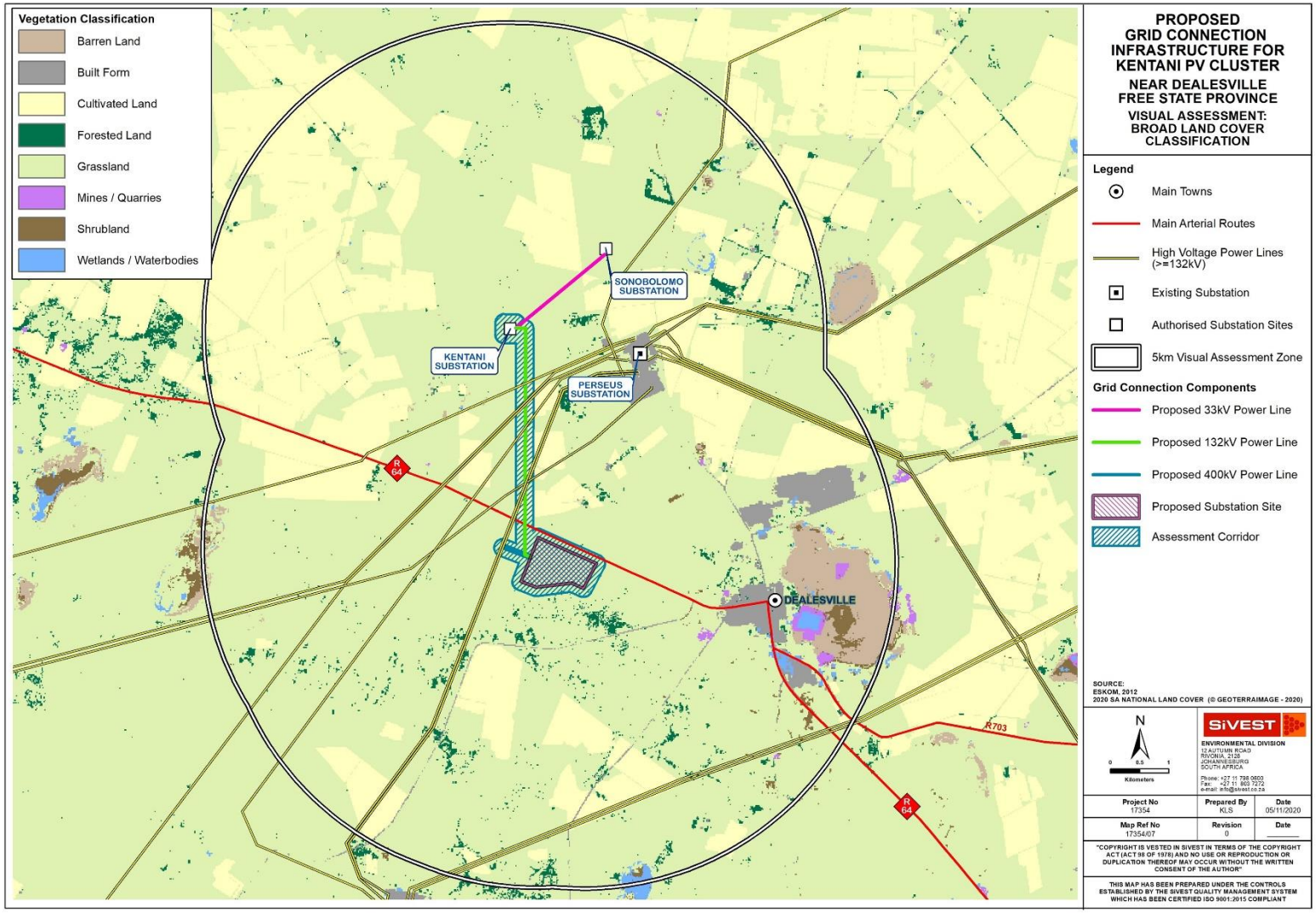

Figure 7-46: Land Cover Classification in the study area.

Figure 7-47: Cultivated land north of Perseus Substation.

Figure 7-48: Typical farmstead located east of the power line assessment corridor.

Figure 7-49: High voltage power lines feeding into Perseus Substation.

Figure 7-50: High voltage power lines in the vicinity of the assessment corridor.

The town of Dealesville, located in the south-eastern sector of the study area, is a small agricultural service centre that includes the town of Dealesville (Figure 7-51) with associated road and electricity / telecommunications infrastructure. To the north-east of Dealesville is the Tswaraganang Township with associated residential development and electricity infrastructure (Figure 7-52). The visual character of these

urban and peri-urban areas is significantly degraded and the level of degradation has been exacerbated by the presence of a refuse dumping site located on the outskirts the town. The refuse site and the litter around the site (Figure 7-53) contribute to the overall disturbed nature of the area.

Other significant anthropogenic elements in the landscape include the R64 main road which traverses the study area in a north-west / south-east direction. (Figure 7-54).

Figure 7-51: Centre of Dealesville.

Figure 7-52: View of Tswaraganang Township to the north-east of Dealesville town centre.

Figure 7-53: Litter in the vicinity of the Dealesville refuse dump.

Figure 7-54: R64 Main road heading south-east towards Dealesville.

7.5.4.1Visual Implications

The relatively low density of human habitation and presence of natural vegetation cover across large portions of the study area would give the viewer the general impression of a largely natural setting with some pastoral elements resulting from cultivation and livestock farming. High levels of human transformation and visual degradation become evident however in the southern sector of the study area where extensive electrical infrastructure, including Perseus Substation and associated high voltage power lines are prominent features in the landscape. In addition, the urban / peri-urban development in and around Dealesville and Tswaraganang Township have significantly altered the visual character in this sector of the study area and resulted in a general degradation of the landscape, extending into the urban periphery. Hence, the visual impacts associated with the proposed development are expected to be relatively insignificant in these areas as they have already undergone significant transformation and degradation.
The influence of the level of human transformation on the visual character of the area is described in more detail below.

7.5.5 Visual Character and Cultural Value

The physical and land use-related characteristics of the study area as described above contribute to its overall visual character. Visual character largely depends on the level of change or transformation from a natural baseline in which there is little evidence of human transformation of the landscape. Varying degrees of human transformation of a landscape would engender differing visual characteristics to that landscape, with a highly modified urban or industrial landscape being at the opposite end of the scale to a largely natural, undisturbed landscape. Visual character is also influenced by the presence of built infrastructure including buildings, roads and other objects such as telephone or electrical infrastructure. The visual character of an area largely determines the **sense of place** relevant to the area. This is the unique quality or character of a place, whether natural, rural or urban which results in a uniqueness, distinctiveness or strong identity.

As mentioned above, much of the study area is characterised by rural areas with natural unimproved vegetation. Agriculture in the form of cultivation and livestock rearing is the dominant land use, which has transformed the natural vegetation in many areas. However, significant portions of the study area have retained a natural appearance due to the presence of grasslands and as such the introduction of electrical infrastructure into this environment could be considered to be a degrading factor.

In this instance however, much of the landscape has already been transformed by the presence of Perseus Substation and the associated power line network. This infrastructure, in conjunction with the urban infrastructure of Dealesville, has resulted in an increasingly industrial landscape character and a high degree of visual degradation. The more industrial character of the landscape is an important factor in this context, as the introduction of the proposed power line would result in less visual contrast where other anthropogenic elements are already present, especially where the scale of those elements is similar to that of the proposed development.

Cultural landscapes are becoming increasingly important concepts in terms of the preservation and management of rural and urban settings across the world. The concept of ‘cultural landscape’ is a way of looking at a place that focuses on the relationship between human activity and the biophysical environment

(Breedlove, 2002). In this instance, the rural / pastoral landscape represents how the environment 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 Dealesville, engulfed by an otherwise rural / pastoral environment, form an integral part of the wider landscape.
In light of this, it is important to assess whether the introduction of a new power line and substation into the study area would be a degrading factor in the context of the prevailing character of the cultural landscape. Broadly speaking, visual impacts on the cultural landscape in this area would be greatly reduced by the presence of Perseus Substation and an extensive network of high voltage power lines in the area.

7.5.6 Visual Absorption Capacity

Visual absorption capacity is the ability of the landscape to absorb a new development without any significant change in the visual character and quality of the landscape. The level of absorption capacity is largely based on the physical characteristics of the landscape (topography and vegetation cover) and the level of transformation present in the landscape.

Although the relatively flat topography in the study area and the predominant grassland would reduce the visual absorption capacity, this would be offset to a considerable degree by the extensive electrical infrastructure already present in the landscape as well as the urban and peri-urban development in the south-east of the study area.

Visual absorption capacity in the study area is therefore rated as **high**.

7.5.7 Sensitive Visual Receptors

A sensitive visual receptor location is defined as a location from where receptors would potentially be impacted by a proposed development. Adverse impacts often arise where a new development is seen as an intrusion which alters the visual character of the area and affects the 'sense of place'. The degree of visual impact experienced will however vary from one 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 receptor locations 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 residential dwellings in natural settings.

The identification of sensitive receptors is typically based on a number of factors which include:

- the visual character of the area, especially taking into account visually scenic areas and areas of visual sensitivity;
- the presence of leisure-based (especially nature-based) tourism in an area;
- the presence of sites or routes that are valued for their scenic quality and sense of place;

- the presence of homesteads / farmsteads in a largely natural setting where the development may influence the typical character of their views; and
- feedback from interested and affected parties, as raised during the public participation process conducted as part of the BA study.

Viewing distance is also a critical factor in the experiencing of visual impacts. As the visibility of the development would diminish exponentially over distance, receptor locations which are closer to the proposed development would experience greater adverse visual impacts than those located further away. The degree of visual impact experienced will however vary from one inhabitant to another, as it is largely based on the viewer's perception. Factors influencing the degree of visual impact experienced by the viewer include the following:

- Value placed by the viewer on the natural scenic characteristics of the area.
- The viewer's sentiments toward the proposed structures. These may be positive (a symbol of progression toward a less polluted future) or negative (foreign objects degrading the natural landscape).
- Degree to which the viewer will accept a change in the typical landscape character of the surrounding area.

7.5.7.1Receptor Identification

Preliminary desktop assessment of the study area identified eighteen (18) potentially sensitive visual receptor locations within a five km radius of the power line / substation assessment corridor, most of which appear to be existing farmsteads. Although the findings of the desktop assessment were largely confirmed during the field investigation, it was not possible to confirm the presence of receptors at all the identified locations due to access restrictions. Notwithstanding this limitation, all the identified receptor locations were assessed as part of the VIA as they are still regarded as being potentially sensitive to the visual impacts associated with the proposed development.

Although the identified receptor locations are all believed to be farmsteads, they are regarded as potentially sensitive visual receptors as the proposed development will likely alter natural or semi-natural vistas experienced from these locations. At this stage however, local sentiments towards the proposed development are not known. Three of these farmsteads were found to be outside the preliminary viewshed for the proposed power line and substation and none of the remaining receptors was identified as being sensitive.

Although the residences in Dealesville and Tswaraganang Township could be considered to be receptors, they are not considered to be sensitive due to their location within built-up, heavily transformed areas. As such, they are not expected to perceive the proposed development in a negative light and this would reduce the level of visual impact experienced at these locations.

In many cases, roads along which people travel are regarded as sensitive receptors. The primary thoroughfare in the study area is the R64 Main road which traverses the study area in a north-west / south-east direction, linking Bloemfontein in the east with Kimberley to the west. The section of the road traversing the study area is not considered part of a designated scenic route, although the route is an important link

and is likely to be utilised, to some extent, by tourists en route to the Northern Cape. As a result, the road is considered to be a potentially sensitive receptor road – i.e. a road being used by motorists who may object to the potential visual intrusion of the proposed power line and substation development.

The R703 Main Road and other thoroughfares in the study area are primarily used as local access roads and do not form part of any scenic tourist routes. These roads are not specifically valued or utilised for their scenic or tourism potential and are therefore not regarded as visually sensitive.

No protected areas were identified within 5kms of the power line / substation assessment corridor.

The potentially sensitive visual receptor locations identified within the study area for the proposed power line and substation are indicated in Figure 7-55.

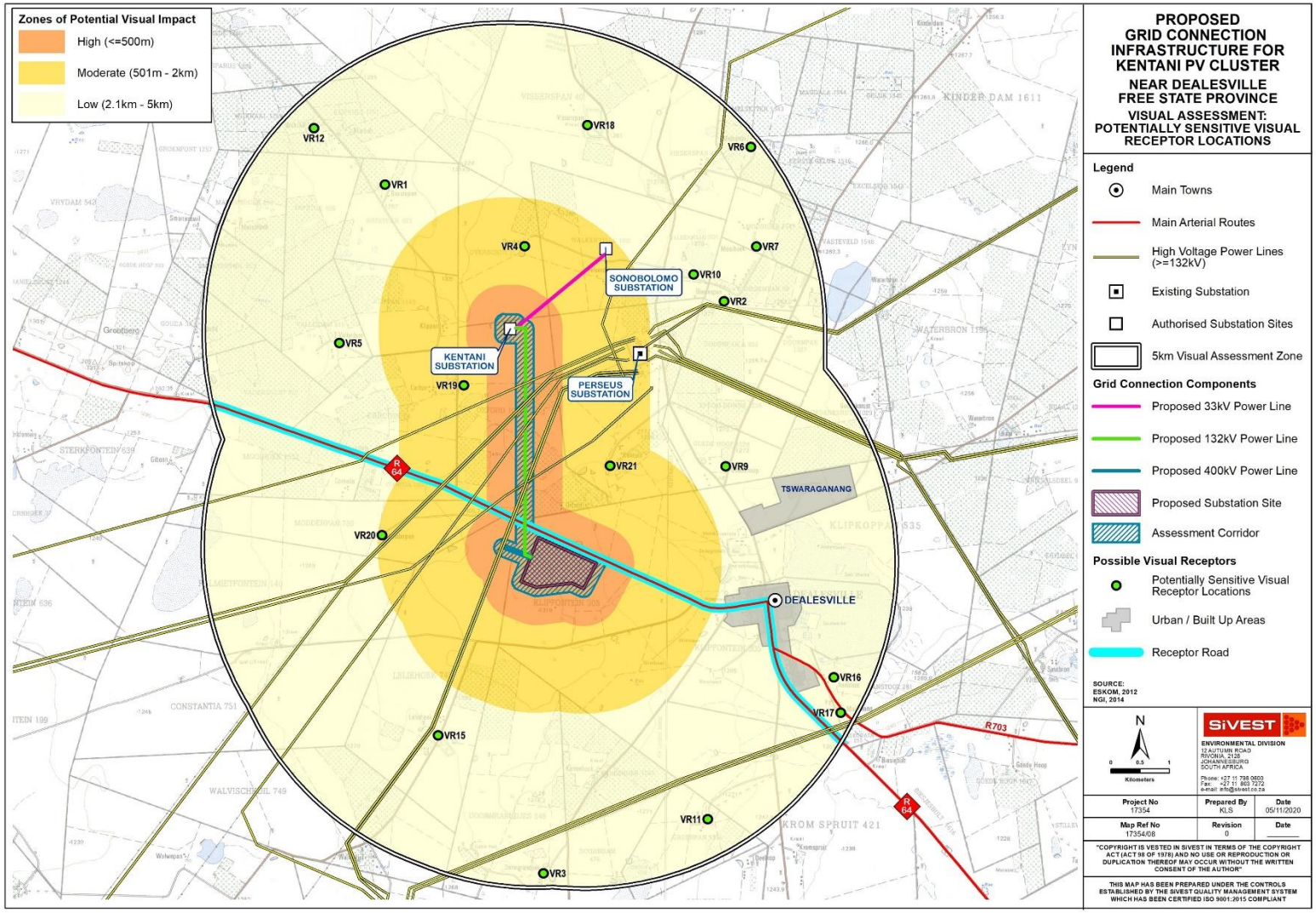

Figure 7-55: Potentially sensitive visual receptor locations.

7.5.7.2 Receptor Impact Rating

In order to assess the impact of the proposed development on the identified potentially sensitive receptor locations, a matrix that takes into account a number of factors has been developed and is applied to each receptor location.

The matrix is based on the factors listed below:

- Distance of a receptor location away from the proposed development (zones of visual impact)
- Presence of screening elements (topography, vegetation etc.)
- Visual contrast of the development with the landscape pattern and form.

These are considered to be the most important factors when assessing the visual impact of a proposed development on a potentially sensitive receptor location in this context. It should be noted that this rating matrix is a relatively simplified way of assigning a likely representative visual impact, which allows a number of factors to be considered. Experiencing visual impacts is however a complex and qualitative phenomenon, and is thus difficult to quantify accurately. The matrix should therefore be seen as a representation of the likely visual impact at a receptor location. Part of its limitation lies in the quantitative assessment of what is largely a qualitative or subjective impact.

As described above, the distance of the viewer / receptor location from the development is an important factor in the context of experiencing visual impacts which will have a strong bearing on mitigating the potential visual impact. A high impact rating has been assigned to receptor locations that are located within 500m of the elements of the proposed development. The visual impact of the proposed development beyond 5km would be negligible as the development would appear to merge with the elements on the horizon. Any visual receptor locations beyond these distance limits have therefore not been assessed as they fall outside the study area and would not be visually influenced by the proposed development.

At this stage of the process, zones of visual impact for the proposed development have been delineated according to distance from the power line / substation assessment corridor. Based on the assumed height and scale of the development, the distance intervals chosen for the zones of visual impact, as shown in Figure 7-55, are as follows:

- 0 – 500m (high impact zone);
- 500m –2km (moderate impact zone);
- 2km - 5km (low impact zone).

The presence of screening elements is an equally important factor in this context. Screening elements can be vegetation, buildings and topographic features. For example, a grove of trees or a series of low hills located between a receptor location and an object could completely shield the object from the receptor.

The visual contrast of a development refers to the degree to which the development would be congruent with the surrounding environment. This is based on whether or not the development would conform to the land use, settlement density, structural scale, form and pattern of natural elements that define the structure of the surrounding landscape. Visual compatibility is an important factor to be considered when assessing the impact of the development on receptors within a specific context. A development that is incongruent

with the surrounding area could change the visual character of the landscape and have a significant visual impact on sensitive receptors.

In order to determine the likely visual compatibility of the proposed development, the study area was classified into the following zones of visual contrast:

- High – undeveloped / natural / rural areas.

- Moderate –
    - areas within 500m of existing power lines (>=88kV);
    - areas within 250m of main roads;
    - cultivated areas and plantations.

- Low –
    - areas within 500m of urban / built-up areas;
    - areas within 500m of Perseus Substation;

These zones are depicted in Figure 7-56 below.

Based on the above criteria, the receptor impact rating matrix returns a score which in turn determines the visual impact rating assigned to each receptor location (Table 7-9) below.

Table 7-9: Rating Scores

Rating	Overall Score
High Visual Impact	8-9
Moderate Visual Impact	5-7
Low Visual Impact	3-4
Negligible Visual Impact	(overriding factor)

An explanation of the matrix is provided in Table 7-10 below.

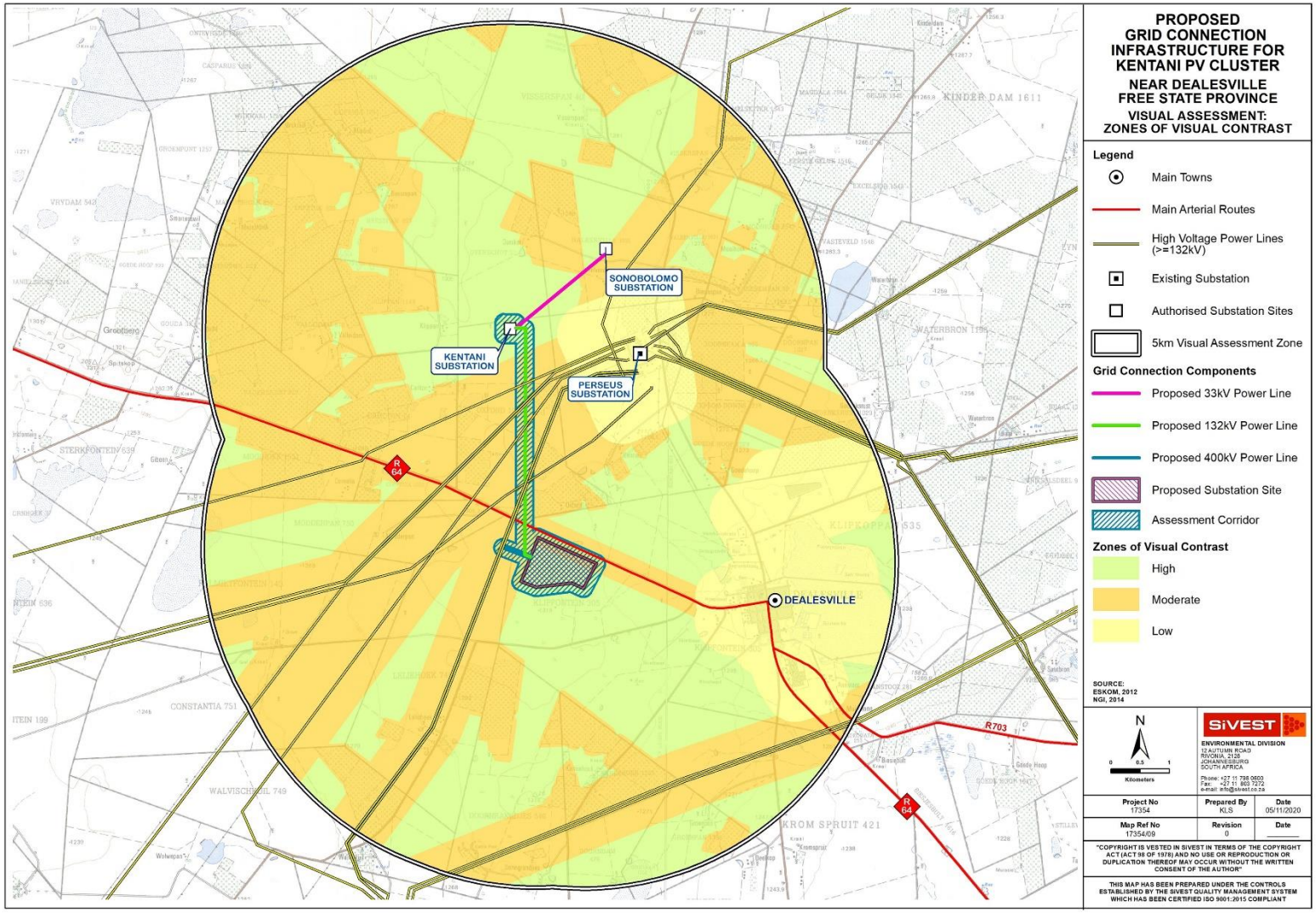

Figure 7-56: Zones of visual contrast.

Table 7-10: Visual assessment matrix used to rate the impact of the proposed development on potentially sensitive receptors

Visual Impact Rating				
Visual FACTOR	**High**	**MODERATE**	**Low**	**Overriding Factor: negligible**
Distance of receptor away from proposed development	<= 500m **Score 3**	500m - 2km **Score 2**	2km - 5km **Score 1**	>5km
Presence of screening factors	No / almost no screening factors – development highly visible **Score 3**	Screening factors partially obscure the development **Score 2**	Screening factors obscure most of the development **Score 1**	Screening factors completely block any views towards the development, i.e. the development is not within the viewshed
Visual Contrast	**High contrast** with the pattern and form of the natural landscape elements (vegetation and land form), typical land use and/or human elements (infrastructural form) **Score 3**	**Moderate contrast** with the pattern and form of the natural landscape elements (vegetation and land form), typical land use and/or human elements (infrastructural form) **Score 2**	**Corresponds** with the pattern and form of the natural landscape elements (vegetation and land form), typical land use and/or human elements (infrastructural form) **Score 1**	

Table 7-11 below presents a summary of the overall visual impact of the proposed 132kV power line and substation on each of the potentially sensitive visual receptor locations identified within 5kms of the proposed development.

Table 7-11: Receptor impact rating for the proposed power lines and substation

Receptor Location	Distance to Corridor			Screening		Contrast		OVERALL IMPACT RATING	
	KM	Rating		Rating		Rating		Rating	
*VR1 - Farmstead **	*NIL*								
VR2 - Farmstead	2.2	Low	1	Low	1	Mod	2	LOW	4
*VR3 - Farmstead **	*NIL*								
VR4 - Farmstead	0.9	Mod	2	Mod	2	Mod	2	MODERATE	6
VR5 - Farmstead	2.9	Low	1	Mod	2	Mod	2	MODERATE	5
VR6 - Farmstead	3.2	Low	1	Low	1	High	3	MODERATE	5
VR7 - Farmstead	2.6	Low	1	Low	1	High	3	MODERATE	5
VR9 - Farmstead	3.2	Low	1	Low	1	Mod	2	LOW	4
VR10 - Farmstead	1.5	Mod	2	Low	1	Mod	2	MODERATE	5
*VR11 – Farmstead**	*NIL*								
VR12 - Farmstead	4.7	Low	1	Mod	2	Mod	2	MODERATE	5
VR15 - Farmstead	2.2	Low	1	Low	1	Low	1	LOW	3
VR16 - Farmstead	5.0	Low	1	Low	1	Low	1	LOW	3
VR17 - Farmstead	5.4	Low	1	Low	1	Mod	2	LOW	4
VR18 - Farmstead	3.5	Low	1	Low	1	High	3	MODERATE	5
VR19 - Farmstead	0.9	Mod	2	High	3	Mod	2	MODERATE	7
VR20 - Farmstead	1.9	Mod	2	Mod	2	Mod	2	MODERATE	6
VR21 - Farmstead	3.5	Low	1	Mod	2	Mod	2	MODERATE	5

Receptor is outside the preliminary viewshed and as such the overall impact rating is "NIL***

The table above shows that three of the identified receptors are outside the viewshed for the development and none of the remaining receptors is expected to experience high levels of visual impact as a result of the proposed development. Ten of the remaining receptor locations are expected to experience moderate levels of impact as a result of the power line and substation development, while five receptors will only experience low levels of visual impact.

As stated above, the R64 main road could be considered as a potentially sensitive receptor road. Elements of the power line / substation development are expected to be visible to motorists travelling along the R64, but the likely visual impacts of the proposed development on motorists would be reduced by the level of transformation and landscape degradation already visible from this route. In light of this, visual impacts affecting the R64 are rated as **low**.

7.5.8 Night-Time Impacts

The visual impact of lighting on the nightscape is largely dependent on the existing lighting present in the surrounding area at night. The night scene in areas where there are numerous light sources will be visually degraded by the existing light pollution and therefore additional light sources are unlikely to have a significant impact on the nightscape. In contrast, introducing new light sources into a relatively dark night sky will impact on the visual quality of the area at night. It is thus important to identify a night-time visual baseline before exploring the potential visual impact of the proposed Solar PV at night.

The urban areas of Dealesville and Tswaraganang Township, located approximately 3 km east of the proposed site is the main source of light within the study area. These areas are expected to have a significant impact on the night scene in the eastern sector of the study area. Another prominent light source within the study area at night is the security lighting at the existing Perseus Substation which is expected to be visible from relatively far away.

Power lines and associated towers or pylons are not generally lit up at night and, thus light spill associated with the proposed electrical infrastructure project is only likely to emanate from the proposed MTS and associated infrastructure. Although the lighting required at the substation site would normally be expected to intrude on the nightscape, night-time impacts of this lighting will be reduced by the existing light spill emanating from Dealesville and Tswaraganang Township as well as Perseus Substation. It should also be noted that the power line and substation will only be constructed if the proposed Kentani PV Cluster is also developed. Light sources for this facility will include operational and security lighting and thus the lighting impacts from the proposed substation would be subsumed by the glare and contrast of the lighting associated with the facility as a whole. As such, the substation alone is not expected to result in significant lighting impacts.

8. IMPACT ASSESSMENT AND DESCRIPTION

8.1 ENVIRONMENTAL MONITORING AND AUDITING OF THE PROJECT DEVELOPMENT PHASES

The Environmental Management Programme (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 (Avifauna);
- Impacts on Heritage resources, including archaeology, Palaeontology, and the Cultural Landscape;

- Impact on Aquatic;
- Impact on Visual;

Based on the outcomes of the impact assessment process concluded in Section 8, Generic EMPrs is included in Appendix 8. However, it should be noted that a Final Generic EMPrs 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 Environmental Control Officer (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.

8.1.1 Preconstruction Phase

- Ensures that the design of the facility 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 facility.

8.1.2 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, and 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.

8.1.3 Operations 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 regard to farming practices, traffic and road use, and effects on local residents; and
- Minimises impacts on fauna.

8.1.4 Decommissioning Phase

At the end of the operational phase of the proposed development, the proposed development might need to be decommissioned. 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 its original pre-construction condition. 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 as there is an active second-hand market for certain components. It must be noted that the decommissioning phase of the proposed development will also 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.

8.2 IMPACT RATING METHODOLOGY

The impacts of the proposed development (during the Pre-Construction, Construction, Operation and Decommissioning phases) are assessed and rated according to the methodology described below, 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 (in Excel format) for this purpose. Please refer to Section 3.5.6.

8.2.1 Agricultural Impacts

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 very low. 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 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 agricultural footprint of the proposed development will occupy land that is of limited land capability and is not suitable for the production of cultivated crops. There is no scarcity of such agricultural land in South Africa and its conservation for agriculture is therefore not a priority.
- The location of the MTS and associated infrastructure is in keeping with the allowable development limits prescribed by the agricultural protocol. These limits reflect the national need to conserve valuable agricultural land and therefore to steer, particularly renewable energy developments, onto land with low agricultural production potential.
- Powerlines have insignificant agricultural impact in the agricultural environment of the project.

There are no additional mitigation measures required, over and above what has already been included in the Generic EMPr for overhead electricity transmission and distribution infrastructure as per Government Notice 435, which was published in Government Gazette 42323 on 22 March 2019.

8.2.2 Aquatic Impacts

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 in this report below**
Faunal and vegetation communities inhabiting the site	Impact 1 and 2

Fragmentation (physical loss of ecological connectivity = Wetland cluster)	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	Impacts1-4[22]

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 Phases

- 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

Operational phase

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

Table 8-1: Loss of aquatic species including any Species of Special Concern

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:	The current layout must be selected, to ensure all the observed aquatic systems will be avoided, thus avoiding this impact	
Monitoring		

[22] Please see Section 8.4.1.2

Issue	Loss of aquatic species including any Species of Special Concern
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

Table 8-2: Damage or loss of riparian systems and disturbance of waterbodies in the construction / decommissioning phase

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 (incl 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:	• The current layout must be selected, to ensure all the observed aquatic systems will be avoided, thus avoiding this impact • 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). This will avoid any secondary impacts that could affect downstream areas.	
Monitoring		
The following monitoring is recommended:	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.	

Table 8-3: Water quality changes (increase in sediment, organic loads, chemicals or eutrophication

Issue	Water quality changes (increase in sediment, organic loads, chemicals or eutrophication
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 fuel storage facility must be given.		
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:	• All liquid chemicals including fuels and oil 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. • 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, lay down areas, wash bays, batching plants or areas and any stores should be more than 50 m 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.	

Table 8-4: Hydrological regime or Hydroperiod changes (Quantity changes such as abstraction or diversion)

Issue	Hydrological regime or Hydroperiod changes (Quantity changes such as abstraction or diversion)
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	

8.2.3 Terrestrial Impacts

There are two main impacts associated with construction of the proposed infrastructure:

1. Direct loss of habitat within the footprint of the proposed infrastructure.
2. Invasion by alien invasive plant species, leading to degradation of habitat.

The main infrastructure components that will lead to loss of habitat are the MTS, BESS and powerline pylons. The site falls within the footprint of approved solar PV projects. Loss of habitat within this footprint area has therefore already been granted EA.

The remaining infrastructure is therefore limited entirely to overhead powerlines. These have a minimal local footprint, restricted to the tower structures and the maintenance roads. The overall loss of habitat due to these infrastructure components is insignificant compared to other approved infrastructure components, and also to existing transformation due to urbanization, utilities and cultivation in the general area.

The main potential remaining impact is therefore due to possible invasion by alien invasive plants within the project area.

Table 8-5: Loss of natural vegetation

Issue	Loss of natural vegetation
Description of Impact	
There will be localised disturbance of natural habitat within the footprint of tower structures during the construction phase. This is evaluated only for the areas within the footprint of the proposed power line, on the basis that all other infrastructure will be located within areas where authorisation has already been obtained	
Type of Impact	Direct

Nature of Impact	Negative	
Phases	Construction	
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Medium	Low
Duration	Long-term	Long-term
Extent	Site	Site
Consequence	Medium	Low
Probability	Probable	Probable
Significance	Medium -	Low -
Degree to which impact can be reversed	The impact is partly reversible by rehabilitation of disturbed areas.	
Degree to which impact may cause irreplaceable loss of resources	Without mitigation of this impact, it is possible that the local footprint of construction around each tower structure will be more extensive than if the impact is controlled. This will lead to a more extensive loss of natural habitat than without mitigation. However, the diversity within the study area is relatively low and includes primarily common and widespread plant species. There would therefore be an insignificant level of irreplaceable loss of resources.	
Degree to which impact can be mitigated	There is significant scope for mitigation as per the recommended mitigation measures below.	
Mitigation actions		
The following measures are recommended:	Restrict activities to footprint areas, use existing maintenance and access roads, rehabilitate disturbed areas after construcion, control alien invasive plant species. The presence of any species of conservation concern within the PV development area as well as along the grid connection should be checked during a preconstruction walk-through of these areas.	
Monitoring		
The following monitoring is recommended:	Annual monitoring for 3 years after construction to evaluate vegetation cover, species composition.	

Table 8-6: Invasion by alien invasive plant species

Issue	Invasion by alien invasive plant species	
Description of Impact		
There are a variety of alien invasive plant species that occur in the general geographical area. Disturbance will promote the opportunity for invasion by any of these species. Local invasion will degrade habitat and may spread further into surrounding areas. This may lead to more extensive loss of indigenous habitat and biodiversity and long-term control issues.		
Type of Impact	Indirect	
Nature of Impact	Negative	
Phases	Operation	
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	High	Low
Duration	Long-term	Long-term
Extent	Local	Site
Consequence	High	Low
Probability	Possible / frequent	Conceivable
Significance	Medium -	Very Low -
Degree to which impact can be reversed	The impact is reversible by implementing control measures.	
Degree to which impact may cause irreplaceable loss of resources	Without mitigation of this impact, it is possible that alien invasive plants will become locally established, develop dense nodes and then spread into surrounding areas. The more established they become, the more difficult it is to get rid of them and the greater the impact they will have on local ecosystems. The effect is exponential, not	

	appearing significant at first, but suddenly becoming excessively difficult to change. At this end point, irreplaceable loss of resources is likely at a local level, and possibly more widely.
Degree to which impact can be mitigated	There is significant scope for mitigation as per the recommended mitigation measures below.
Mitigation actions	
The following measures are recommended:	Compile and implement an alien invasive control plan, monitor degree of invasion as well as outcome and effectiveness of control measures.
Monitoring	
The following monitoring is recommended:	Annual monitoring for the entire operational phase, as per the recommendations of the alien invasive control plan.

8.2.4 Avifaunal Impacts

The main impacts associated with construction of the proposed infrastructure includes

1. Direct loss of habitat within the footprint of the proposed infrastructure during construction and decommissioning
2. Electrocution of birds on pylons during operation.

Table 8-7. Habitat destruction during construction

Issue	Habitat destruction during construction & maintenance	
Description of Impact		
The impact of habitat destruction will be of Low significance both pre and post mitigation. The amount of habitat to be transformed for the MTS substation and the associated infrastructure is relatively small in this landscape and the habitat is not particularly unique or limited in availability. We recommend several mitigation measures which will slightly reduce the impact significance, but not sufficiently to reduce below Low.		
Type of Impact	Indirect	
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	Probable	Probable
Significance	Low -	Low -
Degree to which impact can be reversed	Low - natural habitat will be transformed	
Degree to which impact may cause irreplaceable loss of resources	High - habitat will not easily be restored to original state	
Degree to which impact can be mitigated	Low - certain amount of habitat transformation is inevitable	
Mitigation actions		
The following measures are recommended:	• A pre-construction avifaunal walk down should be conducted to: ○ Confirm final layout and identify any sensitivities that may arise between the conclusion of the BA process and the construction phase. ○ Identify any sensitive species breeding on site that may arise between the conclusion of the BA process and the construction phase.	

	• All construction activities should be strictly managed according to generally accepted environmental best practice standards, so as to avoid any unnecessary impact on the receiving environment. • All temporary disturbed areas should be rehabilitated according to the site's rehabilitation plan, following construction.
Monitoring	
The following monitoring is recommended:	N/A

Table 8-8. Disturbance of birds during construction

Issue	Disturbance of birds during construction	
Description of Impact		
We judge the significance of this impact to be Low for both pre and post mitigation. Disturbance of birds typically reaches significant levels when the receptor is a breeding site for a sensitive species, or some other important feature, such as a roost. We have identified no such features on site.		
Type of Impact	Indirect	
Nature of Impact	Negative	
Phases	Construction	
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Low	Low
Duration	Short-term	Short-term
Extent	Local	Local
Consequence	Low	Low
Probability	Possible / frequent	Possible / frequent
Significance	Low -	Low -
Degree to which impact can be reversed	Highly reversible, as soon as construction stops impact will cease	
Degree to which impact may cause irreplaceable loss of resources	Low - any impacts are reversible and no irreplaceable loss	
Degree to which impact can be mitigated	Low - certain amount of disturbance during construction is inevitable	
Mitigation actions		

The following measures are recommended:	• A pre-construction avifaunal walk down should be conducted to:
	  ○ Confirm final layout and identify any sensitivities that may arise between the conclusion of the BA process and the construction phase.
	  ○ Identify any sensitive species breeding on site that may arise between the conclusion of the BA process and the construction phase.
	• All construction activities should be strictly managed according to generally accepted environmental best practice standards, so as to avoid any unnecessary impact on the receiving environment.
	• All temporary disturbed areas should be rehabilitated according to the site's rehabilitation plan, following construction.	

Monitoring		
The following monitoring is recommended:	N/A	

Table 8-9. Collision of birds with overhead cables during operations

Issue	Collision of birds with overhead cables	
Description of Impact		
We judge the significance of this impact to be Medium pre and Low post mitigation. Several regionally Red Listed bird species which are known to be susceptible to collision with overhead power lines occur in the study area, including Ludwig's Bustard, Blue Crane and Secretary Bird. The significance of this risk is slightly diminished by the placement of the proposed power line within a corridor of existing power lines (some of which are higher above the ground than the proposed line and will provide some shielding for birds in flight).		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Operation	
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Medium	Medium
Duration	Long-term	Long-term
Extent	Regional	Regional
Consequence	Medium	Medium
Probability	Probable	Conceivable
Significance	Medium -	Low -
Degree to which impact can be reversed	Low – bird mortality will occur	
Degree to which impact may cause irreplaceable loss of resources	High - birds mortality will occur	
Degree to which impact can be mitigated	High	
Mitigation actions		
The following measures are recommended:	• A pre-construction avifaunal walk down should be conducted to provide final confirmation of the sections of power line requiring bird collision mitigation. • The overhead cables on high risk sections of the alignments should be fitted with an approved anti bird collision line marking device to make cables more visible to birds in flight and reduce the likelihood of collisions. This should be done according to the Eskom Distribution and Transmission standards in terms of device spacing and other factors. Literature around the world points towards a 50-60% reduction in bird collision risk if the line is marked (Jenkins, Smallie & Diamond, 2010; Shaw et al, 2021). The line marking device should be a dynamic (moving – bird flapper type) device.	
Monitoring		
The following monitoring is recommended:	The new power line should be patrolled during operation by ESKOM annually to measure any impacts on birds (through detecting collision fatalities) and to monitor the durability of the line marking devices Where multiple devices on a span have failed they should be replaced immediately. Data should be submitted to the Eskom –EWT Strategic Partnership where it will be curated and publicly accessible.	

Table 8-10. Electrocution of birds on pylons during operations

Issue	Electrocution of birds perched on power lines
Description of Impact	
The significance of bird electrocution on the proposed power lines will be of Low significance pre mitigation since the proposed pylon structures have phase-phase and phase-earth clearances greater than 1800mm so even vultures and large eagles can perch safely without bridging these critical	

clearances. It is recommended as a precautionary measure that the standard Eskom Bird Perch be fitted to all pole tops to further provide safe perching substrate well above dangerous hardware. It is also essential that if any of the pylon structures are changed we are given opportunity to assess the electrocution risk of the new structure and design mitigation.		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Operation	
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Medium	Medium
Duration	Long-term	Long-term
Extent	Regional	Regional
Consequence	Medium	Medium
Probability	Conceivable	Conceivable
Significance	Low -	Low -
Degree to which impact can be reversed	Low - birds mortality will occur	
Degree to which impact may cause irreplaceable loss of resources	High - birds mortality will occur	
Degree to which impact can be mitigated	Very high - It is possible to mitigate this fully by designing the power lines correctly	
Mitigation actions		
The following measures are recommended:	• It is recommended as a precautionary measure that the standard Eskom Bird Perch be fitted to all pole tops to further provide safe perching space well above dangerous hardware. • It is also essential that if any of the pylon structures are changed we are given opportunity to assess the electrocution risk of the new structures and design mitigation.	

8.2.5 Heritage Impacts

The main impacts associated with construction of the proposed infrastructure includes

1. Damage of Archaeological resources when grubbing and/or excavations for foundations, roads and other infrastructure occurs within the footprint of the proposed infrastructure during construction and decommissioning

2. Impacts to the cultural landscape relate to the visual intrusion of the new electrical infrastructure into the rural cultural landscape.

Table 8-11: Assessment of archaeological impacts.

Issue	Destruction of archaeological resources	
Description of Impact		
Archaeological resources may be damaged during the construction period when grubbing and/or excavations for foundations, roads and other infrastructure occurs. The impacts are direct and will occur during the construction phase only. Because of the limited cultural significance of the archaeological materials, the intensity is medium and the extent limited to the site.		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Construction	
Criteria	**Without Mitigation**	**With Mitigation**

Intensity	Medium	Very Low
Duration	Permanent	Permanent
Extent	Site	Site
Consequence	Medium	Low
Probability	Probable	Unlikely / improbable
Significance	Medium -	Low -
Degree to which impact can be reversed	Low – archaeological resources are non-renewable and cannot be recreated on site.	
Degree to which impact may cause irreplaceable loss of resources	High - archaeological resources are non-renewable and irreplaceable.	
Degree to which impact can be mitigated	High – mitigation is easy to apply and will effectively capture archaeological data before development proceeds.	
Mitigation actions		
The following measures are recommended:	Recording and sampling of artefacts from the site (waypoints 286 to 289). Given that the area where the archaeology occurs was previously ploughed, it is suggested that a large grid of squares measuring perhaps 3x3 m could be laid over the surface with all materials collected from these squares. A number of squares could then be selected for subsurface testing because ploughing would have distributed the material throughout the ploughzone. This mitigation work should preferably be carried out in the dry season in order to ensure efficient sieving of the soil and maximum recovery of finds.	
Monitoring		
The following monitoring is recommended:	None.	

Table 8-12: Assessment of impacts to the cultural landscape.

Issue	**Impacts to the cultural landscape**	
Description of Impact		
Impacts to the cultural landscape relate to the visual intrusion of the new electrical infrastructure into the rural cultural landscape. In this instance, however, it must be noted that a large amount of electrical infrastructure is already present in the landscape. This infrastructure includes many powerlines and two large substations, one of which lies close to the proposed development area. The impacts will occur for as long as the power line and substation remain present (i.e. long term). Because they will be visible from beyond the development area, the extent is rated as local. The position of the MTS and BESS alongside the R64 is notable in this instance because it will be very much in the public eye. During the construction and decommissioning phases the significance would be driven more by the amount of activity on site, while during operation it is driven mostly by the long-term during of the impact.		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Construction, Operation, Decommissioning	
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Low	Low
Duration	Long-term	Long-term
Extent	Local	Local
Consequence	Medium	Medium
Probability	Definite / Continuous	Definite / Continuous
Significance	Medium -	Medium -
Degree to which impact can be reversed	High – With removal of all infrastructure and rehabilitation of the site, the current status quo could be recreated.	
Degree to which impact may cause irreplaceable loss of resources	Low – the grasslands of the South African interior are extensive and similar landscapes occur elsewhere.	
Degree to which impact can be mitigated	Low – There is nothing that can be done to hide the substation and powerlines.	
Mitigation actions		

The following measures are recommended:	Minimise disturbance footprint. Rehabilitate all areas not required during operation. Minimise size of access track.
Monitoring	
The following monitoring is recommended:	None

8.2.6 Palaeontological Impacts

Although isolated outcrops of the Tierberg Formation (Ecca Group, Karoo Supergroup is present no visible evidence of fossils were identified during the site assessment.

However, it is important to note that destructive impacts on palaeontological heritage usually only occur during the construction phase. Excavations will change the current topography and destruct or permanently seal-in fossils at or below the ground surface. Fossil Heritage will then no longer be accessible for scientific research.

A *Chance Find Protocol* must be included in the EMPr and must be on site during construction.

Table 8-13: Assessment of fossil impacts.

Issue	Destruction of fossil heritage	
Description of Impact		
The excavations and site clearance of the powerline will involve extensive excavations into the superficial sediment cover as well as into the underlying bedrock. These excavations will change the existing topography and may destroy and seal-in fossils at or below the ground surface. These fossils will then no longer be available for research. According to the Geology of the project site there is a Very High possibility of finding fossils during construction.		
Type of Impact	Indirect	
Nature of Impact	Negative	
Phases	Construction	
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	High	Low
Duration	Permanent	Permanent
Extent	Site	Site
Consequence	High	Very Low
Probability	Probable	Unlikely / improbable
Significance	High -	Low -
Degree to which impact can be reversed	Irreversible	
Degree to which impact may cause irreplaceable loss of resources	Irreplicable loss of fossil heritage	

Degree to which impact can be mitigated	Mitigation of the damage and destruction of fossil heritage within the planned footprint would entail the collection and describing of fossils. See Chance find Protocol
Mitigation actions	
The following measures are recommended:	Chance Find Procedure
Monitoring	
The following monitoring is recommended:	N/A

8.2.7 Visual Impacts

Table 8-14: Rating of visual impacts of Proposed Power Line, MTS and Access Roads During Construction

Issue:	• **Potential alteration of the visual character and sense of place** • **Potential visual impact on receptors in the study area**	
Description of Impact		
• Large construction vehicles, equipment and construction material stockpiles will alter the natural character of the study area and expose visual receptors to impacts associated with construction. • Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. • Dust emissions and dust plumes from increased traffic on gravel roads serving the construction site may evoke negative sentiments from surrounding viewers. • Surface disturbance during construction would expose bare soil resulting in visual scarring of the landscape and increasing the level of visual contrast with the surrounding environment. • Vegetation clearance required for the construction of the proposed substation is expected to increase dust emissions and alter the natural character of the surrounding area, thus creating a visual impact. • Temporary stockpiling of soil during construction may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.		
Type of Impact	**Direct**	
Nature of Impact	**Negative**	
Phases	**Construction**	
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Medium	Low
Duration	Short-term	Short-term
Extent	Site	Site
Consequence	Low	Very Low
Probability	Probable	Probable
Significance	Low -	Low -
Degree to which impact can be reversed	Impacts are completely reversible with cessation of construction activity.	
Degree to which impact may cause irreplaceable loss of resources	Marginal loss of visual resources without mitigation measures.	

Degree to which impact can be mitigated	There is significant scope for mitigation as per the recommended mitigation measures below.	

The following measures are recommended:	• Carefully plan to mimimise the construction period and avoid construction delays.
	• Minimise vegetation clearing and rehabilitate cleared areas as soon as possible.
	• Maintain a neat construction site by removing rubble and waste materials regularly.
	• Position storage / stockpile areas in unobtrusive positions in the landscape, where possible.
	• Make use of existing gravel access roads where possible.
	• Limit the number of vehicles and trucks travelling to and from the construction site, where possible.
	• Unless there are water shortages, ensure that dust suppression techniques are implemented:
	  ○ on all access roads;
	  ○ in all areas where vegetation clearing has taken place;
	  ○ on all soil stockpiles.	

The following monitoring is recommended:	• Ensure that visual management measures are monitored by an ECO. This will include monitoring activities associated with visual impacts such as the siting and management of soil stockpiles, screening and dust suppression. • Regular reporting to an environmental management team must also take place during the construction phase.	
Nature of cumulative impacts	• Combined visual impacts from construction activities associated with the development of multiple renewable energy and grid connection infrastructure projects in the broader area could further alter the sense of place and visual character of the area; and • Combined visual impacts from construction activities associated with the development of multiple renewable energy and grid connection infrastructure projects in the broader area could potentially exacerbate visual impacts on visual receptors.	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	Medium -	Low -

Table 8-15: Rating of visual impacts of Proposed Power Line, MTS and Access Roads During Operation

Issue:	• Potential visual impact on receptors in the study area. • Potential alteration of the visual character and sense of place	
Description of Impact		
• Potential alteration of the visual character of the area; • Potential visual intrusion resulting from power line and substation infrastructure dominating the skyline in a largely natural / rural area; • Potential impacts of increased dust emissions from maintenance activities and related traffic; • Potential visual effect on surrounding farmsteads; and • Potential alteration of the night time visual environment as a result of operational and security lighting at the proposed substation.		
Type of Impact	**Direct**	
Nature of Impact	**Negative**	
Phases	**Operation**	
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Low	Low
Duration	Long-term	Long-term
Extent	Site	Site

Consequence	Low	Low
Probability	Probable	Probable
Significance	Low -	Low -
Degree to which impact can be reversed	Impacts are partly reversible with decommissioning of infrastructure.	
Degree to which impact may cause irreplaceable loss of resources	Marginal loss of visual resources without mitigation measures.	
Degree to which impact can be mitigated	There is limited scope for mitigation as per the recommended mitigation measures below.	
The following measures are recommended:	• Where possible, limit the number of maintenance vehicles using access roads. • Where possible, limit the amount of security and operational lighting present at the on-site substation. • Light fittings for security at night should reflect the light toward the ground and prevent light spill. • Buildings on the substation site should be painted with natural tones that fit with the surrounding environment. • Non-reflective surfaces should be utilised where possible.	
The following monitoring is recommended:	Ensure that visual management measures are monitored by an ECO. This will include monitoring activities associated with visual impacts such as the control of signage, lighting and maintenance vehicles on access roads..	
Nature of cumulative impacts	• Additional renewable energy and associated infrastructure developments in the broader area will alter the natural character of the study area towards a more industrial landscape and expose a greater number of receptors to visual impacts. • Visual intrusion of multiple renewable energy and infrastructure developments may be exacerbated, particularly in more natural undisturbed settings. • Additional renewable energy facilities in the area would generate additional traffic on gravel roads thus resulting in increased impacts from dust emissions and dust plumes. • The night time visual environment could be altered as a result of operational and security lighting at multiple renewable energy facilities in the broader area.	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	High -	Medium -

Table 8-16: Rating of visual Impacts of Proposed Power Line, MTS and Access Roads During Decommissioning

Issue:	• Potential visual impact on receptors in the study area • Potential alteration of the visual character and sense of place
Description of Impact	
• Vehicles and equipment required for decommissioning will alter the natural character of the study area and expose visual receptors to visual impacts. • Decommissioning activities may be perceived as an unwelcome visual intrusion. • Dust emissions and dust plumes from increased traffic on the gravel roads serving the decommissioning site may evoke negative sentiments from surrounding viewers. • Surface disturbance during decommissioning would expose bare soil resulting in visual scarring of the landscape and increasing the level of visual contrast with the surrounding environment. • Temporary stockpiling of soil during decommissioning may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.	

Type of Impact	**Direct**	
Nature of Impact	**Negative**	
Phases	**Decommissioning**	
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Medium	Low
Duration	Short-term	Short-term
Extent	Site	Site
Consequence	Low	Very Low
Probability	Probable	Probable
Significance	Low -	Low -
Degree to which impact can be reversed	Impacts are completely reversible with cessation of decommissioning activity.	
Degree to which impact may cause irreplaceable loss of resources	Marginal loss of visual resources without mitigation measures.	
Degree to which impact can be mitigated	There is significant scope for mitigation as per the recommended mitigation measures below.	
The following measures are recommended:	• All infrastructure that is not required post-decommissioning should be removed. • Carefully plan to minimize the decommissioning period and avoid delays. • Maintain a neat decommissioning site by removing rubble and waste materials regularly. • Position storage / stockpile areas in unobtrusive positions in the landscape, where possible. • Ensure that dust suppression procedures are maintained on all gravel access roads throughout the decommissioning phase. • All cleared areas should be rehabilitated as soon as possible. • Rehabilitated areas should be monitored post-decommissioning and remedial actions implemented as required.	
The following monitoring is recommended:	• Ensure that procedures for the removal of structures and stockpiles during decommissioning are implemented, including recycling of materials. • In addition, it must be ensured that rehabilitation of the site to a visually acceptable standard is undertaken.	
Nature of cumulative impacts	• Combined visual impacts from decommissioning activities associated with multiple renewable energy and grid connection infrastructure projects in the broader area could further alter the sense of place and visual character of the area; and • Combined visual impacts from decommissioning activities associated with the development of multiple renewable energy and grid connection infrastructure projects in the broader area could potentially exacerbate visual impacts on visual receptors.	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	Medium -	Low -

8.3 SUMMARY OF IMPACTS

Specialist	Phase/s	Issue	Description of Impact	Impact Rating	
				Without Mitigation	With Mitigation
Agriculture	**Pre-Construction** **Construction** **Operation** **Decommissioning**	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 very low. 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 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.		**Low -**	**Low -**
Aquatic	**Construction** **Decommissioning**	Loss of aquatic species including any Species of Special Concern	Potential loss of protected or listed aquatic species, however none were observed on site	**Low -**	**Insignificant**
		Damage or loss of riparian systems and disturbance of waterbodies in the construction / decommissioning phase	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 crossings are made or large hard engineered surfaces are placed within these systems (incl the Proposed buffer). Loss can also include a functional loss, through change in vegetation type via alien encroachment for example	**Medium -**	**Very Low +**
		Water quality changes (increase in sediment, organic loads, chemicals or eutrophication	During construction & decommissioning 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 fuel storage facility must be given.	**Medium -**	**Very Low +**
	Operation	Hydrological regime or Hydroperiod changes (Quantity changes such as abstraction or diversion)	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.	**Medium -**	**Very Low +**
Terrestrial Ecology	**Construction** **Decommissioning**	Loss of natural vegetation	There will be localised disturbance of natural habitat within the footprint of tower structures during the construction phase. This is evaluated only for the areas within the footprint of the proposed power line, on the basis that all other infrastructure will be located within areas where authorisation has already been obtained	**Medium -**	**Low -**
	Operation	Invasion by alien invasive plant species	There are a variety of alien invasive plant species that occur in the general geographical area. Disturbance will promote the opportunity for invasion by any of these species. Local invasion will degraded habitat and may spread further into surrounding areas. This may lead to more extensive loss of indigenous habitat and biodiversity and long-term control issues.	**Medium -**	**Very Low -**
Avifauna	**Construction**	Habitat destruction during construction & maintenance	The impact of habitat destruction will be of Low significance both pre and post mitigation. The amount of habitat to be transformed for the MTS substation, BESS and the associated power lines is relatively small in this landscape and the habitat is not particularly unique or limited in availability. We recommend several mitigation measures which will slightly reduce the impact significance, but not sufficiently to reduce below Low.	**Low -**	**Low -**
		Disturbance of birds during construction	We judge the significance of this impact to be Low for both pre and post mitigation. Disturbance of birds typically reaches significant levels when the receptor is a breeding site for a sensitive species, or some other important feature, such as a roost. We have identified no such features on site.	**Low -**	**Low -**
	Operation	Collision of birds with overhead cables	We judge the significance of this impact to be Medium pre and Low post mitigation. Several regionally Red Listed bird species which are known to be susceptible to collision with overhead power lines occur in the study area, including Ludwig's Bustard, Blue Crane and Secretary Bird. The significance of this risk is slightly diminished by the placement of the proposed power line within a corridor of existing power lines (some of which are higher above the ground than the proposed line and will provide some shielding for birds in flight).	**Medium -**	**Low -**
		Electrocution of birds perched on power lines	The significance of bird electrocution on the proposed power lines will be of Low significance pre mitigation since the proposed pylon structures have phase-phase and phase-earth clearances greater than 1800mm so even vultures and large eagles can perch safely without bridging these critical clearances. It is recommended as a precautionary measure that the standard Eskom Bird Perch be fitted to all pole tops to further provide safe perching substrate well above dangerous hardware. It is also essential that if any of the pylon structures are changed we are given opportunity to assess the electrocution risk of the new structure and design mitigation.	**Low -**	**Low -**
Heritage	**Construction**	Destruction of archaeological resources	Archaeological resources may be damaged during the construction period when grubbing and/or excavations for foundations, roads and other infrastructure occurs. The impacts are direct and will occur during the construction phase only. Because of the limited cultural significance of the archaeological materials, the intensity is medium and the extent limited to the site.	**Medium -**	**Low -**

Specialist	Phase/s	Issue	Description of Impact	Impact Rating	
				Without Mitigation	With Mitigation
	Construction **Operation** **Decommissioning**	Impacts to the cultural landscape	Impacts to the cultural landscape relate to the visual intrusion of the new electrical infrastructure into the rural cultural landscape. In this instance, however, it must be noted that a large amount of electrical infrastructure is already present in the landscape. This infrastructure includes many powerlines and two large substations, one of which lies close to the proposed development area. The impacts will occur for as long as the power line and substation remain present (i.e. long term). Because they will be visible from beyond the development area, the extent is rated as local. The position of the MTS and BESS alongside the R64 is notable in this instance because it will be very much in the public eye. During the construction and decommissioning phases the significance would be driven more by the amount of activity on site, while during operation it is driven mostly by the long-term during of the impact.	**Medium -**	**Medium -**
Palaeontology	**Construction** **Decommissioning**	Destruction of fossil heritage	The excavations and site clearance of the powerline will involve extensive excavations into the superficial sediment cover as well as into the underlying bedrock. These excavations will change the existing topography and may destroy and seal-in fossils at or below the ground surface. These fossils will then no longer be available for research. According to the Geology of the project site there is a Very High possibility of finding fossils during construction.	**High -**	**Low -**
Visual	**Construction**	Powerline affecting potential alteration of the visual character and sense of place and Potential visual impact on receptors in the study area	• Large construction vehicles, equipment and construction material stockpiles will alter the natural character of the study area and expose visual receptors to impacts associated with construction. • Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. • Dust emissions and dust plumes from increased traffic on gravel roads serving the construction site may evoke negative sentiments from surrounding viewers. • Surface disturbance during construction would expose bare soil resulting in visual scarring of the landscape and increasing the level of visual contrast with the surrounding environment. • Vegetation clearance required for the construction of the proposed substation is expected to increase dust emissions and alter the natural character of the surrounding area, thus creating a visual impact. • Temporary stockpiling of soil during construction may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.	**Low -**	**Low -**

	Operation		• Carefully plan to mimimise the construction period and avoid construction delays.
			• Minimise vegetation clearing and rehabilitate cleared areas as soon as possible.
			• Maintain a neat construction site by removing rubble and waste materials regularly.
			• Position storage / stockpile areas in unobtrusive positions in the landscape, where possible.
			• Make use of existing gravel access roads where possible.
			• Limit the number of vehicles and trucks travelling to and from the construction site, where possible.
			• Unless there are water shortages, ensure that dust suppression techniques are implemented:
			  ○ on all access roads;
			  ○ in all areas where vegetation clearing has taken place;
			  ○ on all soil stockpiles.
				High -	**Medium -**

	Decommissioning		• Vehicles and equipment required for decommissioning will alter the natural character of the study area and expose visual receptors to visual impacts. • Decommissioning activities may be perceived as an unwelcome visual intrusion. • Dust emissions and dust plumes from increased traffic on the gravel roads serving the decommissioning site may evoke negative sentiments from surrounding viewers. • Surface disturbance during decommissioning would expose bare soil resulting in visual scarring of the landscape and increasing the level of visual contrast with the surrounding environment. • Temporary stockpiling of soil during decommissioning may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.	**Low -**	**Low -**

8.4 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).

The South African Renewable Energy EIA Application Database (REEA) (namely "REEA_OR_2021_Q2") and other information available at the time[23] shows that there are no operational renewable energy developments situated within a 30km radius of the proposed project site. There are however several renewable energy projects (solar) authorised or being proposed within close proximity to the town of Dealesville, including the Kentani Cluster which consists of eleven (11) authorised solar PV projects and associated electrical infrastructure. According to the information available at the time, the following renewable energy applications for EA are either approved (i.e., EA issued) or being proposed within a 30km radius of the proposed project site:

- 100 MW Kentani PV - 14/12/16/3/3/2/724
- 100 MW Klipfontein PV - 14/12/16/3/3/2/722
- 100 MW Braklaagte PV - 14/12/16/3/3/2/727
- 100 MW Meeding PV - 14/12/16/3/3/2/719
- 100 MW Irene PV - 14/12/16/3/3/2/718
- 100 MW Leliehoek PV - 14/12/16/3/3/2/728
- 75 MW Sonoblomo PV - 14/12/16/3/3/2/723
- 75 MW Klipfontein PV 2 - 14/12/16/3/3/2/726
- 75 MW Braambosch PV - 14/12/16/3/3/2/725
- 75 MW Boschrand PV 2 - 14/12/16/3/3/2/720
- 75 MW Eksteen PV - 14/12/16/3/3/2/717
- 75 MW solar PV facility which forms part of Kentani Photovoltaic solar Energy Facilities and Supporting Electrical Infrastructure - 14/12/16/3/3/2/721
- Klipbult solar plant - 14/12/16/3/3/2/432
- 75 MW Sebina Letsatsi Solar PV Facility - 14/12/16/3/3/2/755
- 100 MW Edison PV Solar Facility and shared electricity Infrastructure - 14/12/16/3/3/2/851
- 100 MW Maxwell PV Solar Facility and shared electricity Infrastructure - 14/12/16/3/3/2/852
- 100 MW Marconi PV solar projects and associated infrastructure - 14/12/16/3/3/2/853
- 100 MW Watt PV solar projects and associated infrastructure - 14/12/16/3/3/2/854

[23] Information has been based on the latest available version of the South African Renewable Energy EIA Application Database (REEA) ("REEA_OR_2021_Q2"), the results of the respective online screening tool reports (**https://screening.environment.gov.za/screeningtool/#/pages/welcome**) and information available on the public domain at the time.

- 100 MW Farday PV solar projects and associated infrastructure - 14/12/16/3/3/2/855
- 100 MW Visserpan solar photovoltaic facility project 2 - 14/12/16/3/3/1/2154
- 100 MW Visserpan solar photovoltaic facility project 3 - 14/12/16/3/3/1/2155
- 100 MW Visserpan solar photovoltaic facility project 4 - 14/12/16/3/3/1/2156

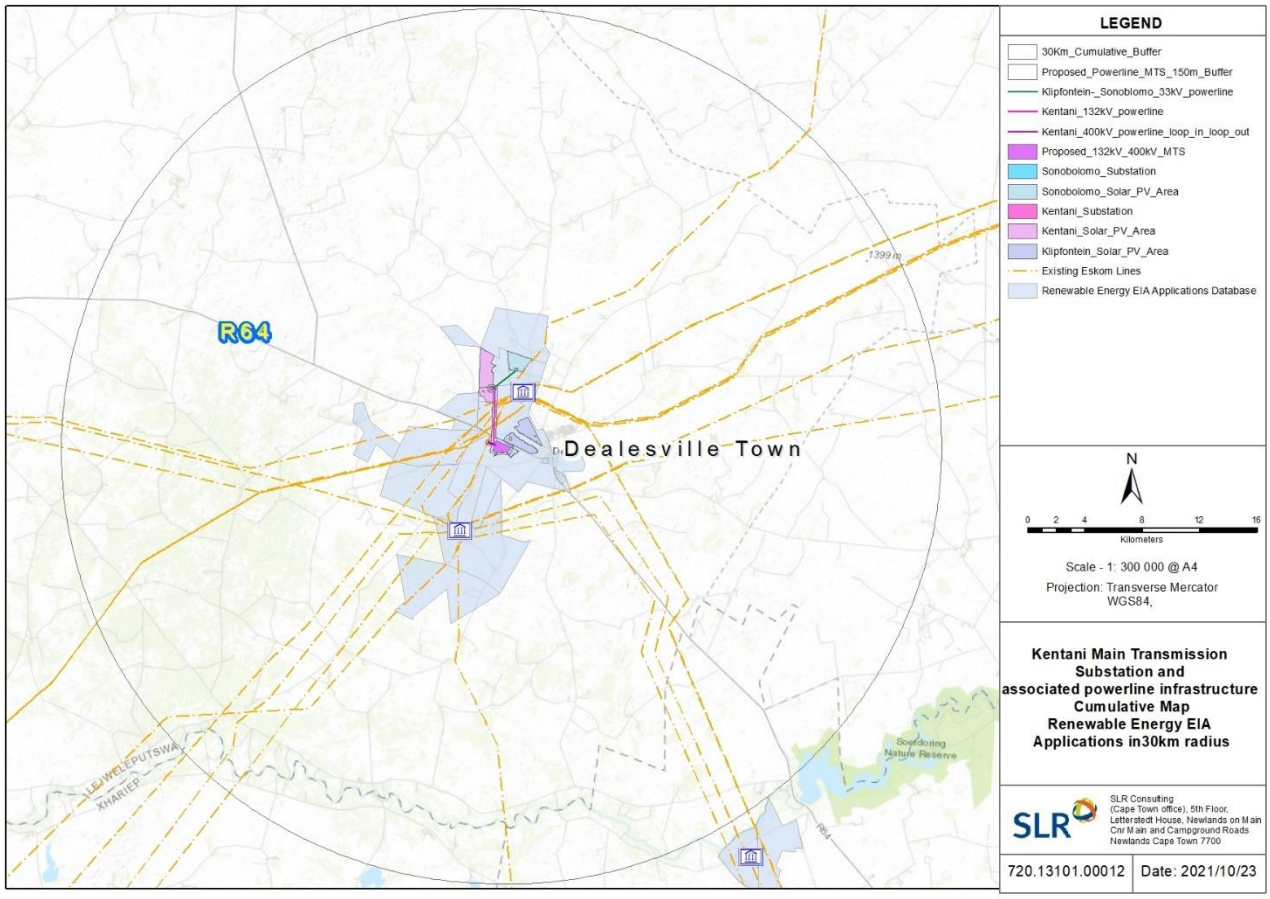

Figure 7.1: Cumulative map showing renewable energy projects with a 30km buffer

In addition, the Jedwater Solar Power Facility (12/12/20/1972/2) and Letsatsi solar power farm (12/12/20/1972/1) are situated just outside of the project site's 30km radius, to the south-east of the project site.

The cumulative impact assessed will therefore be the collective impact of the proposed MTS, BESS and powerline application, along with the above-mentioned renewable energy applications for EA which are either approved or being proposed within a 30km radius of the proposed project site

8.4.1 Cumulative Impacts

8.4.1.1Agricultural Impacts

Solar PV projects are all located on land that is not suitable for cultivation. In quantifying the cumulative impact, the area of such land taken out of agriculture as a result of these 22 projects plus this one, (total generation capacity of 2,000 MW) will amount to a total of approximately 5,025 hectares. This is calculated using the industry standards of 2.5 and 0.3 hectares per megawatt for solar and wind energy generation respectively, as per the Department of Environmental Affairs (DEA) Phase 1 Wind and Solar Strategic Environmental Assessment (SEA) (2015). As a proportion of the total area within a 30km radius (approximately 282,700 ha), this amounts to only 1.78% of the surface area. That is considered to be within an acceptable limit in terms of loss of agricultural land that is only suitable for grazing, of which there is no scarcity in the country. This is particularly so when considered within the context of the following point:

In order for South Africa to achieve its renewable energy generation goals, agriculturally zoned land will need to be used for renewable energy generation. It is far more preferable to incur a cumulative loss of agricultural land which has no cultivation potential, than to lose agricultural land that has a higher potential, and that is much scarcer, to renewable energy development elsewhere in the country. The limits of acceptable agricultural land loss are far higher in this region than in regions with higher agricultural potential.

There are no significant other land uses, apart from renewable energy, that are competing for agricultural land in the area, and so the total cumulative loss of agricultural land from all competing land uses is not significantly higher than what has been considered above.

Due to all of the considerations discussed above, the cumulative impact of loss of agricultural land use will not have an unacceptable negative impact on the agricultural production capability of the area. The proposed development is therefore acceptable in terms of cumulative impact, and it is therefore recommended that it is approved.

8.4.1.2Aquatic Impacts

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 Very Low (-).

Table 8-17: Loss of aquatic species including any Species of Special Concern

Issue	Loss of aquatic species including any Species of Special Concern
Description of Impact	
Potential loss of protected or listed aquatic species	
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. The premise of all the reviewed or assessed projects has been the avoidance of impacts on the

Issue	Loss of aquatic species including any Species of Special Concern	
	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

Table 8-18: Damage or loss of riparian systems and disturbance of waterbodies in the construction / decommissioning phase

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 (incl the Proposed buffer). Loss can also include a functional loss, through change in vegetation type via alien encroachment for example		
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. 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 -

Table 8-19: Water quality changes (increase in sediment, organic loads, chemicals or eutrophication

Issue	Water quality changes (increase in sediment, organic loads, chemicals or eutrophication	
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 fuel storage facility must be given.		
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 -

Table 8-20: Hydrological regime or Hydroperiod changes (Quantity changes such as abstraction or diversion)

Issue	Hydrological regime or Hydroperiod changes (Quantity changes such as abstraction or diversion)	
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.		
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. 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 -

8.4.1.3Terrestrial Impacts

There are two main impacts associated with construction of the proposed infrastructure:

1. Direct loss of habitat within the footprint of the proposed infrastructure.
2. Invasion by alien invasive plant species, leading to degradation of habitat.

Table 8-21: Loss of natural vegetation

Issue	Loss of natural vegetation	
Description of Impact		
There will be localised disturbance of natural habitat within the footprint of tower structures during the construction phase. This is evaluated only for the areas within the footprint of the proposed power line, on the basis that all other infrastructure will be located within areas where authorisation has already been obtained		
Cumulative impacts		
Nature of cumulative impacts	Existing loss of habitat in the study area is due to cultivation and other infrastructure. Solar PV projects that have been approved will lead to loss of habitat similar in magnitude to existing loss of habitat. Loss of habitat due to power line construction is negligible in comparison to these existing and anticipated future impacts.	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	Insignificant	Insignificant

Table 8-22: Invasion by alien invasive plant species

Issue	Invasion by alien invasive plant species
Description of Impact	
There are a variety of alien invasive plant species that occur in the general geographical area. Disturbance will promote the opportunity for invasion by any of these species. Local invasion will degraded habitat and may spread further into surrounding areas. This may lead to more extensive loss of indigenous habitat and biodiversity and long-term control issues.	

Cumulative impacts		
Nature of cumulative impacts	There is limited degree of invasion within the site and surrounding areas. However, some potentially problematic species occur in the area and can easily become established and problematic. In the absence of control measures, it is possible that combined effects may significantly degraded regional ecosystems.	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	Medium -	Very Low -

8.4.1.4 Avifaunal Impacts

The main impacts associated with construction of the proposed infrastructure includes

1. Direct loss of habitat within the footprint of the proposed infrastructure during construction and decommissioning
2. Electrocution of birds on pylons during operation.

Table 8-23. Cumulative impacts of renewable energy & electrical infrastructure on birds.

Issue	Cumulative impacts of renewable energy & electrical infrastructure on birds	
Description of Impact		
Overall we judge the cumulative impact of power lines, substations and renewable energy on avifauna in the area to be of Medium (-) significance pre-mitigation. If all proposed facilities implement mitigation correctly this can be reduced to Low (-).		
Cumulative impacts		
Nature of cumulative impacts	The two direct impacts of collision & electrocution are relatively easily mitigated as presented in the Impact Assessment Tables in Section 6.1-6.4.	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	Medium -	Low -

8.4.1.5Heritage Impacts

The main impacts associated with construction of the proposed infrastructure includes

3. Damage of Archaeological resources when grubbing and/or excavations for foundations, roads and other infrastructure occurs within the footprint of the proposed infrastructure during construction and decommissioning

4. Impacts to the cultural landscape relate to the visual intrusion of the new electrical infrastructure into the rural cultural landscape.

Table 8-24: Assessment of archaeological impacts.

Issue	Destruction of archaeological resources
Description of Impact	
Archaeological resources may be damaged during the construction period when grubbing and/or excavations for foundations, roads and other infrastructure occurs. The impacts are direct and will occur during the construction	

phase only. Because of the limited cultural significance of the archaeological materials, the intensity is medium and the extent limited to the site.		
Cumulative impacts		
Nature of cumulative impacts	Direct	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	Medium -	Very Low -

Table 8-25: Assessment of impacts to the cultural landscape.

Issue	Impacts to the cultural landscape	
Description of Impact		
Impacts to the cultural landscape relate to the visual intrusion of the new electrical infrastructure into the rural cultural landscape. In this instance, however, it must be noted that a large amount of electrical infrastructure is already present in the landscape. This infrastructure includes many powerlines and two large substations, one of which lies close to the proposed development area. The impacts will occur for as long as the power line and substation remain present (i.e. long term). Because they will be visible from beyond the development area, the extent is rated as local. The position of the MTS and BESS alongside the R64 is notable in this instance because it will be very much in the public eye. During the construction and decommissioning phases the significance would be driven more by the amount of activity on site, while during operation it is driven mostly by the long-term during of the impact.		
Cumulative impacts		
Nature of cumulative impacts	Direct	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	Low -	Low -

8.4.1.6Palaeontological Impacts

Issue	Destruction of fossil heritage	
Description of Impact		
The excavations and site clearance of the powerline will involve extensive excavations into the superficial sediment cover as well as into the underlying bedrock. These excavations will change the existing topography and may destroy and seal-in fossils at or below the ground surface. These fossils will then no longer be available for research. According to the Geology of the project site there is a Very High possibility of finding fossils during construction.		
Cumulative impacts		
Nature of cumulative impacts	Loss of Fossil Heritage	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	Low -	Very Low -

8.4.1.7Visual Impacts

Table 8-26: Rating of Impacts of Proposed Power Line, MTS and Access Roads During Construction

Issue:	• **Potential alteration of the visual character and sense of place** • **Potential visual impact on receptors in the study area**
Description of Impact	
• Large construction vehicles, equipment and construction material stockpiles will alter the natural character of the study area and expose visual receptors to impacts associated with construction. • Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. • Dust emissions and dust plumes from increased traffic on gravel roads serving the construction site may evoke negative sentiments from surrounding viewers. • Surface disturbance during construction would expose bare soil resulting in visual scarring of the landscape and increasing the level of visual contrast with the surrounding environment.	

• Vegetation clearance required for the construction of the proposed substation is expected to increase dust emissions and alter the natural character of the surrounding area, thus creating a visual impact. • Temporary stockpiling of soil during construction may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.		
Nature of cumulative impacts	• Combined visual impacts from construction activities associated with the development of multiple renewable energy and grid connection infrastructure projects in the broader area could further alter the sense of place and visual character of the area; and • Combined visual impacts from construction activities associated with the development of multiple renewable energy and grid connection infrastructure projects in the broader area could potentially exacerbate visual impacts on visual receptors.	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	Medium -	Low -

Table 8-27: Rating of Impacts of Proposed Power Line, MTS and Access Roads During Operation

Issue:	• Potential visual impact on receptors in the study area. • Potential alteration of the visual character and sense of place	
Description of Impact		
• Potential alteration of the visual character of the area; • Potential visual intrusion resulting from power line and substation infrastructure dominating the skyline in a largely natural / rural area; • Potential impacts of increased dust emissions from maintenance activities and related traffic; • Potential visual effect on surrounding farmsteads; and • Potential alteration of the night time visual environment as a result of operational and security lighting at the proposed substation.		
Nature of cumulative impacts	• Additional renewable energy and associated infrastructure developments in the broader area will alter the natural character of the study area towards a more industrial landscape and expose a greater number of receptors to visual impacts. • Visual intrusion of multiple renewable energy and infrastructure developments may be exacerbated, particularly in more natural undisturbed settings. • Additional renewable energy facilities in the area would generate additional traffic on gravel roads thus resulting in increased impacts from dust emissions and dust plumes. • The night time visual environment could be altered as a result of operational and security lighting at multiple renewable energy facilities in the broader area.	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	High -	Medium -

Table 8-28: Rating of Impacts of Proposed Power Line, MTS and Access Roads During Decommissioning

Issue:	• Potential visual impact on receptors in the study area • Potential alteration of the visual character and sense of place
Description of Impact	
• Vehicles and equipment required for decommissioning will alter the natural character of the study area and expose visual receptors to visual impacts. • Decommissioning activities may be perceived as an unwelcome visual intrusion. • Dust emissions and dust plumes from increased traffic on the gravel roads serving the decommissioning site may evoke negative sentiments from surrounding viewers. • Surface disturbance during decommissioning would expose bare soil resulting in visual scarring of the landscape and increasing the level of visual contrast with the surrounding environment.	

• Temporary stockpiling of soil during decommissioning may alter the flat landscape. Wind blowing over these disturbed areas could result in dust • which would have a visual impact.		
Nature of cumulative impacts	• Combined visual impacts from decommissioning activities associated with multiple renewable energy and grid connection infrastructure projects in the broader area could further alter the sense of place and visual character of the area; and • Combined visual impacts from decommissioning activities associated with the development of multiple renewable energy and grid connection infrastructure projects in the broader area could potentially exacerbate visual impacts on visual receptors.	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	Medium -	Low -

8.4.2 Summary of Cumulative Impacts

Specialist	Issue	Description of Impact	Rating of cumulative impacts	
			Without Mitigation	With Mitigation
Agriculture	N/A	N/A	**N/A**	**N/A**
Aquatic	Loss of aquatic species including any Species of Special Concern	Potential loss of protected or listed aquatic species	**Low -**	**Insignificant**
	Damage or loss of riparian systems and disturbance of waterbodies in the construction / decommissioning phase	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 (incl the Proposed buffer). Loss can also include a functional loss, through change in vegetation type via alien encroachment for example	**Medium -**	**Very Low -**
	Water quality changes (increase in sediment, organic loads, chemicals or eutrophication	During construction & decommissioning 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 fuel storage facility must be given.	**Medium -**	**Very Low -**
	Hydrological regime or Hydroperiod changes (Quantity changes such as abstraction or diversion)	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.	**Medium -**	**Low -**
Terrestrial Ecology	Loss of natural vegetation	There will be localised disturbance of natural habitat within the footprint of tower structures during the construction phase. This is evaluated only for the areas within the footprint of the proposed power line, on the basis that all other infrastructure will be located within areas where authorisation has already been obtained	**Insignificant**	**Insignificant**
	Invasion by alien invasive plant species	There are a variety of alien invasive plant species that occur in the general geographical area. Disturbance will promote the opportunity for invasion by any of these species. Local invasion will degraded habitat and may spread further into surrounding areas. This may lead to more extensive loss of indigenous habitat and biodiversity and long-term control issues.	**Medium -**	**Very Low -**
Avifauna	Cumulative impacts of renewable energy & electrical infrastructure on birds	Overall we judge the cumulative impact of power lines, substations and renewable energy on avifauna in the area to be of Medium (-) significance pre-mitigation. If all proposed facilities implement mitigation correctly this can be reduced to Low (-).	Medium -	Low -
Heritage	Destruction of archaeological resources	Archaeological resources may be damaged during the construction period when grubbing and/or excavations for foundations, roads and other infrastructure occurs. The impacts are direct and will occur during the construction phase only. Because of the limited cultural significance of the archaeological materials, the intensity is medium and the extent limited to the site.	**Medium -**	**Very Low -**
	Impacts to the cultural landscape	Impacts to the cultural landscape relate to the visual intrusion of the new electrical infrastructure into the rural cultural landscape. In this instance, however, it must be noted that a large amount of electrical infrastructure is already present in the landscape. This infrastructure includes many powerlines and two large substations, one of which lies close to the proposed development area. The impacts will occur for as long as the power line and substation remain present (i.e. long term). Because they will be visible from beyond the development area, the extent is rated as local. The position of the MTS and BESS alongside the R64 is notable in this instance because it will be very much in the public eye. During the construction and decommissioning phases the significance would be driven more by the amount of activity on site, while during operation it is driven mostly by the long-term during of the impact.	**Low -**	**Low -**
Palaeontology	Destruction of fossil heritage	The excavations and site clearance of the powerline will involve extensive excavations into the superficial sediment cover as well as into the underlying bedrock. These excavations will change the existing topography and may destroy and seal-in fossils at or below the ground surface. These fossils will then no longer be available for research. According to the Geology of the project site there is a Very High possibility of finding fossils during construction.	High -	Low -

Specialist	Issue	Description of Impact	Rating of cumulative impacts	
			Without Mitigation	With Mitigation
Visual	Powerline affecting potential alteration of the visual character and sense of place and Potential visual impact on receptors in the study area	• Potential alteration of the visual character of the area; • Potential visual intrusion resulting from power line and substation infrastructure dominating the skyline in a largely natural / rural area; • Potential impacts of increased dust emissions from maintenance activities and related traffic; • Potential visual effect on surrounding farmsteads; and • Potential alteration of the night time visual environment as a result of operational and security lighting at the proposed substation.	High -	Medium -

9. CONCLUSION AND RECOMMENDATIONS

The 2104 EIA Regulations (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 impacts associated with the proposed Main Transmission Substation, BESS and associated grid infrastructure.

A summary of the findings for each identified environmental impact evaluated in the context of the proposed development (both biophysical and social) and is provided in Table 9-1 and Figure 9-1 below.

The Table provides a summary of the findings of the specialist studies (or statements) that were undertaken as part of this BA Process. No negative impacts of high significance are anticipated to occur as a result of this project provided the stipulated management actions are implemented effectively.

The overall negative impacts range between insignificant, very low negative to medium negative in nature after mitigation is applied. The medium impacts are associated with the visual and cultural landscape themes as the MTS and associated infrastructure will further add to the intrusion of the existing electrical infrastructure in the Dealesville area.

While the overall impacts of the project on the receiving environment range between insignificant, very low negative to medium negative, 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.

The 2014 EIA Regulations (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 have been investigated in assessing the proposed projects need and desirability in the context of both the greater community, as well in the context of the proponent. The EAPs and specialists, through the interrogation of planning documents (Section 2) and, where these planning documents are not available - using best judgment, have considered the anticipated needs and interests of the broader community.

It is an important to note that the IRP (2019) indicates that there is a short-term electricity supply gap of approximately 2 000 MW and powerlines will improve energy security by increasing generation capacity and ensuring security of energy supply to society rapidly and significantly. The location of the proposed MTS, BESS and the corridors being proposed for the powerlines have previously been assessed as part of the development footprint for the Kentani Cluster of solar PV developments, each of which received their own EA in 2016 and is centrally located amongst six of the Preferred Bidders of the Round 5 REIPPPP announced 28 October 2021.

These six solar energy facilities have now become Strategic Infrastructure Projects (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.

The BA process for the proposed development has been conducted in accordance with the 2014 EIA Regulations (as amended), promulgated in terms of Chapter 5 of the NEMA. A detailed public participation process was followed during the BA process, which conformed to the public consultation requirements as stipulated in Chapter 6 of the 2014 EIA Regulations (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 EMPr to address these concerns.

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Table 9-1: A summary of the findings for each identified environmental impact evaluated in the context of the proposed development

Specialist	Phase/s	Key Findings	Issue	Description of Impact	Mitigation	Monitoring	Conclusion
Agriculture	Pre-Construction Construction Operation Decommissioning	The site has low agricultural potential because of soil and climate constraints and is therefore unsuitable for cultivated crop production. Agricultural land use is limited to grazing. The exact nature of the different infrastructure within a development has very little bearing on the significance of agricultural impacts. Whether the footprint comprises a solar panel, a road or a substation is largely irrelevant to agricultural impact. What is of most relevance is simply the total footprint of the facility that excludes agricultural land use or impacts agricultural land. Powerlines have negligible agricultural impact because all agricultural activities that are viable in this environment, can continue completely unhindered underneath powerlines. This includes a service track under the powerline which will also have minimal impact. The direct, permanent, physical footprint of a power line that has any potential to interfere with agriculture, is of very limited extent and therefore entirely insignificant within this agricultural environment.	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 very low. 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 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.		There are no additional mitigation measures required, over and above what has already been included in the Generic EMPr for overhead electricity transmission and distribution infrastructure as per Government Notice 435, which was published in Government Gazette 42323 on 22 March 2019.		The site has low agricultural potential because of soil and climate constraints and is therefore unsuitable for cultivated crop production. Agricultural land use is limited to grazing. The site has been assessed as being of medium agricultural sensitivity. Only one negative agricultural impact was identified, namely loss of agricultural potential by occupation of 64 hectares of land. The conclusion of this assessment is that the proposed development will have very low agricultural impact and will be acceptable in terms of its impact on the agricultural production capability of the site. This is substantiated by the fact that the loss is of agricultural land of low potential that is only suitable as grazing land. From an agricultural impact point of view, it is recommended that the development be approved. **The conclusion of this assessment on the acceptability of the proposed development and the recommendation for its approval is not subject to any conditions.**
Aquatic	Construction Decommissioning	The aquatic environment is typical of this portion of the Highveld ecoregion, being dominated my large numbers of small drainage lines and various pans/depressions. With regards impacts, the pans / depression are highly susceptible to changes to any hydrological regimes as well as direct disturbance within the small and localised catchments. 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 this results in erosion and sedimentation.	Loss of aquatic species including any Species of Special Concern	Potential loss of protected or listed aquatic species, however none were observed on site	• The current layout must be selected, to ensure all the observed aquatic systems will be avoided, thus avoiding this impact	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	The nature of the substations and transmission lines are such that they carry low intensity impact on aquatic resources. This however this assumes that the No-Go and Very High sensitivity systems are spanned and or avoided by the proposed structures. A variety of aquatic features, mostly ephemeral in nature were observed within the study area and these were mapped and buffered as necessary for their protection. The current layout has avoided these sensitive features and buffer areas, negating the potential overall impact and risk to Aquatic resources. 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 Very Low (-). 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 aquatic systems and the associated buffer.
			Damage or loss of riparian systems and disturbance of waterbodies in the construction / decommissioning phase	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 crossings are made or large hard engineered surfaces are placed within these systems (incl the Proposed buffer). Loss can also include a functional loss, through change in vegetation type via alien encroachment for example	• The current layout must be selected, to ensure all the observed aquatic systems will be avoided, thus avoiding this impact • 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	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.	

Specialist	Phase/s	Key Findings	Issue	Description of Impact	Mitigation	Monitoring	Conclusion
		The variety of aquatic features, mostly ephemeral in nature were observed within the study area and these were mapped and buffered as necessary for their protection. The current layout has avoided these sensitive features and buffer areas, negating the potential overall impact and risk to Aquatic resources.			dissipaters, spreaders, etc). This will the avoid any secondary impacts that could affect downstream areas.		**Based on the findings of this study, the specialist finds no reason to withhold to an authorisation of any of the proposed activities, assuming that key mitigations measures are implemented.**
			Water quality changes (increase in sediment, organic loads, chemicals or eutrophication	During construction & decommissioning 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 fuel storage facility must be given.	• All liquid chemicals including fuels and oil, 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. • 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, lay down areas, wash bays, batching plants or areas and any stores should be more than 50 m 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	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.	
	Operation		Hydrological regime or Hydroperiod changes (Quantity changes such as abstraction or diversion)	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.	• 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	This stormwater control systems must be inspected on an annual basis to ensure these are functional	

Specialist	Phase/s	Key Findings	Issue	Description of Impact	Mitigation	Monitoring	Conclusion
Terrestrial Ecology and Plant Assessment	Construction Decommissioning	The study area occurs within an Endangered Ecosystem, namely Vaal-Vet Sandy Grassland. Only the powerline part of the study area is in intact condition - other areas are secondary or degraded This verifies the VERY HIGH sensitivity for the Terrestrial Biodiversity Theme for the CBA1 areas, but other areas should be LOW sensitivity for this theme. Parts of the study area occur within Critical Biodiversity Area 1 in the Free State Conservation Plan. This verifies the VERY HIGH sensitivity for the Terrestrial Biodiversity Theme for the CBA1 areas, but it should be LOW for areas outside the CBA1 area. Anticipated impacts due to the power lines are localised loss of habitat below pylon structures, and possible invasion by alien invasive plant species. Both impacts were assessed as having Medium significance before mitigation and Low significance after mitigation.	Loss of natural vegetation	There will be localised disturbance of natural habitat within the footprint of tower structures during the construction phase. This is evaluated only for the areas within the footprint of the proposed power line, on the basis that all other infrastructure will be located within areas where authorisation has already been obtained	• Restrict activities to footprint areas, use existing maintenance and access roads, rehabilitate disturbed areas after construction, control alien invasive plant species. • The presence of any species of conservation concern within the PV development area as well as along the grid connection should be checked during a preconstruction walk-through of these areas.	Annual monitoring for 3 years after construction to evaluate vegetation cover, species composition.	The proposed project consists a MTS, BESS as well as the 132kV and 400kV power lines linking the MTS to Kentani Solar Project and existing Eskom 400kV lines respectively. Other infrastructure components to which these are linked are already approved for development. Anticipated impacts due to the power lines are localised loss of habitat below pylon structures, and possible invasion by alien invasive plant species. Both impacts were assessed as having Medium significance before mitigation and Low significance after mitigation. **On the basis of the assessment undertaken here, which indicates two possible impacts that can be mitigated, it is considered appropriate that they project be given approval.**
	Operation		Invasion by alien invasive plant species	There are a variety of alien invasive plant species that occur in the general geographical area. Disturbance will promote the opportunity for invasion by any of these species. Local invasion will degraded habitat and may spread further into surrounding areas. This may lead to more extensive loss of indigenous habitat and biodiversity and long-term control issues.	• Compile and implement an alien invasive control plan, monitor degree of invasion as well as outcome and effectiveness of control measures.	Annual monitoring for the entire operational phase, as per the recommendations of the alien invasive control plan.	
Avifauna	Construction	For avifaunal purposes, the site is predominantly grassland vegetation interspersed with some isolated thorn trees in places. The micro habitats available to birds on the site are: grassland; thorn trees; stands of exotic trees, and small pans. No Important Bird and Biodiversity Areas (IBA's) exist on or close to the site. The closest is the Soetdoring Nature Reserve approximately 30km south-east of the site. This is too far to be relevant to this study. Up to approximately 273 bird species occur in the broader area within which the proposed project is located. Included amongst these 273 species are a number of regionally and globally Red Listed bird species and a number of endemics. These include most importantly: 1 Critically Endangered species, White-backed Vulture; and 4 Endangered species – Black	Habitat destruction during construction & maintenance	The impact of habitat destruction will be of Low significance both pre and post mitigation. The amount of habitat to be transformed for the MTS substation, BESS and the associated power lines is relatively small in this landscape and the habitat is not particularly unique or limited in availability. We recommend several mitigation measures which will slightly reduce the impact significance, but not sufficiently to reduce below Low.	• A pre-construction avifaunal walk down should be conducted to: • Confirm final layout and identify any sensitivities that may arise between the conclusion of the BA process and the construction phase. • Identify any sensitive species breeding on site that may arise between the conclusion of the BA process and the construction phase. • All construction activities should be strictly managed according to generally accepted environmental best practice standards, so as to avoid any unnecessary impact on the receiving environment. • All temporary disturbed areas should be rehabilitated according to the site's rehabilitation plan, following construction. • A pre-construction avifaunal walk down should be conducted to provide final confirmation of the sections of power line requiring bird collision mitigation.	The new power line should be patrolled during operation by ESKOM annually to measure any impacts on birds (through detecting collision fatalities) and to monitor the durability of the line marking devices Where multiple devices on a span have failed they should be replaced immediately. Data should be submitted to the Eskom –EWT Strategic Partnership where it will be curated and publicly accessible.	**If these mitigation measures are implemented correctly we believe that the impacts of the proposed project will be at an acceptable level and we recommend the proposed project be authorised to proceed.**
			Disturbance of birds during construction	We judge the significance of this impact to be Low for both pre and post mitigation. Disturbance of birds typically reaches significant levels when the receptor is a breeding site for a sensitive species, or some other important feature, such as a roost. We have identified no such features on site.			

Specialist	Phase/s	Key Findings	Issue	Description of Impact	Mitigation	Monitoring	Conclusion
		Harrier, Ludwig's Bustard, Yellow-billed Stork, Martial Eagle and Tawny Eagle; 6 Vulnerable species; and 10 Near-threatened species. If the mitigation measures are implemented correctly t the impacts of the proposed project will be at an acceptable level and we recommend the proposed project be authorised to proceed.			• The overhead cables on high risk sections of the alignments (should be fitted with an approved anti bird collision line marking device to make cables more visible to birds in flight and reduce the likelihood of collisions. This should be done according to the Eskom Distribution and Transmission standards in terms of device spacing and other factors. Literature around the world points towards a 50-60% reduction in bird collision risk if the line is marked (Jenkins, Smallie & Diamond, 2010; Shaw et al, 2021). The line marking device should be a dynamic (moving – bird flapper type) device. The new power line should be patrolled by Mainstream annually to measure any impacts on birds (through detecting collision fatalities) and to monitor the durability of the line marking devices. Where multiple devices on a span have failed they should be replaced immediately. Data should be submitted to the Eskom –EWT Strategic Partnership where it will be curated and publicly accessible.		
	Operation		Collision of birds with overhead cables	We judge the significance of this impact to be Medium pre and Low post mitigation. Several regionally Red Listed bird species which are known to be susceptible to collision with overhead power lines occur in the study area, including Ludwig's Bustard, Blue Crane and Secretarybird. The significance of this risk is slightly diminished by the placement of the proposed power line within a corridor of existing power lines (some of which are higher above the ground than the proposed line and will provide some shielding for birds in flight).	• It is recommended as a precautionary measure that the standard Eskom Bird Perch be fitted to all pole tops to further provide safe perching space well above dangerous hardware. • It is also essential that if any of the pylon structures are changed we are given opportunity to assess the electrocution risk of the new structures and design mitigation.		
			Electrocution of birds perched on power lines	The significance of bird electrocution on the proposed power lines will be of Low significance pre mitigation since the proposed pylon structures have phase-phase and phase-earth clearances greater than 1800mm so even vultures and large eagles can	• It is recommended as a precautionary measure that the standard Eskom Bird Perch be fitted to all pole tops to further provide safe perching space well above dangerous hardware.		

Specialist	Phase/s	Key Findings	Issue	Description of Impact	Mitigation	Monitoring	Conclusion
				perch safely without bridging these critical clearances. It is recommended as a precautionary measure that the standard Eskom Bird Perch be fitted to all pole tops to further provide safe perching substrate well above dangerous hardware. It is also essential that if any of the pylon structures are changed we are given opportunity to assess the electrocution risk of the new structure and design mitigation.	• It is also essential that if any of the pylon structures are changed we are given opportunity to assess the electrocution risk of the new structures and design mitigation.		
Heritage	Construction	The only heritage issues for this project are the destruction of archaeological materials and the visual intrusion of the infrastructure into the cultural landscape. However, neither of them is a significant concern for the approval of the project because the archaeology can very easily be mitigated, while the landscape is now largely an electrical landscape and, in conjunction with all the other existing and approved (but not yet constructed) electrical facilities in the immediate area, the new substation and powerline would not be overly out of place. A location for the substation somewhat further from the R64 would have been better, but it is understood that many other engineering and design considerations went into the location decision Since the 132 kV powerline route and associated access track goes right through the middle of the Stone Age artefact scatter, buffering the area is not possible. It is also possible that other archaeological materials will be present beneath the surface in other parts of the development area but sampling this scatter will provide a good representative sample of the type of materials present in the vicinity.	Destruction of archaeological resources	Archaeological resources may be damaged during the construction period when grubbing and/or excavations for foundations, roads and other infrastructure occurs. The impacts are direct and will occur during the construction phase only. Because of the limited cultural significance of the archaeological materials, the intensity is medium and the extent limited to the site.	• Recording and sampling of artefacts from the site (waypoints 286 to 289). • Appoint archaeologist to conduct mitigation well before construction (Note that a permit application must be submitted to SAHRA by the appointed archaeologist in order to conduct the work. The purpose of this application is to ensure that an appropriately experienced archaeologist will do the work and that an appropriate methodology has been proposed.)	N/A	**Given that the archaeological material located within the development area is of low-medium cultural significance and the impacts can be easily mitigated, and that the landscape is essentially an electrical one in which the proposed new infrastructure would not be out of place, it is the opinion of the heritage specialist that the proposed project should be authorised in full**
	Construction Operation Decommissioning		Impacts to the cultural landscape	Impacts to the cultural landscape relate to the visual intrusion of the new electrical infrastructure into the rural cultural landscape. In this instance, however, it must be noted that a large amount of electrical infrastructure is already present in the landscape. This infrastructure includes many powerlines and two large substations, one of which lies close to the proposed development area. The impacts will occur for as long as the power line and substation remain present (i.e. long term). Because they will be visible from beyond the development area, the extent is rated as local. The position of the MTS and BESS alongside the R64 is notable in this instance because it will be very much in the public eye. During the construction and decommissioning phases the significance would be driven more by the amount of activity on site, while during operation it is driven mostly by the long-term during of the impact.	• Minimise disturbance footprint. • Rehabilitate all areas not required during operation. • Minimise size of access track.		

Specialist	Phase/s	Key Findings	Issue	Description of Impact	Mitigation	Monitoring	Conclusion
Palaeontology	**Construction Decommissioning**	Although isolated outcrops of the Tierberg Formation (Ecca Group, Karoo Supergroup is present no visible evidence of fossils were identified during the site assessment. However, it is important to note that destructive impacts on palaeontological heritage usually only occur during the construction phase. Excavations will change the current topography and destruct or permanently seal-in fossils at or below the ground surface. Fossil Heritage will then no longer be accessible for scientific research.	Destruction of fossil heritage	The excavations and site clearance of the powerline will involve extensive excavations into the superficial sediment cover as well as into the underlying bedrock. These excavations will change the existing topography and may destroy and seal-in fossils at or below the ground surface. These fossils will then no longer be available for research. According to the Geology of the project site there is a Very High possibility of finding fossils during construction.	**Chance Find Procedure.** The expected duration of the impact is assessed as potentially permanent to long term. In the absence of mitigation procedures (should fossil material be present within the affected area) the damage or destruction of any palaeontological materials will be permanent. Impacts on palaeontological heritage during the construction phase could potentially occur but are regarded as having a high possibility. The significance of the impact occurring will be low as no fossiliferous outcrops have been identified during the field visit	**N/A**	The significance of the impact occurring will be High before mitigation and Low after mitigation. **The overall impact of the proposed Mainstream 132kV/400kV On-site MTS and associated infrastructure, on the paleontological resources, is seen as acceptably low after the recommendations have been implemented and therefore, impacts can be mitigated to acceptable levels allowing for the development to be authorised**.

Visual	**Construction**	The VIA has determined that the study area has a somewhat mixed visual character, transitioning from the heavily transformed landscape associated with Perseus Substation and the town of Dealesville in the east to a more rural / pastoral character across the remainder of the study area. Hence, although the proposed development would alter the visual character and contrast with this rural / pastoral character, the location of the proposed development in relatively close proximity to Perseus Substation and its extensive network of high voltage power lines, will reduce the level of contrast.
		A broad-scale assessment of visual sensitivity, based on the physical characteristics of the study area, economic activities and land use that predominates, determined that the area would have a low visual sensitivity. An important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that may value the aesthetic quality of the landscape and depend on it to produce revenue and create jobs. The area is not however typically valued for its tourism significance and no leisure-
			Powerline affecting potential alteration of the visual character and sense of place and Potential visual impact on receptors in the study area	• Large construction vehicles, equipment and construction material stockpiles will alter the natural character of the study area and expose visual receptors to impacts associated with construction.
				• Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings.
				• Dust emissions and dust plumes from increased traffic on gravel roads serving the construction site may evoke negative sentiments from surrounding viewers.
				• Surface disturbance during construction would expose bare soil resulting in visual scarring of the landscape and increasing the level of visual contrast with the surrounding environment.
				• Vegetation clearance required for the construction of the proposed substation is expected to increase dust emissions and alter the natural character of the surrounding area, thus creating a visual impact.
				• Temporary stockpiling of soil during construction may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.
					• Carefully plan to mimimise the construction period and avoid construction delays.
					• Minimise vegetation clearing and rehabilitate cleared areas as soon as possible.
					• Maintain a neat construction site by removing rubble and waste materials regularly.
					• Position storage / stockpile areas in unobtrusive positions in the landscape, where possible.
					• Make use of existing gravel access roads where possible.
					• Limit the number of vehicles and trucks travelling to and from the construction site, where possible.
					• Unless there are water shortages, ensure that dust suppression techniques are implemented:
					  ○ on all access roads;
					  ○ in all areas where vegetation clearing has taken place;
					• on all soil stockpiles.
						• Ensure that visual management measures are monitored by an ECO. This will include monitoring activities associated with visual impacts such as the siting and management of soil stockpiles, screening and dust suppression.
						• Regular reporting to an environmental management team must also take place during the construction phase.
							It is SiVEST's opinion that the potential visual impacts associated with the proposed Main Transmission Substation (MTS), BESS and associated 400 kV, 132 kV and 33kV overhead power lines and access roads are negative and of moderate significance. Given the relatively low number of potentially sensitive receptors and the significant level of human transformation and landscape degradation in areas near the proposed development, the project is deemed acceptable from a visual perspective and the EA should be granted. **SiVEST is of the opinion that the impacts associated with the construction, operation and decommissioning phases can be mitigated to acceptable levels provided the recommended mitigation measures are implemented**

Specialist	Phase/s	Key Findings	Issue	Description of Impact	Mitigation	Monitoring	Conclusion

	Operation	based tourism facilities or formal protected areas were identified within 5 kms of the proposed development. This factor in conjunction with the high levels of transformation in the east have reduced the overall visual sensitivity of the area.
		Eighteen (18) potentially sensitive receptors were identified in the study area, none of which was found to be sensitive. All of the identified receptors are believed to be farmsteads that are regarded as potentially sensitive visual receptors as the proposed development will likely alter natural or semi-natural vistas experienced from these locations. Three of the receptor locations are outside the viewshed for the proposed power lines and substation site and none of the remaining receptors are expected to experience high levels of visual impact as a result of the proposed development. Ten of the remaining receptor locations are expected to experience moderate levels of impact as a result of the power line and substation development, while five receptors will only experience low levels of visual impact.
		Although the R64 receptor road traverses the study area, motorists travelling along this route are only expected to experience low levels of impact from the proposed development due to the degree of landscape degradation already present.
				• Carefully plan to mimimise the construction period and avoid construction delays.
				• Minimise vegetation clearing and rehabilitate cleared areas as soon as possible.
				• Maintain a neat construction site by removing rubble and waste materials regularly.
				• Position storage / stockpile areas in unobtrusive positions in the landscape, where possible.
				• Make use of existing gravel access roads where possible.
				• Limit the number of vehicles and trucks travelling to and from the construction site, where possible.
				• Unless there are water shortages, ensure that dust suppression techniques are implemented:
				  ○ on all access roads;
				  ○ in all areas where vegetation clearing has taken place;
				  ○ on all soil stockpiles.
					• Ensure that visual management measures are monitored by an ECO. This will include monitoring activities associated with visual impacts such as the siting and management of soil stockpiles, screening and dust suppression.
					• Regular reporting to an environmental management team must also take place during the construction phase.
						• Ensure that visual management measures are monitored by an ECO. This will include monitoring activities associated with visual impacts such as the control of signage, lighting and maintenance vehicles on access roads..	

	Decommissioning			• Vehicles and equipment required for decommissioning will alter the natural character of the study area and expose visual receptors to visual impacts. • Decommissioning activities may be perceived as an unwelcome visual intrusion. • Dust emissions and dust plumes from increased traffic on the gravel roads serving the decommissioning site may evoke negative sentiments from surrounding viewers. • Surface disturbance during decommissioning would expose bare soil resulting in visual scarring of the landscape and increasing the level of visual contrast with the surrounding environment. • Temporary stockpiling of soil during decommissioning may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.	• All infrastructure that is not required post-decommissioning should be removed. • Carefully plan to minimize the decommissioning period and avoid delays. • Maintain a neat decommissioning site by removing rubble and waste materials regularly. • Position storage / stockpile areas in unobtrusive positions in the landscape, where possible. • Ensure that dust suppression procedures are maintained on all gravel access roads throughout the decommissioning phase. • All cleared areas should be rehabilitated as soon as possible. • Rehabilitated areas should be monitored post-decommissioning and remedial actions implemented as required.	• Ensure that procedures for the removal of structures and stockpiles during decommissioning are implemented, including recycling of materials. • In addition, it must be ensured that rehabilitation of the site to a visually acceptable standard is undertaken.	

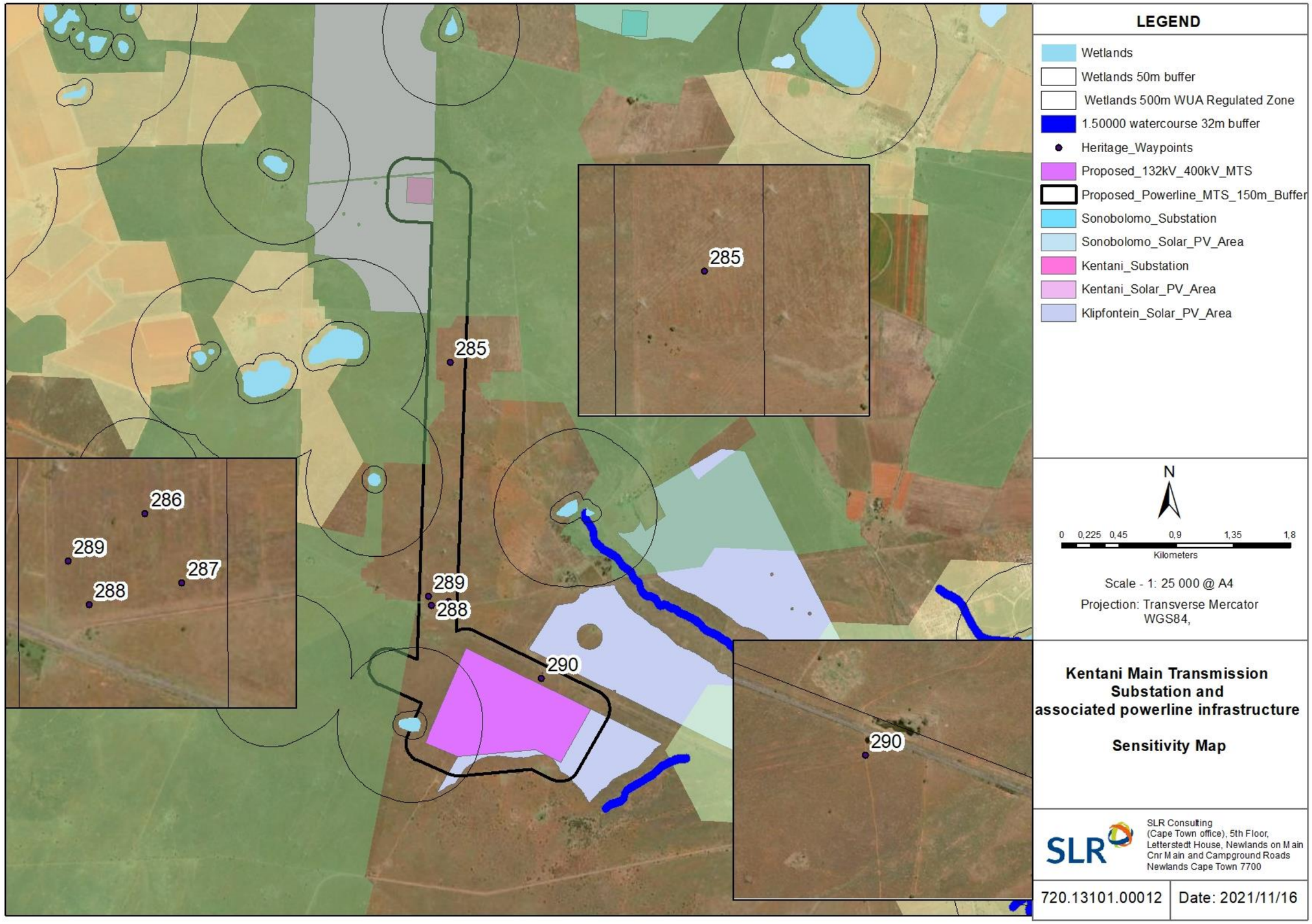

Figure 9-1: Site Sensitivity map based on specialist findings

9.1 ENVIRONMENTAL IMPACT ASSESSMENT STATEMENT

In terms of Section 31 (n) of 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 DFFE to take a decision.

Furthermore, it is the opinion of the EAP that based on the findings of the BA, that the proposed development should be granted an EA and allowed to proceed, provided the following conditions are adhered to:

- All feasible and practical mitigation measures recommended by the various specialists must be incorporated into the Generic Environmental Management Programmes (EMPr) if it is not provided for, and implemented, where applicable;
- Where applicable, monitoring should be undertaken to evaluate the success of the mitigation measures recommended by the various specialists.
- The final layout must be submitted to the DFFE for approval prior to commencing with the activity.

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;
- The MTS, BESS and Associated Grid Infrastructure has been identified as environmentally acceptable and will not result in significant impacts, provided that the recommended mitigation measures are implemented and the placement of these sites avoids the identified sensitive and 'no-go' areas;
- A cumulative impact assessment of similar developments in the area was undertaken by the respective specialists. Based on their findings, the cumulative impacts associated with the proposed development can be kept low after the implementation of mitigation measures and no fatal flaws have been identified and thus the proposed development should proceed from a cumulative impact assessment perspective; and
- Through the implementation of mitigation measures, together with adequate compliance monitoring, auditing and enforcement thereof by the appointed Environmental Control Officer (ECO) as well as the competent authority, the potential detrimental impacts associated with the proposed development can be mitigated to acceptable levels.

SLR requests that Part C of the Generic EMPrs (Appendix 7) are not authorised as the section will need to be updated once specialist walkthroughs have been undertaken and specific management plans are in place.

9.2 CONSTRUCTION TIMEFRAMES

Construction and implementation timeframes of the proposed MTS and associated infrastructure were not available to the EAP at the time of writing. As such it is it is requested that the Environmental Authorisation for construction, if issued by the Competent Authority, be valid for a period of 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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