

# KEREN ENERGY GROUP HOLDINGS (PTY) LTD

## PROPOSED VISSERSPAN SOLAR PV GRID CONNECTION

*on the farms Visserspan No. 40, Mooihoek No. 1547, Vasteveld No. 1548 and  
Kinderdam No. 1685, near Dealesville, Tokologo Local Municipality, Free State Province*



## DRAFT BASIC ASSESSMENT REPORT

*in terms of the National Environmental Management Act, No. 107 of 1998 (as amended)  
and associated environmental impact assessment regulations, 2014*

*Department of Forestry, Fisheries and the Environment* **Reference Number: 2021-08-0007**

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## EXECUTIVE SUMMARY

EnviroAfrica CC (EnviroAfrica) has been appointed by Keren Energy Group Holdings (Pty) Ltd (Keren Energy), to undertake the environmental authorisation (EA) application process for development of an overhead power line (OPL) connection to Eskom Holdings SOC Ltd's (Eskom's) power supply grid. The proposed grid connection will enable electricity evacuated from the already authorised four Visserspan solar photovoltaic (PV) facilities located on the Farm Visserspan No. 40, to be fed into the national electricity grid via Eskom's Perseus substation.

As part of the application for an EA, a basic assessment report (BAR) is required since the proposed development falls within renewable energy development zone 5 (REDZ 5) regulated by Government Notice (GN) 114 of 2018, as well as an associated strategic transmission corridor and electricity grid infrastructure area, regulated by GN. 113 of 2018.

Accompanying this draft basic assessment report (DBAR) is Keren Energy's EA application for the development of Visserspan Solar PV Grid Connection - a HV OPL connection to the national power supply grid.

The proposed development is for the construction of:

- i. high voltage OPLs strung on a single row of steel monopoles or steel lattice pylons which will traverse four farms viz. Visserspan Farm No. 40, Mooihoek Farm No. 1547, Vasteveld Farm No. 1548 and Kinderdam Farm No. 1685, located north of Dealesville (Tokologo Local Municipality) and 70km northwest of Bloemfontein in the Free State Province;
- ii. a collector substation to collect power evacuated from the four Visserspan solar PV facilities together with a switching station to step-up the evacuated electricity's low/medium voltage to HV. The collector substation and switching station are located on the Visserspan Project 2 site (on Visserspan Farm No. 40) and are referred to as the 'on-site' or 'Visserspan substation'.
- iii. a main transmission substation (MTS) located on Kinderdam Farm No. 1685 near to the point of tie-in to the Eskom grid which will step up the conducted

electricity to the required voltage to enable connection to the national grid. This substation is known as the 'Kinderdam MTS'.

Keren Energy, as the Applicant for the environmental authorisation is co-developing the project with Mulilo Energy Holdings (Pty) Ltd (Mulilo). At the time of application for environmental authorisation, negotiations by the Developers with Eskom were not finalised. Therefore, the proposed development alternatives presented in this basic assessment report (BAR) are for high voltage (HV) OPLs which could comprise of either 132kV, 275kV, or 400kV conductors. The OPL will eventually carry at least four conductors (cables) one servicing each of the four Visserspan solar PV facilities.

However, in preliminary discussions with Eskom it was intimated that the connecting power line is typically a 132kV line. Since the exact voltage of the HV line has not been confirmed by Eskom at this stage, the precautionary approach was applied and the impact assessed for this EIA process was for the proposed development footprint which would cause the greatest negative impact on the environment i.e. the 'worst case scenario'. The 'worst case scenario' would be to construct a 400kV OPL, strung on steel lattice pylons.

A 400kV OPL would have the greatest actual and potential negative impacts in terms of biodiversity (flora/vegetation removal and faunal impact, specifically avifauna); loss of agricultural land; freshwater, heritage (archaeological and palaeontological) and visual/aesthetic impacts (including sense of place).

The above precautionary approach was discussed with the Department of Forestry, Fisheries and the Environment (DFFE) during the pre-application meeting held in August 2021. Specialist studies to be undertaken for an effective EIA process, were also agreed to in the pre-application meeting. The precautionary approach (i.e. assessment of a 'worst case scenario' OPL for all potential alternatives) was the brief given specialists conducting the required impact assessment studies. That being said, specialists were also informed to bear in mind that a lower (132kV) voltage OPL may be the likely alternative.

Based on the potential footprint of a 400kV steel pylon OPL, the total development footprint for the proposed Visserspan Solar PV Grid Connection, project covers an area of around 65ha. This includes temporary (construction) as well as permanent sites.

The infrastructure associated with the proposed grid connection includes access roads (either the widening of existing farm roads or the development of new earthen/gravel roads where roads/ tracks do not exist), fenced construction staging/laydown area - a portion of which will form the permanent operational area consisting of substations, site office/s with ablutions and maintenance areas (on Visserspan and Kinderdam farms), all within the approximately 65ha proposed development site footprint.

The permanent operational area consisting of substations, site office/s with ablutions and maintenance areas are located on the Visserspan and Kinderdam farms.

It should be noted that, as is typical for these types of grid connections, the bulk of the built infrastructure will be handed over to Eskom once construction is complete. Thus, the Kinderdam MTS, OPL and Visserspan switching station portion of the Vissersdam substation will become Eskom's operational responsibility, whilst the collector substation portion of Visserspan substation, will remain the applicant's responsibility.

For this reason, it is requested that in accordance with Regulations 11 and 25(2) of the NEMA EIA Regulations as amended in 2017, two EAs be issued from this application – one in the name of the applicant and the other in the name of Eskom. The EA to be issued in the name of Keren Energy, the Applicant, will be only for the Visserspan collector station portion of the Vissersdam substation. The EA to be issued in the name of Eskom will be for the Visserspan switching station, OPL and Kinderdam MTS.

To facilitate an easier division of the responsibilities linked to the conditions of an EA, should the Department decide to issue two EA's from this single application, four separate environmental management plans/programmes (EMPrs) have been developed and are included under Appendix J of this BAR, viz.:

- i. Appendix J1 - Visserspan IPP Collector Station EMPr;
- ii. Appendix J2 - Visserspan Eskom Switching Station EMPr;

- iii. Appendix J3 - Eskom Overhead Power Line EMPr; and
- iv. Appendix J4 - Kinderdam Eskom Main Transmission Substation EMPr.

The actual permanently disturbed footprint of the project is confined to the two substation areas and the specific points where the OPL supporting poles/pylons are anchored into the ground. Agricultural activities prevalent in the areas i.e. grazing and game farming, are still able to continue beneath the OPL as indicated in Figure 1 of the BAR which depicts South African sites where agricultural activities and natural vegetation remain beneath HV OPLs.

The National Environmental Management Act, No.107 of 1998 (NEMA), as amended, makes provision for the identification and assessment of activities that are potentially detrimental to the environment and which require authorisation from the competent authority based on the findings of an Environmental Assessment.

NEMA as a national act, is enforced by the national Department of Forestry, Fisheries and the Environment (DFFE). Typically, these powers are delegated to the provincial department of environmental affairs but since the legislated (or listed) activity which results from the proposed development, occurs in an area of strategic importance identified in terms of Section 24(3) of NEMA, namely in a Renewable Energy Development Zone (REDZ) and associated strategic transmission corridor and electricity grid Infrastructure (EGI) area, the DFFE is the competent authority for this environmental authorisation application.

According to the regulations of Section 24(5) of the NEMA, environmental authorisation is required for certain regulated or listed activities. The schedules of listed activities under the NEMA were evaluated to determine which actual and possible activities required authorisation. Several actual and potential listed activities, as per the 2014 EIA regulations (as amended), apply to the proposed Visserspan Solar PV Grid Connection development. These activities are detailed in Section 6 of this basic assessment report (BAR).

It should be noted that due to the available consents for use of land (as per Appendix K) and the proximity to Eskom's Perseus substation, as well as the other renewable energy

developments/proposed developments, specific alternative sites for the substations and the bulk of the preferred OPL route do not exist.

However, other possible alternative options which include *inter alia*, partial route variation, voltage conducted, supporting structures used and the option of not proceeding with the proposed development at all (the No-Go option) are considered within this BAR. Specialist reports (draft versions) are referenced and appended to this BAR.

The findings, results, observations and recommendations given in this assessment are based on the best scientific and professional knowledge available from information provided and verified by site visits.

A synopsis of the main opinion of each of the specialists appointed to assess various parameters of the project, is presented below. Although route Alternative 3 is referred to in specialist reports since it was initially thought that this could be a possible route alternative, Eskom has informed the EAP/developer that the option to choose this alternative does not exist post Bid Window 5. Therefore, Alternative 3 as referred to in specialist reports, is not listed as an alternative in this BAR.

### **Botanical / Biodiversity:**

According to the Vegetation Map of South Africa, Swaziland and Lesotho (SANBI, 2018) also known as VEGMAP, the area through which the 400 kV Visserspan Grid Connection OPL would be aligned (both alternatives) is Vaal-Vet Sandy Grassland (Figure 4). This vegetation is recognized as an endangered terrestrial ecosystem (Government Gazette, 2011) due to loss from agriculture. However, the OPL will not result in any loss of this vegetation and will have negligible negative effect on the habitat.

Using the information gathered through physical site-visits to ground-truth the interpretation of various maps, databases and information available for the designation of the sensitivity of areas traversed by the grid connection OPL, the botanical/biodiversity specialist determined that both Alternative 1 and Alternative 2 routes have LOW sensitivity with respect to plants and terrestrial biodiversity, the latter specifically since it is linear

infrastructure and would not result in significant loss of Vaal-Vet Sandy Grassland. It is further stated that “with respect to the vegetation and flora either alternative route could be used” and that “the preferred route (Alternative 1) is acceptable”.

## **Avifaunal:**

### **Cumulative impacts**

The proposed Visserspan grid connection equates to a maximum of approximately 6.4km, depending on which of the alternatives are used. There are approximately 440kms of existing high voltage lines within the 30km radius around the Visserspan project (counting parallel lines as one). The Visserspan grid connection grid project will thus increase the total number of existing high voltage lines by approximately 1.4%. The contribution of the proposed Visserspan grid connection to the cumulative impact of all the high voltage lines is thus low. However, the combined cumulative impact of the existing and proposed power lines on avifauna within a 30km radius is considered to be moderate.

The cumulative impact of displacement due to disturbance and habitat transformation in the switching station and MTS associated with the Visserspan PV project is considered to be low, due to the small size of the footprint, and the availability of similar habitat within the 30km radius area. The cumulative impact of potential electrocutions within the switching station and MTS yards is also likely to be low as it is expected to be a rare event.

The no-go alternative will result in the current status quo being maintained at the proposed development site as far as the avifauna is concerned. The development site itself consist mostly of natural grassland and pans. The no-go option would maintain the natural habitat which would be beneficial to the avifauna currently occurring there.

From an avifaunal perspective, Alternative 3 is preferred power line alternative because it is the shortest alternative. However, neither Alternative 1 nor Alternative 2 are fatally flawed and can be utilised with appropriate mitigation.

The expected impacts of the Visserspan switching station, Kinderdam MTS and grid connection power line were rated to be of Medium significance and negative status pre-



mitigation. However, with appropriate mitigation, the post-mitigation significance of the identified impacts should be reduced to Low negative (see Table 3 above).

No fatal flaws were discovered in the course of the investigation. It is therefore recommended that the activity is authorised, on condition that the proposed mitigation measures as detailed in the Impact Assessment Tables in the BAR and the EMPr are strictly implemented.

### **Freshwater:**

The freshwater impact assessment report was undertaken for the NWA electronic water use licence/authorisation application (e-WULAA), as well as this NEMA application. It, therefore, includes site assessment information for the already approved NEMA EAs for the four Visserspan Solar PV Facilities, as well as the current application seeking DFFE approval, the Visserspan Solar PV Grid Connection.

The environmental risks are low, even though the pans are ecologically important and ecologically sensitive. It is therefore recommended that a General Authorization be issued. It is also recommended, since impacts are insignificant and environmental risks are low, that the installation be officially allowed to be developed within 7m of the demarcated central pan, as was the case with a number of previous e-WULAA's for similar solar plants.

The impacts of the PV plant and the associated power line are insignificant.

### **Heritage - Archaeological:**

Results of the study indicate that the route for the proposed Visserspan Grid Connection is not a sensitive archaeological landscape. The survey has shown that the archaeological landscape is dominated by a few isolated and dispersed scatters of mostly MSA lithics of low (Grade IVC) significance.

The assessment has shown that the proposed route corridor for the Visserspan Grid Connection is not a sensitive archaeological landscape.

The overall impact significance of the proposed project on archaeological heritage is assessed as low and therefore there are no objections to the proposed development proceeding.

### **Heritage - Palaeontological:**

According to consulting palaeontologist, Dr John Almond (2020), “the palaeontological sensitivity of the solar PV project areas on Farm Visserspan No. 40 near Dealesville is low”. This applies to the solar PV project areas as well as the proposed Visserspan Grid Connection (Almond *pers. comm.* 2021)<sup>1</sup>.

Almond notes that, “substantial direct impacts on fresh, potentially fossiliferous Tierberg Formation (Ecca Group, Karoo Supergroup) bedrocks during the construction phase of the proposed PV solar projects are considered unlikely”.

Anticipated impacts on local palaeontological heritage resources from the construction and operational phase of the developments are accordingly, of low significance.

### **Visual:**

The sense of place of the region surrounding the proposed Visserspan Solar PV Grid Connection has been altered over time from a rural landscape to accepting large infrastructure as part of the landscape with the construction and expansion of the Perseus substation and the high voltage power lines that converge at the substation.

This altered landscape also accepted the proposed PV projects and these will eventually dominate the landscape. The proposed transmission line is merely a support infrastructure element which will be added to the landscape and fact be a fairly minor element in relation to the existing infrastructure elements in the area.

The area along the corridor is characterized as a rural landscape with large scale infrastructure present. No land uses with high sensitivity towards scenic value has been identified. The area in general thus display a low visual sensitivity. The topography

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<sup>1</sup> As communicated to EnviroAfrica by J Kaplan of Agency for Cultural Resource Management (ACRM)

provides a medium level of visual absorption for low vertical extent objects and existing infrastructure of higher vertical extent provide a buffer for similar infrastructure.

The overall visual impact on the identified receptors is moderate to low and requires no mitigation measures to reduce visual impact.

The cumulative impact of proposed transmission line contributes little to the overall cumulative impact of the total number of PV facilities, substations and powerlines present and already approved. Since thresholds have not been determined on a regional level, a statement to that effect on a project level is not appropriate.

Due to the fact that the line will partially follow existing lines, tracks, boundaries and linear landscape elements, the overall impact is low.

The small extent of the project in relation to the number of approved PV facilities as well as the fact that the site is in the immediate vicinity of other proposed and approved projects and is in close proximity to the Perseus substation result in a low contribution to the cumulative impact with regards to crowding.

The small scale and length of the line result in the overall contribution to the cumulative impact of the development being minimal to insignificant.

### **Soil, Land Use and Agricultural Potential:**

#### **OPL Construction:**

The cumulative impact of this activity will be small as it is constructed on land with low agricultural potential and with discrete point impacts.

#### **Substation area:**

Although the loss of agricultural land is a long-term loss that extends to the post-construction phase. The agricultural potential is very low though. Associated grid connection on the site will not have large impacts due to the low agricultural potential of the site as well as the rainfall that is below 500 mm pa. It is explicitly assumed in this conclusion that centre pivot irrigation fields and infrastructure will not be impacted due to dedicated placement of power line infrastructure.

With the exception of the avifaunal specialist's assessment, all other specialist assessments and conclusions state that the development of the proposed Visserspan Solar PV Grid Connection will have a low, minimal or insignificant environmental impact (refer to reports in Appendix G, attached).

The avifaunal specialist's assessment indicates that without mitigation the impact of the proposed Visserspan Solar PV Grid Connection would be medium. However, with implementation of mitigation measures (as recommended in the specialist report and included in the respective EMPs), the environmental impact risk rating is reduced to low.

This concurs with the other 6 independent specialist reports (and one palaeontological consulting specialist's opinion), indicating that no environmental fatal flaws were discovered or demonstrated.

It is, therefore, the EAP's opinion that authorisation for the proposed Visserspan Solar PV Grid Connection may be granted.

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## 1. ACRONYMS

BAR	Basic Assessment Report
BGIS	National Biodiversity Geographic Information System
CA	Competent Authority
CAA	Civil Aviation Act, No. 13 of 2009
CBA	Critical Biodiversity Area
DBAR	Draft Basic Assessment Report
DEA	Department of Environmental Affairs
DESTEA	Department of Economic, Small Business Development, Tourism and Environmental Affairs
DFFE	Department of Forestry, Fisheries and the Environment
DHSW&S	Department of Human Settlements, Water and Sanitation
DoE	Department of Energy
DoH	Department of Health
DMR&E	Department of Mineral Resources and Energy
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
ECA	Environment Conservation Act, No. 73 of 1989
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMF	Electromagnetic Field
EMPr	Environmental Management Programme
ESA	Ecological Support Area
HIA	Heritage Impact Assessment
HV	High Voltage
HWC	Heritage Western Cape
ICASA	Independent Communications Authority of South Africa
ICASAA	Independent Communications Authority of South Africa Act, No. 13 of 2000 (and regulations as amended by the Broadcasting Amendment Act, No. 64 of 2002)
ICT	Information and Communications Technology

I&APs	Interested and Affected Parties
MNO	Mobile Network Operators
NEMA	National Environmental Management Act, No. 107 of 1998 (and as amended)
NEM:AQA	National Environmental Management: Air Quality Act, No. 39 of 2004 (and as amended)
NEM:BA	National Environmental Management: Biodiversity Act, No. 10 of 2004 (and as amended)
NEM: PAA	National Environmental Management: Protected Areas Act, No. 57 of 2003 (and as amended)
NEM:WA	National Environmental Management: Waste Act, No. 59 of 2008 (and as amended)
NHRA	National Heritage Resources Act, No. 25 of 1999 (and as amended)
NRA	National Roads Act, No. 7 of 1998
NWA	National Water Act, No. 36 of 1998 (and as amended)
OPL	Overhead Power Line
SACAA	South African Civil Aviation Authority
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SANRAL	South African National Road Agency (Pty) Ltd
SANRAL	The South African National Roads Agency Limited
SIP	Strategic Integrated Project
WHO	World Health Organisation
e-WULAA	Electronic Water Use Licence Application and Authorisation

## 2. TERMS OF REFERENCE

EnviroAfrica CC is an independent environmental consulting firm that has no interest in the proposed activity other than fair remuneration for services rendered. Remuneration for services is not linked to approval by decision making authorities and EnviroAfrica has no vested interest in secondary or subsequent development which may result from this project. There are no circumstances that compromise the objectivity of this environmental impact assessment.

The Applicant, Keren Energy Group Holdings (Pty) Ltd, appointed EnviroAfrica on 23 July 2021 to facilitate the environmental impact assessment and authorisation application/s associated with the proposed development.

It should be noted that Keren Energy Group Holdings (Pty) Ltd, company registration number 2020/519683/07 (Keren Energy), is the applicant for this environmental authorisation application and holds the environmental authorisations for the four Visserspan solar photovoltaic (PV) facilities which this grid connection application will service. The four Visserspan solar PV facilities viz.

- i. Visserspan Solar PV Facility - Project 1 (Ref. No. 14/12/16/3/3/1/2153);
- ii. Visserspan Solar PV Facility - Project 2 (Ref. No. 14/12/16/3/3/1/2154);
- iii. Visserspan Solar PV Facility - Project 3 (Ref. No. 14/12/16/3/3/1/2155); and
- iv. Visserspan Solar PV Facility - Project 4 (Ref. No. 14/12/16/3/3/1/2156),

were authorised by the then national Department of Environment, Forestry and Fisheries (DEFF), now the Department of Forestry, Fisheries and the Environment (DFFE), in November 2020, each have the capacity to generate between 75MW and approximately 100MW.



The findings, results, observations and recommendations given here are based on the best scientific and professional knowledge available from information provided and verified, where required, by site visits.

EnviroAfrica reserves the right to modify aspects of this report, including the recommendations, if new information becomes available which may have a significant impact on the findings of this report.

### 3. EAP QUALIFICATIONS

Vivienne Thomson: Vivienne holds a BSc in Zoology from the University of Cape Town (1995) and has over twenty years industry experience in the construction, power generation and mining sectors. She has completed an ISO 14001 Lead Auditors course, as well as several environmental short courses and has guest lectured for the MSc in Environmental Science Environmental Impact Assessment (EIA) course at the University of the Witwatersrand.

Vivienne is a member of the National Association for Clean Air (NACA) and has served as NACA National Council Member. She is a previous member of the South African Coal Ash Association and an affiliate of the Institute of Innovators and Inventors. She was also a member of the Committee of Interested Parties which acted as an independent, advisory body to ensure impartiality of Pricewaterhouse Coopers' Certification Body in their governance and sustainability division.

Since 2004, Vivienne has been involved in environmental consulting with experience in EIAs, establishing and implementing ISO 14001 EMSs, contract management, legal compliance evaluations, as well as developing, implementing and assessing environmental management plans and monitoring programmes.

Relevant Project Experience: Successful completion of EIA process for 6 x 5MW solar PV plants. Authorisations granted with no requests for appeal. Successful completion of EIA process for 4 x 75MW-100MW solar PV plants. Authorisations granted with no requests for appeal. Successful completion of EIA process for linear (pipeline) EIA process. Authorisation granted with no requests for appeal.

Qualifications Summary: BSc, Zoology (UCT); EIA short course (PU), Environmental Law (PU), Advanced Environmental Law (Mandela Institute School of Law, Wits), ISO 14001 Lead Auditors Course (WTH Management and Training), Root Cause Analysis Technique (IRCA), Environmental Performance Measurement Workshop (African Centre for Energy and Environment), Basic Principles of Ecological Rehabilitation and Mine Closure (PU), NACA Member.

EnviroAfrica CC Owner: Bernard de Witt

Bernard de Witt Qualifications Summary: BSc, Forestry (SU); BA (Hons), Public Administration (Stellenbosch); National Diploma in Parks and Recreation Management; EIA Short course (UCT); ISO 14001 Auditors course (SABS); IAIA (SA) Membership Number: 219; EAPASA Registration Number: 2021/3903.

Please refer to Appendix L (EAP Details and Declaration)

## **4. INTRODUCTION**

### **4.1.1. Project Rationale**

In March 2011, the then Department of Energy's (DoE's) Integrated Resource Plan (IRP) 2010-2030 was promulgated with the aim of providing a long-term, cost-effective strategy to meet the electricity demand in South Africa. The IRP 2010-2030 objectives align with Government's in terms of reliable electricity supply, as well as environmental and social responsibilities and economic policies. The study horizon for the IRP was the period from 2010 to 2030.

The short to medium term intentions of the IRP 2010 -2030 are to ascertain the most cost-effective electricity supply option for the country, speak to the opportunities for investment into new power generation projects and determine security of electricity supply.

The IRP's long-term electricity planning goal is to consider social, technical, environmental and economic constraints, as well as other externalities while ensuring sustainable development in the country.

To this end, within the IRP, the DoE – now the Department of Mineral Resources and Energy (DMRE) – set a target electricity supply of 17.8 GW from renewable energy sources by 2030. This target renewable energy capacity would be produced primarily by solar, wind, biomass and small-scale hydro electricity generation (with the bulk being met by wind and solar energy supplies). In addition, the 2030 target ensures that approximately 42% of the country's total estimated electricity generation capacity would be met by renewable energy sources.

This application is in response to the DMR&E's target and IRP 2010-2030 strategy to expand the South African renewable energy electricity generation capacity.

### **4.1.2. Activity Overview**

The purpose of the Visserspan Solar PV Grid Connection project is the development of infrastructure to enable the four (4) already authorised Visserspan Solar Photovoltaic (PV) Facilities to connect and supply electricity to the national (Eskom) grid.

The proposed development is for the construction of:

- i. high voltage OPLs strung on a single row of steel monopoles or steel lattice structure pylons, which will traverse four farms viz. Visserspan Farm No. 40, Mooihoek Farm No. 1547, Vasteveld Farm No. 1548 and Kinderdam Farm No. 1685, located north of Dealesville (Tokologo Local Municipality) and 70km northwest of Bloemfontein in the Free State Province;
- ii. A collector substation to collect power evacuated from the four Visserspan solar PV facilities together with a switching station to step-up the evacuated electricity's low/medium voltage. The collector substation and switching station which are located on the Visserspan Project 2 site (on Visserspan Farm No. 40) and are referred to as the 'on-site' or 'Visserspan substation'.
- iii. A main transmission substation (MTS) located on Kinderdam Farm No. 1685 near the point of tie-in to the Eskom grid which will step up the conducted electricity to the required voltage to enable connection to the national grid. This substation is known as the 'Kinderdam MTS'.

Keren Energy, as the Applicant for the environmental authorisation is co-developing the project with Mulilo Energy Holdings (Pty) Ltd (Mulilo). At the time of application for environmental authorisation, negotiations by the Developers with Eskom were not finalised. Therefore, the proposed development is for a HV OPL which could comprise of either a 132kV, 275kV, or 400kV OPL. The OPL will eventually carry at least four conductors (cables) one servicing each of the four Visserspan solar PV facilities.

However, in preliminary discussions with Eskom it was intimated that the connecting power line is typically a 132kV line. Since the exact voltage of the HV line has not been confirmed by Eskom at this stage, a precautionary approach was applied and the impact assessed for this EIA process was for the proposed development footprint which would cause the greatest negative impact on the environment i.e. the 'worst case scenario'. The 'worst case scenario' in terms of environmental impact, would be to construct a 400kV OPL, strung on steel lattice pylons.

As mentioned above, Eskom communicated that the most likely grid connection for this project would be a 132kV OPL between Visserspan substation and Kinderdam MTS. Therefore, a 132kV OPL option is listed as the preferred alternative in this BAR. This was discussed during the pre-application meeting with the competent authority since any environmental impacts for the lower voltage OPL would be included in an impact

assessment for a higher voltage OPL (as is the case for the 'worst case scenario' approach i.e. assessing the option of developing a 400kV OPL). The potential impacts for this preferred alternative would be less than those anticipated for a higher voltage OPL.

A 400kV OPL would have the greatest actual and potential negative impacts in terms of biodiversity (flora/vegetation removal and faunal impact, specifically avifauna); loss of agricultural land; freshwater, heritage (archaeological and palaeontological) and visual/aesthetic impacts (including sense of place).

It should be noted that the avifaunal specialist did take cognisance of the potential for variation in impacts between infrastructure required for a 132kV versus a 400kV OPL (i.e. height variation).

The above precautionary approach was discussed with the Department of Forestry, Fisheries and the Environment (DFFE) during the pre-application meeting held in August 2021. Specialist studies to be undertaken for an effective EIA process, were also agreed to in the pre-application meeting.

The precautionary approach (for all potential alternatives) was part of the brief given the specialists conducting the required specialist studies. All specialists were informed to bear in mind the likelihood of a lower (132kV) voltage line being one of the alternatives but to assess for the largest impact specifically where buffer zones and areas of impact influence were concerned.

As part of the application for an EA, a basic assessment report (BAR) is required since the proposed development falls within renewable energy development zone 5 (REDZ 5) regulated by Government Notice (GN) 114 of 2018, as well as an associated strategic transmission corridor and electricity grid infrastructure area, regulated by GN. 113 of 2018.

Accompanying this draft basic assessment report (DBAR) is Keren Energy's EA application for the development of a HV OPL connection to the national power supply grid.

The total development footprint for the proposed Visserspan Solar PV Grid Connection, project covers an area of around 65ha. This includes temporary (construction) as well as permanent sites.

The infrastructure associated with the proposed grid connection includes access roads (either the widening of existing farm roads or the development of new earthen roads where roads/ tracks do not exist), fenced construction staging/laydown area - a portion of which will form the permanent operational area consisting of substations, site office/s with ablutions and maintenance areas (on Visserspan and Kinderdam farms), all within the approximately 65ha proposed development site footprint.

The Visserspan Substation area is approximately 8ha of which 6ha will be used by the on-site substation's footprint. The remaining 2ha are included in the total development footprint (as outlined in red in Appendices A1 and A2) although the area will not be built upon.

The Kinderdam MTS footprint is approximately 6ha. It should be noted that the total Kinderdam MTS area (temporary and permanent) covers an area of approximately 15ha of which approximately 9ha will be rehabilitated post construction.

There will be OPLs leading from the Visserspan on-site substation to the proposed Kinderdam MTS and the corridor footprint covered by the OPL is approximately 51ha.

The Kinderdam MTS is located within 600m of the existing Eskom HV OPL servitude which cuts through south-eastern portion of Kinderdam Farm. The connection (or tie-in) to the national power grid will take place via these existing OPLs, in a 'loop-in, loop-out' system enabling electricity to reach Eskom's Perseus substation, approximately 6,3km south of the proposed development site.

It should be noted that, as is typical for these types of grid connections, the bulk of the built infrastructure will be handed over to Eskom once construction is complete. Thus, the Kinderdam MTS, OPL and Visserspan switching station portion of the Vissersdam substation will become Eskom's operational responsibility, whilst the collector substation portion of Visserspan substation, will remain the applicant's responsibility.

For this reason, it is requested that in accordance with Regulations 11 and 25(2) of the NEMA EIA Regulations as amended in 2017, two EAs be issued from this application – one in the name of the applicant and the other in the name of Eskom. The EA to be issued in the name of Keren Energy, the Applicant, will be only for the Visserspan collector station portion of the Vissersdam substation. The EA to be issued in the name of Eskom will be for the Visserspan switching station, OPL and Kinderdam MTS.

To facilitate an easier division of the responsibilities linked to the conditions of an EA, should the Department decide to issue two EA's from this single application, four separate environmental management plans/programmes (EMPrs) have been developed and are included under Appendix J of this BAR, viz.:

- i. Appendix J1 - Visserspan IPP Collector Station EMPr;
- ii. Appendix J2 - Visserspan Eskom Switching Station EMPr;
- iii. Appendix J3 - Eskom Overhead Power Line EMPr; and
- iv. Appendix J4 - Kinderdam Eskom Main Transmission Substation EMPr.

The actual permanently disturbed footprint of the project is confined to the two substation areas and the specific points where the OPL supporting poles/pylons are anchored into the ground.

Agricultural activities are still able to continue beneath the OPL as indicated in Figure 1 below which depicts sites where agricultural activities and natural vegetation remain beneath HV OPLs.



**Figure 1:** South African examples of the impact HV pylon footprints make on existing biodiversity whether it be cultivated lands/monocultures, or natural veld/grazing. A monopole structure would have proportionally less of an impact on the surrounding environment.

The development is primarily a linear development but includes the construction of two 'substations' located at each 'end' of the proposed grid connection line viz.:

- i. a combined collector station and switching station – a HV substation collectively known as the Vissersdam substation – is proposed to be constructed on Visserspan Farm No. 40, located at approximately 28°36'37.82"S, 25°44'50.21"E (estimated central point). This where the proposed 132kV OPLs will conduct power evacuated from the Visserspan Solar PV Facilities; and
- ii. a main transmission substation (MTS) to be located on Kinderdam Farm No. 1685, located at approximately 28°37'0.82"S, 25°48'14.76"E (estimated central point) – a HV substation known as the Kinderdam MTS where the proposed 132kV overhead grid connection power line will enter before exiting from the Kinderdam MTS as a 400kV OPL, to tie-in to the national grid via a loop-in/loop-out connection with Eskom's existing Perseus-Theseus OPL.

The proposed Visserspan Farm switching station/HV substation will serve as a single 'collection' point for electricity evacuated from the Visserspan Solar PV facilities (No's. 1 to 4). From this single substation facility, electricity will be fed via OPLs towards the east and turning north-east to traverse the northern boundary of Mooihoek Farm No. 1547 and Vasteveld Farm No. 1548 before turning north-east again and running along the southern boundary of Kinderdam Farm No. 1685 connecting to the Kinderdam main transmission substation (MTS) to be located at 28°37'0.82"S, 25°48'14.76"E (estimated central point).



The estimated total length of the grid connection line is approximately 6.5km and will be either via OPLs on steel monopoles (approximately 30m in height) conducting either 132kV, 275kV or 400kV pylons. The 275kV and 400kV OPLs would be 40m to 44m in height but not exceeding a maximum of 50m). Grid connection will be either to the existing Theseus-Perseus 400kV or Everest-Perseus 275kV transmission powerlines which feed to Eskom's existing Perseus substation.

Existing roads will be used to access the proposed development area (farm access and fence maintenance roads), wherever possible. In some instances, these roads or tracks will need to be widened and the ground compacted to accommodate heavy load vehicles. Clearance of vegetation/land will only occur for substation and pylon/monopole footprints (not the entire servitude corridor). Although, as a precautionary approach, the minimum servitude for a 400kV powerline will be used to determine potential development footprint i.e. 55m width.

Due to the proximity to Eskom's Perseus substation and grid connection negotiations with Eskom (considering the number of HV lines feeding into Perseus substation), as well as the land owners' consent use (as per Appendix K), only three potential routes for grid connection were identified:

- i. **Alternative 1 (preferred alternative)** – as discussed above with OPLs moving from west to east from Visserspan substation and connecting, via Kinderdam MTS, to the either the 400kV or 275kV Eskom OPL which traverses Kinderdam Farm No. 1685.
- ii. Alternative 2 - a partial deviation in the preferred route (Alternative 1) based on the a suggestion from the landowner; and
- iii. Alternative 3 - a possible route which lies directly to the south of Visserspan Farm No. 40 but involves negotiation with a separate Independent Power Producer (IPP) developer who is developing a solar PV project between Visserspan Farm No. 40 and Eskom's Perseus substation.

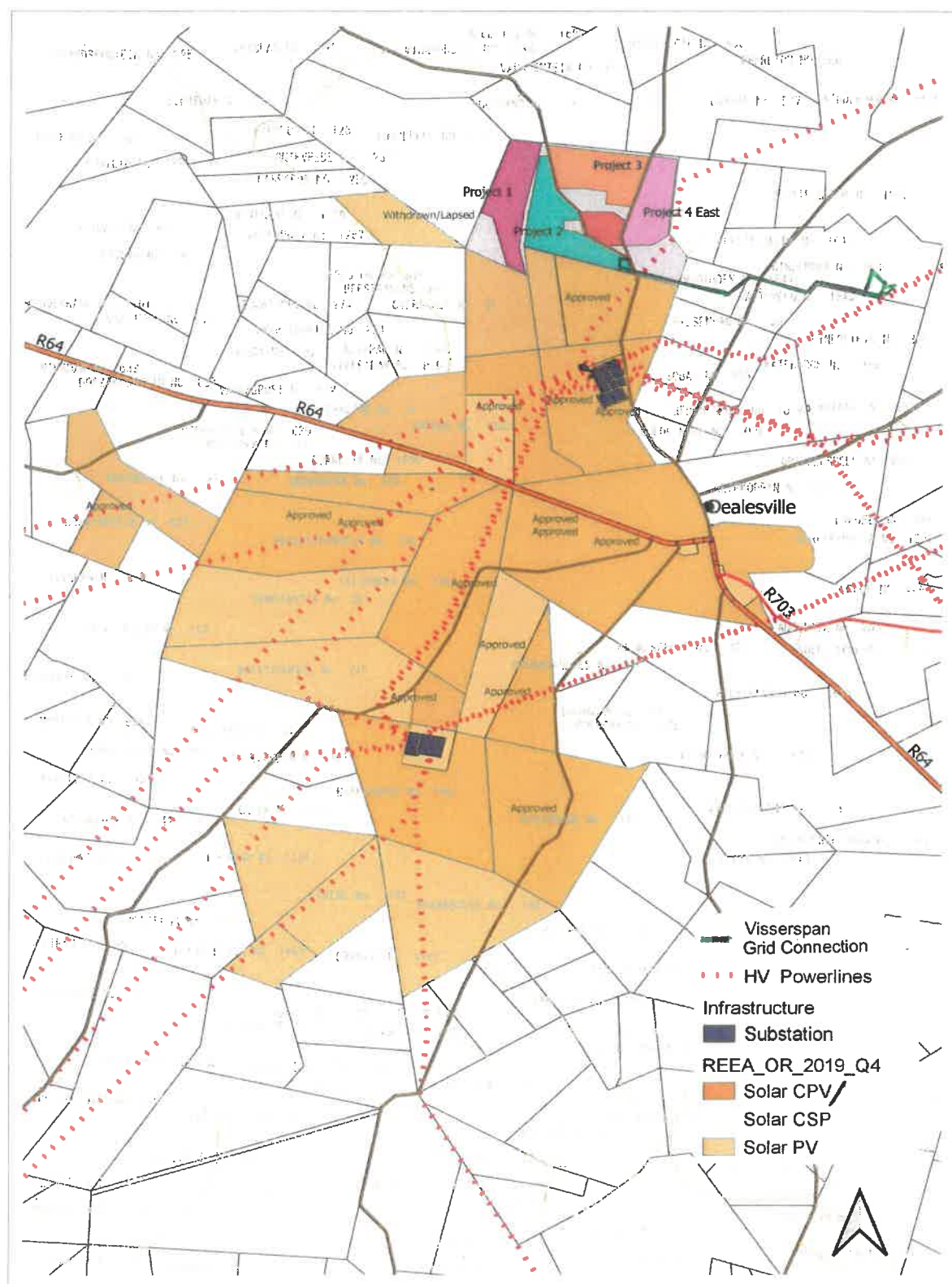
Extensive discussions with Eskom indicated that Alternative 3 will be a highly unlikely alternative since there is no space for the construction of an MTS directly south of Visserspan Farm and the MTSs to be built lie too far to the south/south-west of Perseus substation to service a grid connection from Visserspan. It should be noted that during the time of site visit assessment by

specialists, the information from Eskom was not known and specialists were instructed to assess the potential for alternative 3 (which is the most direct route to Perseus substation). Alternative 3, although highly unlikely to materialize, is therefore, mentioned in the specialists' reports.

Alternative OPL options include *inter alia* alternative HV line voltage, partial route variation and supporting structure/pylon design options and the option of not proceeding with the proposed development at all (the No-Go option) are considered within the DBAR accompanying this application. Specialist reports (draft versions) are referenced and appended to this DBAR and will, together with the DBAR be refined further, if necessary, as more detailed information becomes available.

Figure 2 below indicates the position of the proposed Visserspan Solar PV Grid Connection relative to the Visserspan Solar PV Facilities from where electricity will be evacuated to the Eskom negotiated point of tie-in to the national grid.

Refer to Appendix A for locality, status quo, regional and cumulative sensitivity overlay maps and Appendix B for detailed site-specific layout drawings.



#### **4.1.3. Need and Desirability**

The proposed development is in line with the national DoE's IRP 2010-2030 which was promulgated with the aim of providing a long-term, cost-effective strategy to meet the electricity demand in South Africa. The IRP 2010-2030 objectives align with Government's in terms of increased electricity supply sourced from renewable sources, as well as broader environmental and social responsibilities. Furthermore, the proposed renewable energy development is in line with the national REIPPPP strategy.

According to a socio-economic specialist report undertaken approximately two years ago when the four Visserspan Solar PV Facilities EIA processes were undertaken, *"In terms of national energy planning, the Lejeweletswa District Municipality (LDM) falls within the Kimberley REDZ (Renewable Energy Development Zone). The purpose of the REDZs, linked to power transmission corridors, is to give effect to the Department of Energy's Integrated Resource Plan (IRP), which identifies an increasing role for renewable energy generation in order to bring down the country's carbon footprint.*

*The IRPs are revised and re-issued every year or two. To facilitate roll-out of renewable energy and meet the ambitious targets set in the IRPs, various economic incentives have been initiated to encourage investment in renewable energy, notably the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP). Evident from policy is that solar power requires a greater subsidy than the other forms of renewable energy.*

*A Phase 1 Wind and Solar Strategic Environmental Assessment (SEA), completed by the Council for Industrial and Scientific Research (CSIR) in 2015, identified eight REDZs in South Africa. The SEA set out to identify areas in the country that are best suited for wind and solar PV energy projects, based on a holistic assessment of technical, strategic planning, environmental and socio-economic criteria (the report is available for download on the CSIR REDZ website). These were gazetted for implementation by the Minister of Environmental Affairs, in February 2018 (CSIR, 2019)<sup>2</sup>.*

*The Kimberley REDZ was positioned clearly because of the location of the Perseus substation, the biggest in the country and a key link in the Central powerline corridor. The*

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<sup>2</sup> CSIR REDZ website <https://redzs.csir.co.za> (homepage) as on 15 December 2019

powerline corridors with which the REDZ are associated were identified in the Electricity demand that would be suitable for solar PV development. In this way, the combination of the REDZs and power corridors provides strategic guidance to Eskom on where to prioritise investment in grid infrastructure (CSIR, 2019).

The Lejeweletswa IDP states that an area suitable for a solar power development and carbon credits is situated in the south of Lejeweletswa and continues further into Xhariep (to the west). The primary purpose of the Solar Energy Hub strategy is to use the space and natural abundance of sunshine associated with the Free State Province and to capitalise on the carbon credit opportunities to be unlocked by means of planning (Final Draft Free State Provincial Spatial Development Framework 2014, as reported in Lejeweletswa 2018).

From the perspective of the District, the solar energy projects at Dealesville and Boshof should be promoted to expand into a solar energy hub for the south-western part of the district. The said towns are also indicated as solar energy nodes on the district spatial development framework (SDF) map (Lejeweletswa, 2018).

Farms in the vicinity of Dealesville have proved particularly popular as locations for solar PV proposals, presumably because of the presence of the Perseus substation there and the relatively low value of agricultural land in the immediate area.

Dealesville is a stagnating town and the development of some of the proposed renewable energy projects in the region will help boost the local economy by injecting capital into the region (mainly during the construction phases of these proposed plants).

## 5. PROJECT DESCRIPTION

### 5.1.1. Site Location

Province/s	Free State
District Municipality/ies	Lejeweletswa District Municipality
Local Municipality/ies	Tokologo Local Municipality
Ward number/s	41802001
Nearest town/s	Dealesville
Farm name/s and number/s	Visserspan Farm No. 40, Mooihoek Farm No. 1547, Vasteveld Farm No. 1548 and Kinderdam Farm No. 1685.
Portion number/s	None

**Table 1:** Visserspan Solar PV Grid Connection development locality details



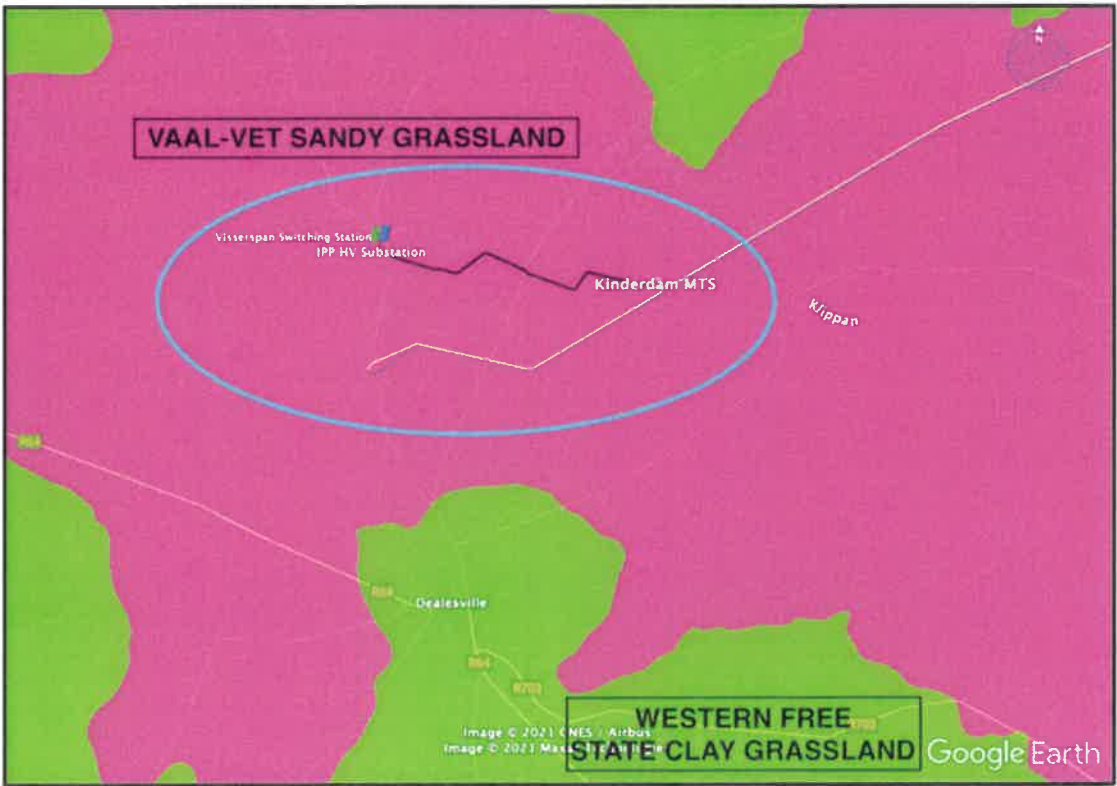
The proposed developments locality and co-ordinates for the project footprint ‘bend points’ are indicated in Appendices A1 and A2 of this BAR.

Surveyor General 21 digit code:

Visserspan Farm No. 40	-	F00400000000004000000
Mooihoek Farm No. 1547	-	F004000000000154700000
Vasteveld Farm No. 1548	-	F004000000000154800000
Kinderdam Farm No. 1685	-	F004000000000168500000

**5.1.2. Site Description**

According to the South African National Biodiversity Institute’s (SANBI’s) Vegetation Map of South Africa, Swaziland and Lesotho (SANBI, 2018) also known as VEGMAP, the area through which the 400kV Visserspan Grid Connection OPL would be aligned (both alternatives) is Vaal-Vet Sandy Grassland as indicated in Figure 3 below.



**Figure 3:** High level view of proposed development footprint (indicated by black line circled by light blue oval) of the Vegetation Map of South Africa, Swaziland and Lesotho (Map from botanical specialist’s report/compliance statement as in Appendix G1. Larger SANBI VEGMAP not included in Appendix D of DBAR since the zoomed-in view merely shows an image in one shade indicating Vaal-Vet Sandy Grassland.

According to the botanical specialist, “*Vaal-Vet Sandy Grassland, is listed as an endangered ecosystem in the National List of Threatened Ecosystems (Government Gazette, 2011) due to loss from agriculture. However, the OPL will not result in any loss of this vegetation and will have negligible negative effect on the habitat*”.

Using the information gathered through physical site-visits to ground-truth the interpretation of various maps, databases and information available for the designation of the sensitivity of areas traversed by the proposed OPL, the botanical/biodiversity specialist determined that both Alternative 1 and Alternative 2 routes have low sensitivity with respect to plants and terrestrial biodiversity, the latter specifically since it is linear infrastructure and would not result in significant loss of Vaal-Vet Sandy Grassland.

The botanical compliance statement further affirms that “with respect to the vegetation and flora either alternative route could be used” and that “the preferred route (Alternative 1) is acceptable”.

The SANBI’s Geographic Information System database does not indicate that the site falls within any formal or informal protected areas which concurs with the findings in Table 1 of Appendix G5 (Visual Impact Assessment Report) which states that the nearest Provincial Nature reserves are Soetdoring Nature reserve (35km from proposed development site) and Sandveld Nature reserve 85km from proposed development site). There are, therefore, no reserves within the potential viewshed area. Please refer to Appendix D – Sensitivity Maps.

The topography of the proposed development footprint is relatively flat with an easterly aspect. A slight rise towards the east becomes more marked closer to the existing Eskom parallel 275kV and 400kV OPL servitudes (refer to locality maps in Appendix A1). This is also the region in which the proposed point of tie-in to the national grid will occur i.e. towards the south-eastern corner of Kinderdam Farm.

Besides the ephemeral pans which are discussed in the freshwater specialist’s report (as per Appendix G3), there are no drainage features evident on the actual development site. The ephemeral pans do not lie within 32m of the proposed development footprint.

The specialist Soil, Land Use and Agricultural Potential Survey attached as Appendix G6, states that, *“The soils on the site are predominantly sandy surface horizons overlying calcrete and weathered dolerite. As such the soils vary from moderately deep sandy Hutton (orthic A / red apedal B / unspecified material – usually hard or weathering rock) forms to Glenrosa (orthic A / lithocutanic B) or Mispah (orthic A / hard rock) forms”*.

Furthermore, the soil patterns are relatively easy to identify on satellite images (refer to Appendix A1) with bleached and lime containing topsoils indicating shallower soils overlying calcrete.

Surrounding sections show evidence of historical tillage and crop production but some have been abandoned. This aspect is considered to indicate a general low agricultural potential. There is however a currently functional centre pivot as well as a dryland field along the corridor. However, it must be noted that the owner of the land and the farmer who farms with the functional centre pivot, specifically stated that he would be reducing the functional centre pivot radius by at least 90m since the cost of water/irrigation had made it unfeasible to maintain a larger pivot. Therefore, the proposed OPL corridor/servitude would not impact on the central pivot agricultural area as indicated in Figure 4 below:



**Figure 4:** Proximity of functional central pivot (indicated by yellow circle, relative to OPL corridor. It was communicated by the farmer/owner of the land that the central pivot was to be reduced in radius from approximately 300m to 210m due to waster shortages in the area and the cost of maintaining a larger pivot.

The proposed development site is located in the summer rainfall region and the climate is classified as warm-temperate. Overall mean annual precipitation is 530mm and temperatures are high in summer and low in winter with severe frosts on average for 37 days of the year. The climate diagram (Figure 5 below) shows the complete lack of rainfall in winter and rain mainly occurring from November to March.



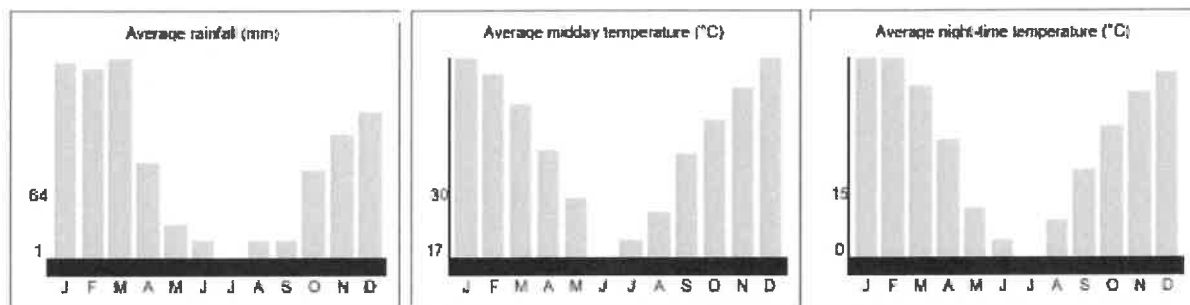


Figure 5: Average rainfall (left), Average midday temperature (centre) and average night-time temperatures in °C (right).

Although there are a few watercourses (specifically pans) on the farms through which the OPL corridor traverses, there are neither watercourses nor drainage lines on, or within 32m of, the development footprint. An e-WULAA process is underway, however, to address the Department of Water and Sanitation (DWS) authorisation requirements for watercourses within 500m of a proposed development under the Section 21 of the National Water Act, No. 36 of 1998 (NWA).

### 5.1.3. Proposed Development Description

EnviroAfrica CC (EnviroAfrica) has been appointed by Keren Energy Group Holdings (Pty) Ltd (Keren Energy), to undertake the environmental authorisation (EA) application process for development of an overhead power line (OPL) connection to Eskom Holdings SOC Ltd's (Eskom's) power supply grid. The proposed grid connection will enable electricity evacuated from the already authorised four Visserspan solar photovoltaic (PV) facilities located on the Farm Visserspan No. 40, to be fed into the national electricity grid via Eskom's Perseus substation.

As part of the application for an EA, a basic assessment report (BAR) is required since the proposed development falls within renewable energy development zone 5 (REDZ 5) regulated by Government Notice (GN) 114 of 2018, as well as an associated strategic transmission corridor and electricity grid infrastructure area, regulated by GN. 113 of 2018.

Accompanying this draft basic assessment report (DBAR) is Keren Energy's EA application for the development of Visserspan Solar PV Grid Connection - a HV OPL connection to the national power supply grid.

The proposed development is for the construction of:

- iv. high voltage OPLs strung on a single row of steel monopoles or steel lattice pylons which will traverse four farms viz. Visserspan Farm No. 40, Mooihoek Farm No. 1547, Vasteveld Farm No. 1548 and Kinderdam Farm No. 1685, located north of Dealesville (Tokologo Local Municipality) and 70km northwest of Bloemfontein in the Free State Province;
- v. a collector substation to collect power evacuated from the four Visserspan solar PV facilities together with a switching station to step-up the evacuated electricity's low/medium voltage to HV. The collector substation and switching station are located on the Visserspan Project 2 site (on Visserspan Farm No. 40) and are referred to as the 'on-site' or 'Visserspan substation'.
- vi. a main transmission substation (MTS) located on Kinderdam Farm No. 1685 near to the point of tie-in to the Eskom grid which will step up the conducted electricity to the required voltage to enable connection to the national grid. This substation is known as the 'Kinderdam MTS'.

Keren Energy, as the Applicant for the environmental authorisation is co-developing the project with Mulilo Energy Holdings (Pty) Ltd (Mulilo). At the time of application for environmental authorisation, negotiations by the Developers with Eskom were not finalised. Therefore, the proposed development alternatives presented in this basic assessment report (BAR) are for high voltage (HV) OPLs which could comprise of either 132kV, 275kV, or 400kV conductors. The OPL will eventually carry at least four conductors (cables) one servicing each of the four Visserspan solar PV facilities.

However, in preliminary discussions with Eskom it was intimated that the connecting power line is typically a 132kV line. Since the exact voltage of the HV line has not been confirmed by Eskom at this stage, the precautionary approach was applied and the impact assessed for this EIA process was for the proposed development footprint which would cause the greatest negative impact on the environment i.e. the 'worst case scenario'. The 'worst case scenario' would be to construct a 400kV OPL, strung on steel lattice pylons.

A 400kV OPL would have the greatest actual and potential negative impacts in terms of biodiversity (flora/vegetation removal and faunal impact, specifically avifauna); loss of

agricultural land; freshwater, heritage (archaeological and palaeontological) and visual/aesthetic impacts (including sense of place).

The above precautionary approach was discussed with the Department of Forestry, Fisheries and the Environment (DFFE) during the pre-application meeting held in August 2021. Specialist studies to be undertaken for an effective EIA process, were also agreed to in the pre-application meeting. The precautionary approach (i.e. assessment of a 'worst case scenario' OPL for all potential alternatives) was the brief given specialists conducting the required impact assessment studies. That being said, specialists were also informed to bear in mind that a lower (132kV) voltage OPL may be the likely alternative.

Based on the potential footprint of a 400kV steel pylon OPL, the total development footprint for the proposed Visserspan Solar PV Grid Connection, project covers an area of around 65ha. This includes temporary (construction) as well as permanent sites.

The infrastructure associated with the proposed grid connection includes access roads (either the widening of existing farm roads or the development of new earthen/gravel roads where roads/ tracks do not exist), fenced construction staging/laydown area - a portion of which will form the permanent operational area consisting of substations, site office/s with ablutions and maintenance areas (on Visserspan and Kinderdam farms), all within the approximately 65ha proposed development site footprint.

The permanent operational area consisting of substations, site office/s with ablutions and maintenance areas are located on the Visserspan and Kinderdam farms.

It should be noted that, as is typical for these types of grid connections, the bulk of the built infrastructure will be handed over to Eskom once construction is complete. Thus, the Kinderdam MTS, OPL and Visserspan switching station portion of the Vissersdam substation will become Eskom's operational responsibility, whilst the collector substation portion of Visserspan substation, will remain the applicant's responsibility.

For this reason, it is requested that in accordance with Regulations 11 and 25(2) of the NEMA EIA Regulations as amended in 2017, two EAs be issued from this application – one in the name of the applicant and the other in the name of Eskom. The EA to be

issued in the name of Keren Energy, the Applicant, will be only for the Visserspan collector station portion of the Vissersdam substation. The EA to be issued in the name of Eskom will be for the Visserspan switching station, OPL and Kinderdam MTS.

To facilitate an easier division of the responsibilities linked to the conditions of an EA, should the Department decide to issue two EA's from this single application, four separate environmental management plans/programmes (EMPrs) have been developed and are included under Appendix J of this BAR, viz.:

- v. Appendix J1 - Visserspan IPP Collector Station EMPr;
- vi. Appendix J2 - Visserspan Eskom Switching Station EMPr;
- vii. Appendix J3 - Eskom Overhead Power Line EMPr; and
- viii. Appendix J4 - Kinderdam Eskom Main Transmission Substation EMPr.

The actual permanently disturbed footprint of the project is confined to the two substation areas and the specific points where the OPL supporting poles/pylons are anchored into the ground. Agricultural activities prevalent in the areas i.e. grazing and game farming, are still able to continue beneath the OPL as indicated in Figure 1 of the BAR which depicts South African sites where agricultural activities and natural vegetation remain beneath HV OPLs.

The National Environmental Management Act, No.107 of 1998 (NEMA), as amended, makes provision for the identification and assessment of activities that are potentially detrimental to the environment and which require authorisation from the competent authority based on the findings of an Environmental Assessment.

NEMA as a national act, is enforced by the national Department of Forestry, Fisheries and the Environment (DFFE). Typically, these powers are delegated to the provincial department of environmental affairs but since the legislated (or listed) activity which results from the proposed development, occurs in an area of strategic importance identified in terms of Section 24(3) of NEMA, namely in a Renewable Energy Development Zone (REDZ) and associated strategic transmission corridor and electricity grid Infrastructure (EGI) area, the DFFE is the competent authority for this environmental authorisation application.

According to the regulations of Section 24(5) of the NEMA, environmental authorisation is required for certain regulated or listed activities. The schedules of listed activities under the NEMA were evaluated to determine which actual and possible activities required authorisation. Several actual and potential listed activities, as per the 2014 EIA regulations (as amended), apply to the proposed Visserspan Solar PV Grid Connection development. These activities are detailed in Section 6 of this basic assessment report (BAR).

It should be noted that due to the available consents for use of land (as per Appendix K) and the proximity to Eskom's Perseus substation, as well as the other renewable energy developments/proposed developments, specific alternative sites for the substations and the bulk of the preferred OPL route do not exist.

However, other possible alternative options which include *inter alia*, partial route variation, voltage conducted, supporting structures used and the option of not proceeding with the proposed development at all (the No-Go option) are considered within this BAR. Specialist reports (draft versions) are referenced and appended to this BAR.

The findings, results, observations and recommendations given in this assessment are based on the best scientific and professional knowledge available from information provided and verified by site visits.

A synopsis of the main opinion of each of the specialists appointed to assess various parameters of the project, is presented below:

#### **Botanical / Biodiversity:**

According to the Vegetation Map of South Africa, Swaziland and Lesotho (SANBI, 2018) also known as VEGMAP, the area through which the 400 kV Visserspan Grid Connection OPL would be aligned (both alternatives) is Vaal-Vet Sandy Grassland (Figure 4). This vegetation is recognized as an endangered terrestrial ecosystem (Government Gazette, 2011) due to loss from agriculture. However, the OPL will not result in any loss of this vegetation and will have negligible negative effect on the habitat.

Using the information gathered through physical site-visits to ground-truth the interpretation of various maps, databases and information available for the designation of the sensitivity of areas traversed by the grid connection OPL, the botanical/biodiversity specialist determined that both Alternative 1 and Alternative 2 routes have LOW sensitivity with respect to plants and terrestrial biodiversity, the latter specifically since it is linear infrastructure and would not result in significant loss of Vaal-Vet Sandy Grassland. It is further stated that “with respect to the vegetation and flora either alternative route could be used” and that “the preferred route (Alternative 1) is acceptable”.

## **Avifaunal:**

### **Cumulative impacts**

The proposed Visserspan grid connection equates to a maximum of approximately 6.4km, depending on which of the alternatives are used. There are approximately 440kms of existing high voltage lines within the 30km radius around the Visserspan project (counting parallel lines as one). The Visserspan grid connection grid project will thus increase the total number of existing high voltage lines by approximately 1.4%. The contribution of the proposed Visserspan grid connection to the cumulative impact of all the high voltage lines is thus low. However, the combined cumulative impact of the existing and proposed power lines on avifauna within a 30km radius is considered to be moderate.

The cumulative impact of displacement due to disturbance and habitat transformation in the switching station and MTS associated with the Visserspan PV project is considered to be low, due to the small size of the footprint, and the availability of similar habitat within the 30km radius area. The cumulative impact of potential electrocutions within the switching station and MTS yards is also likely to be low as it is expected to be a rare event.

The no-go alternative will result in the current status quo being maintained at the proposed development site as far as the avifauna is concerned. The development site itself consist mostly of natural grassland and pans. The no-go option would maintain the natural habitat which would be beneficial to the avifauna currently occurring there.

The avifaunal report states that from an avifaunal perspective, Alternative 3 (which is now no longer a viable alternative due to reasons from Eskom as stated above), is preferred

power line alternative because it is the shortest alternative. However, it further states that neither Alternative 1 nor Alternative 2 are fatally flawed and can be utilised with appropriate mitigation. Alternative 1 is the preferred alternative for this application.

The expected impacts of the Visserspan switching station, Kinderdam MTS and grid connection power line were rated to be of Medium significance and negative status pre-mitigation. However, with appropriate mitigation, the post-mitigation significance of the identified impacts should be reduced to Low negative (see Table 3 above).

No fatal flaws were discovered in the course of the investigation. It is therefore recommended that the activity is authorised, on condition that the proposed mitigation measures as detailed in the Impact Assessment Tables in the BAR and the EMP are strictly implemented.

#### **Freshwater:**

The freshwater impact assessment report was undertaken for the NWA WULA application as well as this NEMA application. It, therefore, includes site assessment information for the already approved NEMA EAs for the four Visserspan Solar PV Facilities, as well as the current application seeking DFFE approval, the Visserspan Solar PV Grid Connection.

The environmental risks are low, even though the pans are ecologically important and ecologically sensitive. It is therefore recommended that a General Authorization be issued. It is also recommended, since impacts are insignificant and environmental risks are low, that the installation be officially allowed to be developed within 7m of the demarcated central pan, as was the case with a number of previous e-WULAs for similar solar plants.

The impacts of the PV plant and the associated power line are insignificant.

#### **Heritage - Archaeological:**

Results of the study indicate that the route for the proposed Visserspan Grid Connection is not a sensitive archaeological landscape. The survey has shown that the archaeological landscape is dominated by a few isolated and dispersed scatters of mostly MSA lithics of low (Grade IVC) significance.

The assessment has shown that the proposed route corridor for the Visserspan Grid Connection is not a sensitive archaeological landscape.

The overall impact significance of the proposed project on archaeological heritage is assessed as LOW and therefore there are no objections to the proposed development proceeding.

### **Heritage - Palaeontological:**

According to consulting palaeontologist, Dr John Almond (2020), “the palaeontological sensitivity of the solar PV project areas on Farm Visserspan No. 40 near Dealesville is low”. This applies to the solar PV project areas as well as the proposed Visserspan Grid Connection (Almond *pers. comm.* 2021)<sup>3</sup>.

Almond notes that, “substantial direct impacts on fresh, potentially fossiliferous Tierberg Formation (Ecca Group, Karoo Supergroup) bedrocks during the construction phase of the proposed PV solar projects are considered unlikely”.

Anticipated impacts on local palaeontological heritage resources from the construction and operational phase of the developments are accordingly, of low significance.

### **Visual:**

The sense of place of the region surrounding the proposed Visserspan Solar PV Grid Connection has been altered over time from a rural landscape to accepting large infrastructure as part of the landscape with the construction and expansion of the Perseus substation and the high voltage power lines that converge at the substation.

This altered landscape also accepted the proposed PV projects and these will eventually dominate the landscape. The proposed transmission line is merely a support infrastructure element which will be added to the landscape and fact be a fairly minor element in relation to the existing infrastructure elements in the area.

The area along the corridor is characterized as a rural landscape with large scale infrastructure present. No land uses with high sensitivity towards scenic value has been

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<sup>3</sup> As communicated to EnviroAfrica by J Kaplan of Agency for Cultural Resource Management (ACRM)



identified. The area in general thus display a low visual sensitivity. The topography provides a medium level of visual absorption for low vertical extent objects and existing infrastructure of higher vertical extent provide a buffer for similar infrastructure.

The overall visual impact on the identified receptors is moderate to low and requires no mitigation measures to reduce visual impact.

The cumulative impact of the proposed transmission line contributes little to the overall cumulative impact of the total number of PV facilities, substations and powerlines present and already approved. Since thresholds have not been determined on a regional level, a statement to that effect on a project level is not appropriate.

Due to the fact that the line will partially follow existing roads, lines, tracks, boundaries and linear landscape elements, the overall impact is low.

The small extent of the project in relation to the number of approved PV facilities as well as the fact that the site is in the immediate vicinity of other proposed and approved projects and is in close proximity to the Perseus substation result in a low contribution to the cumulative impact with regards to crowding.

The small scale and length of the line result in the overall contribution to the cumulative impact of the development being minimal to insignificant.

### **Soil, Land Use and Agricultural Potential:**

#### **OPL Construction:**

The cumulative impact of this activity will be small as it is constructed on land with low agricultural potential and with discrete point impacts.

#### **Substation area:**

Although the loss of agricultural land is a long-term loss that extends to the post-construction phase. The agricultural potential is very low though. Associated grid connection on the site will not have large impacts due to the low agricultural potential of the site as well as the rainfall that is below 500 mm pa. It is explicitly assumed in this conclusion that centre pivot irrigation fields and infrastructure will not be impacted due to dedicated placement of power line infrastructure.

With the exception of the avifaunal specialist's assessment, all other specialist assessments and conclusions state that the development of the proposed Visserspan Solar PV Grid Connection will have a low, minimal or insignificant environmental impact (refer to reports in Appendix G, attached).

The avifaunal specialist's assessment indicates that without mitigation the impact of the proposed Visserspan Solar PV Grid Connection would be medium. However, with implementation of mitigation measures (as recommended in the specialist report and included in the respective EMPs), the environmental impact risk rating is reduced to low.

Please refer to Appendix D for biodiversity, ecological and protected areas sensitivity maps of the proposed development site.

#### ***5.1.4. Description of Development Phases***

That various developmental phases for a project of this nature are expanded on below. Environmental impact assessment for the proposed development has been undertaken according to these phases as per Appendix I which provides detail on proposed project impact assessment methodology, as well as significance rating and mitigation measures

##### **Equipment and Material Delivery/Site Preparation:**

The proposed development site is accessible from larger centres (such as Bloemfontein) by using the R64 heading to Dealesville and then utilising the secondary dirt/gravel road to Hertzogville. Access directly to the farms Mooihoek, Vasteveld and Kinderdam is possible via existing secondary dirt/gravel road from Dealesville to Bultfontein.

Electrical cable/conductors and the steel monopoles or steel for pylon structures will be transported to site using interlink trucks. The main transformers for the Visserspan and Kinderdam substations, graders and 20-ton rollers and the vehicle for stringing the conductors (overhead power cables) will be delivered to site using abnormal load vehicles. In addition to these vehicles, drill rigs, 10m<sup>3</sup> tipper trucks, a waste transport truck, site

bakkies, water tanker trucks, track-loader-backhoes (TLBs), cranes and trenching machines, will also be used on site.

The footprint areas for the substations will be graded and levelled using a 20-ton roller. Water spray from the water tanker truck will be used to control excessive dust blow off.

The OPL corridor will not be completely graded unless access roads are required. Since much of the OPL route follows existing farm (access and fence maintenance) road and tracks, already disturbed routes will be utilised. Excavation along the OPL route corridor will only occur along the specific points where the steel monopoles or lattice structures are to be erected.

Water utilisation during construction and during operation and maintenance/ad-hoc cleaning events would be required. Water supply is discussed under 'Operation'

### **Construction:**

The developer/s will ensure design and construction of the:

1. combined 33kV or 22kV collector station and HV switching station (to step-up the collected electricity to 132kV) proposed to be constructed on Visserspan Farm No. 40, located at approximately 28°36'37.82"S, 25°44'50.21"E (estimated central point) collectively known as the Visserspan Substation;
2. linear OPL develop running between the two substations located at each 'end' of the proposed 132kV OPL, on Visserspan and Kinderdam farms, respectively. This OPL is known as the Visserspan-Kinderdam OPL; and
3. main transmission substation (MTS), Known as the Kinderdam MTS, to be located at 28°37'0.82"S, 25°48'14.76"E (estimated central point) where the proposed 132kV Visserspan-Kinderdam OPL will be stepped-up to 400kV before exiting via a 400kV OPL to form grid tie-in with the existing Eskom HV 400kV Perseus-Theseus OPL via a loop-in/loop-out connection.

The scope of works for each of the above three components of the Visserspan Grid Connection development are detailed below:

1. Visserspan (On-site) Substation:

- i. Proposed as a 132/33kV or 132/22kV substation on the Visserspan Solar PV Project 2 facility's site
- ii. The Visserspan Substation will be designed to accommodate 4 x transformer bays and 2 x 132kV incoming feeder bays and will be constructed as follows -
  - a. Establish and equip a 132 kV busbar
  - b. Establish and equip 2 x 132kV feeder bays with 1 x to connect to the Kinderdam -Visserspan OPL and 1 x left unpopulated as spare
  - c. Establish 4 x 132/33kV or 4 x 132/22kV transformer bay &
  - d. Install 4 x 85MVA transformers or 1 x 500MVA
- iii. Construct 4 x 33kV or 4 x 22kV line bay will full tariff metering to the PV Plant

2. Visserspan-Kinderdam OPL:

- i. The proposed OHPL will be constructed as follows:
  - a. Approximately 6.3km in length and single circuit configuration
  - b. Strung with Twin Tern conductor and 48 core optical ground wire
  - c. Self-supporting and guyed, steel monopole structures

3. Kinderdam MTS:

- i. proposed 400/132kV Substation (Kinderdam MTS)
  - a. Establish a 400 kV double busbar
  - b. Establish and equip (2x) 400 kV feeder bays
  - c. Loop in and out of Perseus – Theseus 400 kV line (1km turn ins)
  - d. Establish and equip (1x) 400/132 kV transformer bay
  - e. Install (1x) 500 MVA 400/132 kV transformer
  - f. Establish a 132 kV Double busbar
  - g. Establish and equip (1x) 132Kv Feeder Bay

**Note:**

- i. The scope of works will be finalised during the Budget Quote process following award of Preferred Bidder status, post Bid Window 6
- ii. Eskom will:
  - a. appoint a clerk of works to monitor the quality of the construction as well as the quality of material.
  - b. appoint a project manager to do site inspections and also monitoring of workmanship and materials/equipment.
  - c. monitor the developer's environmental management in respect of the Contract Works.
  - d. verify the design and equipment of the Contract Works.
  - e. commission the metering, protection and the supervisory control and data acquisition system (SCADA), which will be installed by the developer in terms of the Self-Build Agreement.
  - f. monitor the installation of the Contract Works.
  - g. be responsible for any commissioning in respect of the Contract Works required after the Connection of the Facility to the Distribution System.
  - h. manage any outages required on the Distribution System and or Transmission System.
  - i. check and accept the route selection and will monitor the process of registration of the Servitudes in the name of Eskom.
  - j. affect the closing span to liven up the Connection Works as well as the optical fibre ground wire connection.
- iii. The above Eskom responsibilities prior to operation is the primary reason for the Applicant's request to the DFFE to issue two EA's from this application i.e. one to Keren Energy (for the Visserspan Collector Station) and the other (for the rest of the built infrastructure/Visserspan Grid Connection development) to Eskom.

### **Operation:**

Less than 40 workers (10 direct and 30 indirect) are envisaged to be required during the operational phase of the proposed grid connection development (actual numbers to be confirmed). The lifespan of the development is expected to last for about 25 years.

Positions will be filled by mostly local labour from the area and are not to be housed on site.

Periodic maintenance activities involve replacing transformer oil and other non-functioning mechanical parts essential to the operation of the grid connection. Trips to the development site (substations and OPL route) to undertake maintenance would occur on an as-needed basis, although routine inspections of the OPL and infrastructure will take place. It is assumed, however, that maintenance visits would occur at least four to six times per year. Individuals responsible for maintenance activities would most likely commute from regional offices or nearby operating facilities.

#### Water and Ablutions:

Water for the Visserspan and Kinderdam permanent site offices will be sourced from boreholes on the respective farms. Visserspan's site will have a dedicated borehole/s for water supply (as per the e-WULAA process which is in progress – refer to Appendix E5).

Kinderdam's water supply is to be negotiated with the owner of the land in terms of either a dedicated supply/borehole for the premises (substations) or as supplied from the farmer's existing boreholes. During construction water supply and along the OPL route during will be supplied via tanker trucks.

Each substation will have permanent ablutions with septic tanks toilets. Portable toilets will be utilised during construction and will be place at appropriate intervals along the OPL route.

Both septic tanks and temporarily placed portable toilets will be serviced at regular intervals, as required.

#### Civil and Electrical Services:

Electricity for the grid connection substation facilities will be sourced from the power generated and evacuated from the Visserspan solar PV facilities.

The small amount of domestic waste produced during construction will be removed to the nearest registered municipal waste site for disposal.

### Access:

External site access will be via the existing R64 tar road and the 31999 and 31724 dirt/gravel secondary roads. i.e. the dirt/gravel road from Dealesville to Hertzogville via Colenso and the dirt/gravel road from Dealesville to Bultfontein.

Internal access will be via existing dirt farm roads or fence maintenance tracks since the bulk of the OPL corridor runs along farm boundary fence-lines. Internal roads and tracks may need to be formally graded, widened and compacted to prevent erosion due to heavy duty vehicle such as flatbed trucks used to transport transformers to the respective substations.

There is an approximately 1km section on the Farm Mooihoek No. 1547 where a new dirt access road may need to be constructed.

Although not directly impacting national roads, SANRAL notification/comment has been requested as per Appendices E11, F2 and F3 (Public Participation) but no comment has been received from SANRAL to date.

Please refer to Appendices A (Locality Maps), B (Layout Plans) and C (Site Photographs) to see accessibility to the proposed development site, as discussed above.

### Waste Management:

All domestic and hazardous waste produced on site will be removed to the nearest appropriately registered waste site by a registered waste removal service provider/transporter.

### Decommissioning:

The Visserspan Solar PV facility is expected to have a lifespan of approximately 25 years. It is therefore assumed that the lifespan of the grid connection would be similar. The development would only be decommissioned and the site rehabilitated, once it has reached the end of its economic viability. Thus the lifespan most likely would be extended

due to the enhancement of technology/infrastructure and the future demand for renewable energy.

**Note:** Throughout all phases of the development lifecycle i.e. site preparation, plant construction, operation, maintenance and final decommissioning, waste management in line with the project's environmental management programme includes waste separation and timely periodic waste removal to registered waste sites and recycling, where possible.

## **6. LEGAL REQUIREMENTS**

### **6.1. General Environmental Requirements**

The National Environmental Management Act, No.107 of 1998 (NEMA), as amended, makes provision for the identification and assessment of activities that are potentially detrimental to the environment and which require authorisation from the competent authority based on the findings of an Environmental Assessment.

NEMA as a national act, is enforced by the national Department Forestry, Fisheries and the Environment (DFFE). Typically, these powers are delegated to the provincial department of environmental affairs but since the legislated (or listed) activity which results from the proposed development, occurs in an area of strategic importance identified in terms of Section 24(3) of NEMA, namely in a Renewable Energy Development Zone (REDZ) and associated strategic transmission corridor and electricity grid infrastructure (EGI), DFFE is the competent authority for this environmental authorisation application.

According to the regulations of Section 24(5) of NEMA, authorisation is required for NEMA listed activities. The following NEMA listed activities as per the 2014 EIA regulations (as amended) were evaluated for applicability:

According to the regulations of Section 24(5) of NEMA, authorisation is required for the following listed activities:

### **NEMA, EIA Regulations Listing Notice 1 of 2014 (GN. R. 327)**



**Activity No. 11(i):**

*The development of facilities or infrastructure for the transmission and distribution of electricity;*

- (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts;*

**Note:** Infrastructure for the transmission of electricity may be on 132kV steel monopole overhead power lines within the proposed maximum 55m servitude forming the transmission corridor. Typically, the servitude required for a 132kV transmission OPL is 36m.

**Activity No. 14:**

*The development of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres (m<sup>3</sup>) or more but not exceeding 500m<sup>3</sup>.*

**Note:** It is very probable that the proposed facility will utilise a battery storage system to ensure reliability of supply considering the fluctuating power output of a solar PV system. Batteries may be defined as 'dangerous goods' as per South African National Standards (SANS) 10234 due to the toxicity of their contents e.g. vanadium redox or lithium ion batteries) and/or the flammability of the batteries.

**Activity No. 28:**

*Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or after 01 April 1998 and where such development:*

- (ii) will occur outside and urban area, where the total land to be developed is bigger than 1 hectare;*

**NEMA, EIA Regulations Listing Notice 2 of 2014 (GN. R. 325)****Activity No. 9:**

*The development of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275kV or more, outside an urban area or industrial complex.*

**Activity No. 15:**

*The clearance of an area of 20ha or more of indigenous vegetation.*

**NEMA, EIA Regulations Listing Notice 3 of 2014 (GN. R. 324)****Activity No. 4:**

*The development of a road wider than 4 metres (m) with a reserve of less than 13,5m.*

**b. Free State**

*ii. Outside urban areas:*

*(ee) CBAs as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans*

**Activity No. 10:**

*The development of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 30m<sup>3</sup> or more but not exceeding 80m<sup>3</sup>.*

**b. Free State**

*ii. Outside urban areas:*

*(ee) CBAs as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans*

**Activity No. 12:**

*The clearance of an area of 300m<sup>3</sup> or more of indigenous vegetation.*

**b. Free State**

*ii. Within CBAs identified in bioregional plans;*

*iv. Areas within a watercourse or wetland; or within 100m from the edge of a watercourse or wetland*

**Activity No. 14:**

*The development of;*

*(ii) infrastructure or structures with a physical footprint of 10m<sup>2</sup> or more;*

*where such development occurs;*

*(c) if no development setback exists, within 32m of a watercourse, measured from the edge of a watercourse;*

**b. Free State**

i. *Outside urban areas:*

(ff) *CBA's or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.*

Other legislative requirements, pertinent to the proposed project, include but are not limited to those detailed below.

6.2. Other legislative and guideline documents:

*(List not exhaustive)*

<b>Relevant Act/Notice:</b>	<b>Site or Project Specific Applicability/Description</b>
National Water Act, No. 36 of 1998	Possible water use licence or general authorisation application for use/extraction of groundwater or confirmation of allocation, mas well as for potential Section 21 listed activities.
National Environmental Management: Biodiversity Act, No. 10 of 2004	Control of alien invasive species
National Environmental Management: Protected Areas Act, No. 31 of 2004	Assessment of proposed development location in terms of Act.
National Environmental Management: Air Quality Act, No. 39 of 2004	Adherence to legal requirements during construction, operation and maintenance.
National Environmental Management: Waste Act, No. 59 of 2008	Adherence to legal requirements during construction, operation and maintenance.
National Forests Act, No. 84 of 1998	Comment (possible permit or licence application) in terms of protected tree/flora species damage or removal – botanical survey did not indicate any protected species.
Conservation of Agricultural Resources Act, No. 43 of 1983	Possible relevance in terms of utilisation and protection of vleis, marshes, water sponges and water courses.
National Heritage Resources Act, No. 25 of 1999	Adherence to Section 38 of Act.
National Road Traffic Act, No. 93 of 1996	Compliance with Act in terms of transportation of abnormal loads to project site.
South African National Roads Agency Limited (SANRAL) and National Roads Act, No. 7 of	Sub-surface crossing of the secondary dirt/gravel

1998	road/s will be required and SANRAL
Civil Aviation Act, No.13 of 2009 and Civil Aviation Regulations (1997)	This application does not include the power lines for evacuation of electricity into the national grid. However, this application proposes that any internal facility and electricity/power evacuation lines which will eventually tie in with the main Eskom lines, along predetermined servitudes, run underground (sub-surface)
Civil Aviation Authority Act, No.40 of 1998	Possible above surface structures (OPLs for tie in to Eskom HV lines requiring obstacle application process)
Astronomy Geographic Advantage Act, No. 21 of 2007	Comment required regarding potential setbacks and visual impact mitigation.
National Veld and Forest Fire Act, No. 101 of 1998	Adherence to firebreak establishment and maintenance.
Fencing Act, No. 31 of 1963	Adherence to fencing and access control specifications.
Free State Nature Conservation Ordinance, No. 8 of 1969	Assessment of protected or endangered species.
Spatial Planning and Land Use Management Act, No. 16 of 2013 (SPLUMA)	A consent use and change in land use planning application in terms of Section 35 of the SPLUMA regulations and Section 37 of the Free State Guideline Bylaw on Municipal Land Use Planning.
Subdivision of Agricultural Land Act, No. 70 of 1970	Possible applicability in terms of route for evacuation power lines and tie-in to substation.
Tokologo Municipal Land Use By-law	Rezoning application must be lodged in terms of the Municipal Land Use Planning By-law of the applicable municipality (e-lodgement)
Occupational Health and Safety Act, No. 85 of 1993 and Construction Regulations (2003)	Adherence to Health and Safety requirements and construction regulations during project development and operation.
Hazardous Substances Act, No. 15 of 1973	Adherence to legal requirements during construction, operation and maintenance.
Promotion of Administrative Justice Act, No. 3 of 2000	Transparent and fair public participation process for proposed development.
Constitution of the Republic of South Africa Act, No. 108 of 1996	Adherence to Section 24 (environmental rights and responsibilities)
Electricity Act, No. 41 of 1987 and Electricity Regulation Amendments (2009)	Compliance with requirements to tie-in to the national grid.
Integrated Resource Plan (IRP) for South Africa (2010)	The proposed development will form part of the Renewable Energy Independent Power Producers Procurement Process (REIPPPP) bidding window 5.
Energy Efficiency Strategy of the Republic of South Africa (2005)	Laid the foundation for the IRP (2010) and need to shift towards renewable energy in the country's energy mix.
United Nations Framework Convention on Climate Change (1992)	Promotion of a move away from a coal-based energy supply to a more sustainable one (renewable energy) such as the proposed development.
Kyoto Protocol (1997)	South Africa acceded to the Protocol in 2002

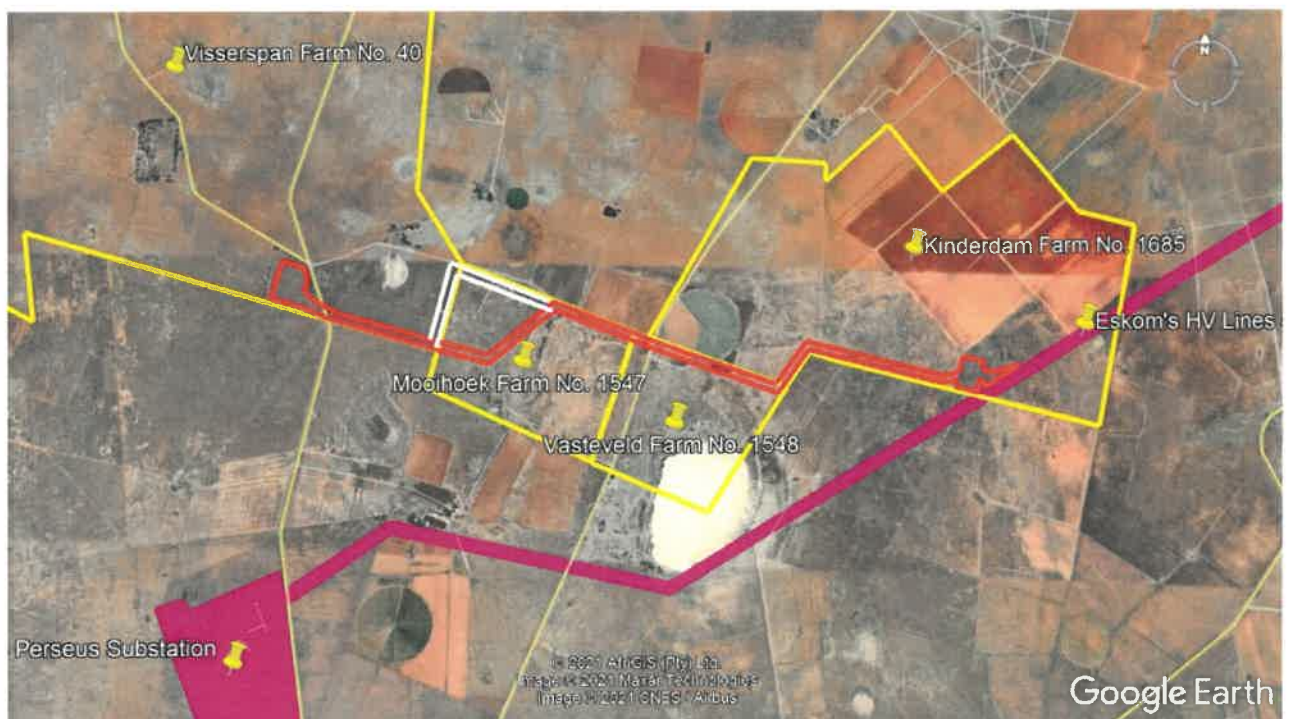
## 7. ALTERNATIVES

### 7.1.1. Location Alternative:

In terms of location, only one general development site, traversing from Visserspan Farm, through Mooihoek Farm, Vasteveld Farm and finally Kinderdam Farm, exists for the project.

This is due to the pre-negotiated land owner consents and negotiation with Eskom in terms of a suitable place for actual grid tie-in/connection.

The difference in the two proposed alternatives for this EIA Alternative 1 and Alternative 2 (which is a slight variation in Alternative 1's route) are indicated in Figures 6 to 8 below, with **Alternative 1 (the preferred Alternative indicate in red):**

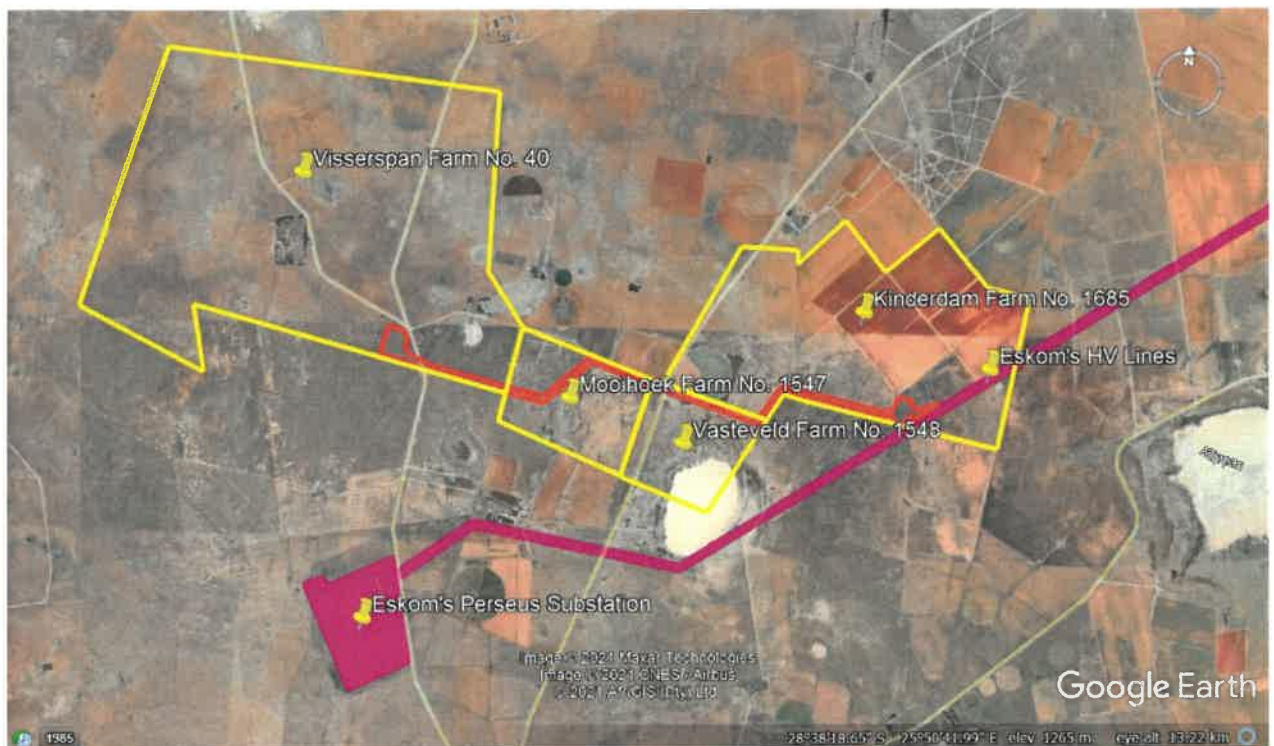


**Figure 6:** Indication (yellow outlines) of four properties affected by proposed development viz. (from west to east) Visserspan Farm No. 40, Mooihoek Farm No. 1547, Vasteveld Farm No. 1548 and Kinderdam Farm No. 1685. Existing Eskom servitude containing 400kV and 275 kV overhead powerlines, as well as existing Eskom Perseus substation indicated in purple. Proposed Visserspan, Grid Connection development (Alternative 1 – the preferred alternative) indicated in red. Slight variation in route making up Alternative 2 indicated in white.

Specific Alternative 1 and 2 diagrams are included below and in Appendix A1.

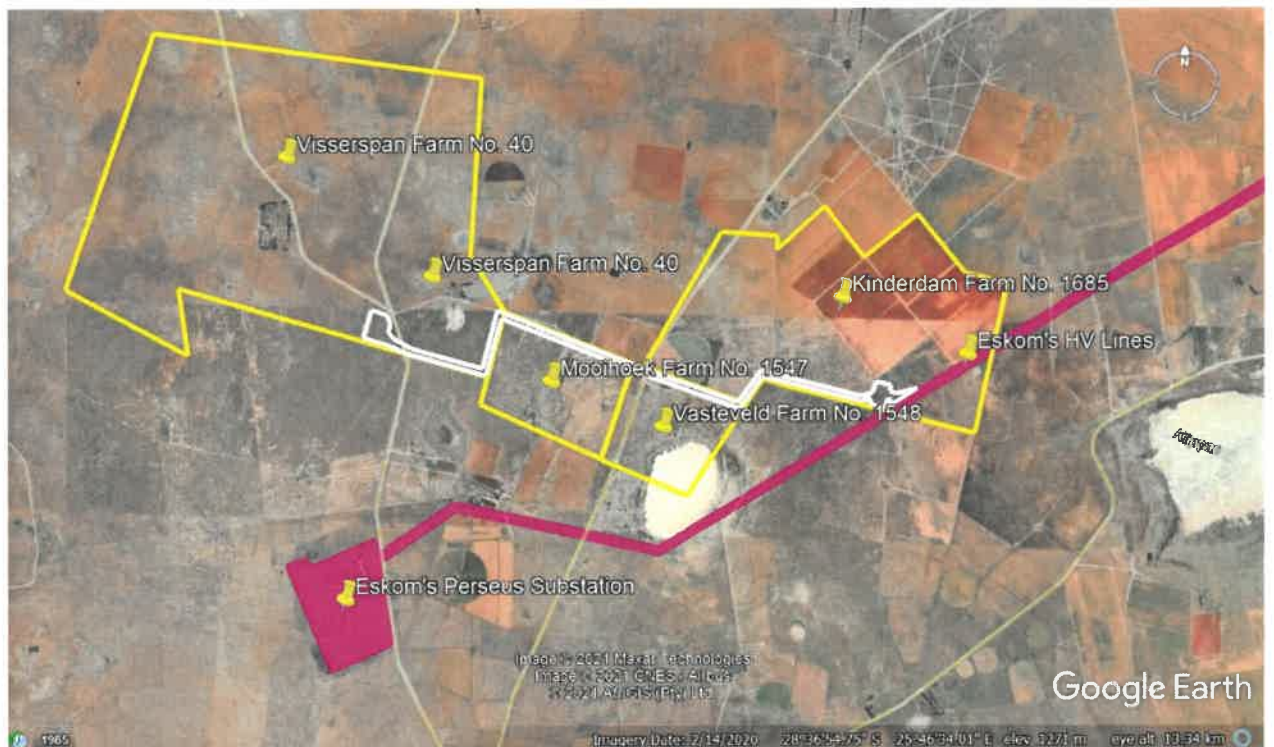
### Alternative 1 (preferred alternative):





**Figure 7:** Indication (yellow outlines) of four properties affected by proposed development viz. (from west to east) Visserspan Farm No. 40, Mooihoek Farm No. 1547, Vasteveld Farm No. 1548 and Kinderdam Farm No. 1685. Existing Eskom servitude containing 400kV and 275 kV overhead powerlines, as well as existing Eskom Perseus substation indicated in purple. Proposed Alternative 1 for Visserspan, Grid Connection development OPL (preferred alternative) indicated in red. This alternative has the smallest permanent physical footprint of 65ha (although the entire 65ha will not be disturbed since it comprises area under the OPL which can remain vegetated).

## Alternative 2:



**Figure 8:** Indication (yellow outlines) of four properties affected by proposed development viz. (from west to east) Visserspan Farm No. 40, Mooihoek Farm No. 1547, Vasteveld Farm No. 1548 and Kinderdam Farm No. 1685. Existing Eskom servitude containing 400kV and 275 kV overhead powerlines, as well as existing Eskom Perseus substation indicated in purple. Proposed Alternative 1 for Visserspan, Grid Connection development OPL (preferred alternative) indicated in white. This alternative has a slightly longer OPL corridor resulting in a slightly larger physical footprint (just under 66ha as opposed to 65ha permanent footprint).

### **7.1.2. Activity Alternative:**

There are no activity alternatives since the primary activity proposed is **Activity No. 11(i):** *The development of facilities or infrastructure for the transmission and distribution of electricity;*

- (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts;*

### **7.1.3. Design/Technology Alternative:**

Possible alternatives in design exist for the 132kV OPL i.e. either a steel monopole supporting structure, or a steel lattice supporting structure.

#### **i. Alternative 1 (Preferred Alternative) – 132kV steel monopole transmission line structures**

The steel monopole structure is more effective in terms of reduced construction time and is the developer's preferred alternative. It also has less chance of providing aerial perches for avifauna as opposed to a lattice structure. The physical footprint/land disturbance of both the monopole and lattice structures is similar:

- **Size:** 65ha development footprint area required (permanent)
- **Landowner consent:** Refer to Appendix K attached –The Bredenkamp Familie Trust and Mr Koos Saaiman have provided consent
- **Available access:** The site can be accessed from the R64, using existing secondary roads. However, there additional access roads may need to be established on site.
- **Locality to nearest tie-in to the national electricity grid:** The Eskom (Perseus) electricity sub-station is less than 500m to the east of the proposed Kinderdam MTS.
- **Topography:** The proposed site is located on an almost level area with an eastern aspect.
- **Agricultural Potential:** Refer to Appendix G6 (Soil, Land Use and Agricultural Potential Survey). The site has a low dryland cropping agricultural potential more suited to grazing but is rated low in terms of agricultural potential. It was communicated by the farmer and owner of the land (Mr Koos Saaiman) that the crop

pivot irrigation area on Kinderdam farm is being reduced in radius by at least 90m due to financial constraints and water supply.

- **Biodiversity:** It is stated by the specialist that “with respect to the vegetation and flora either alternative route could be used” and that “the preferred route (Alternative 1) is acceptable”.
- **Avifaunal:** No fatal flaws were discovered in the course of the investigation and it is therefore recommended that the activity is authorised, on condition that the proposed mitigation measures as detailed in the Impact Assessment Tables in the BAR and the EMPr are strictly implemented. Refer to Appendices G2 and J.
- **Freshwater:** There are no watercourses within 32m of the proposed development footprint and those within 500m trigger the need for an electronic water use licence/authorisation application (e-WULAA) in terms of the National Water Act No. 36 of 1998. The e-WULAA process is being conducted by the freshwater specialist and is already underway as per Appendix E5 and G3.
- **Heritage (Archaeological and Palaeontological):** No objections on archaeological grounds to the proposed development being authorised. Refer to Appendix G4.
- **Visual:** The proposed site is situated in a rural area with some natural trees and cultivated alien invasive (*Eucalyptus spp.*) trees. The area displays a rural character with low intensity farming, game farming and natural around further east on the farm. The Eskom (Perseus) substation is in close proximity to the site and an HV power line servitude runs to the east of the Farm Visserspan No. 40 towards Perseus substation in the south. The overall visual impact has been rated as low. Refer to the Visual Impact Assessment (as per Appendix G5).

## ii. **Alternative 2 (Not Preferred Alternative) – 132kV steel lattice transmission line structures**

The steel lattice structure will take slightly longer to construct on site. It a greater chance of providing aerial perches for avifauna as opposed to a lattice structure which poses a potential electrocution risk to the avifauna. The physical footprint/land disturbance of both the monopole and lattice structures is similar:

- **Size:** 65ha development footprint area required (permanent)



- **Landowner consent:** Refer to Appendix K attached –The Bredenkamp Familie Trust and Mr Koos Saaiman have provided consent
- **Available access:** The site can be accessed from the R64, using existing secondary roads. However, there additional access roads may need to be established on site.
- **Locality to nearest tie-in to the national electricity grid:** The Eskom (Perseus) electricity sub-station is less than 500m to the east of the proposed Kinderdam MTS.
- **Topography:** The proposed site is located on an almost level area with an eastern aspect.
- **Agricultural Potential:** Refer to Appendix G6 (Soil, Land Use and Agricultural Potential Survey). The site has a low dryland cropping agricultural potential more suited to grazing but is rated low in terms of agricultural potential. It was communicated by the farmer and owner of the land (Mr Koos Saaiman) that the crop pivot irrigation area on Kinderdam farm is being reduced in radius by at least 90m due to financial constraints and water supply.
- **Biodiversity:** It is stated by the specialist that “with respect to the vegetation and flora either alternative route could be used” and that “the preferred route (Alternative 1) is acceptable”.
- **Avifaunal:** No fatal flaws were discovered in the course of the investigation and it is therefore recommended that the activity is authorised, on condition that the proposed mitigation measures as detailed in the Impact Assessment Tables in the BAR and the EMPr are strictly implemented. Refer to Appendices G2 and J.
- **Freshwater:** There are no watercourses within 32m of the proposed development footprint and those within 500m trigger the need for an electronic water use licence/authorisation application (e-WULAA) in terms of the National Water Act No. 36 of 1998. The e-WULAA process is being conducted by the freshwater specialist and is already underway as per Appendix E5 and G3.
- **Heritage (Archaeological and Palaeontological):** No objections on archaeological grounds to the proposed development being authorised. Refer to Appendix G4.
- **Visual:** The proposed site is situated in a rural area with some natural trees and cultivated alien invasive (*Eucalyptus spp.*) trees. The area displays a rural character with low intensity farming, game farming and natural around further east on the farm. The Eskom (Perseus) substation is in close proximity to the site and an HV power line servitude runs to the east of the Farm Visserspan No. 40 towards Perseus substation in the south. The overall visual impact has been rated as low. Refer to the Visual Impact Assessment (as per Appendix G5).

#### **7.1.4. Layout Alternative:**

Only concept layout drawings were available at the time of compilation of the DBAR. However, adjustments in the layout to accommodate buffers/setback areas, as well as placement of the infrastructural requirements and structures/buildings within the proposed development footprint, will be made.

#### **7.1.5. No-go Alternative:**

The no-go alternative will not result in any removal of vegetation or impacts on biodiversity (flora or faunal) or loss of agricultural land since the development will not take place. In addition, the designated CBAs and ESAs will be able to function unhindered. However, this does not guarantee that the ecosystem will revive or thrive since the area is used for grazing/game farming and parts of the proposed development footprint are already quite degraded.

The no-go alternative will also result in South Africa's unsustainable, coal-based electricity supply not being augmented with renewable energy alternatives.

Considering that this development is proposed to be part of the REIPPPP bidding process (Bid Window 6), Government's target of securing 17 800MW of renewable energy capacity by 2030, as well as the country's commitment to wider/global climate change issues will remain subordinate to other pressing challenges which our country faces.

Due to the nature of the activity, and the size and location of the site (located with an area specified by the Government for outweigh such developments), the national benefits of the activity and the indirect revenue injection for the wider local community are considered to outweigh any environmental benefits of not implementing the activity. This is particularly true considering that all the assessed environmental impacts rate as low negative or insignificant with mitigation.

The no-go alternative is, therefore, not advocated.

## **8. ASSESSMENT METHODOLOGY**

Please refer to Appendix I for details on proposed project impact assessment methodology, as well as significance rating and mitigation measures.

## **9. ENVIRONMENTAL ISSUES AND POTENTIAL IMPACTS**

According to the independent Visual Impact Assessment attached as Appendix G5:

Actual and potential view receptors affected by this proposed development were identified. The impact of the proposed development on these receptors was evaluated and also considered the effect of the proposed development on the sense of place of the environment.

Due to the topography and landscape elements, the area displays a high absorption level. The assessment of the potential receptors indicated that the overall impact is low and well within acceptable levels of change.

While both the archaeological and palaeontological specialists had no objections to the proposed development being authorised (refer to Appendix G4), using the precautionary principle, the possibility of any heritage related discovery during construction has been accommodated in the EMPr (attached as Appendix J), this is in line with typical comment received from SAHRA in such cases. Comment on the Notice of Intent to develop (from SAHRA) is still forthcoming and will be included in Appendix E of the final BAR - Correspondence from Organs of State.

However, as a precautionary principle, the possibility of any heritage related discovery during construction has been accommodated in the EMPr (attached as Appendix J), in line with the preliminary and final comments to be received from SAHRA as per Appendix E attached (Correspondence from Organs of State).

## **10. PUBLIC PARTICIPATION PROCESS**

As per the NEMA 2014 regulations (as amended), a comprehensive public participation process is required to inform interested and affected parties (I&APs) of the proposed development and alternatives.

Particulars of the public participation process conducted and still to be conducted, are summarised below:

### **i. Pre-application public participation (PP) process:**

Placed advertisement in local newspapers regarding project, availability of copies of documents and process to register as an I&AP.

Sent out notifications to Interested and Affected Parties (I&APs) previously registered for projects in the areas (Organs of State; Forums; Community groups, etc.)

Placed A2 posters on site

Displayed and placed A3 posters, maildrop letters/background information document in public facilities (Municipality and large retail shops)

Displayed A3 posters at local public amenities (local clinic / bar)

Delivered maildrop letters to neighbouring properties / farms spaza shops

Made copies of PP associated documents available on EnviroAfrica website for public viewing / comment

Emailed, delivered or posted copies of any PP documentation to querying I&APs who requested them.

Compiled comments and response trail report as per Appendix F.

Updated I&AP List.

### **ii. Post-application PP process:**

PP involving informing via email, posting of cd copies process for all registered I&APs for the post-application round of PP using draft BAR.

iii. Inform all registered I&APs of submission of final BAR as the third round of PP and availability on website using.

Await DEFF EA decision.

iv. Inform I&APs within 14 days of DEFF decision when received.

## 11. CONCLUSIONS

According to the BGIS maps in Appendix D, parts of the development footprint do encroach on a CBA 1 region. However, it is the botanical specialists' opinion after ground-truthing the BGIS maps that the impact is low and most of the development footprint for the preferred alternative would still allow vegetation to grow beneath the OPL.

All the properties are currently zoned 'Agricultural' and the negotiated servitudes/rights of way will undergo rezoning.

Although the DEFF Screening Tool attached as Appendix H indicates that the area is of high animal species/biodiversity significance, it is evident that the proposed development site is, or was, transformed / disturbed land which is currently used for grazing.

The high faunal biodiversity in terms of avifauna was assessed by the avifaunal specialist (refer to Appendix G2 attached) and found that with implementation of mitigation this environmental aspect is low.

From desktop studies, it seems that no endangered or threatened faunal species seem to be prevalent in the proposed development site. Nonetheless, the EMP<sub>r</sub> will require a search and rescue of any faunal and flora species as required by the environmental control officer or regulating authority during construction, should it be deemed necessary e.g. such as for tortoises and toads.

The land surrounding the proposed development site comprises a mix of land uses: agricultural land, Eskom high voltage power line servitudes, Perseus substation, farm workshops and scattered residences and further afield (not immediate neighbour/s) game farms.

Visserspan Grid Connection will be visible from particularly the (dirt/gravel) secondary or trunk roads which the proposed development crosses.

According to the independent Visual Impact Assessment report (attached as Appendix G5): The overall visual impact is low.

The small extent of the project in relation to the number of approved PV facilities as well as the fact that the site abuts the approved projects and is in close proximity to the Perseus substation, results in a low contribution to the cumulative impact with regards to crowding. Due to the low overall visual impact, no mitigation measures are required.

## **12.RECOMMENDATIONS**

Prior to construction, an avifaunal specialist must walk through the proposed development and inspect the area to identify Red List species that may be breeding within the project footprint to ensure that the impacts to breeding species (if any) are adequately managed.

The installation of bird flight diverters as per sensitivity maps and avifaunal specialist report (Appendix G2 attached).

Should fossil remains such as bones, teeth, shells or petrified wood be discovered before or during the construction phase, these should be safeguarded (preferably *in situ*) and the ECO should alert the South African Heritage Resources Agency, SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Phone: +27 (0)21 462 4502. Fax: +27 (0)21 462 4509. Web: [www.sahra.org.za](http://www.sahra.org.za)). This is so that appropriate mitigation (e.g. recording, sampling or collection) can be taken by a professional palaeontologist. A 'Chance Fossil Finds Procedure' must be appended to the method statements of each EMPr.

All recommendations made in specialist reports and the EMPr (and the environmental authorisation, should it be granted) must be adhered to, in particular, but not limited to, ECO site compliance inspections/audits and reporting, during and post construction.

The above specialist recommendations have been included in the generic Environmental Management Plan (EMPrs) under site specific sensitivities for the proposed development.

It is proposed that the authorisation be valid for a period of 25 years with construction commencing within 5 years from the date of authorisation, should authorisation be granted.

It is, therefore, recommended that this application be authorised with the necessary conditions of approval as described throughout this BAR and associated EMPs..

## Appendices



APPENDIX		TITLE	APPENDIX ATTACHED? YES
A		Maps	✓
	A1	Locality	✓
	A2	Project Site Coordinates	✓
	A3	Status Quo	✓
	A4	Regional	✓
	A5	Visserspan Farm Projects 1-4 Cumulative	✓
	A6	REDZ 5 and Strategic Infrastructure Corridor (EGI)	✓
	A7	Project Layout Superimposed on Sensitivity Layers	✓
B		Site Layout Plans	✓
C		Site Photographs	✓
	C1	Visserspan Substation Site	✓
	C2	Grid Connection Corridor	✓
	C3	Kinderdam Main Transmission Substation Site	✓
D		Biodiversity/Sensitivity Maps	✓
	D1	Visserspan Grid Connection Sensitivities, CBAs & ESAs (Status Quo Map)	✓
	D2	Visserspan Substation Sensitivity Map	✓
	D3	Kinderdam Substation Sensitivity Map	✓
	D4	Visserspan Grid Connection 201 5 Free State Biodiversity Plan Map	✓
	D5	Visserspan Grid Connection NFEPA Rivers and Wetlands Map	✓
	D6	Visserspan Grid Connection National Landcover Map	✓
	D7	Visserspan Grid Connection National Threatened Terrestrial Ecosystems Map	✓
E		Correspondence with Organs of State/National Partner Entities	✓
	E1	DFFE	✓
	E2	DFFE (National Biodiversity Directorate)	✓
	E3	DALRRD (National Agriculture)	✓
	E4	DARD (Provincial Agriculture)	✓
	E5	DHSW&S (Provincial)	✓
	E6	SAHRA	✓
	E7	Municipality	✓
	E8	Eskom	✓
	E9	CAA	✓
	E10	SKA	✓
	E11	SANRAL	✓
	E12	BirdLife South Africa	✓
	E13	DESTEA (Provincial)	✓
F		Comment and Response Report/s	✓
	F1	Supporting Documents	✓
	F2	Public Participation Proof	✓
	F3	Interested and Affected Parties (I&AP) Lists	✓
G		Specialist Studies/Opinions	✓
	G1	Botanical Impact Assessment / Compliance Statement	✓
	G2	Avifaunal Impact Assessment	✓

	G3	Freshwater Impact Assessment	✓
	G4	Heritage Impact Assessment	✓
	G5	Visual Impact Assessment	✓
	G6	Soil, Land Use and Agricultural Potential Survey	✓
H		Screening Tool Report with Site Sensitivity Verification Report	✓
I		Impact Assessment	✓
J		Environmental Management Programmes/Plans (EMPrs)	✓
	J1	Visserspan IPP Collector Station EMPr	✓
	J2	Visserspan Eskom Switching Station EMPr	✓
	J3	Eskom Overhead Power Line (EMPr)	✓
	J4	Kinderdam Eskom Main Transmission Substation EMPr	✓
K		Property Owner's Consent and Property Title Deed	✓
L		Specialists' Declarations	✓
M		EAP's Declaration & CV	✓
N		Applicant's Declaration	✓