HERITAGE IMPACT ASSESSMENT

In terms of Section 38(8) of the NHRA for the

Proposed development of the 132kV Oya Overhead Power Line near Matjiesfontein, Western and Northern Cape

Prepared by CTS Heritage

CTS HERITAGE

For

Oya Energy (Pty) Ltd

November 2020

HWC Reference: 20103006SB

SAHRIS Case No: 15709

CTS HERITAGE

THE INDEPENDENT PERSON WHO COMPILED A SPECIALIST REPORT OR UNDERTOOK A SPECIALIST PROCESS

I Jenna Lavin, as the appointed independent specialist hereby declare that I:

• act/ed as the independent specialist in this application;

• regard the information contained in this report as it relates to my specialist input/study to be true and correct, and

• do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2010 and any specific environmental management Act;

• have and will not have no vested interest in the proposed activity proceeding;

• have disclosed, to the applicant, EAP and competent authority, any material information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations, 2010 and any specific environmental management Act;

• am fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations, 2010 (specifically in terms of regulation 17 of GN No. R. 543) and any specific environmental management Act, and that failure to comply with these requirements may constitute and result in disqualification;

• have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;

• have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;

• have ensured that the names of all interested and affected parties that participated in terms of the specialist input/study were recorded in the register of interested and affected parties who participated in the public participation process;

• have provided the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not; and

• am aware that a false declaration is an offence in terms of regulation 71 of GN No. R. 543.

Signature of the specialist

CTS Heritage, November 2020

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EXECUTIVE SUMMARY

1. Site Name:

The 132kV Oya power line near Maitjiesfontein, Western and Northern Cape

2. Location:

Portion 2 of the Farm Bakovens Kloof No 152 (2/152): C01900000000015200002

Remainder of the Farm Bakovens Kloof No 152 (RE/152): C01900000000015200000

Portion 3 of the Farm Baakens Rivier No 155 (3/155): C01900000000015500003

Remainder of the Farm Baakens Rivier No 155 (RE/155): C01900000000015500000

Portion 1 of the Farm Gats Rivier No 156 (1/156): C01900000000015600001

Remainder of the Farm Gats Rivier No 156 (RE/156): C01900000000015600000

Portion 1 of the Farm Amandelboom No 158 (1/158): C01900000000015800001

Remainder of the Farm Oliviers Berg No 159 (RE/159): C01900000000015900000

Portion 2 of the Farm Bantamsfontein No 168 (2/168): C01900000000016800002

Portion 4 of the Farm Bantamsfontein No 168 (4/168): C01900000000016800004

Portion 5 of the Farm Bantamsfontein No 168 (5/168): C01900000000016800005

Portion 7 of the Farm Bantamsfontein No 168 (7/168): C01900000000016800007

Portion 13 of the Farm Bantamsfontein No 168 (13/168): C01900000000016800013

Remainder of the Farm Bantamsfontein No 168 (RE/168): C01900000000016800000

Remainder of the Farm Lower Roodewal No 169 (RE/169): C01900000000016900000

Remainder of the Farm Matjes Fontein No 194 (RE/194): C07200000000019400000

The Farm Platfontein No 240 (240): C01900000000024000000

The Farm Die Brak No 241 (241): C01900000000024100000

Portion 1 of the Farm Rietpoort No 243 (1/243): C01900000000024300001

Remainder of the Farm Rietpoort No 243 (RE/243): C01900000000024300000

Remainder of the Farm Toover berg No 244 (RE/244): C01900000000024400000

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3. Locality Plan:

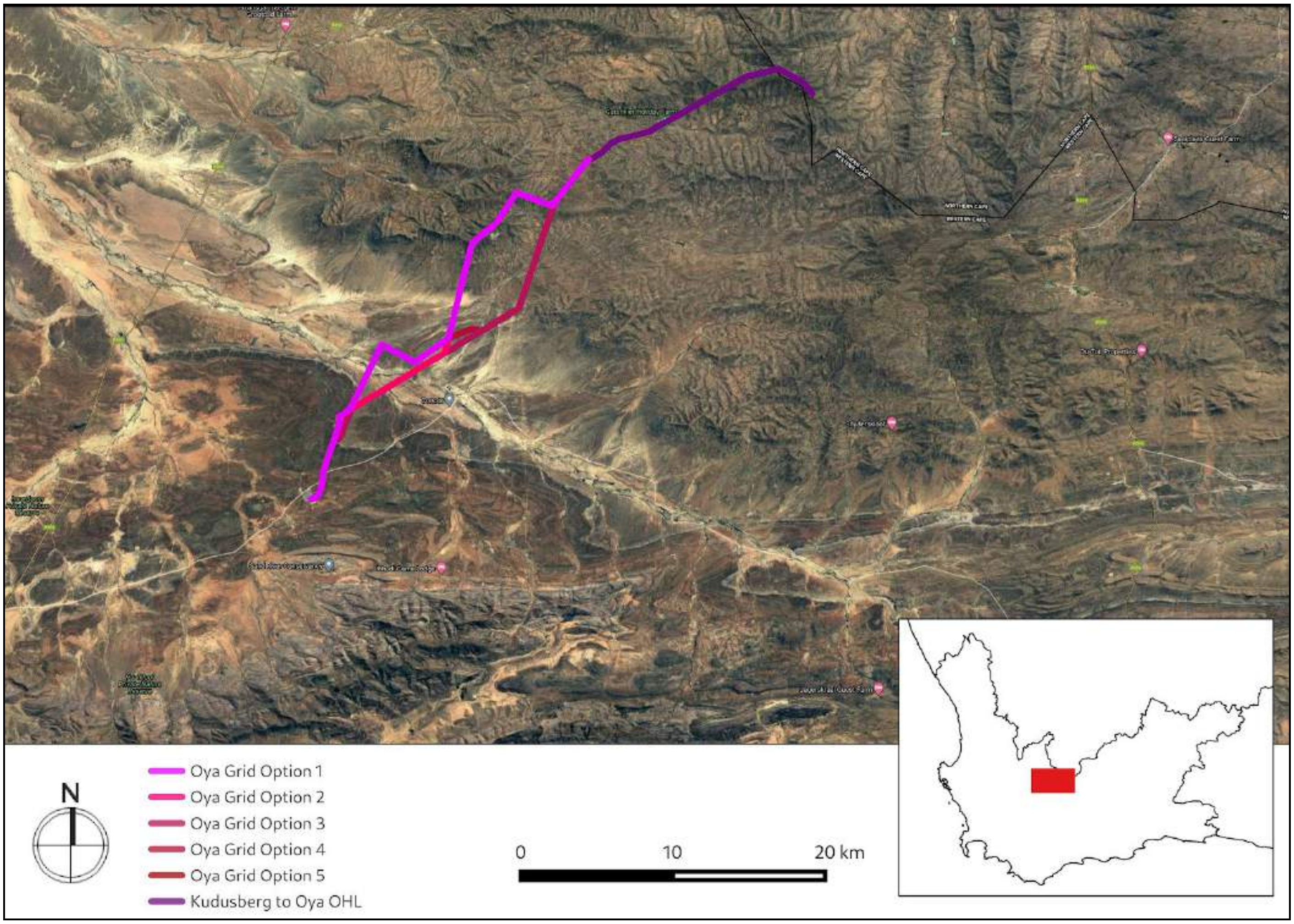

Figure 1: Location of the proposed development area

4. Description of Proposed Development:

Oya Energy (Pty) Ltd (hereafter referred to as "Oya Energy") is proposing to construct a 132kV overhead power line and 33/132kV substations near Matjiesfontein in the Western and Northern Cape Provinces (hereafter referred to as the "proposed development"). The overall objective of the proposed development is to feed the electricity generated by the proposed Oya Energy Facility (part of separate on-going EIA process with DEFF Ref No.: 14/12/16/3/3/2/2009) as well as potentially the nearby developments into the national grid. The grid connection and substation (this application) requires a separate EA, in order to allow the EA to be handed over to Eskom. The proposed power line and substations development is located in the Witzenberg and Karoo Hoogland Local Municipalities respectively, which fall within the Cape Winelands and Namakwa District Municipalities.

The type of power lines being considered at this stage include both lattice and monopole towers and it is assumed that these towers will be located approximately 200m to 250m apart. The towers will be up to 45m in height, depending on the terrain, but will ensure minimum overhead line clearances from buildings and surrounding infrastructure. The size of the proposed Oya and Kudusberg on-site Eskom substation and O&M building sites will be approximately 4 hectares (ha)] each.

It should be noted that only one (1) route is possible for the section of the proposed power line which connects the Kudusberg substation (authorised under 14/12/16/3/3/1/1976/AM1) to the Oya on-site substation (oi.e. Kudusberg to Oya). No alternatives can therefore be provided for this section of the power line. The Kudusberg to Oya power line corridor route is approximately 16.6km in length and runs from the Kudusberg on-site substation along the RE/194, 1/158, RE/159, RE/156, 1/156 and RE/155 properties to the Oya on-site substation.

Five (5) power line corridor route alternatives have however been provided for the section of the proposed overhead power line which connects the Oya on-site substation to the Kappa substation (i.e. Oya to Kappa). The above-mentioned alternatives are described below:

- Power Line Corridor Alternative 1 (Oya to Kappa): Approximately 34.14km in length and runs along the RE/155, RE/152, 2/152, RE/169, RE/243, 241, 240 and RE/244 properties to the Kappa substation
- Power Line Corridor Alternative 2 (Oya to Kappa): Approximately 32.43km in length and runs along the RE/155, 3/155, RE/152, 2/152, RE/169, 13/168, 5/168, 1/243, RE/243, 241 and 240 properties to the Kappa substation
- Power Line Corridor Alternative 3 (Oya to Kappa): Approximately 30.56km in length and runs along the RE/155, 4/168, 13/168, 5/168, 1/243, 240 and RE/244 properties to the Kappa substation
- Power Line Corridor Alternative 4 (Oya to Kappa): Approximately 32.94km in length and runs along the RE/155, 4/168, 13/168, RE/169, RE/243, 241 and 240 properties to the Kappa substation
- Power Line Corridor Alternative 5 (Oya to Kappa): Approximately 32.26km in length and runs along the RE/155, RE/152, 2/152, RE/169, 5/168, 1/243 and 240 properties to the Kappa substation
- ‘No-go’ alternative: The ‘no-go’ alternative is the option of not fulfilling the proposed project as well as prevent the connection of the energy development in the area to feed electricity into the national grid. This alternative would result in no environmental impacts from the proposed project on the site or surrounding

local area. It provides the baseline against which other alternatives are compared and will be considered throughout the report. Implementing the 'no-go' option would entail no development. The affected properties are currently not used for agricultural activities, although they are suitable for very low-level grazing.

The power line corridor routes mentioned above provide different route alignments contained within an assessment corridor of up to approximately 300m wide. This is to allow for flexibility to route the power line within the authorised corridor.

5. Heritage Resources Identified:

Table 3: Sites identified during the assessment

Site No.	Site Name	Description	Type	Co-ordinates		Grading	Mitigation
130730	**OYPV-09**	Three grave features including a medium-density scatter of MSA and LSA stone tools	Archaeological	-32.909831	20.202653	IIIA	100m buffer to ensure no impact
130768	**BKRN031**	Waterford Formation. Good riverbed and bank exposures of tabular, greyish wackes with undulose or wave-rippled tops. Thin, fissile, medium-grained, laminated, greyish sandy interbeds, locally ferruginised, towards base of package of medium- to thick-bedded wackes (horizontally to current ripple cross-laminated) containing dense hash of transported plant debris – mainly stems, including probable sphenophytes - preserved as moulds where weathered and carbonaceous compressions in fresher material. Some possible axes up to 10 cm across.	Palaeontological	-32.909361	20.201889	IIIA	50m buffer
130772	**BKRN034**	Waterford Formation. Hillslope exposure of grey-green mudrocks with large ferruginous carbonate diagenetic concretions and package of tabular, thin-bedded wackes. Small float block of silicified wood.	Palaeontological	-32.933389	20.177833	IIIC	50m buffer to ensure no impact
130981	**KDB012**	Circular cobble-built structure, piled stone, likely hut or shelter	Structure	-32.864056	20.308778	IIIC	50m buffer to ensure no impact
130760	**BKNR023**	Lower Abrahamskraal Fm Riverine (probably Combrinkskraal Member equivalent). Exposure of well-jointed top and interior of thick, medium-grained channel sandstone with dispersed	Palaeontological	-32.893528	20.243944	IIIB	50m buffer to ensure no impact

		moulds of plant debris including indeterminate plant axes up to several cm wide, tongue-shaped glossopterid leaves, some retaining an original spatulate 3D morphology (uncompressed), clear midrib but fine venation on lamina is very faint or absent. Associated thin mudflake intraclast breccias					
130761	**BKNR024**	Lower Abrahamskraal Fm Riverine (probably Combrinkskraal Member equivalent). Excellent steep streambank sections through thick, tabular-bedded channel sandstone complex with well-developed coarse, poorly-sorted, monomict / oligomict mudrock intraclast breccias up to 2m or so thick at several horizons, locally with sharply erosive bases cutting down into tabular-bedded sandstones (No reworked calcrete or fossils seen in situ within breccias)	Palaeontological	-32.893694	20.243444	IIIA	50m buffer to ensure no impact
NA	**NA**	Gatsrivier CLA	Cultural Landscape	-32.8919	20.2905	IIIB	No go area
NA	**NA**	Historic road river crossings	Cultural Landscape	NA	NA	IIIC	100m buffer
NA	**NA**	River Confluences	Cultural Landscape	NA	NA	IIIB	100m buffer
NA	**NA**	Baakensriver CLA	Cultural Landscape	-32.9015	20.1859	IIIA	No go area
NA	**NA**	Ridge lines	Cultural Landscape	NA	NA	II	
NA	**NA**	Historic trunk road	Cultural Landscape	NA	NA	IIIA	50m buffer

6. Anticipated Impacts on Heritage Resources:

Some significant heritage resources are located within the 300m (150m x2) corridor for the proposed Alternative 4 alignment. The lithic material identified is of low significance, and even though the resources may be destroyed during the construction, the impact is inconsequential for the majority of the heritage resources identified during the archaeological and palaeontological assessments conducted for this project. These are detailed in Table 4 and various mitigation measures are proposed in order to ensure that no impact to these resources takes place. These resources include archaeological sites 130734, 130981 and 131154 around which a buffer of 50m is proposed.

Site 130730 is a burial ground site and is very sensitive in terms of impacts. As such, a 100m buffer area around this site is recommended.

No significant fossils were identified during the field analysis. This is mostly due to the soil cover and lack of outcrop in the area. Only four fossils were identified in the field assessment and the fossils found were all silicified wood from the Abrahamskraal Formation. None of the samples were found *in situ*. However, significant palaeontological resources have been previously identified within the 300m corridor for Alternative 4 (SAHRIS Site IDs 130760, 130761, 130768 and 130772). 50m buffers are proposed around these sites to ensure that no impact takes place.

The primary heritage impact anticipated for this proposed development is impact to the cultural landscape. Previous Cultural Landscape Assessments conducted in the immediate vicinity of the proposed OHL alignment have identified cultural landscape features of significance including the Cultural Landscape Areas of the Baakensrivier and the Gatsrivier, river confluences, ridge lines, outspans, the historic trunk road and where this road crosses rivers (road river crossings). Various mitigation measures are proposed to mitigate the negative impacts to the cultural landscape including buffer zones, no-go areas and general development guidelines included in section 5.4. Importantly, this proposed OHL development is located within a REDZ area and in a strategic transmission corridor (Central Corridor) as per GN 113 with many proposed and already authorised renewable energy facilities in its immediate proximity. In general, it is preferred for this kind of infrastructure to be concentrated on the landscape instead of sprawled out.

Alternative 4 is preferred by the developer for the Oya to Kappa overhead power line corridor route, and in light of the above information, also in terms of impacts to heritage resources. The proposed development is unlikely to have a negative impact on significant heritage resources situated within the corridor for the proposed Oya OHL on condition that the proposed mitigation measures including buffer areas and no-go areas are implemented.

7. Recommendations:

There is no objection to the proposed development on heritage grounds and the following is recommended:

- Power Line Corridor Alternative Alignment 4 (Oya to Kappa) is preferred in terms of impacts to heritage and there is no objection on heritage grounds to the proposed substations
- No mitigation is required prior to construction operations commencing.

- The recommended buffer areas and no-go areas identified in Table 4 above must inform the final alignment and must be implemented during the construction phase.
- During the construction phase all excavations must be monitored for fossil remains by the responsible Environmental Control Officer (ECO) using the HWC Chance Fossil Finds Procedure. Should substantial fossil remains such as vertebrate bones and teeth, petrified wood, plant-rich fossil lenses or dense fossil burrow assemblages be exposed during construction, the responsible ECO should safeguard these, preferably in situ, and alert the South African Heritage Resources Authority (SAHRA) in the Northern Cape and HWC in the Western Cape so that appropriate action can be taken by a professional palaeontologist,
- Should any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources be found during the proposed development, SAHRA APM Unit (Natasha Higgitt/Phillip Hine 021 462 5402) in the Northern Cape and HWC in the Western Cape must be alerted.
- If unmarked human burials are uncovered in the Northern Cape, the SAHRA Burial Grounds and Graves (BGG) Unit (Mimi Seetelo 012 320 8490), and in the Western Cape, HWC must be alerted immediately as per section 36(6) of the NHRA. A professional archaeologist must be contracted as soon as possible to inspect the findings. A Phase 2 rescue excavation operation may be required subject to permits issued by SAHRA and/or HWC

8. Author/s and Date:

Jenna Lavin

November 2020

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NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998) (NEMA) AND ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REGULATIONS, 2014 (AS AMENDED) - REQUIREMENTS FOR SPECIALIST REPORTS (APPENDIX 6)

Regulation GNR 326 of 4 December 2014, as amended 7 April 2017, Appendix 6	Section of Report
1. (1) A specialist report prepared in terms of these Regulations must contain- 1. **details of-** 1. **the specialist who prepared the report; and** 2. **the expertise of that specialist to compile a specialist report including a curriculum vitae;**	Page 11
2. **a declaration that the specialist is independent in a form as may be specified by the competent authority;**	Page 1
3. **an indication of the scope of, and the purpose for which, the report was prepared;**	Section 2
(cA) an indication of the quality and age of base data used for the specialist report;	Section 2
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 3
4. **the date and season of the site investigation and the relevance of the season to the outcome of the assessment;**	Section 2
5. **a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;**	Section 2
6. **details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;**	Section 4
7. **an identification of any areas to be avoided, including buffers;**	Section 5
8. **a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;**	Section 5
9. **a description of any assumptions made and any uncertainties or gaps in knowledge;**	Section 2

10. **a description of the findings and potential implications of such findings on the impact of the proposed activity, (including identified alternatives on the environment) or activities;**	Section 5
11. **any mitigation measures for inclusion in the EMPr;**	Section 8
12. **any conditions for inclusion in the environmental authorisation;**	Section 8
13. **any monitoring requirements for inclusion in the EMPr or environmental authorisation;**	Section 8
14. **a reasoned opinion-** 1. **(as to) whether the proposed activity, activities or portions thereof should be authorised;** **(iA) regarding the acceptability of the proposed activity or activities; and** 2. **if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;**	Section 9
15. **a description of any consultation process that was undertaken during the course of preparing the specialist report;**	Section 6
16. **a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and**	Appendix 5
17. **any other information requested by the competent authority.**	Included throughout report
2) Where a government notice *gazetted* by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	No such protocol is in place however HWC has Guidelines for HIAs and SAHRA has Minimum Standards for AIAs and PIAs - all of which are complied with

Details of Specialist who prepared the HIA

Jenna Lavin, an archaeologist with an MSc in Archaeology and Palaeoenvironments, and currently completing an MPhil in Conservation Management , heads up the heritage division of the organisation, and has a wealth of experience in the heritage management sector. Jenna's previous position as the Assistant Director for Policy, Research and Planning at Heritage Western Cape has provided her with an in-depth understanding of national and international heritage legislation. Her 8 years of experience at various heritage authorities in South Africa means that she has dealt extensively with permitting, policy formulation, compliance and heritage management at national and provincial level and has also been heavily involved in rolling out training on SAHRIS to the Provincial Heritage Resources Authorities and local authorities.

Jenna is on the Executive Committee of the Association of Professional Heritage Practitioners (APHP), and is also an active member of the International Committee on Monuments and Sites (ICOMOS) as well as the International Committee on Archaeological Heritage Management (ICAHM). In addition, Jenna has been a member of the Association of Southern African Professional Archaeologists (ASAPA) since 2009. Recently, Jenna has been responsible for conducting training in how to write Wikipedia articles for the Africa Centre's WikiAfrica project.

Since 2016, Jenna has drafted over 50 Heritage Impact Assessments throughout South Africa.

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APPENDICES

1 Archaeological Impact Assessment 2020

2 Palaeontological Impact Assessment 2020

3 Visual Impact Assessment and Visual Statement

4 Heritage Screening Assessment

5 NID form and NID Response

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1. INTRODUCTION

1.1 Background Information on Project

CTS Heritage has been appointed by SiVEST (PTY) Ltd, on behalf of Oya Energy (Pty) Ltd to undertake the assessment of the proposed 132 kilovolt (kV) overhead power line and 33/132kV substations located within one (1) of the Strategic Transmission Corridors as defined and in terms of the procedures laid out in Government Notice (GN) No. 113[1], namely the Central Corridor, near Matjiesfontein in the Western and Northern Cape Provinces of South Africa.

The proposed overhead power line (OHL) and substation project will irrespective of this be subject to a BA process in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA) (as amended) and Appendix 1 of the EIA Regulations, 2014 promulgated in Government Gazette 40772 and GN R326, R327, R325 and R324 on 7 April 2017. The competent authority for this BA is the national Department of Environment, Forestry and Fisheries (DEFF). Specialist studies have been commissioned to assess and verify the OHL and substations.

1.2 Technical Summary

Oya Energy (Pty) Ltd (hereafter referred to as "Oya Energy") is proposing to construct a 132kV overhead power line and 33/132kV substations near Matjiesfontein in the Western and Northern Cape Provinces (hereafter referred to as the "proposed development"). The overall objective of the proposed development is to feed the electricity generated by the proposed Oya Energy Facility (part of separate on-going EIA process with DEFF Ref No.: 14/12/16/3/3/2/2009) as well as potentially the nearby developments into the national grid. The grid connection and substations (this application) require a separate EA, in order to allow the EA to be handed over to Eskom. The proposed power line and substations are located in the Witzenberg and Karoo Hoogland Local Municipalities respectively, which fall within the Cape Winelands and Namakwa District Municipalities.

The entire extent of the proposed overhead power line is located within one (1) of the Strategic Transmission Corridors as defined and in terms of the procedures laid out in GN No. 1131, namely the Central Corridor. The proposed overhead power line project will irrespective of this be subject to a BA process in terms of the NEMA (as amended) and Appendix 1 of the EIA Regulations, 2014 promulgated in Government Gazette 40772 and GN R326, R327, R325 and R324 on 7 April 2017. The competent authority for this BA is the DEFF.

At this stage, it is anticipated that the proposed development will include a 132kV power line and 33/132kV substations to feed electricity generated by the renewable energy facilities owned by the applicant into the national grid at the Kappa substation.

The type of power line towers being considered at this stage include both lattice and monopole towers and it is assumed that these towers will be located approximately 200m to 250m apart. The towers will be up to 45m in height, depending on the terrain, but will ensure minimum overhead line clearances from buildings and surrounding infrastructure.

300m wide power line corridors (i.e. 150m on either side) are being assessed to allow flexibility when determining the final route alignment. The proposed power line however only requires a 31m wide servitude and as such, this servitude would be positioned within the assessed corridor.

The size of the proposed Oya and Kudusberg on-site Eskom substation and O&M building sites will be approximately 4 hectares (ha) each.

It should be noted that only one (1) route is possible for the section of the proposed power line which connects the Kudusberg on-site substation (authorised under 14/12/16/3/3/1/1976/AM1) to the Oya on-site substation (i.e. Kudusberg to Oya). No alternatives can therefore be provided for this section of the power line. The **Kudusberg to Oya power line corridor route** is approximately 16.6km in length and runs from the Kudusberg on-site substation along the RE/194, 1/158, RE/159, RE/156, 1/156 and RE/155 properties to the Oya on-site substation.

Five (5) power line corridor route alternatives have however been provided for the section of the proposed overhead power line which connects the Oya on-site substation to the Kappa substation. The above-mentioned alternatives are described below:

- **Power Line Corridor Alternative 1 (Oya to Kappa)**: Approximately 34.14km in length and runs along the RE/155, RE/152, 2/152, RE/169, RE/243, 241, 240 and RE/244 properties to the Kappa substation
- **Power Line Corridor Alternative 2 (Oya to Kappa)**: Approximately 32.43km in length and runs along the RE/155, 3/155, RE/152, 2/152, RE/169, 13/168, 5/168, 1/243, RE/243, 241 and 240 properties to the Kappa substation
- **Power Line Corridor Alternative 3 (Oya to Kappa):** Approximately 30.56km in length and runs along the RE/155, 4/168, 13/168, 5/168, 1/243, 240 and RE/244 properties to the Kappa substation

- **Power Line Corridor Alternative 4 (Oya to Kappa):** Approximately 32.94km in length and runs along the RE/155, 4/168, 13/168, RE/169, RE/243, 241 and 240 properties to the Kappa substation
- **Power Line Corridor Alternative 5 (Oya to Kappa)**: Approximately 32.26km in length and runs along the RE/155, RE/152, 2/152, RE/169, 5/168, 1/243 and 240 properties to the Kappa substation
- 'No-go' alternative: The 'no-go' alternative is the option of not fulfilling the proposed project as well as prevent the connection of the energy development in the area to feed electricity into the national grid. This alternative would result in no environmental impacts from the proposed project on the site or surrounding local area. It provides the baseline against which other alternatives are compared and will be considered throughout the report. Implementing the 'no-go' option would entail no development. The affected properties are currently not used for agricultural activities, although they are suitable for very low-level grazing.

The power line corridor routes mentioned above provide different route alignments contained within an assessment corridor of up to approximately 300m wide. This is to allow for flexibility to route the power line within the authorised corridor.

The 'no-go' option is a feasible option, however, this would prevent the proposed development from contributing to the environmental, social and economic benefits associated with the development of the renewables sector.

1.3 Description of Property and Affected Environment

The area proposed for development is located within an undulating landscape within which the predominant land use is game grazing. It is a semi-arid region and the vegetation is characteristic of the Succulent Karoo Biome. The area is covered in varying densities of knee-high scrub. There is a farmhouse and numerous jeep tracks across the large farm property but the site remains predominantly natural and very isolated. Natural ephemeral streams (currently dry) and man-made sources of water were observed.

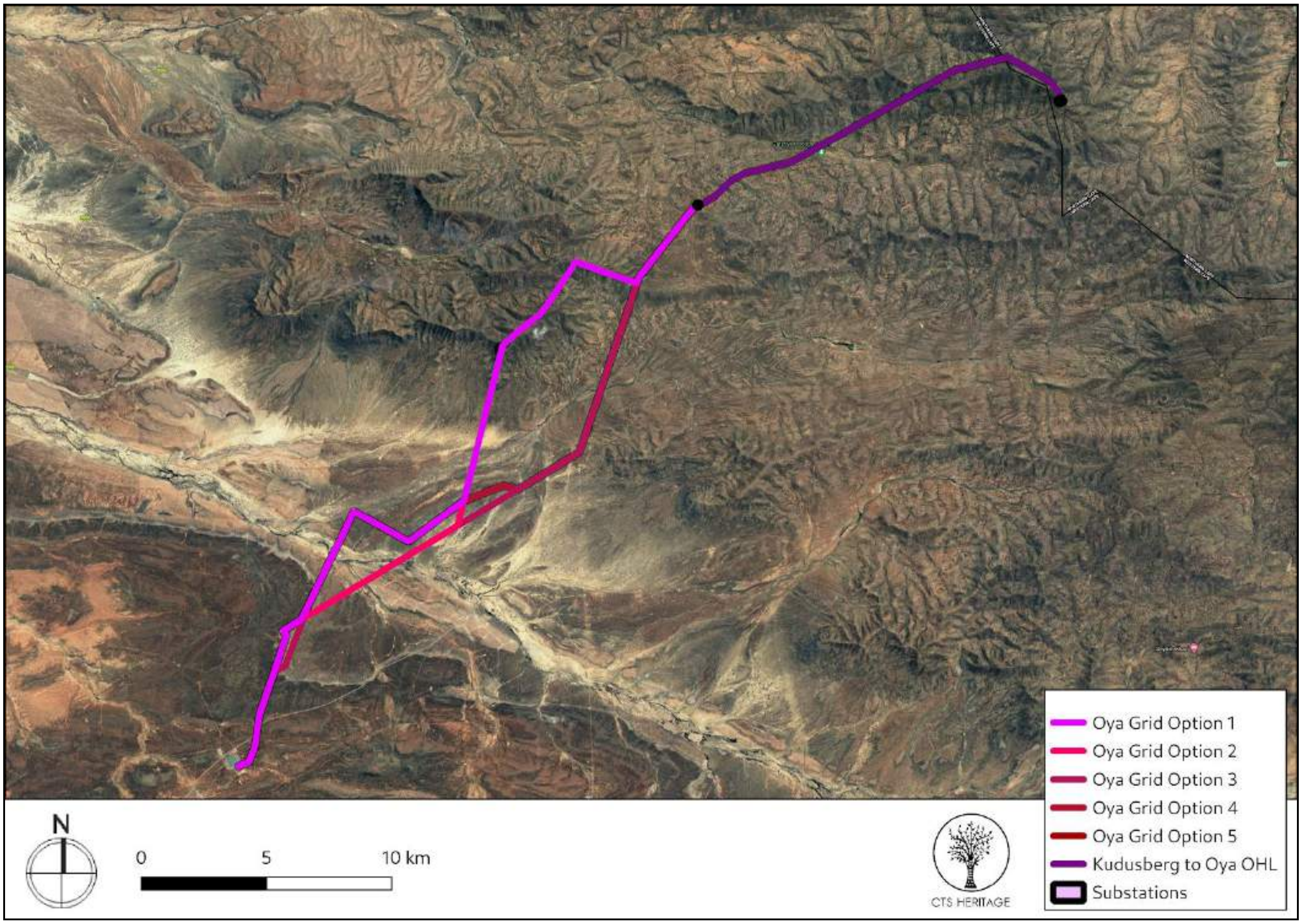
According to a Cultural Landscape Assessment completed for a neighbouring project (Jansen 2020), "The Karoo Cultural Landscape consists of the following elements:

1. This part of the Karoo is prized for its wide-open spaces and expansive vistas.
2. Considering the larger context, the character of the land is mostly homogenous. The proposed site is located within the expansive plains typical of the karoo, and end in a ridgeline that demarcates the Eastern boundary of these three sites. Tooverkop, and Pramberg, and a component, is a distinct feature in

the landscape, that as a result determines the sense of place of the various sites.

3. Small shrubs dominate the plain, accentuating the mountains and valleys moving through the landscape. Taller shrubs are found within the drainage lines, and among rocky outcrops, and in close proximity to the farm werf.
4. Absence of trees is noteworthy, and therefore any tree (single or in a cluster) is considered a feature that is associated with cultural activity.
5. Tombstone weathering of the rocks are distinctive on the kopjes, and linear shale outcroppings in a vertical position were noted. The outcroppings generally create an environment where different plant species are found.
6. Some of these tombstone weathered rocks are like fingers, and get used in the construction of fence lines as posts, for hakkiesdraad / barbed wire, and intermittent droppers or these rocks. Most farms have a farm gate or 'pyphek' that allows entrance to the various fields/farm roads.
7. The main form of agriculture is sheep farming. Karoo sheep are known for their distinct taste that they get from the feeding on the small shrubs. Large tracts of land are needed to support one sheep. The portions of farms in the karoo are as a result typically larger.
8. Many of the farm werfs include historic structures. Usually a modest size farm dwelling made from local rocks, painted white with an outbuilding. Some of these structures are no longer in use, are converted into farm sheds to house animals, or any other use that supports farming activities. One of the farms had a farm dwelling with a large porch, and remnants of an historic adobe structure.
9. Kraal structures from local rock are found in the area, and often against the slope of the kopje, an interesting feature in the landscape. These were most likely used to keep sheep overnight, or used as a lambing kraal.
10. Typical of the karoo is a round concrete dam, with a wind pump. The study area also features a number of larger dams constructed through digging depressions in the landscape in drainage lines.
11. Remnant outspan areas are found in the area. These relate to the trekboere, and could possibly relate to existing economic activity.
12. Dirt roads, and three transmission lines are found in close proximity of the site, as well as an established wind Energy Facility (WEF).
13. Vehicles are seen approaching from far in the form of a moving dust column (mostly white bakkies associated with the developed wind farm in the area)."

In her description of the cultural landscape context, Bailey (2020) describes the Baakens River Cultural Landscape as “sparsely populated with a few farmsteads and their associated structures located on the valley floors, adjacent to watercourses and linked by a series of crisscrossing farm tracks and significant historic roads that are material remains of the important connections and linkages between the people travelling across the vast landscape and living isolated lives. Sites of habitation are usually layered in their historic signature, with various periods of habitation evident on the same site over time, such as stone age sites (rock art and stone age scatter) farmsteads, stone kraals with their herder’s cottages and more recent 20th century associated farm structures (sheds and seasonal labourers residence) and tourist cottages. The farm buildings in the area contain elements greater than 60 years of age and fall with the general protection of the National Heritage Resources Act (25 of 1999) (NHRA). Significant landscape elements were identified within the study site, including tangible heritage resources, specific cultural landscape areas and intangible heritage resources and graded according to NHRA grading. **The significance grading of the landscape elements ranged from IIIB to II.”**



Map 1.1: The proposed alignment alternatives for the Oya OHL grid connection and proposed substation sites

2. METHODOLOGY

2.1 Purpose of HIA

The purpose of this Heritage Impact Assessment (HIA) is to satisfy the requirements of section 38(8), and therefore section 38(3) of the National Heritage Resources Act (Act 25 of 1999). A NID application was submitted to HWC on 5 November 2020. HWC's HOMS Committee assessed the NID submission on 16 November 2020 and indicated that "An HIA including an AIA, PIA and Visual statement assessing areas close to scenic routes, valleys and mountain ridges is required." This HIA is submitted in order to satisfy this requirement.

2.2 Summary of steps followed

- A Desktop Study was conducted of relevant reports previously written (please see the reference list for the age and nature of the reports used)
- Two archaeologists conducted an assessment of archaeological resources likely to be disturbed by the proposed development. The archaeologist conducted his site visit from 19 to 20 October 2020.
- A palaeontologist conducted an assessment of palaeontological resources likely to be disturbed by the proposed development. The palaeontologist conducted his site visit from 19 to 20 October 2020.
- A VIA specialist drafted a Visual Statement which was integrated into this HIA
- The identified resources were assessed to evaluate their heritage significance
- Alternatives and mitigation options were discussed with the Environmental Assessment Practitioner

2.3 Assumptions and uncertainties

- The *significance* of the sites and artefacts is determined by means of their historical, social, aesthetic, technological and scientific value in relation to their uniqueness, condition of preservation and research potential. It must be kept in mind that the various aspects are not mutually exclusive, and that the evaluation of any site is done with reference to any number of these.

- It should be noted that archaeological and palaeontological deposits often occur below ground level. Should artefacts or skeletal material be revealed at the site during construction, such activities should be halted, and it would be required that the heritage consultants are notified for an investigation and evaluation of the find(s) to take place.

However, despite this, sufficient time and expertise was allocated to provide an accurate assessment of the heritage sensitivity of the area.

2.4 Constraints & Limitations

A portion of the area proposed for development was not easily accessible, due to restricted road access. As a result, the entirety of the proposed development area was not able to be surveyed but sampling was implemented and approximately 25km of the area was surveyed by foot.

The experience of the archaeologist, and observations made during the study as well as previous studies, allow us to predict with some accuracy the archaeological sensitivity of the receiving environment.

2.5 SiVEST Impact Assessment Methodology

The Environmental Impact Assessment (EIA) Methodology assists in evaluating the overall effect of a proposed activity on the environment. Determining of the significance of an environmental impact on an environmental parameter is determined through a systematic analysis.

2.5.1 Determination of Significance of Impacts

Significance is determined through a synthesis of impact characteristics which include context and intensity of an impact. Context refers to the geographical scale (i.e. site, local, national or global), whereas intensity is defined by the severity of the impact e.g. the magnitude of deviation from background conditions, the size of the area affected, the duration of the impact and the overall probability of occurrence. Significance is calculated as shown in **Table 1**.

Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

2.5.2 Impact Rating System

The impact assessment must take account of the nature, scale and duration of effects on the environment and whether such effects are positive (beneficial) or negative (detrimental). Each issue / impact is also assessed according to the various project stages, as follows:

- Planning;
- Construction;
- Operation; and

- Decommissioning.

Where necessary, the proposal for mitigation or optimisation of an impact should be detailed. A brief discussion of the impact and the rationale behind the assessment of its significance has also been included.

Rating System Used to Classify Impacts

The rating system is applied to the potential impact on the receiving environment and includes an objective evaluation of the possible mitigation of the impact. Impacts have been consolidated into one (1) rating. In assessing the significance of each issue the following criteria (including an allocated point system) is used:

Table 1: Rating of impacts criteria

ENVIRONMENTAL PARAMETER		
A brief description of the environmental aspect likely to be affected by the proposed activity.		
ISSUE / IMPACT / ENVIRONMENTAL EFFECT / NATURE		
Include a brief description of the impact of environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted upon by a particular action or activity (e.g. oil spill in surface water).		
EXTENT (E)		
This is defined as the area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales and as such bracketing ranges are often required. This is often useful during the detailed assessment of a project in terms of further defining the determined		
1	Site	The impact will only affect the site
2	Local/district	Will affect the local area or district
3	Province/region	Will affect the entire province or region
4	International and National	Will affect the entire country
PROBABILITY (P)		
This describes the chance of occurrence of an impact		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence)
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).
REVERSIBILITY (R)		

This describes the degree to which an impact on an environmental parameter can be successfully reversed upon completion of the proposed activity.		
1	Completely reversible	The impact is reversible with implementation of minor mitigation measures
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
4	Irreversible	The impact is irreversible and no mitigation measures exist.
IRREPLACEABLE LOSS OF RESOURCES (L)		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resource.	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in significant loss of resources.
4	Complete loss of resources	The impact is result in a complete loss of all resources.
DURATION (D)		
This describes the duration of the impacts on the environmental parameter. Duration indicates the lifetime of the impact as a result of the proposed activity		
1	Short term	The impact and its effects will either disappear with mitigation or will be mitigated through natural process in a span shorter than the construction phase (0 – 1 years), or the impact and its effects will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium term	The impact and its effects will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10 – 50 years).
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered transient (Indefinite).
INTENSITY / MAGNITUDE (I / M)		
Describes the severity of an impact (i.e. whether the impact has the ability to alter the functionality or quality of a system permanently or temporarily).		
1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/ component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).

3	High	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	Very high	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired (system collapse). Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.
SIGNIFICANCE (S)		
Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. This describes the significance of the impact on the environmental parameter. The calculation of the significance of an impact uses the following formula: **Significance = (Extent + probability + reversibility + irreplaceability + duration) x magnitude/intensity.** The summation of the different criteria will produce a non-weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.		
Points	**Impact Significance Rating**	**Description**
5 to 23	Negative Low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
5 to 23	Positive Low impact	The anticipated impact will have minor positive effects.
24 to 42	Negative Medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
24 to 42	Positive Medium impact	The anticipated impact will have moderate positive effects.
43 to 61	Negative High impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
43 to 61	Positive High impact	The anticipated impact will have significant positive effects.
62 to 80	Negative Very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
62 to 80	Positive Very high impact	The anticipated impact will have highly significant positive effects.

3. HISTORY AND EVOLUTION OF THE SITE AND CONTEXT

3.1 Desktop Assessment

Cultural Landscape

The proposed power line is located in the Witzenberg and Karoo Hoogland Local Municipalities respectively, which fall within the Cape Winelands and Namakwa District Municipalities. The area proposed for development is located within a REDZ area, is located in a Strategic Transmission Corridor and is firmly located within the Tanqua and Ceres Karoo. This part of the Karoo is prized for its wide-open spaces and expansive vistas. Hart et al. (2016) note that the cultural landscape of this area is agricultural in nature and consists of mostly stock farming with very occasional agriculture. The area is isolated with natural qualities and semi-desert landscapes. Many of the farm werfs in the broader area include historic structures. These are usually a modest size farm dwelling made from local rocks and painted white with an outbuilding. Some of these structures are no longer in use, or are converted into farm sheds, housing animals, or any other use that supports farming activities. Other infrastructure typically found in the karoo is a round concrete dam, with a wind pump. The broader cultural landscape associated with the Baakens River Cultural Landscape has been previously thoroughly assessed by Bailey (2020) for the Oya HIA and the larger basin has been assessed by Jansen (2020a and 2020b)

The interaction between the topography, geology, flora and historical remnants of human occupation of the area form a unique cultural landscape that may be negatively impacted by the proposed development. However, it must be noted that there are a number of approved Renewable Energy Facilities in the area, furthermore, the proposed OHL alignment falls within a Strategic Transmission Corridor (namely the Central Corridor) which already contains existing powerline infrastructure (Figure 6). As noted in the Cultural Landscape Assessment for Oya (Bailey 2020), the negative impact of the development of such infrastructure on the Cultural Landscape is unavoidably high and are inevitable. The only mitigation option available is to develop this infrastructure in clusters, such as within the Komsberg REDZ and Central Corridor (as with this project). As the cultural landscape for this area has already been assessed by Bailey (2020) as well as Jansen (2020), it is recommended that no additional Cultural Landscape assessment is necessary for this project.

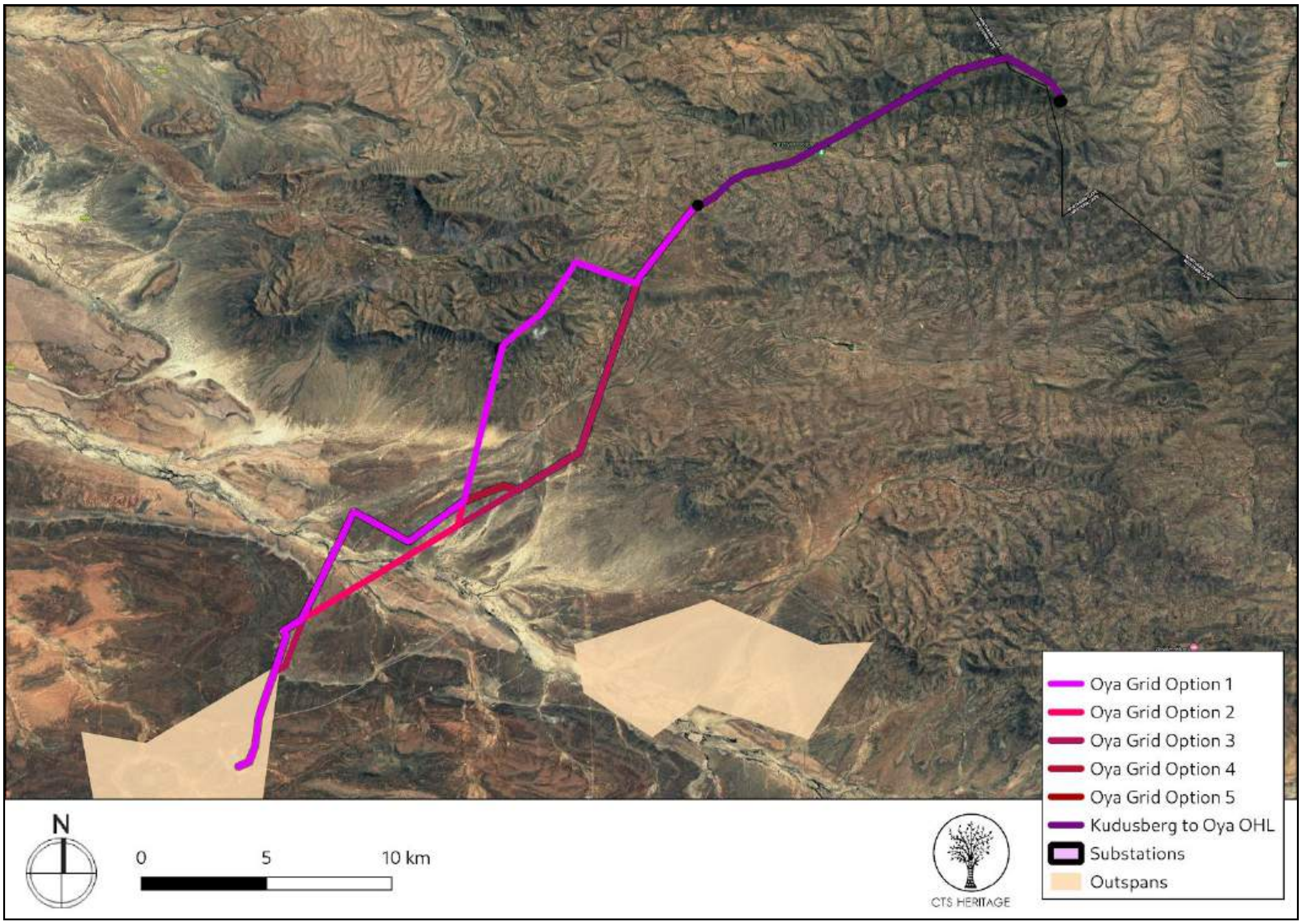
According to a Cultural Landscape Assessment completed in the area by Jansen et al. 2020a, "Access to the site is gained from the main gravel road that connects the R356 to Matjiesfontein, where the study area is located in a bowl-like catchment area created by the Koedoesberg Mountains to the north and the Bontebergen Mountains to the south. The R356 is known as the forgotten highway to the North that runs up past Sutherland, with access through Karoopoort. This alignment is significant to understand the greater context of the study area, since Karoopoort formed part of a system of outspans that functioned as an area of rest in the journey towards the north. The route and poort were also used as a thoroughfare of herds of bovids, as a means to travel between two biomes in order to benefit from different pastures, and hunting grounds to the north."

Many of the farm werfs in the broader area include historic structures. These are usually a modest size farm dwelling made from local rocks, and painted white with an outbuilding. Some of these structures are no longer in use, or are converted into farm sheds, housing animals, or any other use that supports farming activities. One of the farms (Bruwelsfontein) had a farm dwelling with a large porch, and remnants of an old adobe structure. Other infrastructure typically found in the karoo is a round concrete dam, with a wind pump.

The Cultural Landscape Assessment by Jansen et al. (2020a) further notes that outspan areas form a significant feature in the Karoo as they are not only important to understand in terms of heritage, but also in terms of existing active use within the current cultural landscape, in the form of living heritage or the potential for an active use to be enhanced. There are two known outspan areas in close proximity to the proposed power line alignments (Figure 1.2). The system of outspan areas are possibly still actively used by the sheep-shearers of the Great Karoo that are known and acknowledged of the karretjiemense (Donkey Cart People). The following is an extract of a Masters study that was done by Steyn (2009) on the karretjiemense:

> *Karretjie People are usually seen migrating on secondary and tertiary roads in pursuit of a shearing assignment on farms or camping at an outspan next to a road.*
>
> *They are described as "preferentially endogamous, non-food producing communities who subsist predominantly on the sale of goods and services to sedentary customers and employ spatial mobility in varying degrees as a survival strategy" (Rao 1987:1). DNA of the Karretjie People can be traced directly to the KhoeKhoen and San (cf. De Jongh & Soodyall, Forthcoming). from the gathering-hunting /Xam-speaking San (Bushmen) and/or the nomadic-pastoral KhoeKhoen (mainly Griqua and Korana), that is, of the earliest inhabitants of the Karoo.*
> *However, due to various factors the lifestyle of both the /Xam and the Griqua/Korana were transformed. In the case of the /Xam, for example, they changed from nomadic hunters to become so-called 'tame Bushmen' farm labourers.*
>
> *They retained their mobility, first on foot, later with the help of pack animals and eventually they adopted the donkey cart as mode of transport, constructing their carts from materials salvaged from discarded parts of horse carriages and motorcars. With the mobility made possible by the donkey cart, the Karretjie People, as they became known, developed a flexible and mobile lifestyle in order to exploit employment opportunities on farms. Their means of livelihood necessitates spatial mobility and therefore the donkey cart allows them to utilise discontinuous opportunities, primarily for shearing.*

Where areas are identified to have an active use, cultural significance is heightened, and should be protected as such. The proposed development of the OHL and substations might negatively impact on this living heritage if not managed and mitigated appropriately.

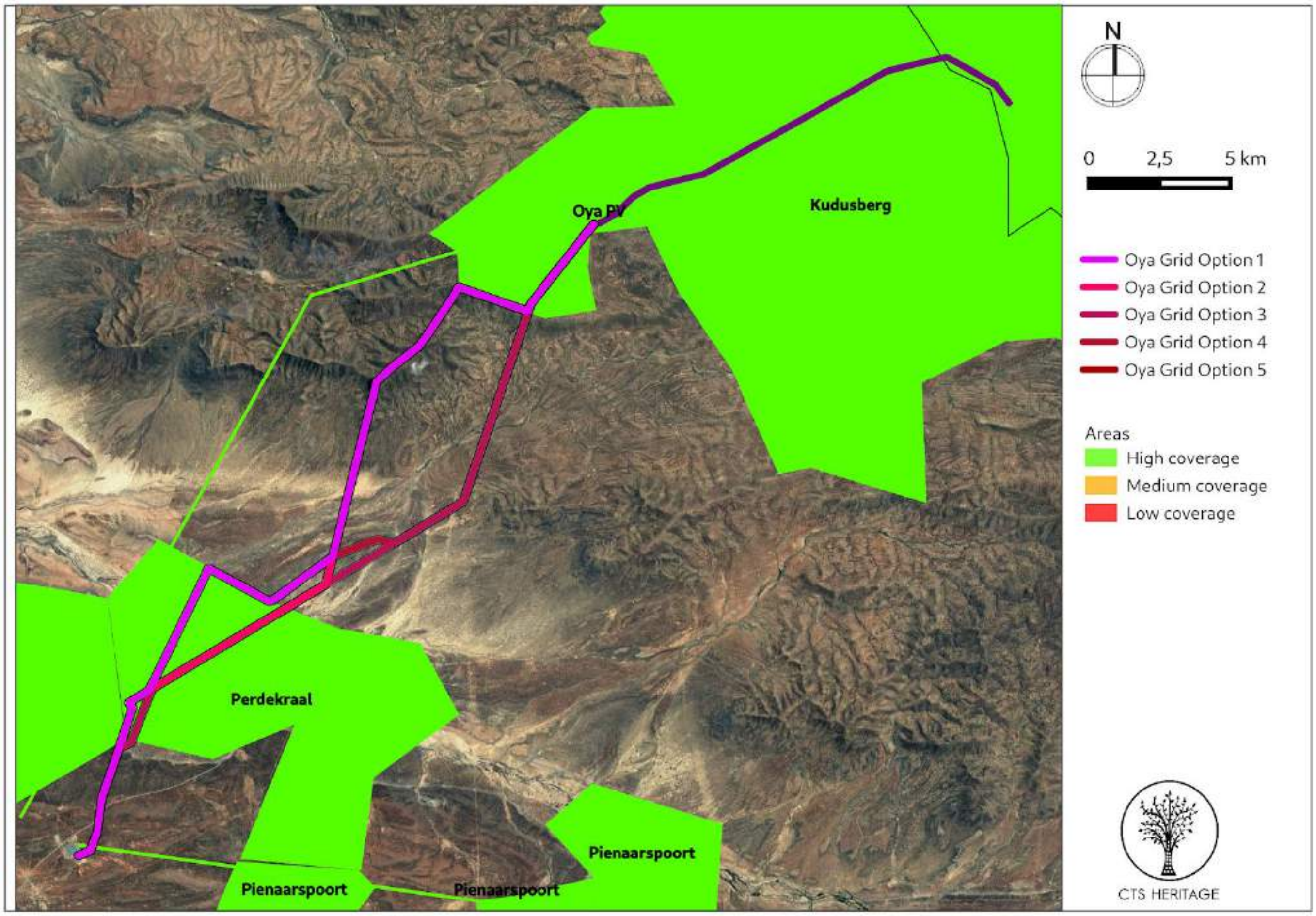


Map 1.2: The proposed alignment alternatives for the Oya OHL grid connection and substation sites relative to known outspans in the area

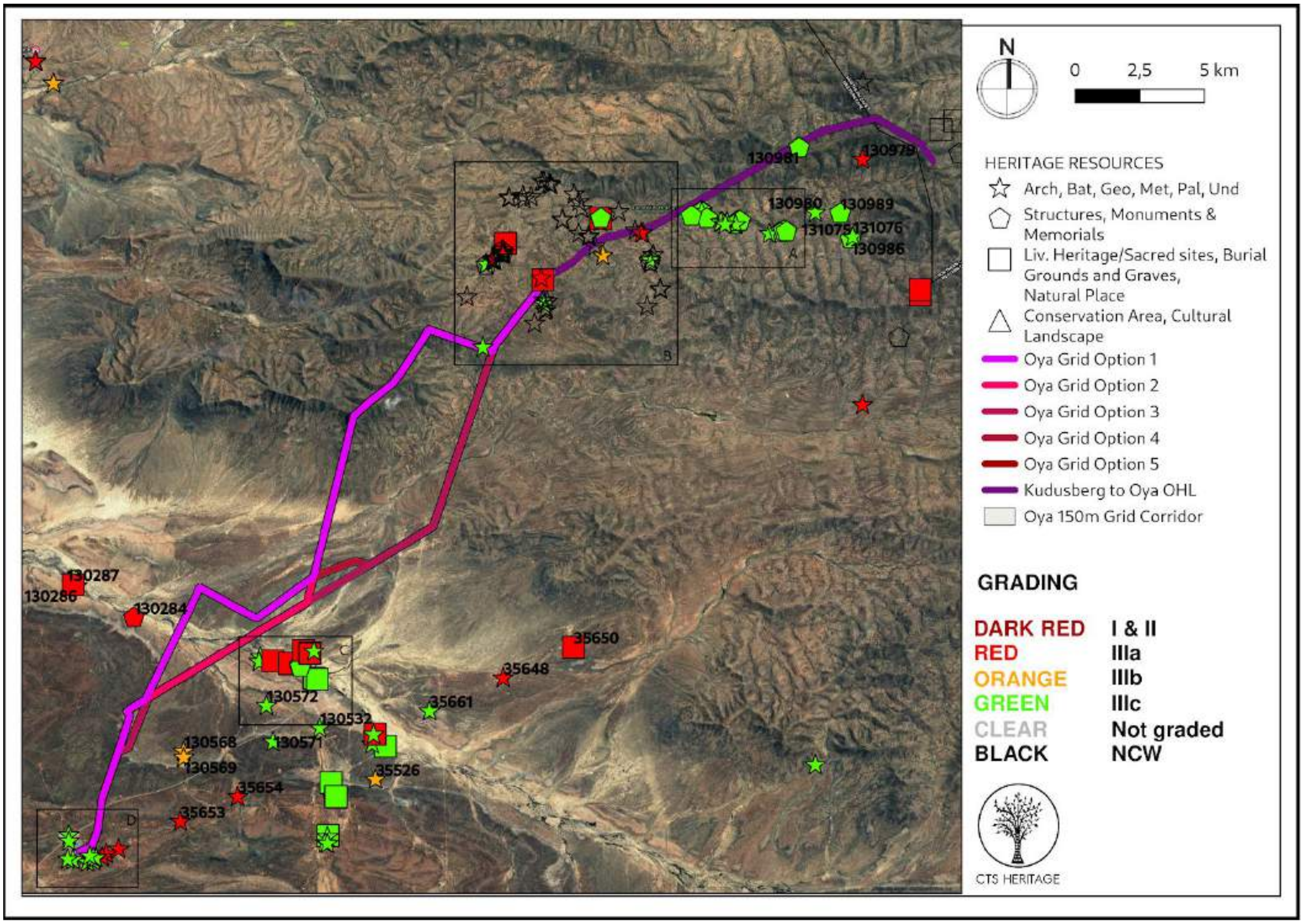
Previous Heritage Assessments

Heritage Impact Assessments have been completed within 20km of the area proposed for development and are recorded on SAHRIS, the South African Heritage Resources Information System, or have been sourced for this desktop screening assessment. It is noted that wherever an assessment has been completed, heritage resources of significance have been identified. According to Deacon (2008, SAHRIS ID 4843), this area "is well known for its rock art. However this is restricted to the kloofs and higher lying areas. There is the possibility that stone artefacts of different ages may occur in well-watered lowlands and valley margins." In addition, according to Pinto and Smuts (2011, SAHRIS ID 375379), "Agriculture since colonial times has been, to a large extent, marginal and has had a low impact on the archaeological evidence for these early communities. Prehistoric sites in the area, consisting predominantly of surface and sub-surface stone artefact scatters in the open landscape together with overhangs and recesses in the sandstone hills used as shelters, are likely to be well preserved with little disturbance from later historic periods." According to Smuts et al. (2018, SAHRIS NID 514990), studies completed in the broader area identified surprisingly little pre-colonial or stone age archaeology, and distinct spatial patterning to the little that was found. Almost all archaeological material, predominantly in the form of scatters, has been identified on the flat floodplains up to the foothills of the mountains, and within river valleys along watercourses... The area is known to have been inhabited since the Early Stone Age (ESA) and throughout the Middle Stone Age (MSA). Later Stone Age (LSA) scatters have also been documented throughout the region, although at remarkably low density, although excavations at cave sites near Sutherland yielded significant LSA cultural material" Furthermore, Smuts et al (2018) notes that rock art and archaeological resources associated with the trek boers and historical occupation of the area are known from the region. In addition, it has been noted that there is often a more dense accumulation of archaeological artefactual material along an exposure of the Collingwood Formation (Pc) as this formation provides an excellent raw material source. Part of the proposed OHL lies along this formation (Figure 5b).

In 2016 a Draft HIA (Hart et al.) for the proposed Kolkies and Karee WEFs on neighbouring properties was not completed as the project was cancelled. Hart et al. (2016) note that in terms of impacts to archaeology, sites tend to be found on the banks of river beds. Discrete scatters of Middle Stone Age artefacts are often identified in sheet washed locations at several farms in the area but they are not considered to be of high significance. In general, Hart et al. (2016) found that Late and Early Stone Age Archaeology is sparse. Hart et al. (2016) also found that the built environment is sparse. Hart et al. (2016) note that previous heritage work has shown there are numerous stone cairns along the dry riverbeds which may represent graves. Similarly, in the archaeological assessment completed for the Oya Energy facility by Fourie (2020), burial grounds and graves, some old farmsteads and kraals. Lavin and Wiltshire (2020) identified diffuse scatters of Middle and Later Stone Age artefacts in the neighbouring Pienaarspoort REF area.



Map 2.1: Spatialisation of heritage assessments conducted in proximity to the proposed development



Map 2.2: Spatialisation of heritage resources known in proximity to the proposed development (see Appendices for insets)

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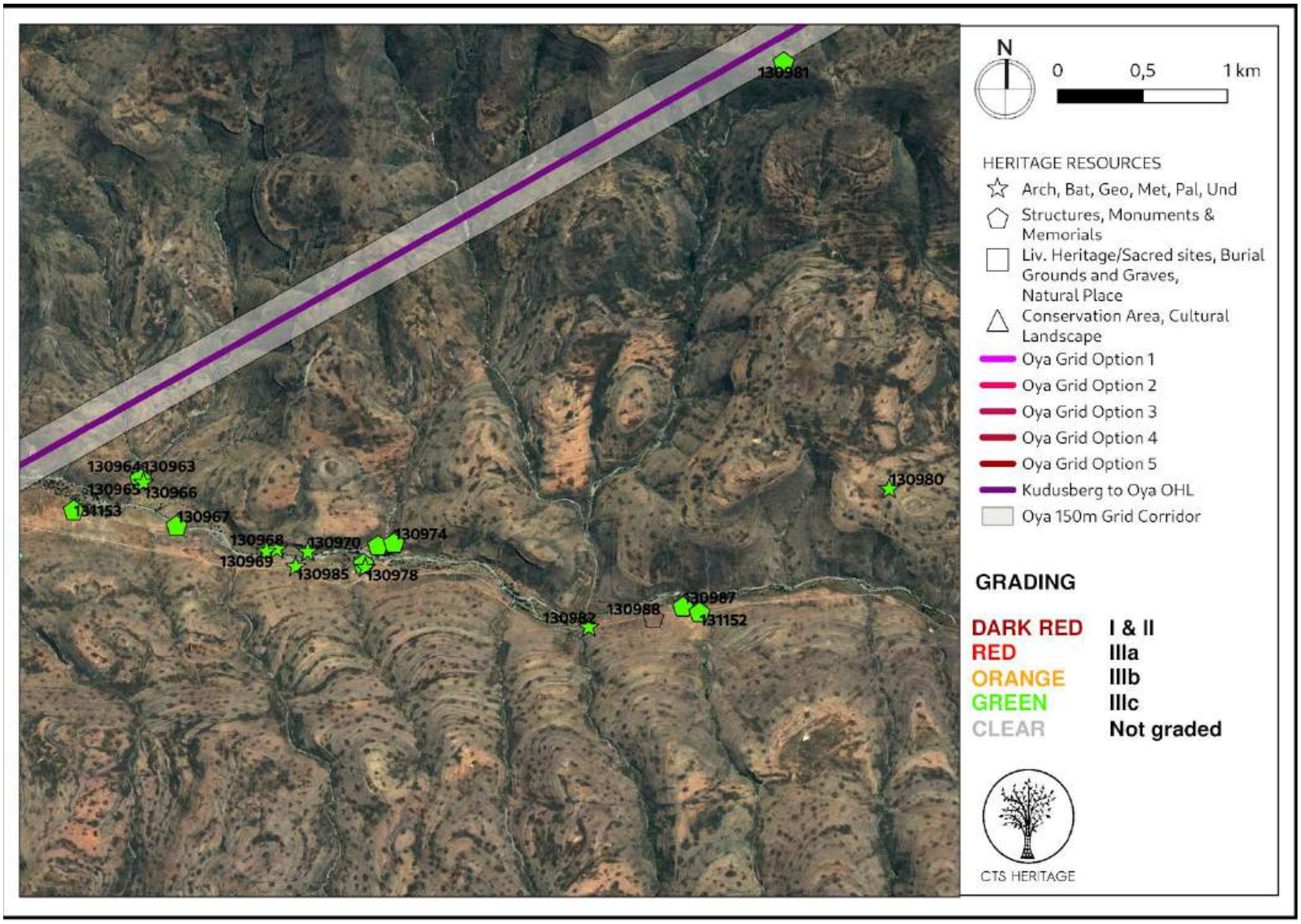
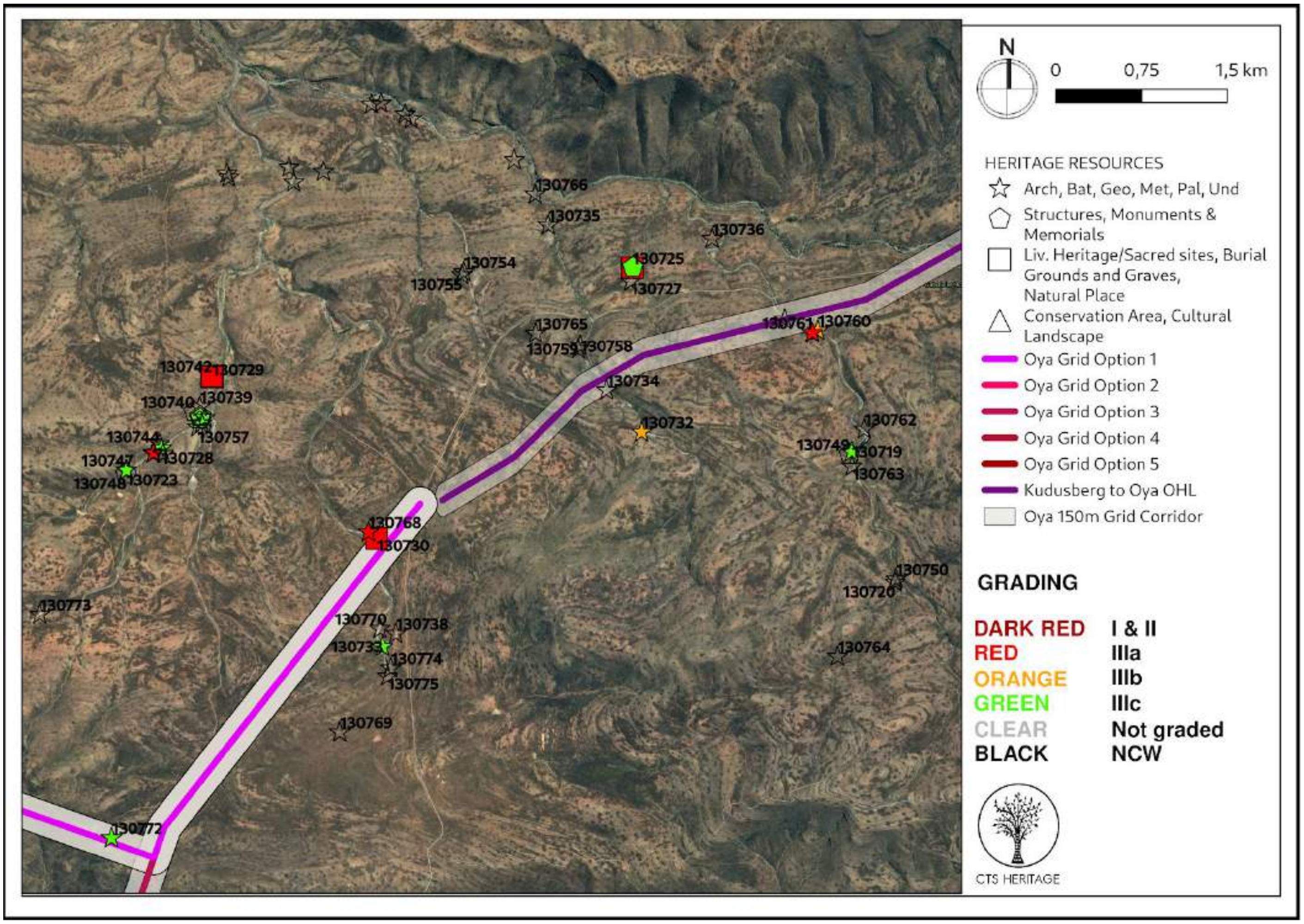


Map 2.3: Spatialisation of heritage resources known in proximity to the proposed development (see Appendices for insets)



Map 2.4: Spatialisation of heritage resources known in proximity to the proposed development (see Appendices for insets)

Palaeontology

According to the SAHRIS Palaeosensitivity Map, the area proposed for development is underlain by sediments that are of low, moderate, high and very high palaeontological sensitivity (Figure 4a). According to the extract from the Council for GeoScience Map 3220 for Sutherland (Figure 5a) and Map 3320 for Ladismith (Figure 5b), the area proposed for development is underlain by sediments of the Karoo Supergroup assigned to the Dwyka, Ecca and Witteberg Groups in addition to Quaternary Sands. The Dwyka Group is known to preserve trace fossils, organic-walled microfossils, rare marine invertebrates (*eg* molluscs), fish, vascular plants, predominantly interglacial and post-glacial trace fossil assemblages, possibility of body fossils (*eg* molluscs, fish, plants). The

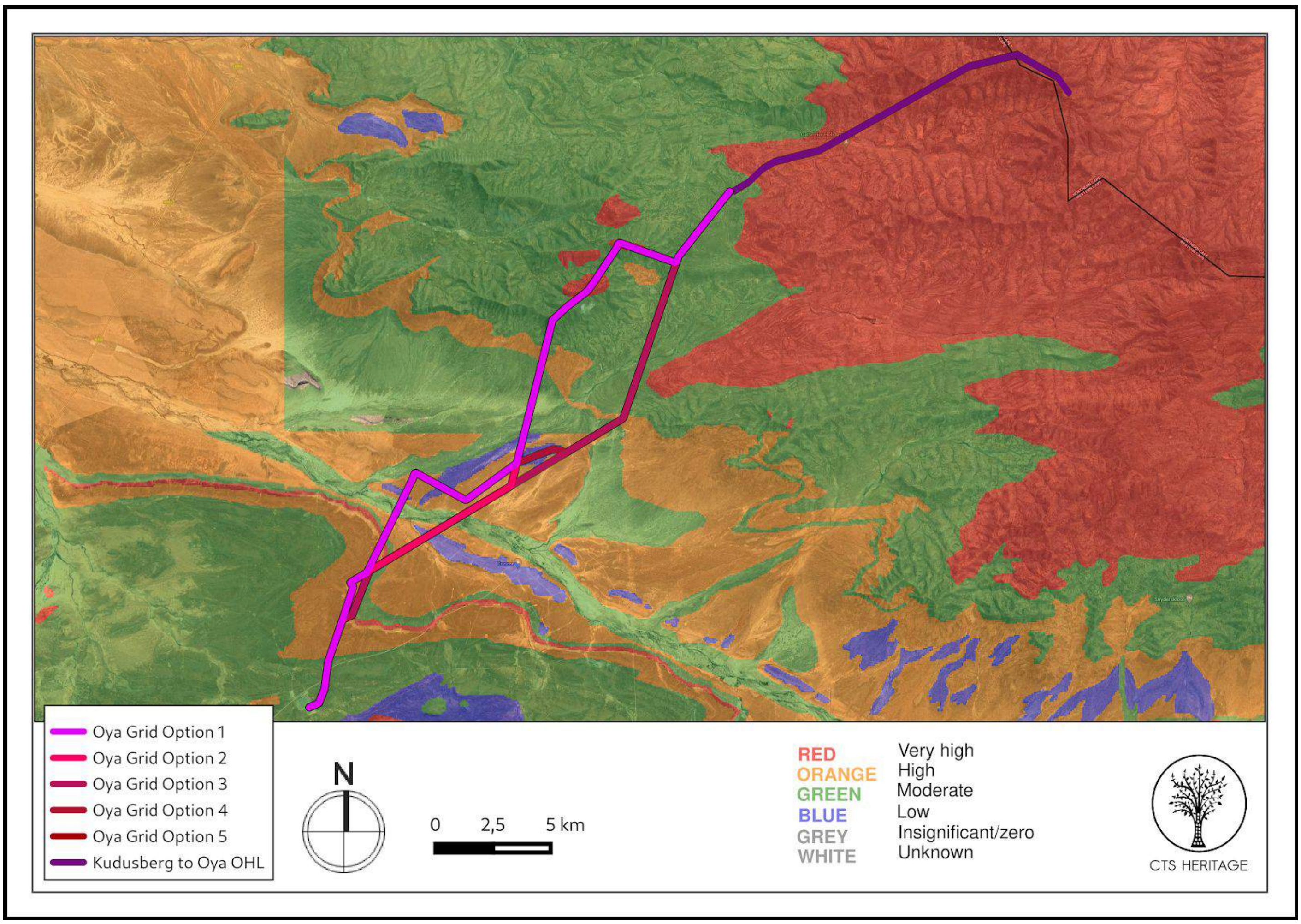
Ecca Group is known to conserve non-marine trace fossils, vascular plants (including petrified wood) and palynomorphs of *Glossopteris* flora, mesosaurid reptiles, fish (including microvertebrate remains, coprolites), crustaceans, sparse marine shelly invertebrates (molluscs, brachiopods), microfossils (radiolarians *etc*) and insects. The Witteberg Group is very palaeontologically sensitive and is known to conserve trace fossils, vascular plants, sparse shelly invertebrates and fish (brachiopods, bivalves *etc*). In the palaeontological assessment completed for the Oya Energy Facility, Almond (2020) concluded that the Oya project area has low paleontological sensitivity overall, but with small unpredictable areas of high to very high sensitivity. It is therefore likely that the proposed development will impact on significant palaeontological heritage.

Known Resources

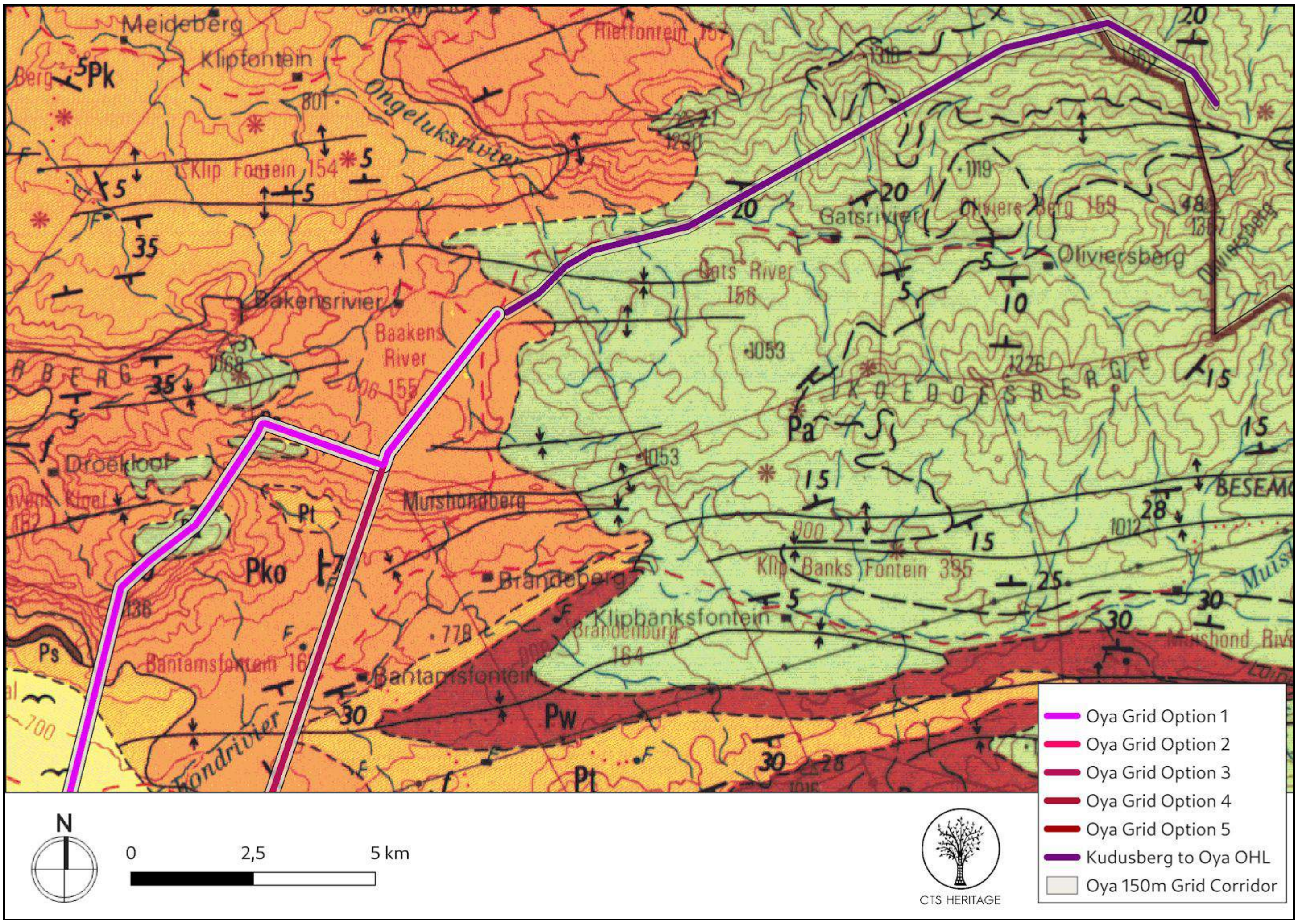
A number of known archaeological and palaeontological heritage resources fall within the 300m buffer area proposed for the Oya OHL and substations according to SAHRIS (Figure 3a and 3b). These are SAHRIS Site ID 130730, 130734, 130768, 130772 and 130981, as well as a small cluster of sites with SAHRIS IDs 131154, 130760 and 130761 along the river course. Site 130730 is graded IIIA and is described by Fourie (2020) as “Three grave features including a medium-density scatter of MSA and LSA stone tools… The site is located on the eastern bank of a river and has evidence of flooding. Three possible stone grave features were identified. The first grave (OYPV-10a) consists of packed stones in a semi-rectangular shape. The second grave (OYPV- 10b) has two sharp rectangular stones placed in one corner, most likely forming part of a grave marker that has been washed away or covered by sand from the river. The third grave feature (OYPV-10c) contains two stones placed on the eastern and western end, marking the feature as a grave. A medium-density scatter of MSA and LSA tools were found around the site. The stone tools mostly consist of cores, flakes, blades and chunks, and formal tools such as scrapers. The tools were made from chert, shale, and hornfels. Burial grounds and graves are protected under Section 36 of the NHRA 25 of 1999. Thus, the site is provisionally rated as having a high heritage significance with a heritage rating of IIIA. All graves have high levels of emotional, religious and in some cases historical significance. It is also important to understand that the identified graves could have significant heritage value to the relevant families.”

Site 130734 is not graded as significant and is described by Fourie (2020) as consisting of “Several LSA stone tools were found scattered over an area of 107,23m 2 near the river on the farm Gats Rivier 156. The flakes were made from chert and shale.” Site 130768 is also graded IIIA for its palaeontological research potential and is described by Almond (2020) as “Good riverbed and bank exposures of tabular, greyish wackes with undulose or wave-rippled tops. Thin, fissile, medium-grained, laminated, greyish sandy interbeds, locally ferruginised, towards base of package of medium- to thick-bedded wackes (horizontally to current ripple cross-laminated) containing dense hash of transported plant debris – mainly stems, including probable sphenophytes - preserved as moulds where weathered and carbonaceous compressions in fresher material. Some possible axes up to 10 cm across". Site 130981 is a structure that is graded IIIC and is described as "Circular cobble-built structure, piled stone, likely hut or shelter". The remaining sites are all archaeological occurrences that are considered to be not conservation-worthy (130734 and 131154).

Sites 130760, 130761, 130768 and 130772 are all palaeontological finds identified by Almond (2020). These paleontological finds all consist of fossilised wood or plant material from either the Waterford Formation or the Abrahamskraal Formation.



Map 3.1: Palaeontological sensitivity of the proposed development area



Map 3.2 Geology Map. Extract from the CGS 3220 Sutherland Map indicating that the northern portion of the development area is underlain by sediments of the Karoo Supergroup assigned to the Tierberg (Pt) and Koedoesberg (Pko) formations of the Ecca Group, as well as the Abrahamskraal Formation (Pa) of the Beaufort Group and Quaternary Sands

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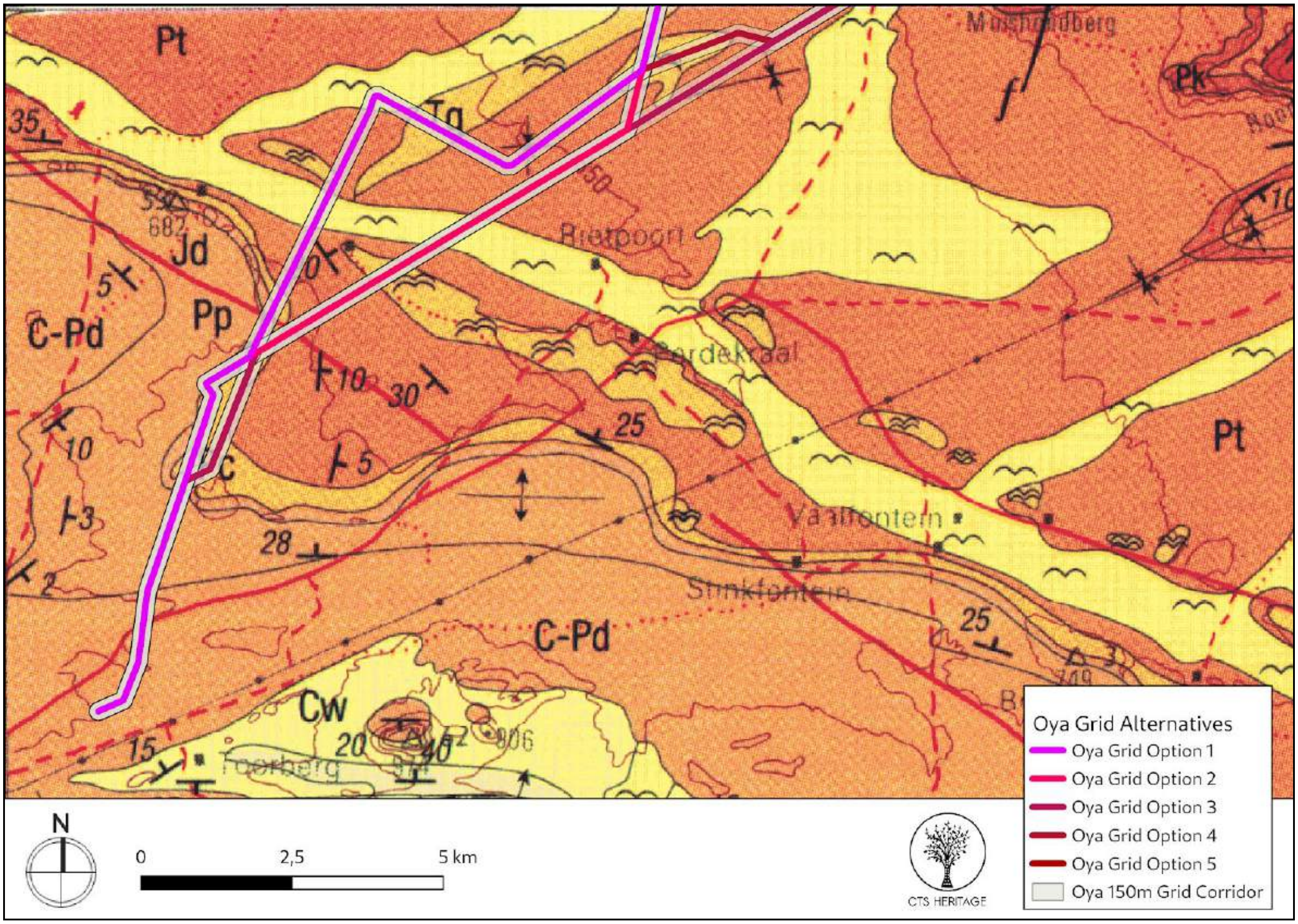

Map 3.3. Geology Map. Extract from the CGS 3320 Ladismith Map indicating that the development area is underlain by sediments of the Karoo Supergroup assigned to the Dwyka group (C-Pd), as well as the Prince Albert (Pp), Tierberg (Pt) and Collingwood (Pc) formations of the Ecca Group, as well as the Waaipoort (Cw) formation of the Witteberg Group and Quaternary Sands (Tg)

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Table 2: Explanation of symbols for the geological map

Symbol	Group	Formation	Lithology	Approximate Age	Palaeontology
Pa	**Beaufort, Adelaide Subgroup**	**Abrahamskraal**	Green to blue-grey mudstones	266 – 250 Ma	Bioturbation, Trance fossils ~Tapinocephalus Assemblage Zone
Pko	**Ecca**	**Waterford Fm. (Old Koedoesberg Fm.)**	Shales, siltstones, sandstones.	290 – 266 Ma	Wave ripples, silicified wood, Trace fossils.
Ps		**Skoorsteensberg**	Sandstone interbedded with shale		Trace fossils, Glossopteris
Pt		**Tierberg**	**Dark shales, yellow tuffs.**		Invertebrate fossils, sponge spicules, trace fossils, fish scales
Pp		**Prince Albert**	**Shales, wackes, arenite.**		Marine invertebrates, fish (Dwykaselachus *oosthuizeni*), coprolites.
C-Pd	**Dwyka**		**Diamictites**	290 – 317 Ma	Wood, trace fossils, invertebrates, polen.

4. IDENTIFICATION OF HERITAGE RESOURCES

4.1 Summary of findings of Specialist Reports

Cultural Landscape Summary

Bailey (2020) identified a number of Cultural Landscape Areas of significance in her assessment of the impacts of the Oya Energy Facility on the Cultural Landscape. These elements are included below and are used to assess the anticipated impacts of the proposed OHL and substations on the Cultural Landscape resources previously identified by Bailey (2020). The below information is taken directly from Bailey (2020).

Ridges (Grade II for scenic qualities)

This area is characterised by a series of very high and long ridges with valleys in-between. On a regional scale, viewed from the lower surrounding valleys floors and more distant plains, the high ridges are a dramatic sight and create the layers of blue and grey typical of the Karoo.

Watercourses and river confluences (Graded IIIB)

Water is a critical resource, ever more so in the Karoo due to its scarcity. The rivers run dry most of the year, historically leaving any inhabitants dependent on a few springs in the landscape. Herds of wildlife and stock and their hunters and watchers would travel between water sources as they became variably available throughout the season. Human development structures are found most densely clustered at the confluences of ridge and spring fed water courses and then more spread along these watercourses. Historically the pastoralist farmsteads would have been located as close as possible to the best sources of clean, consistent water supply which would have been the springs and seeps along the tops of the watersheds. Later, with the introduction of wind pumps in the late 18th century, farmers could move further down the valleys (Regensberg, 2016). Further, as the ground adjacent to watercourses is usually more pliable and better for irrigation, these areas were more likely to be used for any activity that required digging, such as cultivation or burials.

The watercourses that have been specifically identified as significant as cultural landscape elements in the broader area are:

- The non-perennial courses on the Baakens River farm, which converge at the Baakens Rivier homestead / tourist cottages and then follow a single course northward to join with the Ongeluksrivier which crosses the study site at the northern most point of the PV facility.
- There is a non-perennial watercourse on the Gats Rivier farm portion which runs north towards and joins up with the Ongeluksrivier.

- The Ongeluksrivier which runs along the northern boundary of the Oya Solar PV Facility site, is one of the main rivers in the area, one of the few with a name.

Water course and road intersections (Graded IIIC)

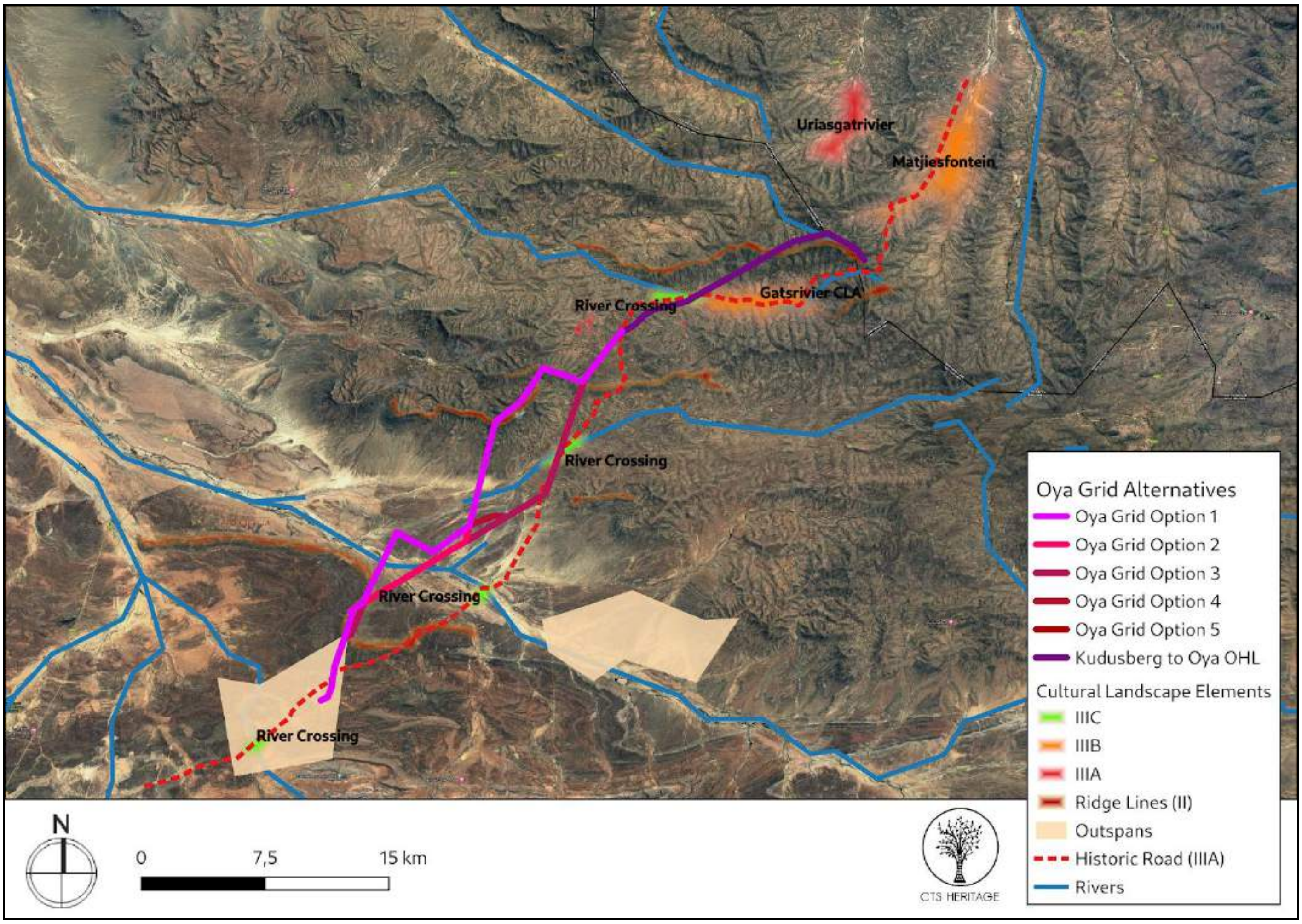
These points of intersection are significant as places that influence and determine the patterns and processes of the cultural landscape. Road intersections with the above identified watercourses are considered significant as cultural landscape elements.

Baakens Rivier Valley CLA (Graded IIIA for historic road and CLA)

The Baakens River homestead is part of the Baakens Rivier valley CLA which is characterised by long phases of occupation from at least the Late Stone Age, evident from the archaeological sites located further up river, through the pre-colonial and colonial, evident in the large stone kraals and associated stone herder's huts, up to the modern century with wire fencing and corrugated iron construction for stock management. The evolution of the Baakens Rivier CLA, where habitation follows a river course and over time moves further downstream as land use changes from hunting of wild game to herding and stock keeping, reflects the landscape patterns of the nearby Uriasgat and Matjiesfontein CLA's identified in the Kudusberg WEF Cultural Landscape Assessment report (Rabe Bailey, 2018). The solar powered water points for the management of wildlife, are the most recent element of cultural landscape in the Baakens Rivier CLA, illustrating the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their natural environment and of successive social, economic and cultural forces, both external and internal.

Gats Rivier Valley CLA (Graded IIIA for historic road and CLA)

The road that runs through the Gats Rivier Valley CLA is evident on historic maps and considered as a Grand Trunk Road on the Laingsberg Imperial map of 1900 – 1919. The farm road runs next to the Gats Rivier entering the narrow valley from the west (off the R356) running west to east and exiting the valley to the north at the Oliviersberg farmstead. The valley floor along the Gats Rivier has archaeological evidence of continual land use over the last few centuries. Historic farmsteads (Gats Rivier and Oliviersberg), stone kraals (GTR001), packed stone residential structures (GTR002) and evidence of water harvesting are all evident, as are remnant remains of cultivation. More recent elements of corrugated iron have also been introduced. According to the local farm manager there are historic stone buildings that are thought to be old school buildings (across from Springbok Cottage) which is also the site of the old Gats Rivier farmstead. No clear pre-colonial material was identified but it cannot be ruled out due to the prevalence of such sites in the vicinity such as the relatively nearby rock shelter north of Oliviersberg farmstead that contained pre-colonial material. Considering the increased traffic that would have travelled along this valley in the past, relative to other surrounding roads, there is an increased potential for significant archaeological remains that form part of the story of the relationship between people and the land in this place. Travelling south up a watercourse intersection off the historic road towards “Fontein” there are remnants of another historic farmstead with stone kraal and walling along the watercourse.



Map 4.1: Spatialisation of cultural landscape elements identified by Jansen et al. (2020) and Bailey (2010) in proximity to the proposed development

Historic “Grand Trunk Road” CLA (Graded IIIA)

The farm track that rises out of the Ceres Karoo over the ridge saddle past Muishondberg, passes the Baakens Rivier CLA and runs through the Gats Rivier valley CLA, turning north onto the Oliviersberg ridge slope at the Oliviersberg homestead, over the saddle south of Pad se Hoek, and down into the Matjiesfontein se Kloof valley to the north and beyond to Sutherland, is a noted historic road visible on the Laingsberg Imperial Map dated 1900 - 1919 as a Grand Trunk Road. Although it is an interprovincial road and as such could be given a grading of I or II in its entirety, it is only this section that is the focus of this study and other sections of the road are included in more significant scenic routes. The section of the historic Grand Trunk Road that runs past Baakens River and through Gats Rivier CLAs, is the last section that is open to public access which increases its opportunity for experience by travellers which increases its grading as a site of historical importance as a cultural landscape element. Remnants of stone packed retaining walls of the old road are evident as one travels along certain areas of the current road and are evidence of heritage resources of technical achievement. This road connects the historic farmsteads in the area to each other and would have connected these farmsteads and communities to opportunities for trade and resources with people travelling between Cape Town and Sutherland (and beyond). The route is associated with several cultural landscape areas in the area including both of the CLA’s of the Baakens River study site, as it travels along river courses through valleys, up ridge slopes and over ridge saddles, in so doing connecting these areas in use, memory and function over space and time.

In addition, the proposed power line ends at an existing substation located within a historic outspan called “Platfontein Uitspanning”. Based on an assessment conducted by Jansen et al (2020) that includes this outspan, “These outspan areas are not only important to understand in terms of its heritage, but also for possible features that might be found on site. Furthermore, it is important to understand the active use within the current cultural landscape, or potential for an active use to be enhanced. It is evident that a substation is located on this piece of outspan area, giving the portion of land a “no-mans land” feel to it, which is in line with that of an outspan that aims to serve a communal purpose.”.

Archaeology

An archaeologist conducted a survey of the site and its environs on the 22 October 2020 to determine what archaeological resources are likely to be impacted by the proposed development. A portion of the area proposed for development was not easily accessible, due to restricted road access. As a result, the entirety of the proposed development area was not able to be surveyed. Oya Grid Option 4 is the preferred development option and as such, this alignment was the primary focus of the field assessment. Sampling was implemented and approximately 25km of the area was surveyed by foot.

The findings of the survey were dominated by a diffuse scatter of low-density Middle Stone Age (MSA) artefacts spread across the broader landscape. The MSA lithics identified were predominantly made out of silcrete, chert, hornfels and quartzite. The field assessment methodology provides an adequate sample of the kinds of archaeological resources that are to be found along the flatter plains of the Karoo. Overall, the survey has provided a very good account of the range of archaeological material that is present in the area and is entirely consistent with the previous studies for the wind and solar farms that are proposed or already constructed.

Palaeontology

The proposed development spans over three Groups and five formations. All these formations could contain fossils. These could include Plant fragments, silicified wood, multiple trace fossils, coprolites, crustaceans, arthropods and vertebrate bone fragments.

Of these formations the Abrahams kraal Formation is the most sensitive as it contains the Tapinocephalus Assemblage Zone (AZ) which spans the middle part of the Abrahamskraal Formation. Vertebrate fossils of the Tapinocephalus AZ are not as common as in succeeding biozones and are usually found as individual specimens in the mudrock sequences in association with, and often enveloped by, brown-weathering calcareous nodular material. This faunal assemblage is mainly represented by small dicynodonts, large dinocephalians, pareiasaurs and pristerognathid therocephalians. The dinocephalians which consist of Synapsida and Therapsida dominated as one of the tetrapod groups in the Middle Permian. The Tapinocephalus AZ in the Main Karoo Basin holds the most abundant record of these dinocephalians. The top of the Abrahamskraal Formation marks the extinction of the dinocephalians. Their disappearance is one of the criteria that marks the beginning of the Pristerognathus AZ.

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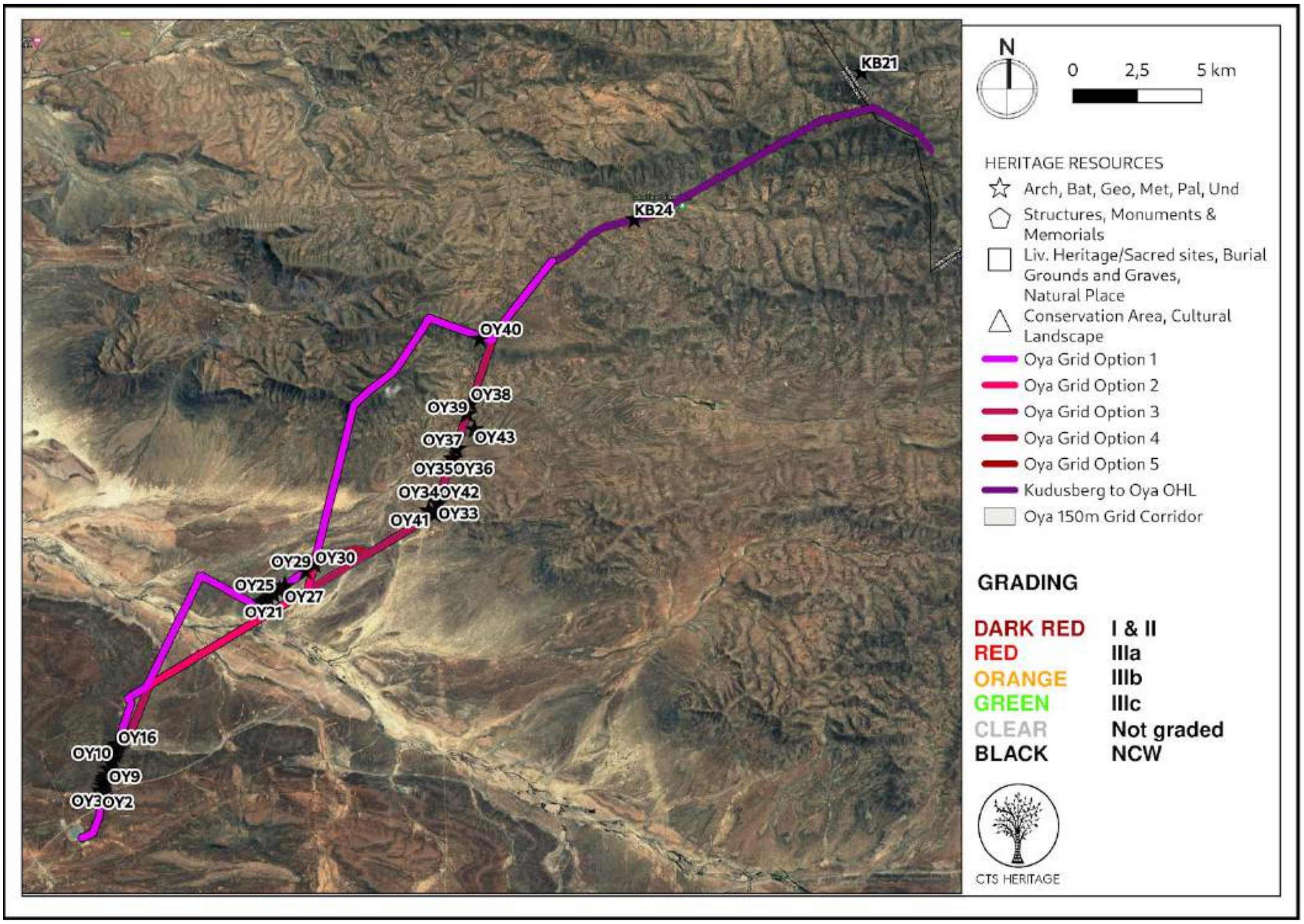


Map 4.2: Map of heritage resources identified during the archaeological and palaeontological field assessments relative to the proposed development footprint (see appendices for detailed mapping)

4.2 Heritage Resources identified

Cultural Landscape

The Kuduberg to Oya OHL and the alternatives proposed for the Oya OHL traverse a number of cultural landscape elements that have previously been identified as significant within this portion of the Ceres Karoo (Map 4.1). These elements include:

- Ridge Lines (Grade II)
- Baakensrivier Valley CLA (Grade IIIA)
- River confluences (Grade IIIA)
- Portions of the historic trunk road (Grade IIIA)
- The Gatsrivier Cultural Landscape Area (Grade IIIB)
- River crossings (Grade IIIC)
- Platfontein Uitspanning

Archaeology

The archaeological field assessment focused on Oya Grid Alternative 4 as this is the preferred alternative from the developer's perspective. The methodology used provides a good indication of the kinds of archaeological resources to be impacted by the proposed development along the other proposed alternative routes as well.

The most southerly portion of the survey area (**OYA1-OYA19**) is characterised by flat lying topography with occasional slopes. There is varied shrub cover growing over sandy red soils with scattered sandstone, greywacke boulders and occasional rocky ridges cut by ephemeral streams and sheetwash action. Bioturbation is evident throughout. The distribution of the archaeological finds can be described as a background scatter resulting from the action of surface deflation and ephemeral streams. The highest concentration of finds (**OYA11-OYA16**) was located within an area cut by numerous ephemeral streams and sheet wash activity, therefore were most likely not in their original context. For example, **OYA17** which represents 9 silcrete flakes, was located within an ephemeral stream. Archaeological findings **OYA4**-**OYA10** and **OYA19** were located on a slope cut by ephemeral streams, while **OYA1-OYA3** occurred on residual soils.

The findings **OYA20-OYA30** occurred in an area where the topography was generally flat and covered by sparse vegetation and traversed by jeep tracks. The isolated archaeological finds were likely out of context due to the impact of the well-used jeep tracks. The isolated archaeological resources **OYA31-OYA39** occurred at the base and along a steep slope comprising red soils with scree slope material of greywacke and quartzite rock fragments.

The area was cut by several large ephemeral streams and the vegetation was moderate to sparsely developed. In addition, archaeological resources with SAHRIS Site IDs 130730, 130734, 130981 and 131154 are also known to be located within the 300m buffer area.

Palaeontology

No significant fossils were identified during the field analysis. This is mostly due to the soil cover and lack of outcrop in the area. Only four fossils were identified in the field assessment and the fossils found were all silicified wood from the Abrahamskraal Formation. None of the samples were found *in situ*. In addition, palaeontological resources with SAHRIS Site IDs 130760, 130761, 130768 and 130772 are also known to be located within the 300m buffer area.

Table 3: Heritage resources known to be located within the development area

Site No.	Site Name	Description	Type	Co-ordinates		Grading	Mitigation
OY1	**Oya OHL_1**	Hornfels flake, MSA	Archaeological	-33,09289	20,01967	NCW	None required
OY2	**Oya OHL_2**	3 Chert flake, MSA	Archaeological	-33,09225	20,01967	NCW	None required
OY3	**Oya OHL_3**	2 Hornfels flakes, MSA	Archaeological	-33,09182	20,01962	NCW	None required
OY4	**Oya OHL_4**	2 Hornfels flakes and 1 chert flake, MSA	Archaeological	-33,09000	20,01976	NCW	None required
OY5	**Oya OHL_5**	3 Hornfels flakes and 2 Chert flakes, MSA	Archaeological	-33,08886	20,02025	NCW	None required
OY6	**Oya OHL_6**	5 Hornfels flakes, MSA	Archaeological	-33,08802	20,02066	NCW	None required
OY7	**Oya OHL_7**	Hornfels flake and patinated silcrete flake, MSA	Archaeological	-33,08728	20,02093	NCW	None required
OY8	**Oya OHL_8**	Possible handaxe and 2 hornfels flakes	Archaeological	-33,08627	20,02140	NCW	None required
OY9	**Oya OHL_9**	2 chert flakes, upper grindstone and 2 silicified shale flakes	Archaeological	-33,08415	20,02244	NCW	None required
OY10	**Oya OHL_10**	Weathered silicified shale	Archaeological	-33,08191	20,02330	NCW	None required
OY11	**Oya OHL_11**	Hornfels and silcrete flakes, MSA	Archaeological	-33,07911	20,02463	NCW	None required
OY12	**Oya OHL_12**	4 Silcrete flakes, MSA	Archaeological	-33,07793	20,02531	NCW	None required

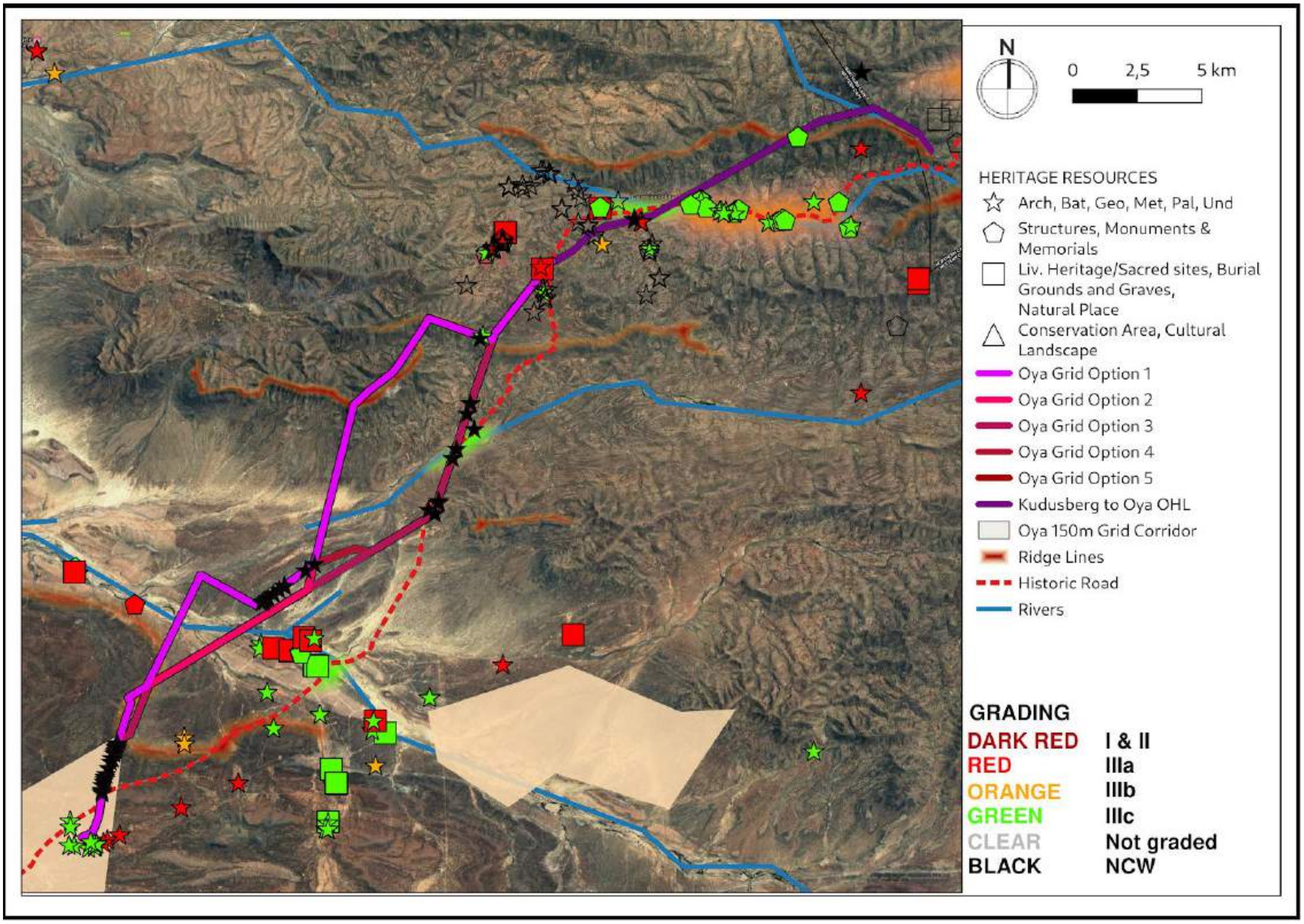
OY13	**Oya OHL_13**	1 hornfels flake and 3 Silcrete flakes, MSA	Archaeological	-33,07740	20,02562	NCW	None required
OY14	**Oya OHL_14**	6 Silcrete flakes, MSA	Archaeological	-33,07649	20,02571	NCW	None required
OY15	**Oya OHL_15**	Silcrete flake, MSA	Archaeological	-33,07592	20,02598	NCW	None required
OY16	**Oya OHL_16**	4 Silcrete flakes, MSA	Archaeological	-33,07565	20,02615	NCW	None required
OY17	**Oya OHL_17**	9 Silcrete flakes, MSA	Archaeological	-33,07686	20,02558	NCW	None required
OY18	**Oya OHL_18**	Silcrete LSA flake?	Archaeological	-33,07856	20,02481	NCW	None required
OY19	**Oya OHL_19**	Hornfels flake, MSA	Archaeological	-33,08073	20,02390	NCW	None required
OY20	**Oya OHL_20**	Chert flake	Archaeological	-33,02648	20,08604	NCW	None required
OY21	**Oya OHL_21**	Chert flake, MSA	Archaeological	-33,02610	20,08660	NCW	None required
OY22	**Oya OHL_22**	Chert flake, MSA	Archaeological	-33,02586	20,08704	NCW	None required
OY23	**Oya OHL_23**	2 chert flakes, MSA	Archaeological	-33,02533	20,08787	NCW	None required
OY24	**Oya OHL_24**	Hornfels flake, MSA	Archaeological	-33,02481	20,08868	NCW	None required
OY25	**Oya OHL_25**	Quartzite flake, MSA	Archaeological	-33,02342	20,09091	NCW	None required
OY26	**Oya OHL_26**	Chert flake, MSA	Archaeological	-33,02198	20,09331	NCW	None required
OY27	**Oya OHL_27**	Chert flake, MSA	Archaeological	-33,02074	20,09533	NCW	None required
OY28	**Oya OHL_28**	Quartzite flake, MSA	Archaeological	-33,02055	20,09564	NCW	None required
OY29	**Oya OHL_29**	Chert flake, MSA	Archaeological	-33,01526	20,10425	NCW	None required
OY30	**Oya OHL_30**	Chert flake, MSA	Archaeological	-33,01302	20,10800	NCW	None required
OY31	**Oya OHL_31**	Chert flake, MSA	Archaeological	-32,99546	20,15786	NCW	None required
OY32	**Oya OHL_32**	Pieces of fossil wood	Palaeontological	-32,99533	20,15791	NCW	None required
OY33	**Oya OHL_33**	Ceramic sherd	Archaeological	-32,99171	20,15925	NCW	None required

OY34	**Oya OHL_34**	Piece of fossil wood	Palaeontological	-32,99107	20,15950	NCW	None required
OY35	**Oya OHL_35**	Chert flake, MSA	Archaeological	-32,97612	20,16534	NCW	None required
OY36	**Oya OHL_36**	Pieces of ostrich egg shell	Modern	-32,97608	20,16535	NCW	None required
OY37	**Oya OHL_37**	Ceramic sherd	Archaeological	-32,97281	20,16700	NCW	None required
OY38	**Oya OHL_38**	Silcrete flake, MSA	Archaeological	-32,95695	20,17280	NCW	None required
OY39	**Oya OHL_39**	Chert flake, MSA	Archaeological	-32,96062	20,17138	NCW	None required
OY40	**Oya OHL_40**	Silicified Wood from the Abrahamskraal Formation, *ex situ*	Palaeontological	-32.9343	20.1767	NCW	None required
OY41	**Oya OHL_41**	Silicified Wood from the Abrahamskraal Formation, *ex situ*	Palaeontological	-32.9941	20.1553	NCW	None required
OY42	**Oya OHL_42**	Silicified Wood from the Abrahamskraal Formation, *ex situ*	Palaeontological	-32.9911	20.1595	NCW	None required
OY43	**Oya OHL_43**	Silicified Wood from the Abrahamskraal Formation, *ex situ*	Palaeontological	-32.9659	20.1743	NCW	None required
KB21	**Kudusberg WEF_21**	Chert adze, single piece no other artefacts evident	Archaeological	-32.8413	20.33519	NCW	None required
KB24	**Kudusberg WEF_24**	Chert core, Only minor flaking around edges	Archaeological	-32.89265	20.24085	NCW	None required
130730	**OYPV-09**	Three grave features including a medium-density scatter of MSA and LSA stone tools	Archaeological	-32.909831	20.202653	IIIA	100m buffer to ensure no impact
130734	**OUPV-13**	Several LSA stone tools were found scattered over an area of 107,23m 2 near the river on the farm Gats Rivier 156. The flakes were made from chert and shale.	Archaeological	-32.898217	20.224189	NCW	None required
130768	**BKRN031**	Waterford Formation. Good riverbed and bank exposures of tabular, greyish wackes with undulose or wave-rippled tops. Thin, fissile, medium-grained, laminated, greyish sandy interbeds, locally ferruginised, towards base of package of medium- to thick-bedded wackes (horizontally to current ripple cross-laminated) containing dense hash of transported plant debris – mainly	Palaeontological	-32.909361	20.201889	IIIA	50m buffer

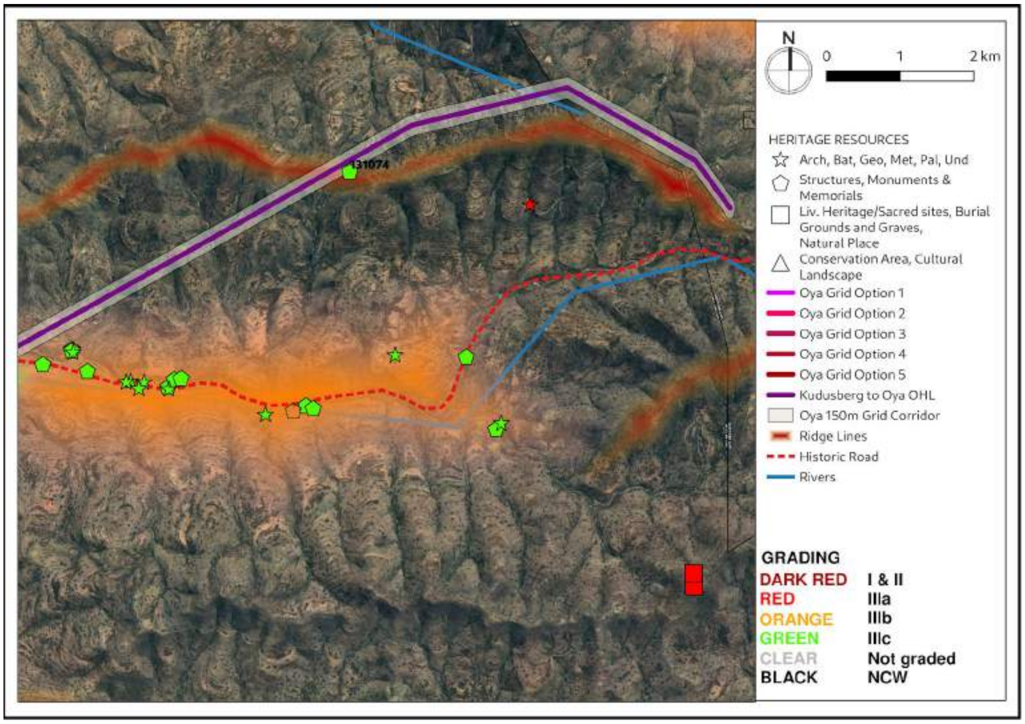
		stems, including probable sphenophytes - preserved as moulds where weathered and carbonaceous compressions in fresher material. Some possible axes up to 10 cm across.					
130772	**BKRN034**	Waterford Formation. Hillslope exposure of grey-green mudrocks with large ferruginous carbonate diagenetic concretions and package of tabular, thin-bedded wackes. Small float block of silicified wood.	Palaeontological	-32.933389	20.177833	IIIC	50m buffer to ensure no impact
130981	**KDB012**	Circular cobble-built structure, piled stone, likely hut or shelter	Structure	-32.864056	20.308778	IIIC	50m buffer to ensure no impact
131154	**KDB134**	Chert core	Archaeological	-32.892650,	20.240850	NCW	None required
130760	**BKNR023**	Lower Abrahamskraal Fm Riverine (probably Combrinkskraal Member equivalent). Exposure of well-jointed top and interior of thick, medium-grained channel sandstone with dispersed moulds of plant debris including indeterminate plant axes up to several cm wide, tongue-shaped glossopterid leaves, some retaining an original spatulate 3D morphology (uncompressed), clear midrib but fine venation on lamina is very faint or absent. Associated thin mudflake intraclast breccias	Palaeontological	-32.893528	20.243944	IIIB	50m buffer to ensure no impact
130761	**BKNR024**	Lower Abrahamskraal Fm Riverine (probably Combrinkskraal Member equivalent). Excellent steep streambank sections through thick, tabular-bedded channel sandstone complex with well-developed coarse, poorly-sorted, monomict / oligomict mudrock intraclast breccias up to 2m or so thick at several horizons, locally with sharply erosive bases cutting down into tabular-bedded sandstones (No reworked calcrete or fossils seen in situ within breccias)	Palaeontological	-32.893694	20.243444	IIIA	50m buffer to ensure no impact
NA	**NA**	Gatsrivier CLA	Cultural Landscape	-32.8919	20.2905	IIIB	No go area
NA	**NA**	Historic road river crossings	Cultural Landscape	NA	NA	IIIC	100m buffer

NA	**NA**	River Confluences	Cultural Landscape	NA	NA	IIIB	100m buffer
NA	**NA**	Baakensriver CLA	Cultural Landscape	-32.9015	20.1859	IIIA	No go area
NA	**NA**	Ridge lines	Cultural Landscape	NA	NA	II	
NA	**NA**	Historic trunk road	Cultural Landscape	NA	NA	IIIA	50m buffer
NA	**NA**	Outspan	Cultural Landscape	NA	NA	NA	None required

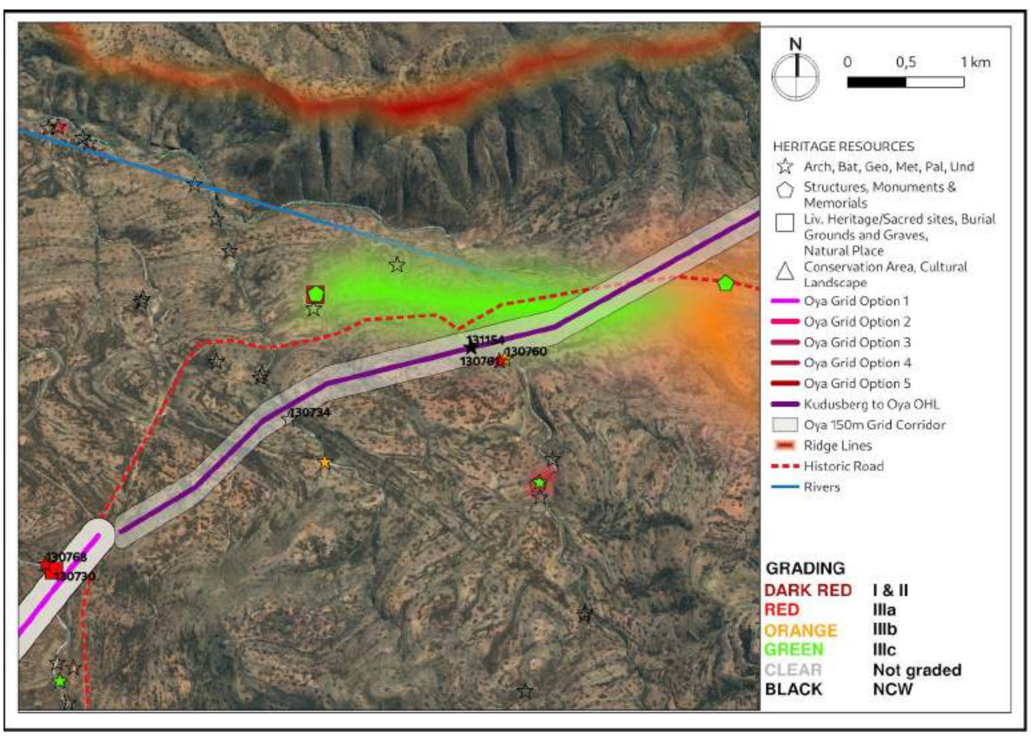
4.3 Mapping and spatialisation of heritage resources



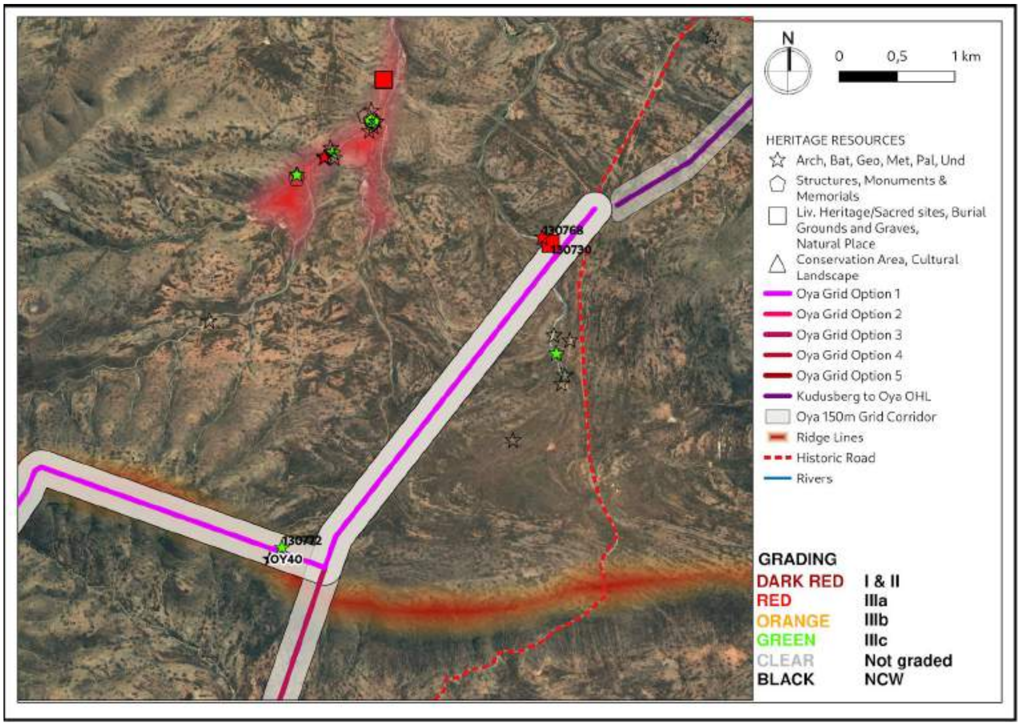
Map 5: All known heritage resources located within the proposed development



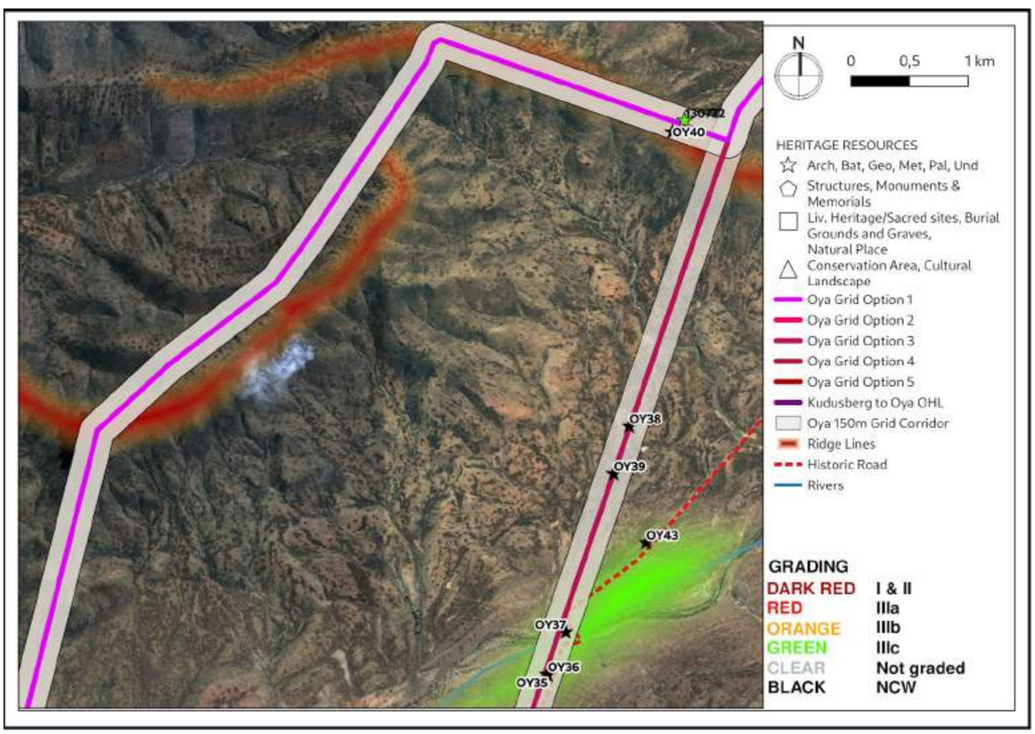
Map 5.1: All known heritage resources located within the proposed development



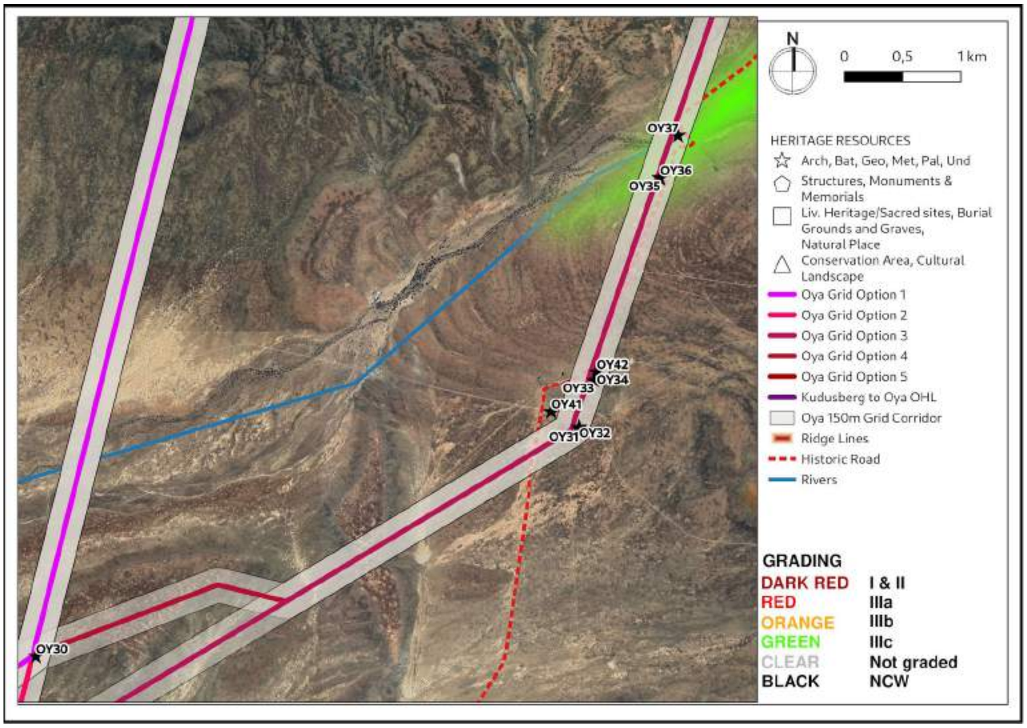
Map 5.2: All known heritage resources located within the proposed development



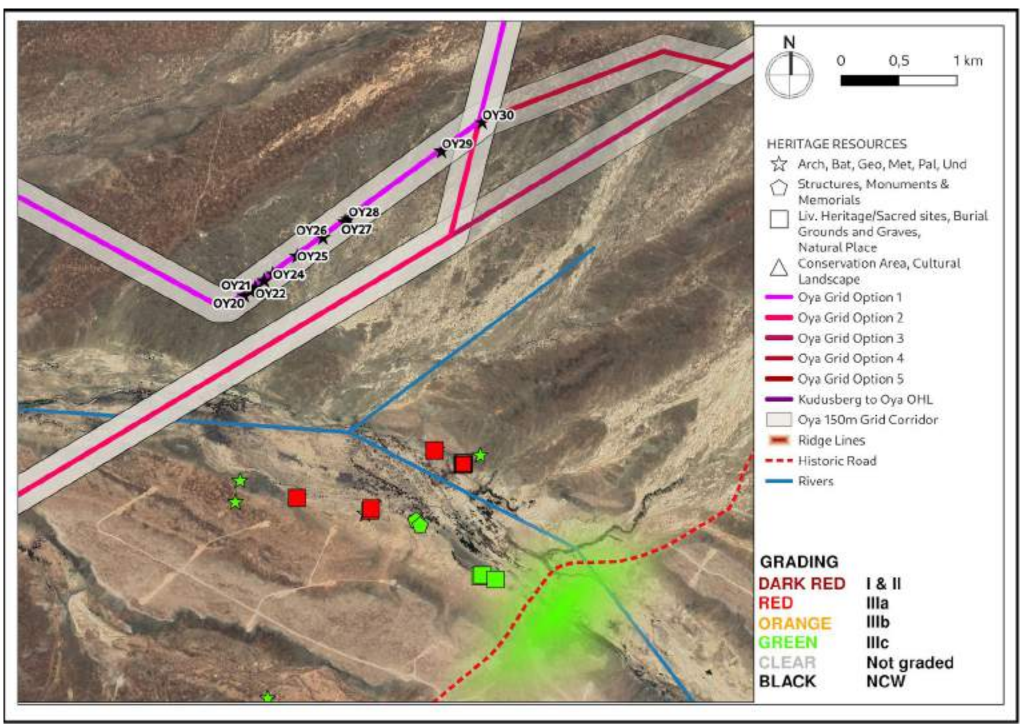
Map 5.3: All known heritage resources located within the proposed development



Map 5.4: All known heritage resources located within the proposed development



Map 5.5: All known heritage resources located within the proposed development



Map 5.6: All known heritage resources located within the proposed development

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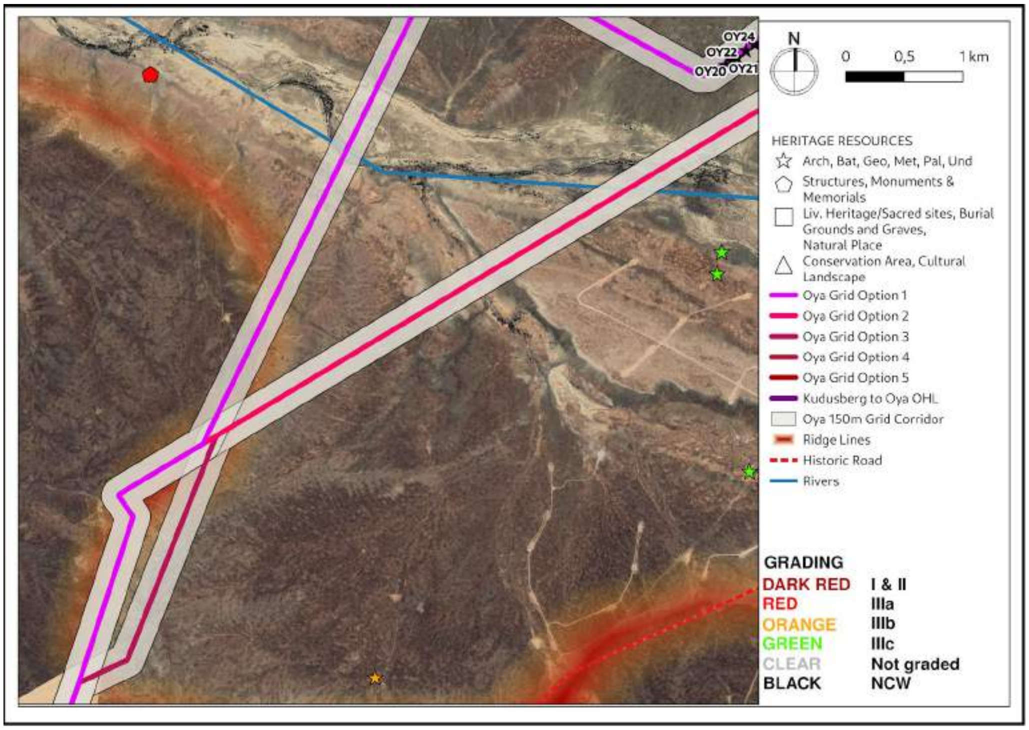
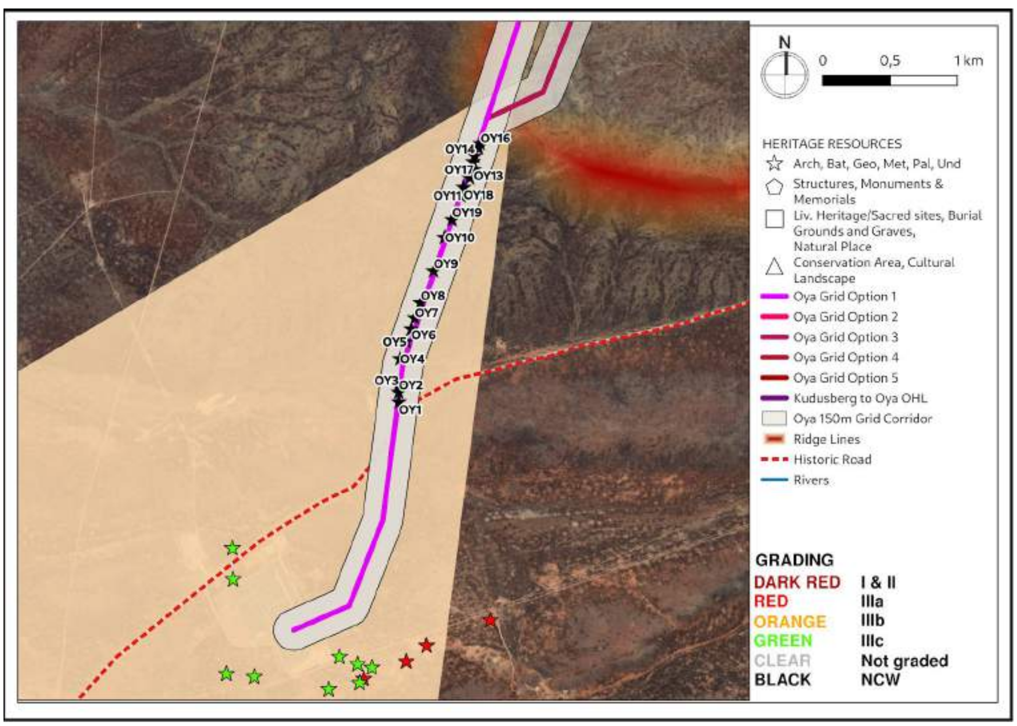


Map 5.7: All known heritage resources located within the proposed development



Map 5.8: All known heritage resources located within the proposed development

5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

5.1 Assessment of impact to Heritage Resources (See Table 5)

Planning Phase

No impacts to heritage resources are anticipated during this phase.

Construction Phase

Impacts to archaeological, palaeontological and other heritage resources are anticipated during this phase. Most of the archaeological and palaeontological resources identified within the preferred alternative alignment are considered to be not conservation-worthy. The remaining sites of cultural significance located within the proposed alignment of the preferred alternative can be avoided through the implementation of buffer areas and no-go areas.

Table 4: List of heritage resources located within the proposed development corridor with mitigation measures

Site No.	Site Name	Description	Type	Co-ordinates		Grading	Mitigation
130730	**OYPV-09**	Three grave features including a medium-density scatter of MSA and LSA stone tools	Archaeological	-32.909831	20.202653	IIIA	100m buffer to ensure no impact
130768	**BKRN031**	Waterford Formation. Good riverbed and bank exposures of tabular, greyish wackes with undulose or wave-rippled tops. Thin, fissile, medium-grained, laminated, greyish sandy interbeds, locally ferruginised, towards base of package of medium- to thick-bedded wackes (horizontally to current ripple cross-laminated) containing dense hash of transported plant debris – mainly stems, including probable sphenophytes - preserved as moulds where weathered and carbonaceous compressions in fresher material. Some possible axes up to 10 cm across.	Palaeontological	-32.909361	20.201889	IIIA	50m buffer
130772	**BKRN034**	Waterford Formation. Hillslope exposure of grey-green mudrocks with large ferruginous carbonate diagenetic concretions and package of tabular, thin-bedded wackes. Small float block of silicified wood.	Palaeontological	-32.933389	20.177833	IIIC	50m buffer to ensure no impact
130981	**KDB012**	Circular cobble-built structure, piled stone, likely hut or shelter	Structure	-32.864056	20.308778	IIIC	50m buffer to ensure no impact
130760	**BKNR023**	Lower Abrahamskraal Fm Riverine (probably Combrinkskraal Member	Palaeontological	-32.893528	20.243944	IIIB	50m buffer to ensure

		equivalent). Exposure of well-jointed top and interior of thick, medium-grained channel sandstone with dispersed moulds of plant debris including indeterminate plant axes up to several cm wide, tongue-shaped glossopterid leaves, some retaining an original spatulate 3D morphology (uncompressed), clear midrib but fine venation on lamina is very faint or absent. Associated thin mudflake intraclast breccias					no impact
130761	**BKNR024**	Lower Abrahamskraal Fm Riverine (probably Combrinkskraal Member equivalent). Excellent steep streambank sections through thick, tabular-bedded channel sandstone complex with well-developed coarse, poorly-sorted, monomict / oligomict mudrock intraclast breccias up to 2m or so thick at several horizons, locally with sharply erosive bases cutting down into tabular-bedded sandstones (No reworked calcrete or fossils seen in situ within breccias)	Palaeontological	-32.893694	20.243444	IIIA	50m buffer to ensure no impact
NA	**NA**	Gatsrivier CLA	Cultural Landscape	-32.8919	20.2905	IIIB	No go area
NA	**NA**	Historic road river crossings	Cultural Landscape	NA	NA	IIIC	100m buffer
NA	**NA**	River Confluences	Cultural Landscape	NA	NA	IIIB	100m buffer
NA	**NA**	Baakensriver CLA	Cultural Landscape	-32.9015	20.1859	IIIA	No go area
NA	**NA**	Ridge lines	Cultural Landscape	NA	NA	II	No go area
NA	**NA**	Historic trunk road	Cultural Landscape	NA	NA	IIIA	50m buffer

Operational Phase

No impacts to archaeological or palaeontological resources are anticipated during this phase. However, long term visual impacts to the sense of place and cultural landscape will occur due to the additional large infrastructure erected on the landscape. The nature of the majority of these impacts is cumulative and as such, these impacts are addressed further below in section 5.4. The Visual Impacts of the proposed OHL anticipated during the

Operational Phase have also been addressed in the attached VIA completed for the project (Appendix 3) and are summarised below:

According to the VIsual Statement (Appendix 3), "The study area has a largely natural, untransformed visual character with some elements of rural/pastoral infrastructure and as such, the proposed power line and substation development would alter the visual character and contrast significantly with the typical land use and/or pattern and form of human elements present across the broader study area. The level of contrast will however be reduced by the presence of the Perdekraal East WEF, associated power line infrastructure, Kappa substation and existing high voltage power lines located in the south-western sector of the study area.

The VIA determined that much of the study area represents a typical Karoo cultural landscape. This is important in the context of potential visual impacts associated with the development of a power line and associated infrastructure as introducing this type of development could be considered to be a degrading factor in the context of the natural Karoo character of the study area. In this instance visual impacts on the cultural landscape would be reduced by the fact that the area is relatively remote and there are no significant tourism enterprises attracting visitors into the study area. In addition, **the nearest major scenic routes (N1 and R355) are some considerable distance away and are not expected to experience any visual impacts from the proposed developmen**t."

The Visual Statement also notes that "A broad-scale assessment of landscape sensitivity, based on the physical characteristics of the study area, economic activities and land use that predominates, determined that the area would have a low visual sensitivity. However, an important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that would potentially be impacted by a proposed development.

No formal protected areas were identified in the study area and relatively few sensitive or potentially sensitive receptors were found to be present within the study area (less than 0.3 receptors per square kilometre). Preliminary desktop assessment of the study area identified twenty-three (23) potentially sensitive visual receptor locations within the study area, most of which appear to be existing farmsteads. These farmsteads are regarded as potentially sensitive visual receptors as they are located within a mostly rural setting and the proposed development will likely alter natural vistas experienced from these locations, although the residents' sentiments toward the proposed development are unknown.

Five (5) of these potentially sensitive receptor locations were however found to be outside the viewshed of the proposed development and thus are not expected to experience any visual impacts as a result of the proposed development. Two (2) receptors are considered to be sensitive receptors as they are linked to leisure/nature-based tourism activities in the area, although both of these properties are associated with adjacent Wind Energy Facility projects and as such the land owners have a vested interest in the proposed development and associated grid connection infrastructure. It was also noted that thirteen of the fifteen potentially sensitive receptors are located on farms which either form part of the power line development project or are located within the development sites for other renewable energy projects and as such the owners / occupants are not expected to perceive the proposed power line and substations in a negative light.

In assessing the potential visual sensitivity of roads in the study area, it was found that the main thoroughfares (namely the R356 Main Road and the DR1475 District Road) do not form part of any recognised tourism routes and are primarily used as local access roads. Other roads in the area are mainly gravel farm access roads. As such, roads in the area are not considered to be visually sensitive. The identification of areas of visual sensitivity affecting the power line assessment corridors and substation sites involved a visibility analysis which showed that elements of the grid connection infrastructure as proposed would be visible from all identified potentially sensitive receptors. As such, no areas along the route alignment alternatives were found to be significantly more sensitive than any other areas. Accordingly, areas visible to more than 33% of the receptors were rated as areas of potentially 'high visual sensitivity'. However, as the study area as a whole is rated as having a low visual sensitivity, the sensitivity rating would be reduced to "Medium-High". Hence these areas are not considered to be "no go areas", but rather should be viewed as zones where development would be least preferred. This factor was taken into account in the comparative assessment of route alternatives.

The overall impact rating conducted for the proposed power line revealed that the proposed development is expected to have a negative low visual impact rating during the operation phase with a number of mitigation measures available to prevent any additional visual impacts. It was also noted in the VIA that the study area for the proposed power line is located within the Renewable Energy Development Zone 2 (REDZ 2) known as Komsberg, and also within a Strategic Transmission Corridor and thus the relevant authorities support the concentration of renewable energy developments and associated power line infrastructure in this area."

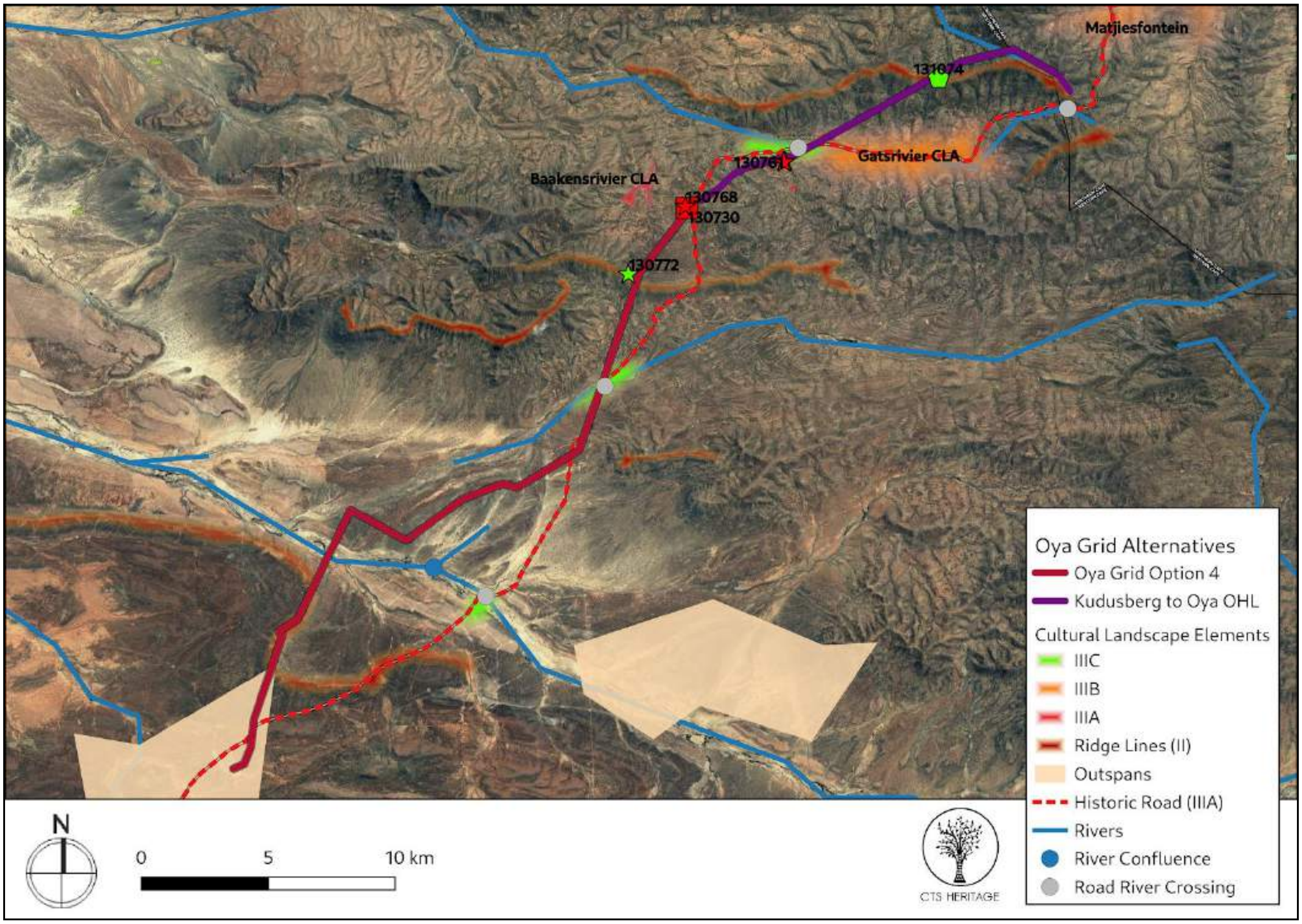
Decommissioning Phase

No impacts to heritage resources are anticipated during this phase.

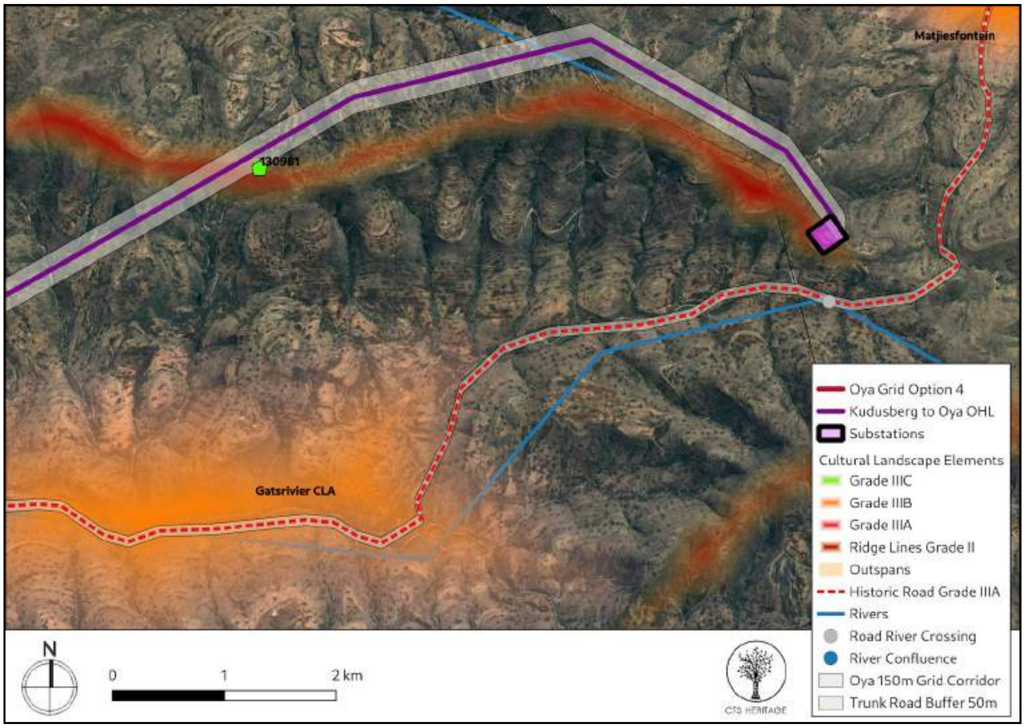
Table 5: Impacts Table																				
OYA OHL																				
ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Construction Phase																				
Impacts to archaeological heritage resources	Construction activities that take place near to archaeological resources may result in their destruction	1	2	4	3	4	3	42	(-)	Negative Medium	50m buffer area imposed around known archaeological resources 100m buffer area imposed around burial grounds and graves Should any previously unknown archaeological resources be impacted during construction, work must cese in the vicinity of the find and the relevant heritage authority must be contacted	1	1	4	1	4	1	11	(-)	Negative Low
Impacts to palaeontological resources	Construction activities that take place near to palaeontological resources may result in their destruction	1	2	4	3	4	3	42	(-)	Negative Medium	50m buffer area imposed around known palaeontological resources Implementation of the HWC Chance Fossil Finds Procedure	1	1	4	1	4	1	11	(-)	Negative Low
Impacts to the cultural ladscape	Construction activities that take place near to cultural landscape elements may result in their destruction	3	3	4	3	4	3	51	(-)	Negative High	100m buffer area imposed around river confluences 100m buffer around instances where the historic truck road crosses a river 50m buffer around the historic trunk road No-go areas for the Baakesnrivier CLA and the Gatsrivier CLA Sensitivity regarding significant ridge lines Adoption of the cultural landscape sensitivity guidelines in section 5.4	3	2	4	2	4	2	30	(-)	Negative Medium
Operational Phase																				
Impacts to archaeological heritage resources	Operational activities that take place near to archaeological resources may result in their destruction	1	2	4	3	4	3	42	(-)	Negative Medium	50m buffer area imposed around known archaeological resources 100m buffer area imposed around burial grounds and graves Should any previously unknown archaeological resources be impacted during construction, work must cese in the vicinity of the find and the relevant heritage authority must be contacted	1	1	4	1	4	1	11	(-)	Negative Low
Impacts to palaeontological resources	Operational activities that take place near to palaeontological resources may result in their destruction	1	2	4	3	4	3	42	(-)	Negative Medium	50m buffer area imposed around known palaeontological resources Implementation of the HWC Chance Fossil Finds Procedure	1	1	4	1	4	1	11	(-)	Negative Low

Impacts to the cultural landscape	Operational activities that take place near to cultural landscape elements may result in their destruction	3	3	4	3	4	3	51	(-)	Negative High	100m buffer area imposed around river confluences 100m buffer around instances where the historic truck road crosses a river 50m buffer around the historic trunk road No-go areas for the Baakesnrivier CLA and the Gatsrivier CLA Sensitivity regarding significant ridge lines Adoption of the cultural landscape sensitivity guidelines in section 5.4	3	2	4	2	4	2	30	(-)	Negative Medium
Decommissioning Phase																			
Impacts to archaeological heritage resources	Decommissioning activities that take place near to archaeological resources may result in their destruction	1	2	4	3	4	3	42	(-)	Negative Medium	50m buffer area imposed around known archaeological resources 100m buffer area imposed around burial grounds and graves Should any previously unknown archaeological resources be impacted during construction, work must cese in the vicinity of the find and the relevant heritage authority must be contacted	1	1	4	1	4	1	11	(-)	Negative Low
Impacts to palaeontological resources	Decommissioning activities that take place near to palaeontological resources may result in their destruction	1	2	4	3	4	3	42	(-)	Negative Medium	50m buffer area imposed around known palaeontological resources Implementation of the HWC Chance Fossil Finds Procedure	1	1	4	1	4	1	11	(-)	Negative Low
Impacts to the cultural landscape	Decommissioning activities that take place near to cultural landscape elements may result in their destruction	3	3	4	3	4	3	51	(-)	Negative High	100m buffer area imposed around river confluences 100m buffer around instances where the historic truck road crosses a river 50m buffer around the historic trunk road No-go areas for the Baakesnrivier CLA and the Gatsrivier CLA Sensitivity regarding significant ridge lines Adoption of the cultural landscape sensitivity guidelines in section 5.4	3	2	4	2	4	2	30	(-)	Negative Medium
Cumulative																			
Impacts to archaeological heritage resources	Cumulative destruction of significant archaeological heritage	1	2	4	3	4	3	42	(-)	Negative Medium	50m buffer area imposed around known archaeological resources 100m buffer area imposed around burial grounds and graves Should any previously unknown archaeological resources be impacted during construction, work must cese in the vicinity of the find and the relevant heritage authority must be contacted	1	1	4	1	4	1	11	(-)	Negative Low
Impacts to palaeontological resources	Cumulative destruction of significant palaeontological heritage	1	2	4	3	4	3	42	(-)	Negative Medium	50m buffer area imposed around known palaeontological resources Implementation of the HWC Chance Fossil Finds Procedure	1	1	4	1	4	1	11	(-)	Negative Low

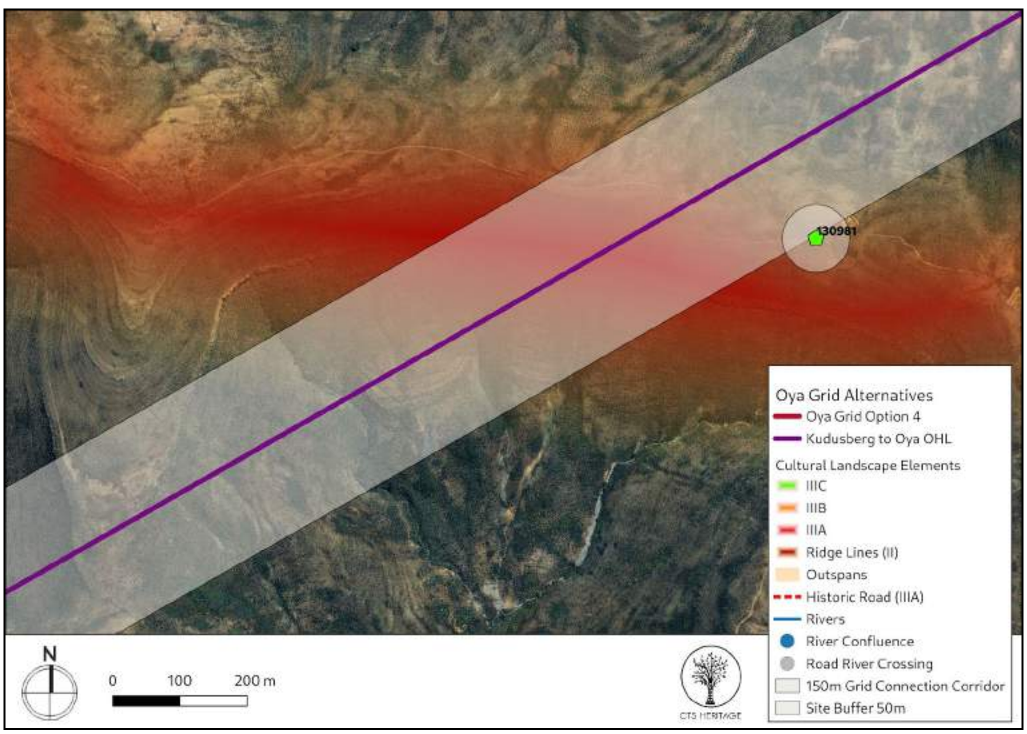
Impacts to the cultural landscape	Cumulative impact to the cultural landscape	3	3	4	3	4	3	51	(-)	Negative High	100m buffer area imposed around river confluences 100m buffer around instances where the historic truck road crosses a river 50m buffer around the historic trunk road No-go areas for the Baakesnrivier CLA and the Gatsrivier CLA Sensitivity regarding significant ridge lines Adoption of the cultural landscape sensitivity guidelines in section 5.4	3	2	4	2	4	2	30	(-)	Negative Medium



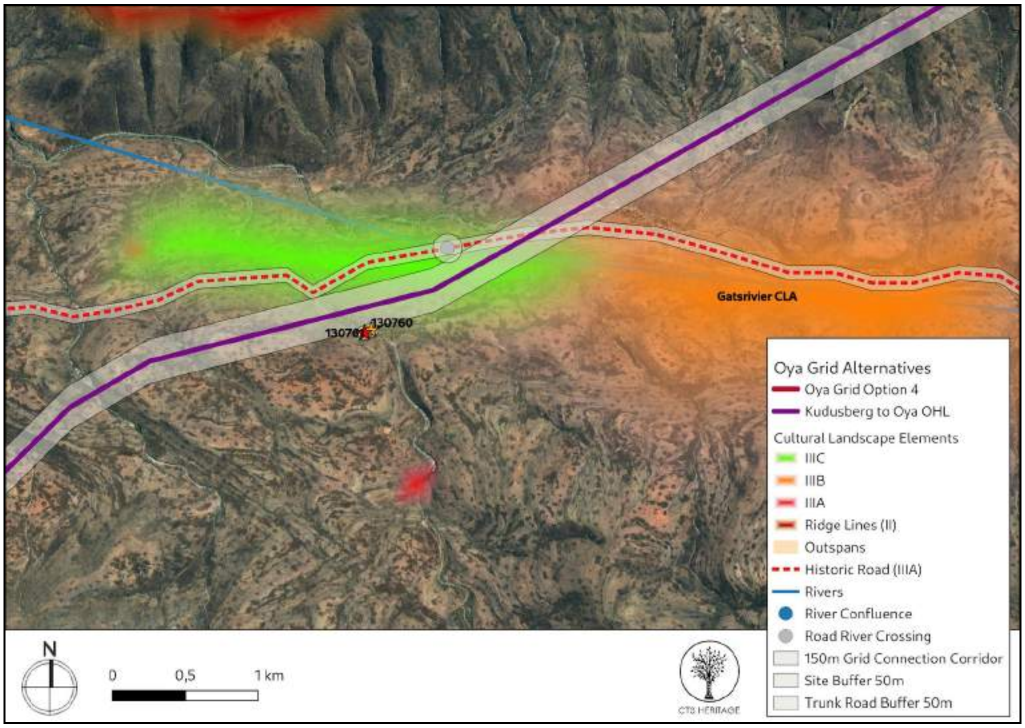
Map 6.1: Heritage resources located within the proposed development area with proposed mitigation measures



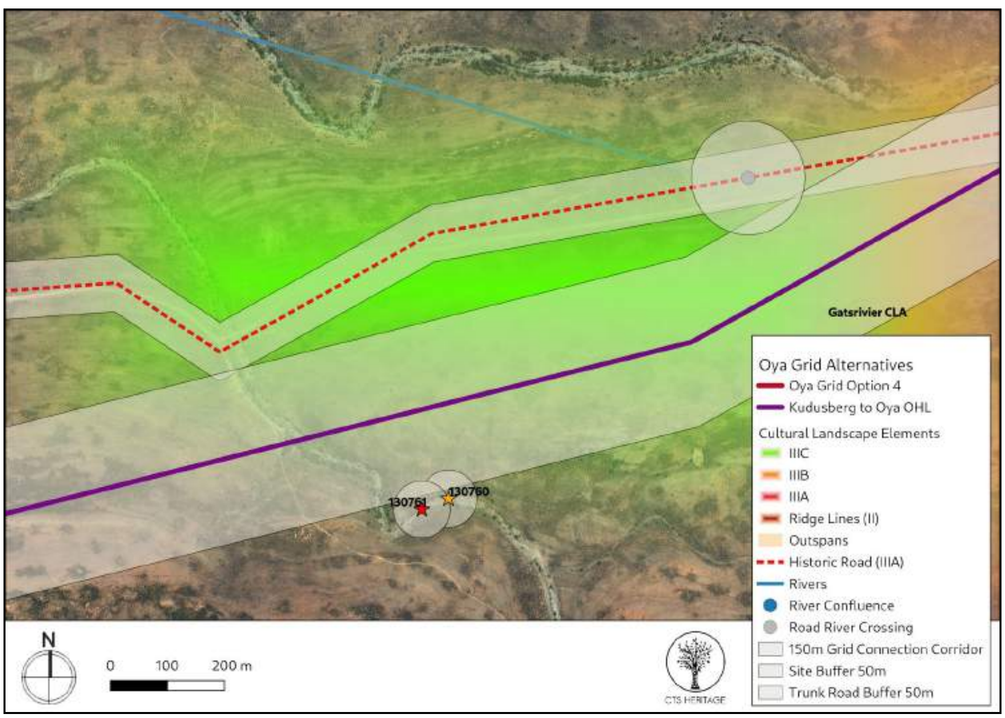
Map 6.2: Heritage resources located within the proposed development with proposed mitigation measures



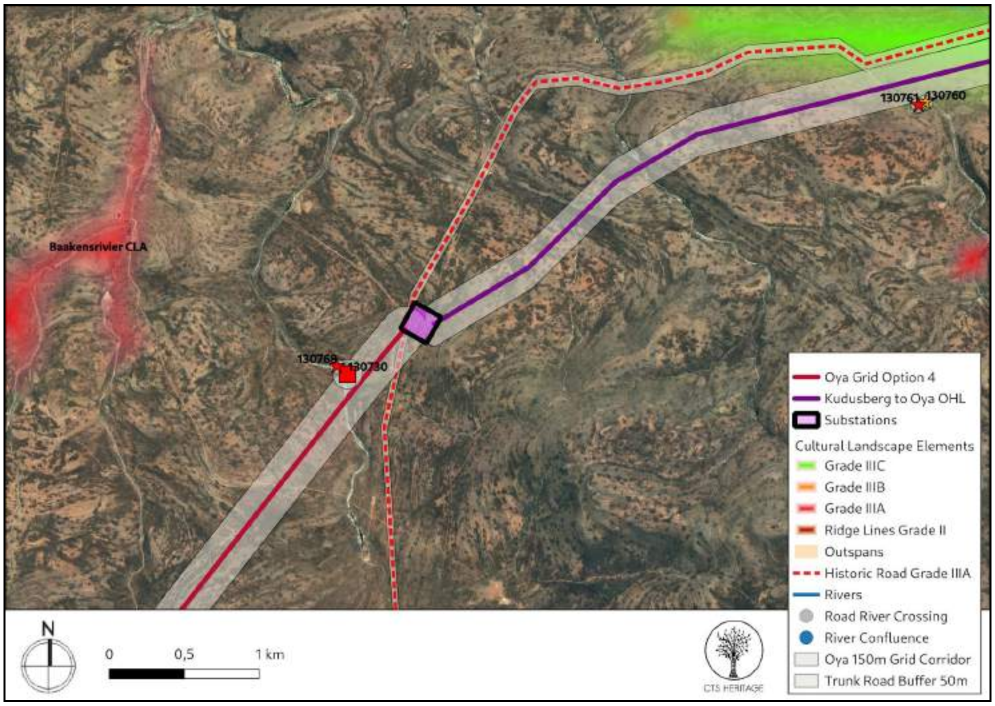
Map 6.3: Heritage resources located within the proposed development with proposed mitigation measures - Site 130981 50m buffer



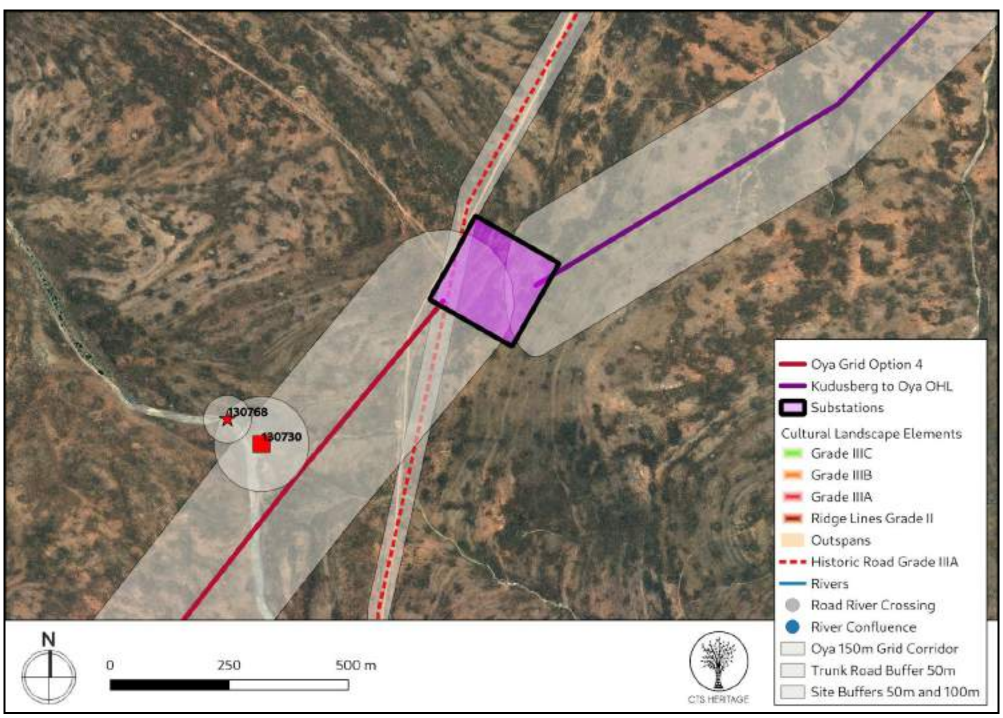
Map 6.4: Heritage resources located within the proposed development with proposed mitigation measures



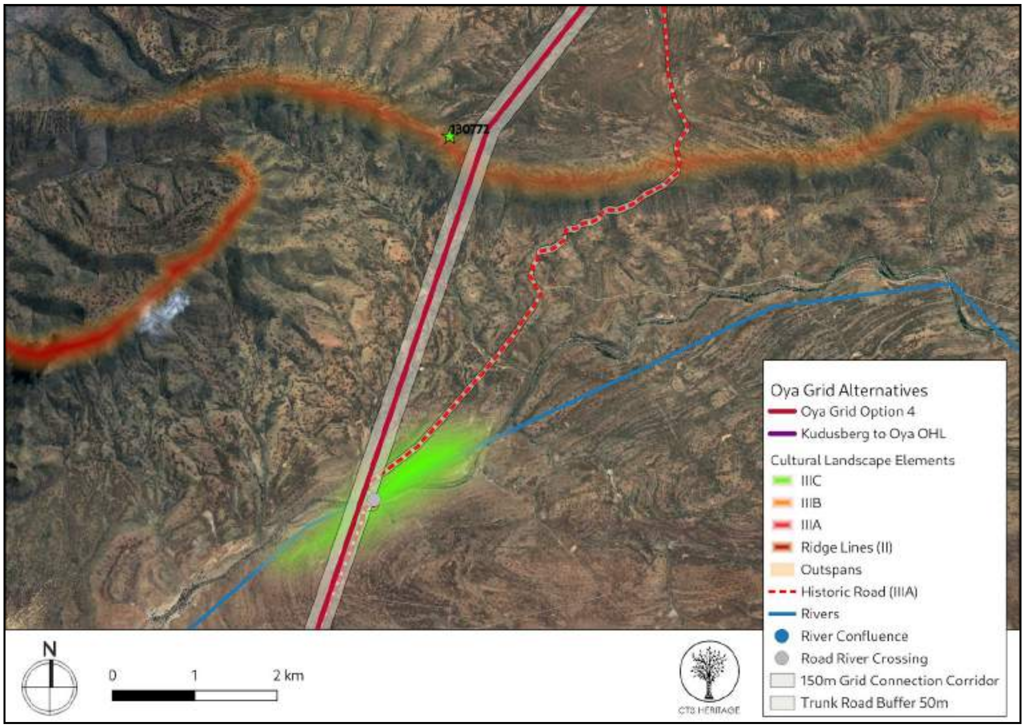
Map 6.5: Heritage resources located within the proposed development with proposed mitigation measures - Sites 130760 and 130761, and road river crossing: 50m buffer



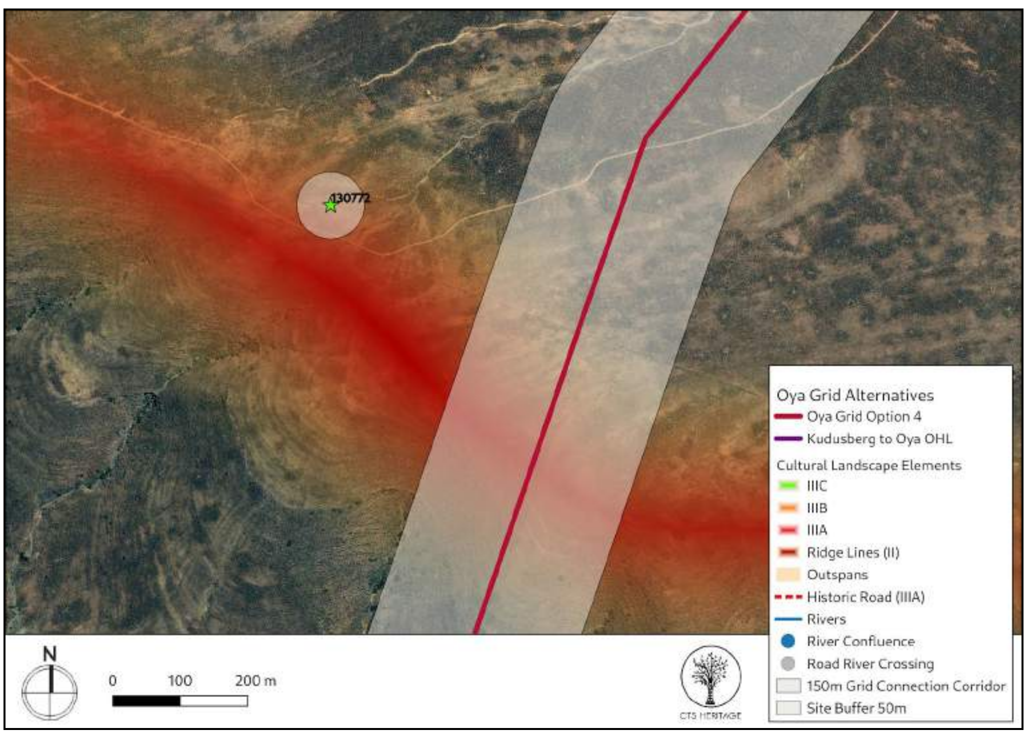
Map 6.6: Heritage resources located within the proposed development with proposed mitigation measures



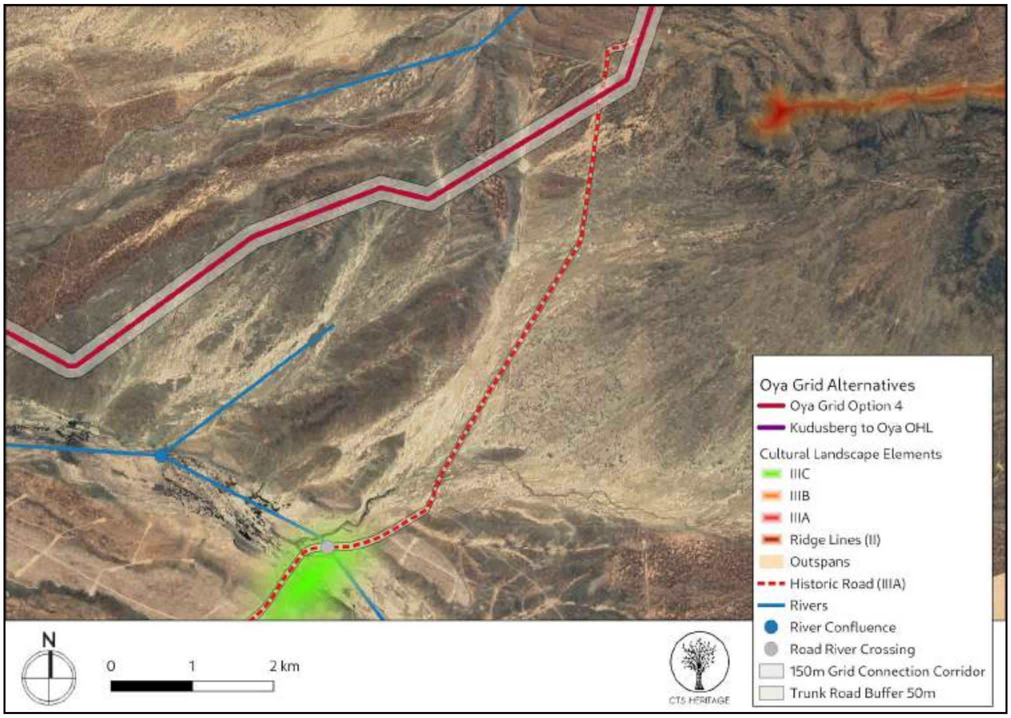
Map 6.7: Heritage resources located within the proposed development with proposed mitigation measures - Site 130768 50m buffer and Site 130730 100m buffer



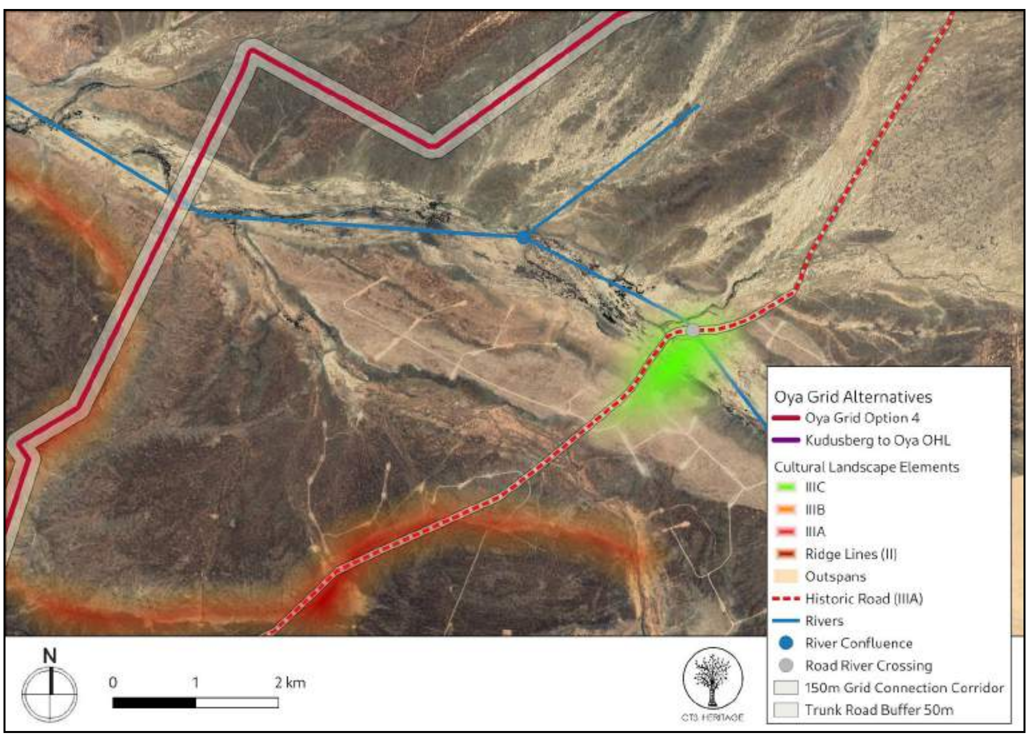
Map 6.8: Heritage resources located within the proposed development with proposed mitigation measures



Map 6.9: Heritage resources located within the proposed development with proposed mitigation measures - Site 130772 50m buffer



Map 6.10: Heritage resources located within the proposed development with proposed mitigation measures



Map 6.11: Heritage resources located within the proposed development with proposed mitigation measures

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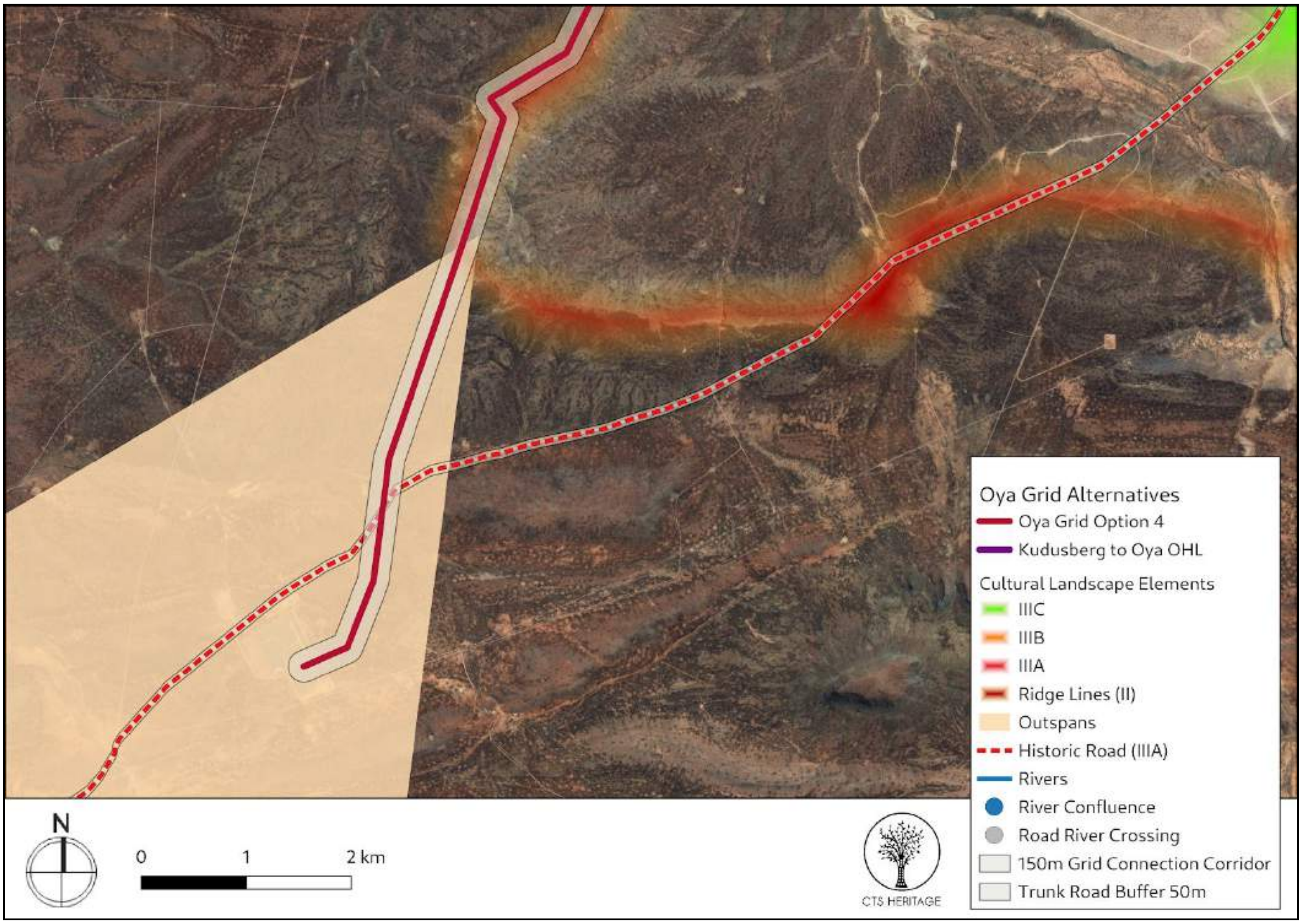


Map 6.12: Heritage resources located within the proposed development with proposed mitigation measures

5.2 Sustainable Social and Economic Benefit

A Socio-economic Impact Assessment was completed for the proposed Oya OHL by Dr N. News (2020). According to this report; "The objective of the proposed development is to feed electricity generated by the proposed 750 MW Oya Energy Facility into the National Grid and, as such, it is an integral component required to ensure the success of the Oya Energy Facility. An additional advantage of the power line is that it provides a potential opportunity to connect nearby developments to the grid, thus eliminating any need for additional infrastructure in the area. Once commissioned, the power line will be absorbed; operated and maintained by Eskom; thus resulting in the power line becoming an Eskom asset and eliminating any risk attached to privately owned transmission grid infrastructure. In this regard, Eskom indicates a commitment " ...to developing the electricity supply industry by facilitating the integration of independent power producers (IPPs) into the national grid and buying electricity from IPPs for national distribution" .

The entire extent of the proposed overhead power line is located within the Central Strategic Transmission Corridors while also remaining within the boundaries of Renewable Energy Development Zone, Komsberg – REDZ 2 as delineated in GN No. 113.

In accordance with international and governmental requirements, the project will shift the country away from a high reliance on fossil fuels towards a far greener and cleaner energy generation mix. The proposed development also supports the objectives of the RMIPPPP, which serves as an "emergency" power generation programme for accelerated assistance to the national grid amid electricity supply constraints. The DMRE issued a RFP for the emergency procurement of 2000 MW of electricity. Due to the emergency nature of the RMIPPPP, the objective is to procure energy from projects that are near ready and can connect to the grid quickly. The proposed development is deemed to meet these requirements and can reduce the risk of load shedding. Grid capacity is also available and no deep grid works are required, which are beneficial for the connection timelines of the RMIPPPP

The Minister of Mineral Resources and Energy also recently welcomed the concurrence by the NERSA to the second Section 34 Ministerial Determination, which enables the Department to undertake procurement of additional electricity capacity in line with the IRP (2019). 6 800 MW of capacity is determined to be generated from renewable energy sources (PV and Wind), 513 MW from storage and 3 000 MW from gas. The proposed development will be able to contribute to this diverse electricity requirement and will thus actively contribute to the commitments made to increase generation capacity, and ensure the security of energy supply to society rapidly and significantly."

The negative heritage impacts associated with this development largely pertain to impacts to the cultural landscape. Although over the operational phase, the project will be visible and is likely to alter the sense of place of the area, this should be limited to the extent that it is placed within a REDZ. As such, the anticipated socio-economic benefits of the proposed development outweigh the anticipated negative impacts to heritage resources.

5.3 Proposed development alternatives

It should be noted that only one (1) route is possible for the section of the proposed power line which connects the Kudusberg on-site substation (authorised under 14/12/16/3/3/1/1976/AM1) to the Oya on-site substation (i.e. Kudusberg to Oya). No alternatives can therefore be provided for this section of the power line. The Kudusberg to Oya power line corridor route is approximately 16.6km in length and runs from the Kudusberg on-site substation along the RE/194, 1/158, RE/159, RE/156, 1/156 and RE/155 properties to the Oya on-site substation.

Five (5) power line corridor route alternatives have however been provided for the section of the proposed overhead power line which connects the Oya on-site substation to the Kappa substation (i.e. Oya to Kappa). The above-mentioned alternatives are described below:

- **Power Line Corridor Alternative 1 (Oya to Kappa):** Approximately 34.14km in length and runs along the RE/155, RE/152, 2/152, RE/169, RE/243, 241, 240 and RE/244 properties to the Kappa substation
- **Power Line Corridor Alternative 2 (Oya to Kappa)**: Approximately 32.43km in length and runs along the RE/155, 3/155, RE/152, 2/152, RE/169, 13/168, 5/168, 1/243, RE/243, 241 and 240 properties to the Kappa substation
- **Power Line Corridor Alternative 3 (Oya to Kappa):** Approximately 30.56km in length and runs along the RE/155, 4/168, 13/168, 5/168, 1/243, 240 and RE/244 properties to the Kappa substation
- **Power Line Corridor Alternative 4 (Oya to Kappa):** Approximately 32.94km in length and runs along the RE/155, 4/168, 13/168, RE/169, RE/243, 241 and 240 properties to the Kappa substation
- **Power Line Corridor Alternative 5 (Oya to Kappa):** Approximately 32.26km in length and runs along the RE/155, RE/152, 2/152, RE/169, 5/168, 1/243 and 240 properties to the Kappa substation

The power line corridor routes mentioned above provide different route alignments contained within an assessment corridor of up to approximately 300m wide. This is to allow for flexibility to route the power line within the authorised corridor.

'***No-go' alternative***

The 'no-go' alternative is the option of not fulfilling the proposed project as well as prevent the connection of the energy development in the area to feed electricity into the national grid. This alternative would result in no environmental impacts from the proposed project on the site or surrounding local area. It provides the baseline against which other alternatives are compared and will be considered throughout the report. Implementing the 'no-go' option would entail no development. The affected properties are currently not used for agricultural activities, although they are suitable for very low-level grazing.

The 'no-go' option is a feasible option, however, this would prevent the proposed development from contributing to the environmental, social and economic benefits associated with the development of the renewables sector.

Preferred Alternatives

Power Line Corridor Alternative 4 (Oya to Kappa) is the preferred alternative from the developers perspective. This is the alternative that was subject to the archaeological and palaeontological field assessment.

According to the Visual Impact Assessment completed for this project (Appendix 3), Alternative 3 is the most preferable from a Visual Impacts perspective. The VIA notes the following regarding Alternative 3:

- Alternative 3 largely avoids the ridge lines near the proposed Oya substation and as such, most of this route alternative is located on relatively flat terrain. As such, the power lines would only be moderately exposed on the skyline.
- The closest sensitive receptor to this alternative is 1.8kms away, this being SR2. The visual impacts from Alternative 3 affecting this receptor are therefore rated as moderate. As SR2 is located on the Oya Energy Facility application site, it is assumed that the owner has a vested interest in the proposed development and thus the associated power lines would not be perceived in a negative light.
- Eleven (11) potentially sensitive receptors are located within 5kms of Alternative 3, although the proposed power lines are only expected to be visible from nine (9) of these locations. The closest potentially sensitive receptor to this alternative is approximately 700m away, this being VR16. The visual impacts from Alternative 3 affecting this receptor are therefore rated as moderate. As VR16 is located on a property which is affected by all ofthe proposed power line route alignments, it is assumed that the land owner has

consented to the proposed development on their property and does not perceive the proposed power line in a negative light. The remaining receptors are all more than 780m away and, would only be subjected to moderate or low levels of impact.

- Much of this alternative follows the alignment of the existing 765kW power lines and traverses an area which has already undergone significant transformation as a result of the power lines, Kappa Substation and the Perdekraal East WEF. This would lessen the impacts of the new power line in this area.
- In light of the above, there are no fatal flaws associated with Alternative 3. As this route is shorter than the others, and follows the alignment of the existing 765kV power lines over a significant distance and affects fewer potentially sensitive receptors, this alternative is considered preferred from a visual perspective.

The VIA notes the following regarding Alternative 4:

- Alternative 4 largely avoids the ridge lines near the proposed Oya substation and as such, most of this route alternative is located on relatively flat terrain. As such, the power lines would only be moderately exposed on the skyline.
- The closest sensitive receptor to this alternative is 1.8kms away, this being SR2. The visual impacts from Alternative 4 affecting this receptor are therefore rated as moderate. As SR2 is located on the Oya Energy Facility application site, it is assumed that the owner has a vested interest in the proposed development and thus the associated power lines would not be perceived in a negative light.
- Eleven (11) potentially sensitive receptors are located within 5kms of Alternative 4, although the proposed power lines are only expected to be visible from nine (9) of these locations. The closest potentially sensitive receptor to this alternative is approximately 672m away, this being VR16. The visual impacts from Alternative 3 affecting this receptor are therefore rated as moderate. As VR16 is located on a property which is affected by all of the proposed power line route alignments, it is assumed that the land owner has consented to the proposed development on their property and does not perceive the proposed power line in a negative light.The remaining receptors are all more than 780m away and, would only be subjected to moderate or low levels of impact.
- Much of this alternative follows the alignment of the existing 765kW power lines and traverses an area which has already undergone significant transformation as a result of the power lines, Kappa Substation and the Perdekraal East WEF. This would lessen the impacts of the new power line in this area.
- In light of the above, there are no fatal flaws associated with Alternative 4 and this alternative is considered favourable from a visual perspective.

No archaeological or palaeontological resources of significance were identified within this alignment. The impacts to the cultural landscape are similar for all alternatives, however Alternative 4 crosses fewer significant ridge lines than the other alternatives and is therefore preferred from this perspective. The other impacts anticipated to heritage resources can be mitigated through refining the precise layout within the 300m corridor that has been identified for Alternative 4 in order to avoid such impact. This would include the implementation of the proposed buffer and no-go areas in the final layout.

5.4 Cumulative Impacts

At this stage, there is the potential for the cumulative impact of the proposed OHL and substation infrastructure in conjunction with the proposed renewable energy facilities and their associated grid infrastructure (power lines and substations) in the immediate area to negatively impact the cultural landscape due to a change in the landscape character from natural wilderness to semi-industrial. Based on the available information, a number of renewable energy facilities and their associated grid infrastructure (power lines and substations) have been approved in the immediate vicinity of the proposed OHL and substation development and it is noted that it is preferable to have renewable energy facility development and its associated infrastructure focused in an area such as a REDZ or Strategic Transmission Corridor.

Table 6: Renewable energy developments identified within a 35km radius of the proposed development

Applicant	Project	Technology	Capacity	Status
Oya Energy (Pty) Ltd	Oya Energy Facility	Hybrid Facility	305MW	EIA Process underway
Brandvalley Wind Farm (Pty) Ltd	Brandvalley WEF	Wind	140MW	Approved
Biotherm Energy (Pty) Ltd	Esizayo WEF	Wind	140MW	Approved
African Clean Energy Developments Renewables	Hidden Valley (Karusa & Soetwater) WEF	Wind	140MW	Under Construction
Karreebosch Wind Farm (Pty) Ltd	Kareebosch WEF	Wind	140W	Approved
Rondekop Wind Farm (Pty) Ltd	Rondekop WEF	Wind	325MW	Approved
Kudusberg Wind Farm (Pty) Ltd	Kudusberg WEF	Wind	325W	Approved

South Africa Mainstream Renewable Power Perdekraal West (Pty) Ltd	Perdekraal West WEF & Associated Grid Connection Infrastructure	Wind	150MW	Approved
South Africa Mainstream Renewable Power Perdekraal East (Pty) Ltd	Perdekraal East WEF & Associated Grid Connection Infrastructure	Wind	110MW	Operational
Rietkloof Wind Farm (Pty) Ltd	Rietkloof WEF	Wind	186MW	Approved
Roggeveld Wind Power (Pty) Ltd	Roggeveld WEF	Wind	140MW	Under Construction
ENERTRAG SA (Pty) Ltd	Tooverberg WEF & Associated Grid Connection Infrastructure	Wind	140MW	Approved

The cumulative impact of these proposed renewable energy facilities and their associated infrastructure such as the proposed OHL and substation development has the potential to negatively impact on the Cultural Landscape, as well as the distribution and integrity of archaeological and palaeontological resources. A Landscape Character Assessment conducted for two renewable energy facilities in the area includes five core value lines that underscore heritage significance in the context of the Western Cape (ecologic, aesthetic, historic, social and economic value). Each of these value lines, and the element of landscape character that they support, lead to development criteria or design indicators for the protection and management of its heritage significance which can be applied to the OHL and substation development. The design criteria detailed below are not project specific and are proposed as general measures to mitigate against negative cumulative impacts to the significant Karoo Cultural Landscape. These design criteria are summarised below:

Ecological Criteria:

- Most of the area is prized for the fact that its natural character is retained, and that the landscape therefore still performs a range of biodiversity and ecological functions. Species and ecosystem loss should be prevented by limiting fragmentation in the landscape, and should therefore adhere to the following:
  - Remaining areas of endemic and endangered natural vegetation should be conserved.

  - Critical Biodiversity Areas, and Ecological Support Areas (along drainage lines), should be protected from development of the wind turbines.
  - Areas of critical biodiversity should be protected from any damage during construction; where indigenous and endemic vegetation should be preserved at all cost.
  - Areas of habitat are found among the rocky outcrops and contribute to the character, as well as biodiversity of the area. Care should be taken that habitats are not needlessly destroyed.
- No pylons should be allowed to be placed within the 1:100-year flood line of the Groot, and Adamskraal river. In the context of the Karoo with its destructive 1:100 year flood events that can irreversibly alter the character, as well as ecological workings of the ESA, would be a risk.
- Careful planning should incorporate areas for stormwater runoff where the base of the structure disturbed the natural soil. Local rocks found on the site could be used to slow stormwater (instead of concrete, or standard edge treatments), and prevent erosion that would be an unfortunate consequence that would alter the character of the site. By using rocks from site it helps to sensitively keep to the character.
- Renosterveld, and in this case, the Matjiesfontein Shale Renosterveld is found in the mid-elevations, and should be kept free from development. Renosterveld is classified as a threatened ecosystem, only found within the boundaries of South Africa. Care should be taken that we do not needlessly destroy our rare resources that determine the character of the karoo landscape, and often on the mid-slopes.
- The principle of 'tread lightly' must be applied for any activity (and associated development requirements e.g. toilets for the construction process) should be emphasised.

Aesthetic Criteria:

- Encourage mitigation measures (for instance use of vegetation) to 'embed' or disguise the proposed structures within the surrounding tourism and agricultural landscape at ground level, road edges etc;
- The continuation of the traditional use of material could be enhanced with the use of the rocks on the site as building material. This would also help to embed structures into the landscape that does not have to be standard containers that clutter the landscape.
- Using material found on the site adds to the sense of place and reduces transportation costs of bringing materials to site.
- Where additional infrastructure (i.e. roads) is needed, the upgrade of existing roads to accommodate the development should be the first consideration. The local material such as the rocks found within the area could be applied to address stormwater runoff from the road to prevent erosion.

- Infrastructure improvement, including new roads and upgrades to the road network, should be appropriate to the rural context (scale, material etc.).
- The layout of the pylons should have an emphasis on place-making, i.e. landscape-related heritage considerations, as opposed to standard infrastructure driven requirements;
- Prevent the construction of new buildings/structures on visually sensitive, steep, elevated or exposed slopes, ridgelines and hillcrests. Retain the integrity of the distinctive Karoo landscape character;
- Scale and massing should be sensitive to the surrounding Karoo landscape.
- Avoid visual clutter in the landscape by intrusive signage, and the intrusion of commercial, corporate development along roads (as seen at the existing Wind Energy compound)).
- The mountains in the study area are landforms vital to its overall landscape character. They enclose the valleys and settlements of heritage significance. Prevent development on visually sensitive mountain slopes and ridgelines in order to preserve the continuity of the mountains as a backdrop.
- Avoid development of infrastructure (such as buildings, wind turbines and power lines), on crests or ridgelines due to the impact on the visual sensitivity of skylines.
- Retain view-lines and vistas focused on prominent natural features such as mountain peaks or hills (such as Tooverberg), as these are important place-making and orientating elements for experiencing the cultural landscape.

Historic Criteria:

- The integrity of the historic farm werfs should be maintained and protected. Therefore, care should be exercised in the placement of the pylons at least 900m from all werfs and historic farmsteads.
- Names of routes and watercourses that refer to traditional use during the time of the hunter-gatherers and herders, as well as the colonial era in the Cape, should be celebrated. Public access to these sites should be encouraged, and care should be taken to protect these names.
- Traditional planting patterns should be protected by ensuring that existing trees are not needlessly destroyed, as these signify traces of cultural intervention in a harsh environment. These planting patterns include the trees planted around the werfs.
- In some cases, remnant planting patterns (even single trees) uphold the historic character of an area. Interpretation of these landscape features as historic remnants should occur.
- Mountain slopes have been used for traditional practices for many years, and care should be taken that any significant cultural sites, such as burials and veldkos/medicinal plant resources, are not disturbed.

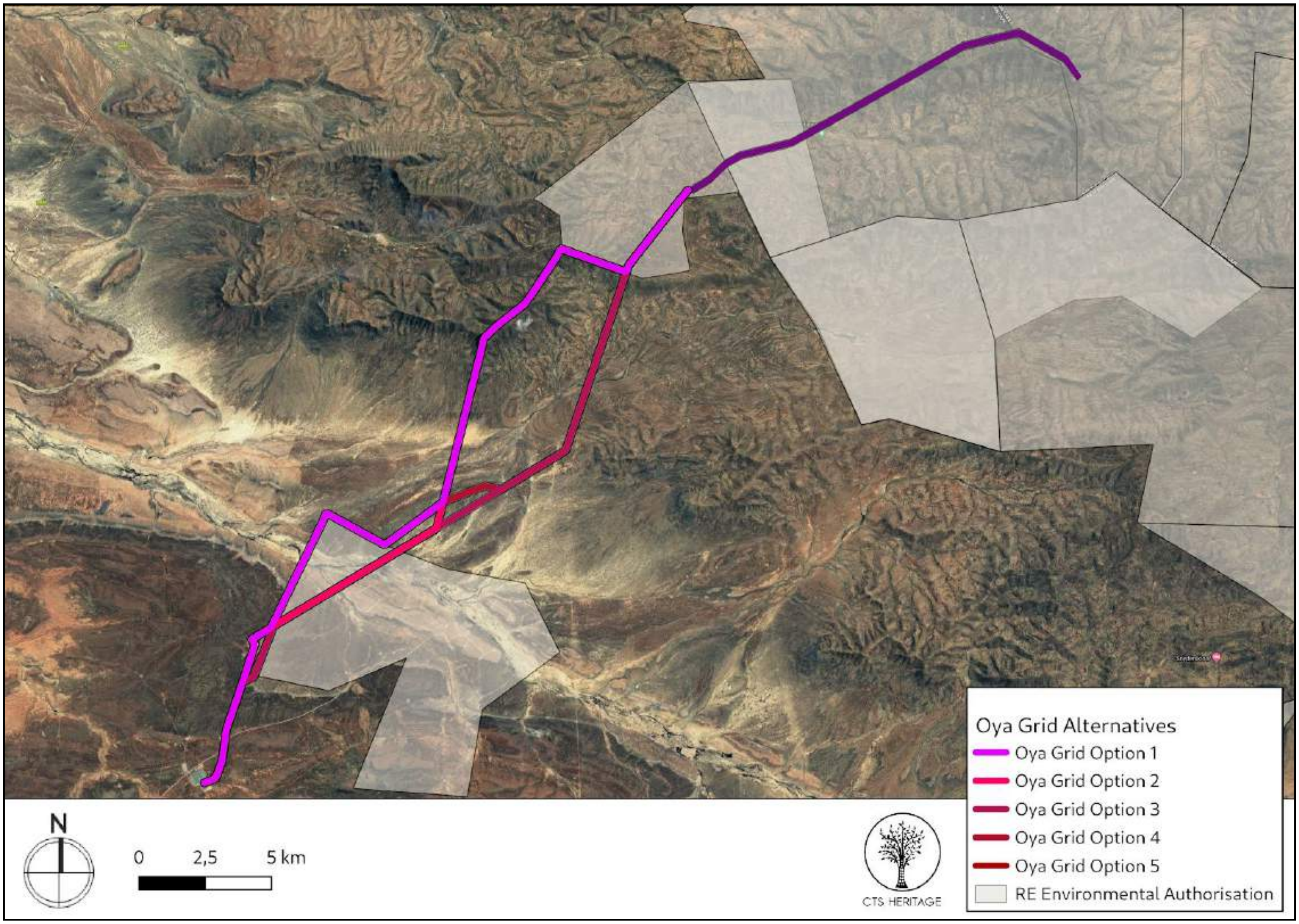
- Farms in the area followed a system of stone markers to demarcate the farm boundaries in the area. Where these structures are found on the site, care should be taken that they are not needlessly destroyed, as they add to the layering of the area.
- Where the historic function of a building/site is still intact, the function has heritage value and should be protected.
- Surviving examples (wagon routes, outspans, and commonage), where they are owned in some public or communal way (or by a body responsible for acting in the public interest) and where they are found to be actively operating in a communal way, will have cultural and heritage value and should be enhanced and retained. The historic outspan on the edge of the Groot River is a historic function that is potentially in use/could be in use by the karretjiemense of the karoo, and therefore should be protected as the main access to the site traverse this historic outspan.
- The new roads (especially those that align with historic wagon routes) should display minimum scale designs where possible.
- Maintain traditional movement patterns across rural landscapes or to places of socio-historical value. (a) Avoid privatization or the creation of barriers to traditional access routes. (b) Retain old roadways, which have been replaced by newer roads, for use as recreation trails.
- The site is located adjacent to an old outspan area. Commonages and outspans were located at water points, and these places were likely gathering points before the arrival of colonists and continued to provide communal resources. In the mid-20th century, many old commonages came under the ownership of the Municipality, and have since been rented out to private individuals or organisations.
- The Municipality should facilitate the use of common land in a way that promotes the well-being and quality of life of the public. These sites can play a restorative role within the community, for instance for those who have limited alternative opportunities for recreation.
- Respect existing patterns, typologies and traditions of settlement-making by promoting the continuity of heritage features. These include: (a) indigenous; (b) colonial; and (c) current living heritage in the form of tangible and intangible associations to place.
- Alterations and additions to conservation-worthy structures should be sympathetic to their architectural character and period detailing.
- Respect traditional werf settlement patterns by considering the entire werf as the component of significance. This includes the backdrop of the natural landscape against which it is sited, as well as its spatial structure. Any development that impacts the inherent character of the werf component should be discouraged.

Social Criteria:

- Care should be taken that existing functions such as schools, churches, outspan areas (see criteria for these under historic) are not lost in the development stages, as it fulfils an important function within the cultural landscape.
- The local community around the development should benefit from job opportunities created by the proposed development.

Economic Criteria:

- Sheep or game farming should be allowed to continue below the pylons, or be rehabilitated to increase biodiversity in the area.
- Care should be taken to reduce visual impact from surrounding tourism areas, by following the recommended areas for placement of structures within the site.



Map 7: REF projects within the vicinity of the proposed development area

6. RESULTS OF PUBLIC CONSULTATION

The public consultation process will be undertaken by the EAP during the Basic Assessment, which will include the Witzenberg Municipality. There are no registered conservation bodies for the areas impacted according to HWC's database of Registered Conservation Bodies (accessed on 5 October 2020).

7. LEGISLATIVE AND PERMIT REQUIREMENTS

This proposed development triggers sections 38(1) and 38(8) of the National Heritage Resources Act (Act 25 of 1999) as this proposed development constitutes a linear development exceeding 300m and this proposed development requires an evaluation of impacts to heritage resources in terms of other legislation (NEMA). This section states that the consenting authority (DEADP in the Western Cape and DENC in the Northern Cape) must ensure that the assessment completed for impacts to heritage satisfies the requirements of the relevant heritage authority in terms of section 38(3) of the NHRA (HWC in the Western Cape and SAHRA in the Northern Cape), and that the recommendations of the relevant heritage authority must be taken into consideration prior to the granting of consent.

Section 38(3) of the NHRA details the information that MUST be included in a Heritage Impact Assessment drafted in terms of section 38 of the NHRA. Furthermore, HWC has published guidelines on their minimum requirements for Heritage Impact Assessments and SAHRA has published Minimum Standards for Archaeological and Palaeontological Impact Assessments. All such guidelines and minimum standards have been complied with in the drafting of this HIA.

In terms of section 38(10) of the NHRA, if the applicant complies with the recommendations and requirements of the relevant heritage authority issued in terms of section 38(8) of the NHRA, then the applicant MUST be exempted from compliance with all other (general) protections included in the NHRA. As such, as long as the requirements of the heritage authority are satisfied, no permit application is required for the destruction of or impact to any heritage resource that has been identified in the HIA.

Should any heritage resources be newly uncovered during excavation activities i.e. heritage resources that were not identified in the HIA, then as per the recommendations of the HIA, work must cease in that area and the relevant heritage authority must be contacted regarding a way forward. This HIA recommends that the HWC Chance Fossils Finds procedure be implemented in order to direct such actions.

8. ENVIRONMENTAL MANAGEMENT PROGRAMME INPUTS (See Table 7)

The following recommendations must be included in the EMPr for this project:

- The final alignment of Power Line Corridor Alternative 4 (Oya to Kappa) must accommodate the recommended buffer areas and no-go areas identified in Table 4.
- During the construction phase all excavations must be monitored for fossil remains by the responsible Environmental Control Officer (ECO) using the HWC Chance Fossil Finds Procedure. Should substantial fossil remains such as vertebrate bones and teeth, petrified wood, plant-rich fossil lenses or dense fossil burrow assemblages be exposed during construction, the responsible ECO should safeguard these, preferably in situ, and alert the South African Heritage Resources Authority (SAHRA) in the Northern Cape and HWC in the Western Cape so that appropriate action can be taken by a professional palaeontologist,
- Should any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources be found during the proposed development, SAHRA APM Unit (Natasha Higgitt/Phillip Hine 021 462 5402) in the Northern Cape and HWC in the Western Cape must be alerted.
- If unmarked human burials are uncovered in the Northern Cape, the SAHRA Burial Grounds and Graves (BGG) Unit (Mimi Seetelo 012 320 8490), and in the Western Cape, HWC must be alerted immediately as per section 36(6) of the NHRA. A professional archaeologist must be contracted as soon as possible to inspect the findings. A Phase 2 rescue excavation operation may be required subject to permits issued by SAHRA and/or HWC

9. FINAL SPECIALIST STATEMENT AND AUTHORISATION RECOMMENDATION

9.1 Statement and Reasoned Opinion

Some significant heritage resources are located within the 300m (150m x2) corridor for the proposed Power Line Corridor Alternative 4 (Oya to Kappa) alignment. The lithic material identified is of low significance, and even though the resources may be destroyed during the construction, the impact is inconsequential for the majority of the heritage resources identified during the archaeological and palaeontological assessments conducted for this project. These are detailed in Table 4 and various mitigation measures are proposed in order to ensure that no impact to these resources takes place. These resources include archaeological sites 130734, 130981 and 131154 around which a buffer of 50m is proposed. Site 130730 is a burial ground site and is very sensitive in terms of impacts. As such, a 100m buffer area around this site is recommended. Alternative 4 is thus not fatally flawed and can still be utilized.

No significant fossils were identified during the field analysis. This is mostly due to the soil cover and lack of outcrop in the area. Only four fossils were identified in the field assessment and the fossils found were all silicified wood from the Abrahamskraal Formation. None of the samples were found *in situ*. However, significant palaeontological resources have been previously identified within the 300m corridor for Power Line Corridor Alternative 4 (Oya to Kappa) (SAHRIS Site IDs 130760, 130761, 130768 and 130772). 50m buffers are proposed around these sites to ensure that no impact takes place. Alternative 4 is thus not fatally flawed and can still be utilized.

The primary heritage impact anticipated for this proposed development is impact to the cultural landscape. Previous Cultural Landscape Assessments conducted in the immediate vicinity of the proposed OHL alignment and substation sites have identified cultural landscape features of significance including the Cultural Landscape Areas of the Baakensrivier and the Gatsrivier, river confluences, ridge lines, outspans, the historic trunk road and where this road crosses rivers (road river crossings). Various mitigation measures are proposed to mitigate the negative impacts to the cultural landscape including buffer zones, no-go areas and general development guidelines included in section 5.4. Importantly, this proposed OHL and substation development is located within a REDZ area with many proposed and already authorised renewable energy facilities in its immediate proximity. In addition, the proposed development also falls entirely within one of the Strategic Transmission Corridors, where development of overhead power line and substation infrastructure is prioritised. In general, it is preferred for this kind of infrastructure to be concentrated on the landscape instead of sprawled out.

Alternative 4 is preferred by the developer, and in light of the above information, also in terms of impacts to heritage resources. The proposed development is unlikely to have a negative impact on significant heritage resources situated within the corridor for the proposed Oya OHL and substations. The proposed layout is acceptable from a heritage perspective and should be approved as part of the EA on condition that the proposed mitigation measures including buffer areas and no-go areas are implemented.

9.2 EA Condition Recommendations

There is no objection to the proposed development on heritage grounds and the following is recommended:

a. Power Line Corridor Alternative Alignment 4 (Oya to Kappa) is preferred in terms of impacts to heritage and there is no objection on heritage grounds to the proposed substations
b. No mitigation is required prior to construction operations commencing.
c. The recommended buffer areas and no-go areas identified in Table 4 above must inform the final alignment and must be implemented during the construction phase.
d. During the construction phase all excavations must be monitored for fossil remains by the responsible Environmental Control Officer (ECO) using the HWC Chance Fossil Finds Procedure. Should substantial fossil remains such as vertebrate bones and teeth, petrified wood, plant-rich fossil lenses or dense fossil burrow assemblages be exposed during construction, the responsible ECO should safeguard these, preferably in situ, and alert the South African Heritage Resources Authority (SAHRA) in the Northern Cape and HWC in the Western Cape so that appropriate action can be taken by a professional palaeontologist,
e. Should any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources be found during the proposed development, SAHRA APM Unit (Natasha Higgitt/Phillip Hine 021 462 5402) in the Northern Cape and HWC in the Western Cape must be alerted.
f. If unmarked human burials are uncovered in the Northern Cape, the SAHRA Burial Grounds and Graves (BGG) Unit (Mimi Seetelo 012 320 8490), and in the Western Cape, HWC must be alerted immediately as per section 36(6) of the NHRA. A professional archaeologist must be contracted as soon as possible to inspect the findings. A Phase 2 rescue excavation operation may be required subject to permits issued by SAHRA and/or HWC

Table 7: Measures for inclusion in the EMP

Objective: Mitigating negative impact to significant Archaeological, Palaeontological and Cultural Landscape heritage resources		
Project Components	Construction phase of OHL and associated infrastructure, ground disturbance and excavation	
Potential Impact	Disturbance and destruction of scientifically valuable archaeological and palaeontological resources located either at the ground surface or below ground	
Activity/Risk Source	Extensive bedrock excavations and surface disturbance (*e.g.* wind turbine foundations, laydown areas, new access roads, transmission line pylon footings, on-site substation, foundations for the office / workshop, underground cables).	
Mitigation: Target/Objective	Recording, judicious sampling and curation of any important archaeological or fossil heritage exposed during construction within the OHL development area. Safeguarding of scientifically-important archaeological and fossil sites that cannot be effectively mitigated	
Mitigation: Action/Control	**Responsibility**	**Timeframe**
Monitoring of all bedrock excavations for archaeological resources or fossil remains during the construction phase.	ESO	Construction Phase
Fossil finds to be safeguarded as per the HWC Chance Finds Procedure and reported to Heritage Western Cape (HWC) for possible mitigation.	ESO	Construction Phase
Recording and judicious sampling of exceptional new fossil material or archaeological resources from the development footprint.	Archaeologist/Palaeontologist depending on the nature of the finds	Construction Phase
Curation of fossil specimens or archaeological resources at an approved repository (*e.g.* museum).	Archaeologist/Palaeontologist depending on the nature of the finds	Following mitigation
Final technical report on palaeontological or archaeological heritage mitigated within study area submitted to HWC.	Archaeologist/Palaeontologist depending on the nature of the finds	Following mitigation
Performance Indicator	Identification of any new archaeological or palaeontological hotspots within broader development footprint by ESO. Submission of interim and final technical reports to HWC by palaeontologist or archaeologist involved with mitigation work. Palaeontology: Cumulative acquisition of geographically and stratigraphically well-localised fossil records, samples and relevant geological data from successive subsections of the development area. Archaeology: Controlled sampling and collection or recording of any significant archaeological resources identified.	
Monitoring	Monitoring on on-going basis during construction phase of fresh bedrock exposures within development footprint by ESO and, if necessary, by professional palaeontologist/archaeologist.	

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10. REFERENCES

Heritage Impact Assessments				
Nid	**Report Type**	**Author/s**	**Date**	**Title**
8180	AIA Phase 1	Jayson Orton	01/02/2006	ARCHAEOLOGICAL IMPACT ASSESSMENT FOR THE CONSTRUCTION OF A DAM ON THE VERLORENVLEI FARM (VERLORENVALLEY 344) NEAR TOUWSRIVIER
8181	AIA Phase 1	Jayson Orton	29/09/2009	HERITAGE STATEMENT FOR THE PROPOSED VERLORENVLEI DIVERSION CANAL, CERES MAGISTERIAL DISTRICT, WESTERN CAPE
6644	AIA Phase 1	Jonathan Kaplan	29/09/2009	ARCHAEOLOGICAL IMPACT ASSESSMENT PROPOSED DEVELOPMENT ERF 660 DE DOORNS, WESTERN CAPE PROVINCE
186697	Desktop AIA	Foreman Bandama, Shadrack Chirikure	01/08/2014	An Archaeological Scoping and Assessment report for the proposed Gamma (Victoria West, Northern Cape) - Kappa (Ceres – Western Cape) 765Kv (2) Eskom power transmission line
329647	HIA Phase 1	Dave Halkett	15/06/2012	HERITAGE IMPACT ASSESSMENT OF THE IMPACTS RESULTING FROM THE RAISING OF THE EXISTING KEEROM DAM, SITUATED BETWEEN MONTAGU AND TOUWS RIVER, WESTERN CAPE
359488	Heritage Screener	Mariagrazia Galimberti, Kyla Bluff, Nicholas Wiltshire	09/03/2016	Brandvalley Wind Energy Facility
53187	HIA Phase 1	Timothy Hart, Lita Webley	01/03/2011	HERITAGE IMPACT ASSESSMENT PROPOSED WIND ENERGY FACILITY
337370	PIA Phase 1	Duncan Miller	01/03/2011	Palaeontological Impact Assessment Proposed Roggeveld Wind Energy Facility
356316	Heritage Screener	Mariagrazia Galimberti, Kyla Bluff, Nicholas Wiltshire	02/02/2016	Heritage Screener CTS15_015b EOH Brandvalley Wind Energy Facility
356318	Heritage Screener	Mariagrazia Galimberti, Kyla Bluff, Nicholas Wiltshire	01/02/2016	Heritage Screener CTS15_015a EOH Rietkloof Wind Energy Facility
364162	PIA Phase 1	John E Almond	01/04/2016	PALAEONTOLOGICAL HERITAGE ASSESSMENT: COMBINED DESKTOP & FIELD-BASED STUDY - PROPOSED BRANDVALLEY WIND ENERGY FACILITY LAINGSBURG, WESTERN & NORTHERN CAPE PROVINCES

364163	AIA Phase 1	Celeste Booth	01/04/2016	A PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT (AIA) FOR THE PROPOSED BRANDVALLEY WIND ENERGY FACILITY (WEF) SITUATED IN THE KAROO HOOGLAND LOCAL MUNICIPALITY (NAMAKWA DISTRICT MUNICIPALITY), THE WITZENBURG LOCAL MUNICIPALITY (CAPE WINELANDS DISTRICT MUNICIPALITY) AND LAINGSBURG LOCAL MUNICIPALITY (CENTRAL KAROO DISTRICT MUNICIPALITY).
4843	AIA Phase 1	Hilary Deacon	28/03/2008	Archaeological Impact Assessment: Proposed Breede Valley De Doorns Housing Project
514990	HIA Phase 1	Katie Smuts, Emmylou Bailey, Madelon Tusenius, John Almond	29/10/2018	HERITAGE IMPACT ASSESSMENT Basic Assessment for the Proposed Development of the 325MW Kudusberg Wind Energy Facility and associated infrastructure, between Matjiesfontein and Sutherland in the Western and Northern Cape Provinces: BA REPORT
375379	AIA Phase 1	Hugo Pinto, Katie Smuts	24/10/2011	Preliminary Archaeological Survey of Karoopoort Farm

Additional References:

Hart, T. et al. (2016). **HERITAGE IMPACT ASSESSMENT (SCOPING) FOR THE PROPOSED KOLKIES WIND ENERGY FACILITY AND ASSOCIATED GRID CONNECTION TO BE SITUATED IN THE SOUTHERN TANKWA KAROO.** (Assessment conducted under Section 38 (8) of the National Heritage Resources Act (No. 25 of 1999) as part of an EIA). For Arcus Consulting. Unpublished and not submitted.

Hart, T. et al. (2016). **HERITAGE IMPACT ASSESSMENT (SCOPING) FOR THE PROPOSED KAREE WIND ENERGY FACILITY AND ASSOCIATED GRID CONNECTION TO BE SITUATED IN THE SOUTHERN TANKWA KAROO.** (Assessment conducted under Section 38 (8) of the National Heritage Resources Act (No. 25 of 1999) as part of an EIA). For Arcus Consulting. Unpublished and not submitted.

Shaw, Matthew & Ames, Christopher & Phillips, Natasha & Chambers, Sherrie & Dosseto, Anthony & Douglas, Matthew & Goble, Ron & Jacobs, Zenobia & Jones, Brian & Lin, Sam & Low, Marika & Mcneil, Jessica-Louise & Nasoordeen, Shezani & O'driscoll, Corey & Saktura, Rosaria & Sumner, T. & Watson, Sara & Will, Manual & Mackay, Alex. (2020). **The Doring River Archaeology Project: Approaching the Evolution of Human Land Use Patterns in the Western Cape, South Africa.**

Smith, Andrew B., and Michael R. Ripp. "**An Archaeological Reconnaissance of the Doorn/Tanqua Karoo.**" The South African Archaeological Bulletin, vol. 33, no. 128, 1978, pp. 118–133

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APPENDICES

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APPENDIX 1: Archaeological Assessment

ARCHAEOLOGICAL SPECIALIST STUDY

In terms of Section 38(8) of the NHRA for a

Proposed development of the 132kV Oya Overhead Power Line near Matjiesfontein, Western and Northern Cape

HWC Ref:

Prepared by

CTS HERITAGE

In Association with

Oya Energy (Pty) Ltd

October 2020

THE INDEPENDENT PERSON WHO COMPILED A SPECIALIST REPORT OR UNDERTOOK A SPECIALIST PROCESS

I Jenna Lavin, as the appointed independent specialists hereby declare that we:

• act/ed as the independent specialist in this application;

• regard the information contained in this report as it relates to my specialist input/study to be true and correct, and

• do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2010 and any specific environmental management Act;

• have and will not have no vested interest in the proposed activity proceeding;

• have disclosed, to the applicant, EAP and competent authority, any material information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations, 2010 and any specific environmental management Act;

• am fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations, 2010 (specifically in terms of regulation 17 of GN No. R. 543) and any specific environmental management Act, and that failure to comply with these requirements may constitute and result in disqualification;

• have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;

• have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;

• have ensured that the names of all interested and affected parties that participated in terms of the specialist input/study were recorded in the register of interested and affected parties who participated in the public participation process;

• have provided the competent authority with access to all information at our disposal regarding the application, whether such information is favourable to the applicant or not; and

• are aware that a false declaration is an offence in terms of regulation 71 of GN No. R. 543.

Jenna Lavin
Signature of the specialist

CTS Heritage
Name of company

September 2020
Date

CTS Heritage
34 Harries Street, Plumstead, Cape Town
Tel: +27 (0)87 073 5739 **Email:** info@ctsheritage.com **Web:** www.ctsheritage.com

EXECUTIVE SUMMARY

Oya Energy (Pty) Ltd (hereafter referred to as "Oya Energy") is proposing to construct a 132kV overhead power line and substations northwest of Matjiesfontein in the Western and Northern Cape Provinces (hereafter referred to as the "proposed development"). The overall objective of the proposed development is to feed the electricity generated by the proposed Oya Energy Facility (part of separate on-going EIA process with DEFF Ref No.: 14/12/16/3/3/2/2009) as well as potentially the nearby developments into the national grid.

An archaeologist conducted a survey of the site and its environs on the 22 October 2020 to determine what archaeological resources are likely to be impacted by the proposed development. A portion of the area proposed for development was not easily accessible, due to restricted road access. As a result, the entirety of the proposed development area was not able to be surveyed. Power Line Corridor Alternative 4 is the preferred development option for the section of the proposed overhead power line which connects the Oya on-site substation to the Kappa substation (i.e. Oya to Kappa) and as such, this alignment was the primary focus of the field assessment. Sampling was implemented and approximately 25km of the area was surveyed by foot.

The findings of the survey were dominated by a diffuse scatter of low density Middle Stone Age (MSA) artefacts spread across the broader landscape. The MSA lithics identified were predominantly made out of silcrete, chert, hornfels and quartzite. The field assessment methodology provides an adequate sample of the kinds of archaeological resources that are to be found along the flatter plains of the Karoo. Overall, the survey has provided a very good account of the range of archaeological material that is present in the area and is entirely consistent with the previous studies for the wind and solar farms that are proposed or already constructed.

Based on the assessment completed, the area proposed for development has an overall low archaeological sensitivity. It is unlikely that the proposed development of the 132kV overhead power line and substations will negatively impact on significant archaeological heritage as the footprint of the powerline and substations infrastructure is limited.

Despite the abundance of diffusely scattered archaeological material, no intact and cohesive sites were found that have not been significantly altered through surface deflation and erosion in the exposed plains covering much of this route. No mitigation is required prior to construction.

Should any significant archaeological resources be identified during the course of development, work must cease and HWC must be contacted regarding an appropriate way forward.

CTS Heritage
34 Harries Street, Plumstead, Cape Town
Tel: +27 (0)87 073 5739 **Email:** info@ctsheritage.com **Web:** www.ctsheritage.com

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CONTENTS

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1. INTRODUCTION

1.1 Background Information on Project

Oya Energy (Pty) Ltd (hereafter referred to as "Oya Energy") is proposing to construct a 132kV overhead power line an substations northwest of Matjiesfontein in the Western and Northern Cape Provinces (hereafter referred to as the "proposed development"). The overall objective of the proposed development is to feed the electricity generated by the proposed Oya Energy Facility (part of separate on-going EIA process with DEFF Ref No.: 14/12/16/3/3/2/2009) as well as potentially the nearby developments into the national grid. The grid connection and substations (this application) require a separate EA, in order to allow the EA to be handed over to Eskom. The proposed power line and substation development is located in the Witzenberg and Karoo Hoogland Local Municipalities respectively, which fall within the Cape Winelands and Namakwa District Municipalities.

The entire extent of the proposed overhead power line and substation development is located within one of the Strategic Transmission Corridors as defined and in terms of the procedures laid out in GN No. 1131, namely the Central Corridor. The proposed overhead power line project will irrespective of this be subject to a Basic Assessment (BA) process in terms of the NEMA (as amended) and Appendix 1 of the EIA Regulations, 2014 promulgated in Government Gazette 40772 and GN R326, R327, R325 and R324 on 7 April 2017. The competent authority for this BA is the DEFF.

At this stage, it is anticipated that the proposed development will include a 132kV power line and a 33/132kV substation to feed electricity generated by the renewable energy facilities owned by the applicant into the national gird at the Kappa substation.

The type of power line towers being considered at this stage include both lattice and monopole towers and it is assumed that these towers will be located approximately 200m to 250m apart. The towers will be up to 45m in height, depending on the terrain, but will ensure minimum overhead line clearances from buildings and surrounding infrastructure.

300m wide power line corridors (i.e. 150m on either side) are being assessed to allow flexibility when determining the final route alignment. The proposed power line however only requires a 31m wide servitude and as such, this servitude would be positioned within the assessed corridor.

The size of the proposed Oya and Kudusberg substation and O&M building sites will be approximately 4 hectares (ha) each. It should be noted that only one (1) route is possible for the section of the proposed power line which connects the Kudusberg on-site substation (authorised under 14/12/16/3/3/1/1976/AM1) to the Oya on-site substation (i.e. Kudusberg to Oya). No alternatives can therefore be provided for this section of the power line. The Kudusberg to Oya power line corridor route is approximately 16.6km in length and runs from the Kudusberg on-site substation along the RE/194, 1/158, RE/159, RE/156, 1/156 and RE/155 properties to the Oya on-site substation.

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Five (5) power line corridor route alternatives have however been provided for the section of the proposed overhead power line which connects the Oya on-site substation to the Kappa substation (i.e. Oya to Kappa). The above-mentioned alternatives are described below:

- Power Line Corridor Alternative 1 (Oya to Kappa): Approximately 34.14km in length and runs along the RE/155, RE/152, 2/152, RE/169, RE/243, 241, 240 and RE/244 properties to the Kappa substation
- Power Line Corridor Alternative 2 (Oya to Kappa): Approximately 32.43km in length and runs along the RE/155, 3/155, RE/152, 2/152, RE/169, 13/168, 5/168, 1/243, RE/243, 241 and 240 properties to the Kappa substation
- Power Line Corridor Alternative 3 (Oya to Kappa): Approximately 30.56km in length and runs along the RE/155, 4/168, 13/168, 5/168, 1/243, 240 and RE/244 properties to the Kappa substation
- Power Line Corridor Alternative 4 (Oya to Kappa): Approximately 32.94km in length and runs along the RE/155, 4/168, 13/168, RE/169, RE/243, 241 and 240 properties to the Kappa substation
- Power Line Corridor Alternative 5 (Oya to Kappa): Approximately 32.26km in length and runs along the RE/155, RE/152, 2/152, RE/169, 5/168, 1/243 and 240 properties to the Kappa substation
- 'No-go' alternative: The 'no-go' alternative is the option of not fulfilling the proposed project as well as prevent the connection of the energy development in the area to feed electricity into the national grid. This alternative would result in no environmental impacts from the proposed project on the site or surrounding local area. It provides the baseline against which other alternatives are compared and will be considered throughout the report. Implementing the 'no-go' option would entail no development. The affected properties are currently not used for agricultural activities, although they are suitable for very low-level grazing.

The power line corridor route alternatives provide different route alignments contained within an assessment corridor of up to approximately 300m wide. This is to allow for flexibility to route the power line within the authorised corridor.

The 'no-go' option is a feasible option, however, this would prevent the proposed development from contributing to the environmental, social and economic benefits associated with the development of the renewables sector.

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1.2 Description of Property and Affected Environment

The area proposed for development is located within a mountainous landscape within which the predominant land use is grazing land for domestic stock and game, however one of the farms offers accommodation to tourists. It is a semi-arid region and the vegetation is characteristic of the Succulent Karoo Biome. The mountain ridges are largely undeveloped and are covered in varying densities of knee high shrubs. The area is sparsely populated and some of the farms are no longer being actively used for grazing. There are a number of farmhouses and numerous jeep tracks across the large area but the site remains predominantly natural and very isolated. Natural ephemeral streams (currently dry) and various small earthen dams were observed.

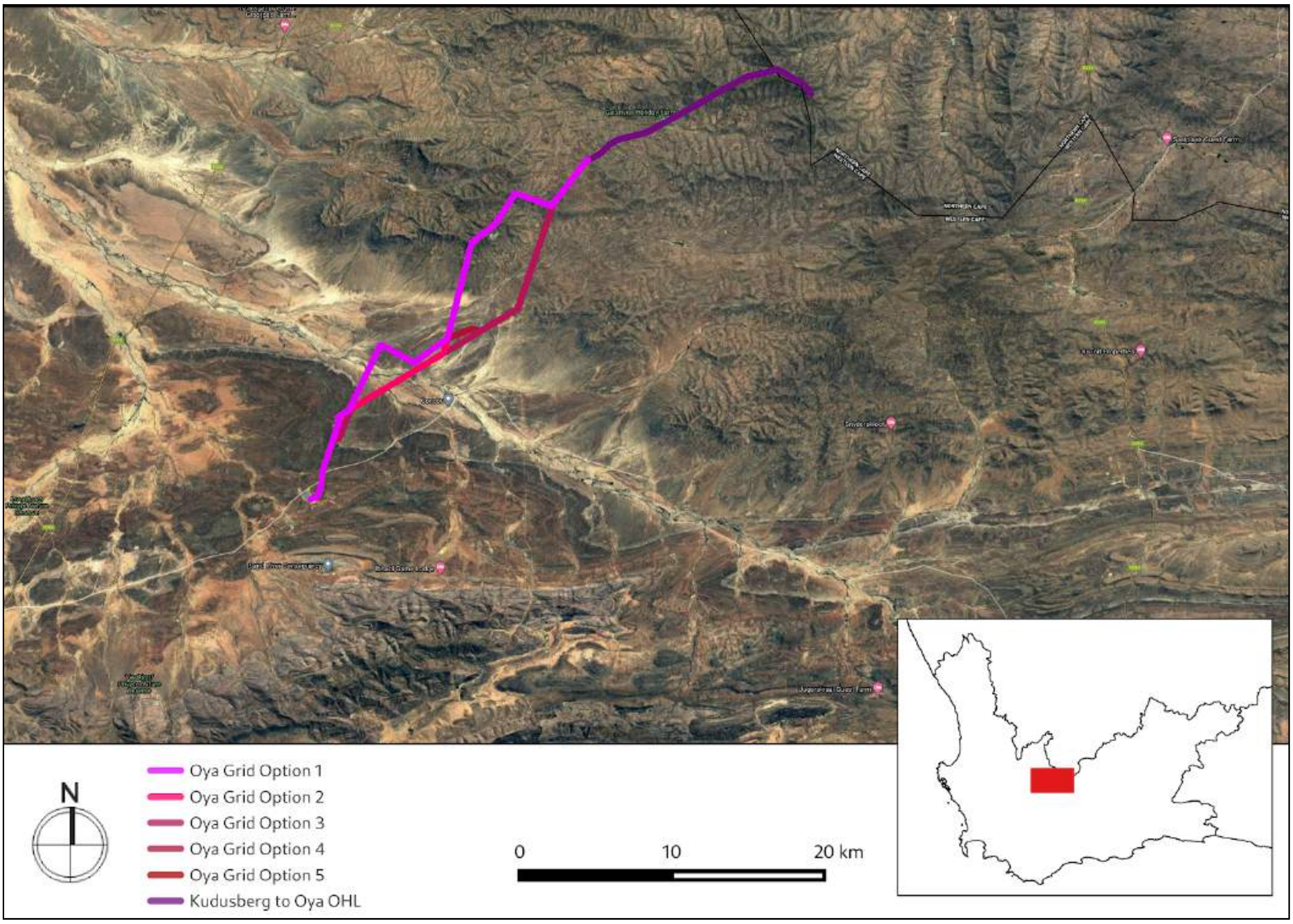

Figure 1.1: Close up satellite image indicating proposed location of development

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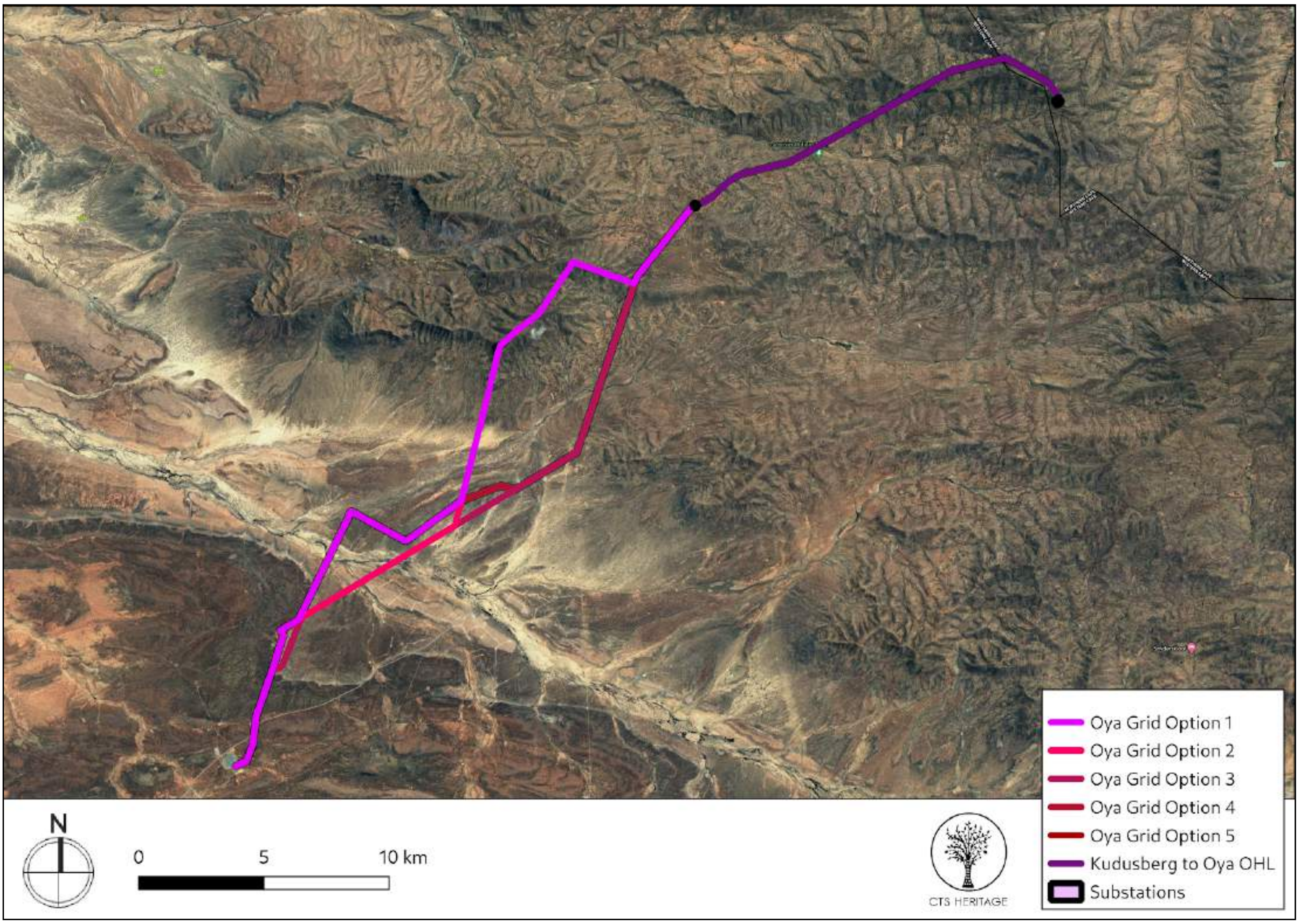

Figure 1.2: Area proposed for development

2. METHODOLOGY

2.1 Purpose of Archaeological Study

The purpose of this archaeological study is to satisfy the requirements of section 38(8), and therefore section 38(3) of the National Heritage Resources Act (Act 25 of 1999) in terms of impacts to archaeological resources.

2.2 Summary of steps followed

- An archaeologist conducted a survey of the site and its environs on the 22 October 2020 to determine what archaeological resources are likely to be impacted by the proposed development.
- The area proposed for development was assessed on foot and by 4x4 vehicle, photographs of the context and finds were taken, and tracks were recorded (at 20m intervals) using a GPS.
- The identified resources were assessed to evaluate their heritage significance in terms of the grading system outlined in section 3 of the NHRA (Act 25 of 1999).
- Alternatives and mitigation options were discussed with the Environmental Assessment Practitioner.

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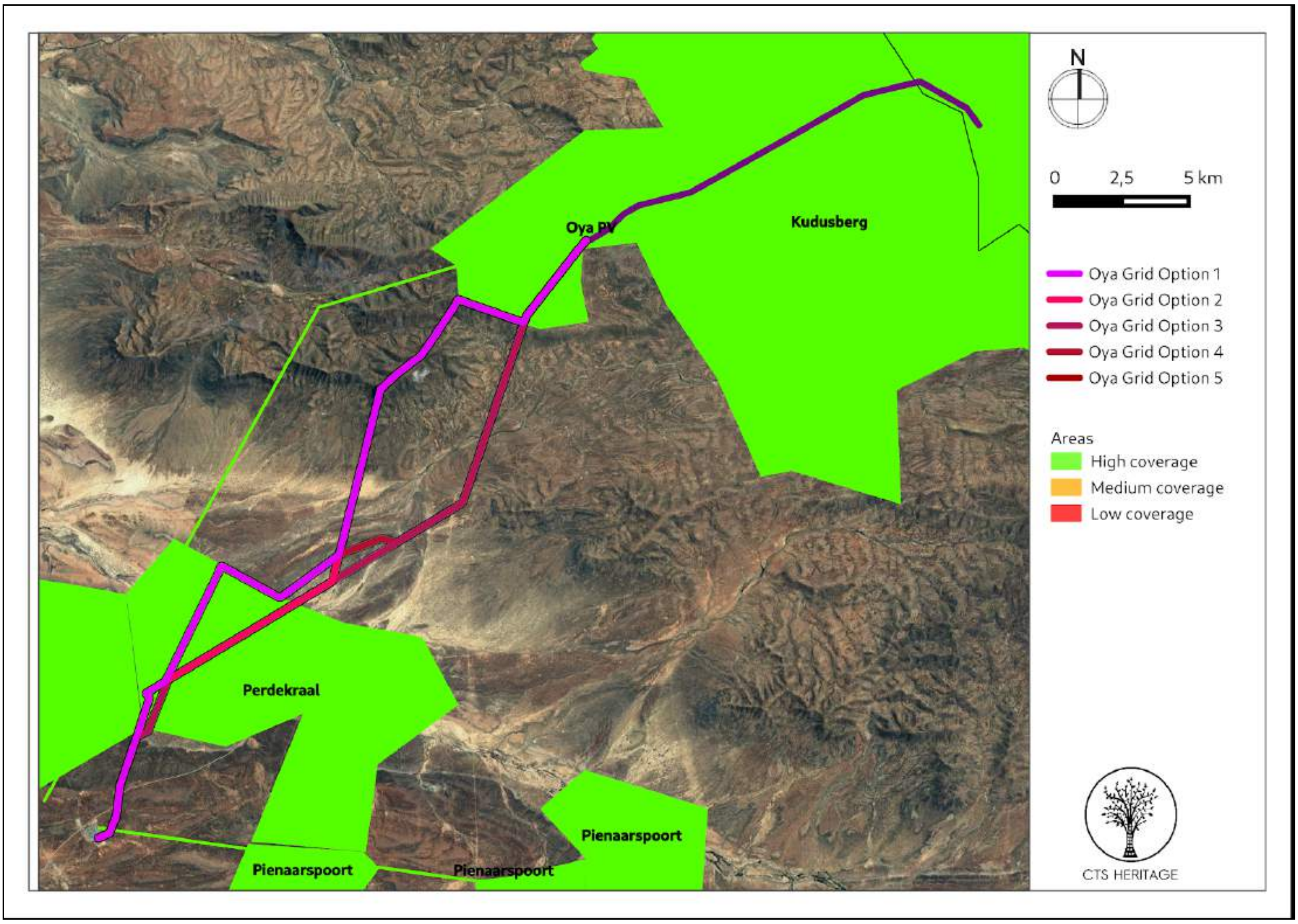

Figure 2: Close up satellite image indicating proposed location of development in relation to heritage studies previously conducted

2.3 Constraints & Limitations

A portion of the area proposed for development was not easily accessible, due to restricted road access. As a result, the entirety of the proposed development area was not able to be surveyed but sampling was implemented and approximately 25km of the area was surveyed by foot.

The experience of the archaeologist, and observations made during the study as well as previous studies, allow us to predict with some accuracy the archaeological sensitivity of the receiving environment.

3. HISTORY AND EVOLUTION OF THE SITE AND CONTEXT

Heritage Impact Assessments have been completed that overlap or are within 20km of the area proposed for development and are recorded on SAHRIS, the South African Heritage Resources Information System, or have been sourced for this desktop screening assessment. It is noted that wherever an assessment has been completed, heritage resources of significance have been identified. According to Deacon (2008, SAHRIS ID 4843), this area "is well known for its rock art. However this is restricted to the kloofs and higher lying areas. There is the possibility that stone artefacts of different ages may occur in well-watered lowlands and valley margins." In addition, according to Pinto and Smuts (2011, SAHRIS ID 375379), "Agriculture since colonial times has been, to a large extent, marginal and has had a low impact on the archaeological evidence for these early communities. Prehistoric sites in the area, consisting predominantly of surface and sub-surface stone artefact scatters in the open landscape together with overhangs and recesses in the sandstone hills used as shelters, are likely to be well preserved with little disturbance from later historic periods." According to Smuts et al. (2018, SAHRIS NID 514990), studies completed in the broader area identified surprisingly little pre-colonial or stone age archaeology, and distinct spatial patterning to the little that was found. Almost all archaeological material, predominantly in the form of scatters, has been identified on the flat floodplains up to the foothills of the mountains, and within river valleys along watercourses… The area is known to have been inhabited since the Early Stone Age (ESA) and throughout the Middle Stone Age (MSA). Later Stone Age (LSA) scatters have also been documented throughout the region, although at remarkably low density, although excavations at cave sites near Sutherland yielded significant LSA cultural material" Furthermore, Smuts et al (2018) notes that rock art and archaeological resources associated with the trek boers and historical occupation of the area are known from the region. In addition, it has been noted that there is often a more dense accumulation of archaeological artefactual material along an exposure of the Collingwood Formation (Pc) as this formation provides an excellent raw material source. Part of the proposed OHL lies along this formation (Figure 5b).

In 2016 a Draft HIA (Hart et al.) for the proposed Kolkies and Karee WEFs on neighbouring properties was not completed as the project was cancelled. Hart et al. (2016) note that in terms of impacts to archaeology, sites tend to be found on the banks of river beds. Discrete scatters of Middle Stone Age artefacts are often identified in sheet washed locations at several farms in the area but they are not considered to be of high significance. In general, Hart et al. (2016) found that Late and Early Stone Age Archaeology is sparse. Hart et al. (2016) also found that the built environment is sparse. Hart et al. (2016) note that previous heritage work has shown there are numerous stone cairns along the dry river beds which may represent graves. Similarly, in the archaeological assessment completed for the Oya Energy facility by Fourie (2020), burial grounds and graves, some old farmsteads and kraals. Lavin and Wiltshire (2020) identified diffuse scatters of Middle and Later Stone Age artefacts in the neighbouring Pienaarspoort REF area.

As such, it is likely that the proposed OHL and substations development will impact on significant archaeological and other heritage resources and as such, an assessment that identifies this impact is recommended. However, much of the OHL alternative alignments have been covered by existing completed heritage assessments (Figure 2). As such, only the portions of the alternatives that have not yet been assessed are surveyed for impacts to archaeological heritage in this report.

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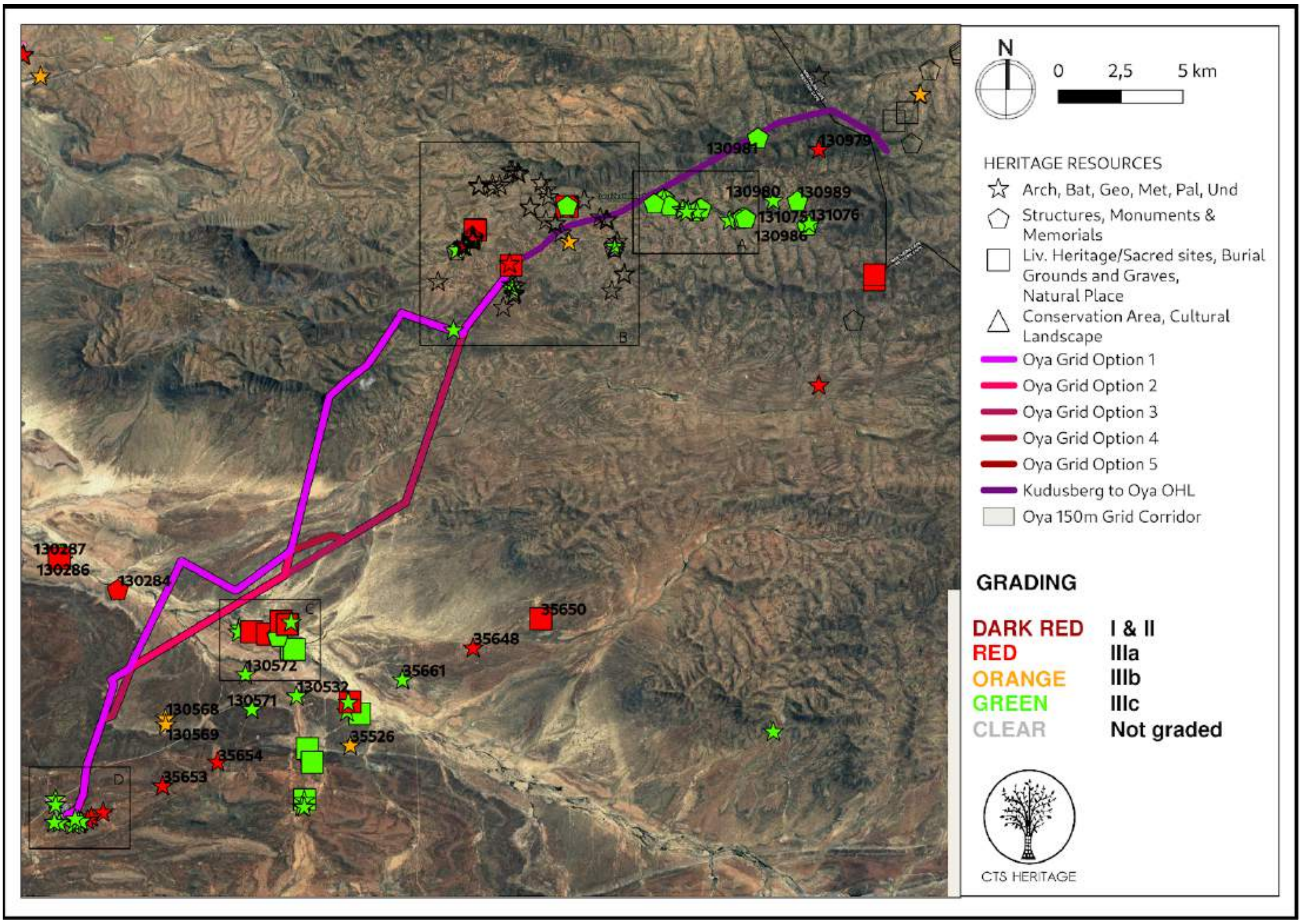

Figure 3. Heritage Resources Map. Heritage Resources previously identified in and near the study area, with SAHRIS Site IDs indicated

A number of known archaeological heritage resources fall within the 300m buffer area proposed for the Oya OHL and substations development according to SAHRIS (Figure 3a and 3b). These are SAHRIS Site ID 130730, 130734, 130768 and 130981, as well as an archaeological site with SAHRIS ID 131154 along the river course. Site 130730 is graded IIIA and is described by Fourie (2020) as "Three grave features including a medium-density scatter of MSA and LSA stone tools... The site is located on the eastern bank of a river and has evidence of flooding. Three possible stone grave features were identified. The first grave (OYPV-10a) consists of packed stones in a semi-rectangular shape. The second grave (OYPV- 10b) has two sharp rectangular stones placed in one corner, most likely forming part of a grave marker that has been washed away or covered by sand from the river. The third grave feature (OYPV-10c) contains two stones placed on the eastern and western end, marking the feature as a grave. A medium-density scatter of MSA and LSA tools were found around the site. The stone tools mostly consist of cores, flakes, blades and chunks, and formal tools such as scrapers. The tools were made from chert, shale, and hornfels. Burial grounds and graves are protected under Section 36 of the NHRA 25 of 1999. Thus, the site is provisionally rated as having a high heritage significance with a heritage rating of IIIA. All graves have high levels of emotional, religious and in some cases historical significance. It is also important to understand that the identified graves could have significant heritage value to the relevant families."

Site 130981 is a structure that is graded IIIC and is described as "Circular cobble-built structure, piled stone, likely hut or shelter". The remaining sites are all archaeological observations that are considered to be not conservation-worthy (130734 and 131154).

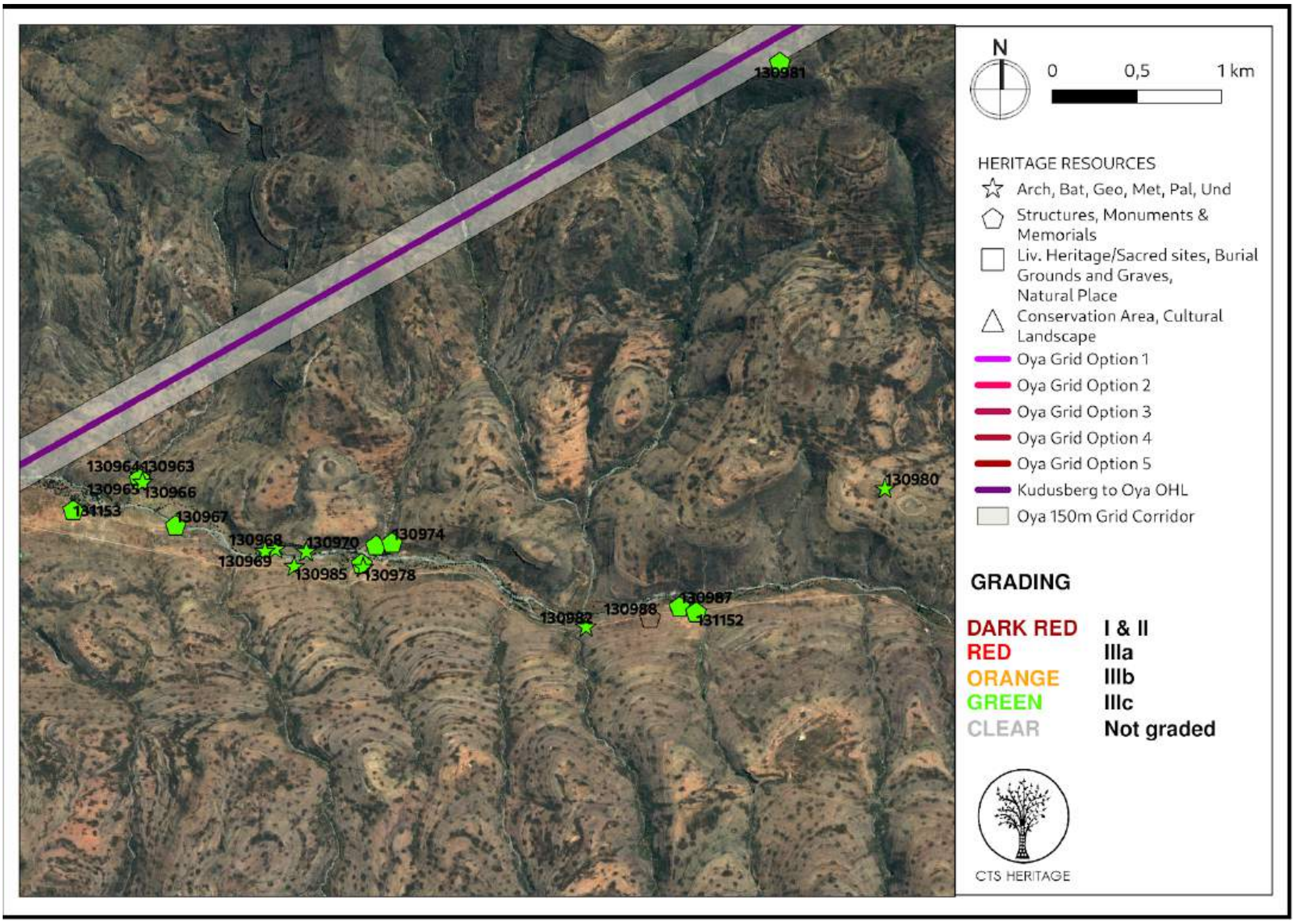

Figure 3a. Indicating known heritage resources relative to the proposed layout

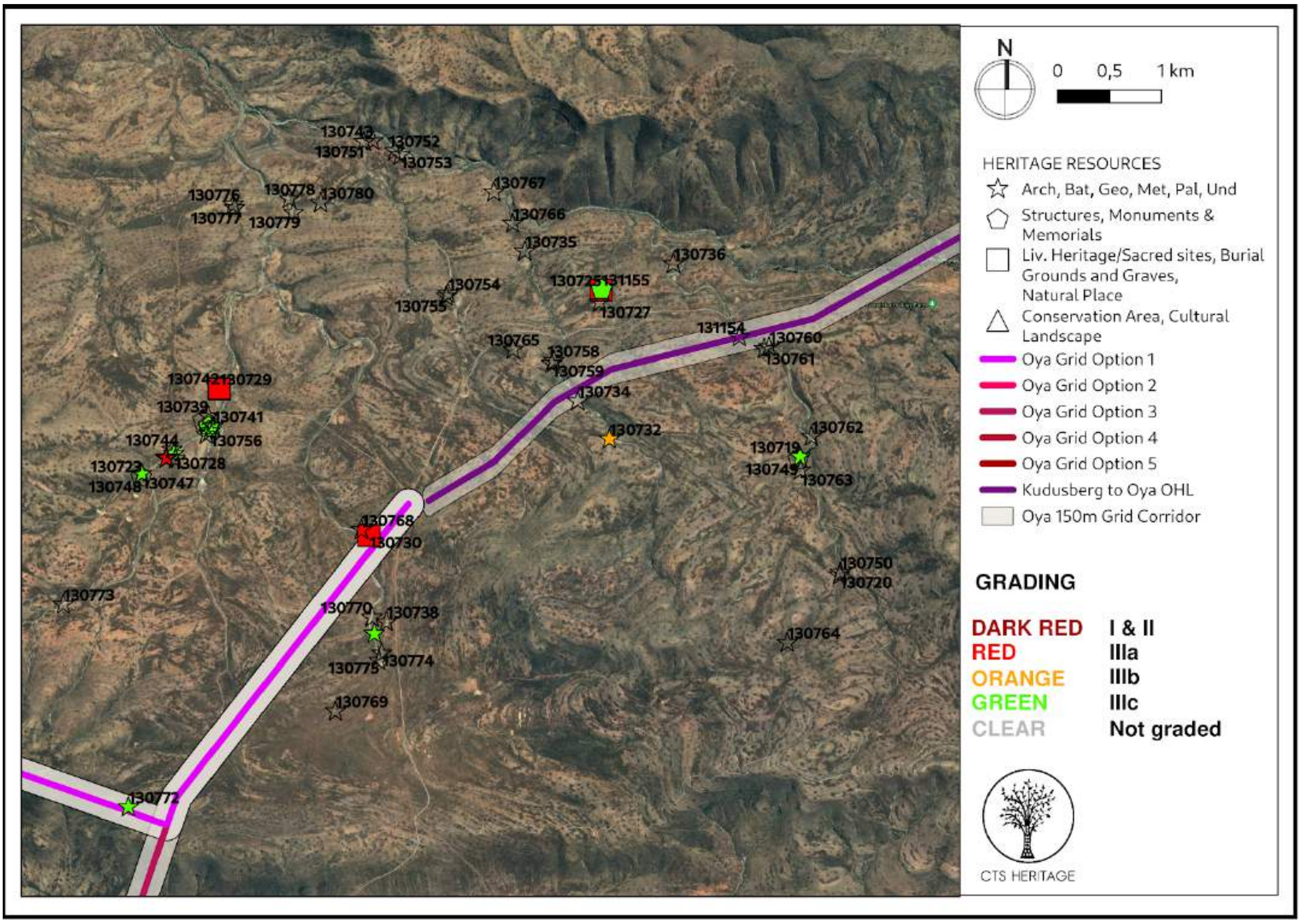

Figure 3b. Indicating known heritage resources relative to the proposed layout

4. IDENTIFICATION OF HERITAGE RESOURCES

4.1 Field Assessment

An archaeologist conducted a survey of the site and its environs on the 22 October 2020 to determine what archaeological resources are likely to be impacted by the proposed development. A portion of the area proposed for development was not easily accessible, due to restricted road access. As a result, the entirety of the proposed development area was not able to be surveyed. Only the portions of the alternatives that have not yet been assessed are surveyed for impacts to archaeological heritage in this report.

Power Line Corridor Alternative is the preferred development option for the section of the proposed overhead power line which connects the Oya substation to the Kappa substation (i.e. Oya to Kappa) and as such, this alignment, as well as the Kudusberg Oya OHL, was the primary focus of the field assessment. Sampling was implemented and approximately 25km of the area was surveyed by foot.

The findings of the survey were dominated by a diffuse scatter of low-density Middle Stone Age (MSA) artefacts spread across the broader landscape. The MSA lithics identified were predominantly made out of silcrete, chert, hornfels and

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quartzite. The field assessment methodology provides an adequate sample of the kinds of archaeological resources that are to be found along the flatter plains of the Karoo. Overall, the survey has provided a very good account of the range of archaeological material that is present in the area and is entirely consistent with the previous studies for the wind and solar farms that are proposed or already constructed.

Figure 4.1: Contextual Image of development area

Figure 4.2: Contextual Image of development area

Figure 4.3: Contextual Image of development area

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Figure 4.4: Contextual Images of Development Area

Figure 4.5: Contextual Images of Development Area

Figure 4.6: Contextual Images of Development Area

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Figure 4.8: Contextual Images of Landscape

Figure 4.9: Contextual Images of Development Area

Figure 4.10: Contextual Images of Landscape - existing infrastructure in the landscape

Figure 4.11: Contextual Images - existing infrastructure in the landscape

Figure 4.12: Contextual Images - existing infrastructure in the landscape

Figure 4.13: Contextual Images - existing infrastructure in the landscape

Figure 4.14: Contextual Images - existing infrastructure in the landscape

Figure 4.15: Contextual Images - existing infrastructure in the landscape

Figure 4.16: Contextual Images

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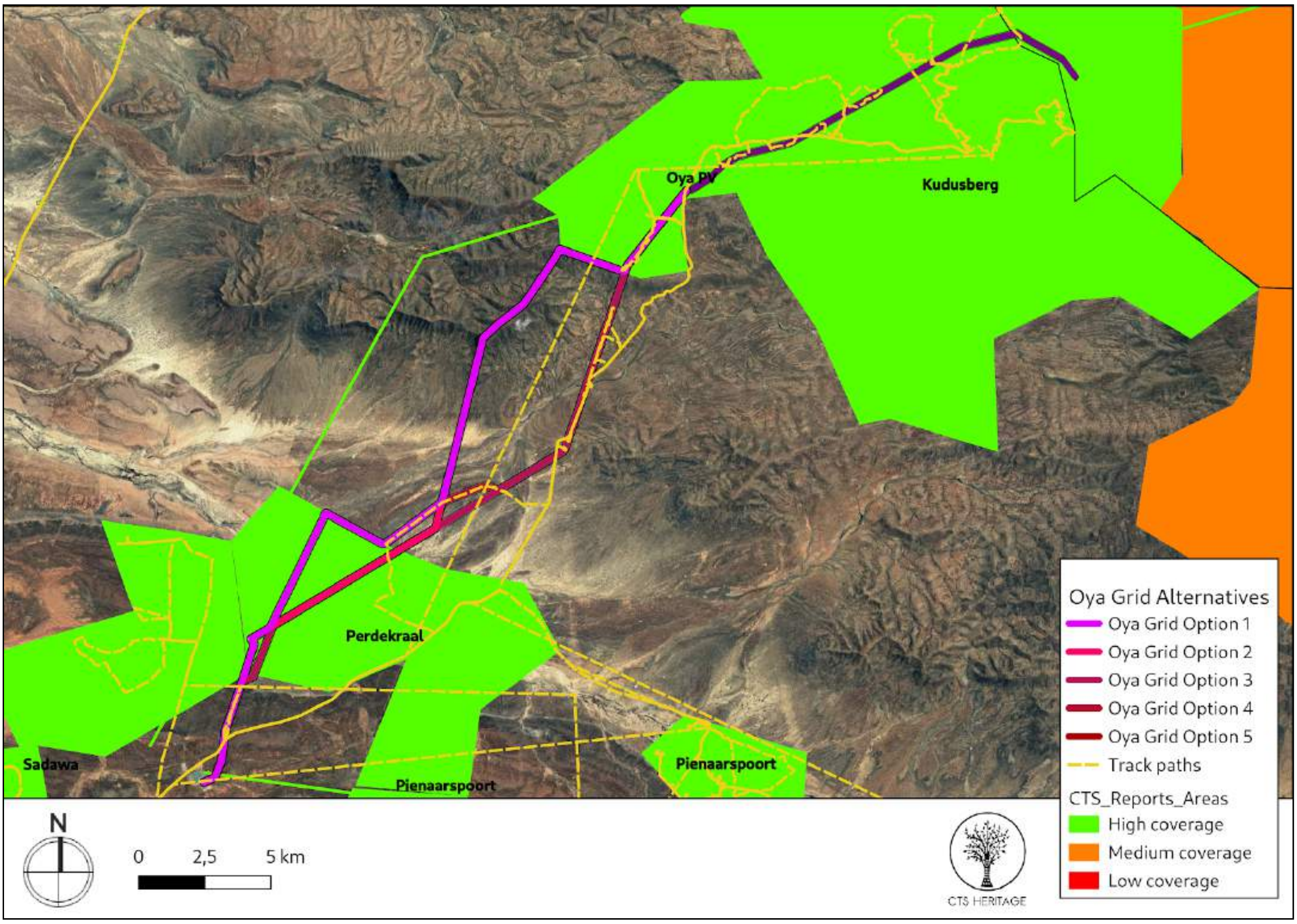

Figure 5: Overall track paths of foot survey overlaid with the areas previously in already approved HIAs

4.2 Archaeological Resources identified

The most southerly portion of the survey area (**OYA1-OYA19**) is characterised by flat lying topography with occasional slopes. There is varied shrub cover growing over sandy red soils with scattered sandstone, greywacke boulders and occasional rocky ridges cut by ephemeral streams and sheetwash action. Bioturbation is evident throughout. The distribution of the archaeological finds can be described as a background scatter resulting from the action of surface deflation and ephemeral streams. The highest concentration of finds (**OYA11-OYA16**) was located within an area cut by numerous ephemeral streams and sheet wash activity, therefore were most likely not in their original context. For example, **OYA17** which represents 9 silcrete flakes, was located within an ephemeral stream. Archaeological findings **OYA4**-**OYA10** and **OYA19** were located on a slope cut by ephemeral streams, while **OYA1-OYA3** occurred on residual soils.

The findings **OYA20-OYA30** occurred in an area where the topography was generally flat and covered by sparse vegetation and traversed by jeep tracks. The isolated archaeological finds were likely out of context due to the impact of the well-used jeep tracks.

The isolated archaeological resources **OYA31-OYA39** occurred at the base and along a steep slope comprising red soils with scree slope material of greywacke and quartzite rock fragments. The area was cut by several large ephemeral streams and the vegetation was moderate to sparsely developed.

Table 2: Archaeological observations noted during the field assessment

Site No.	Site Name	Description	Co-ordinates		Grading	Mitigation
OY1	**Oya OHL_1**	Hornfels flake, MSA	-33,09289	20,01967	NCW	None required
OY2	**Oya OHL_2**	3 Chert flake, MSA	-33,09225	20,01967	NCW	None required
OY3	**Oya OHL_3**	2 Hornfels flakes, MSA	-33,09182	20,01962	NCW	None required
OY4	**Oya OHL_4**	2 Hornfels flakes and 1 chert flake, MSA	-33,09000	20,01976	NCW	None required
OY5	**Oya OHL_5**	3 Hornfels flakes and 2 Chert flakes, MSA	-33,08886	20,02025	NCW	None required
OY6	**Oya OHL_6**	5 Hornfels flakes, MSA	-33,08802	20,02066	NCW	None required
OY7	**Oya OHL_7**	Hornfels flake and patinated silcrete flake, MSA	-33,08728	20,02093	NCW	None required
OY8	**Oya OHL_8**	Possible handaxe and 2 hornfels flakes	-33,08627	20,02140	NCW	None required
OY9	**Oya OHL_9**	2 chert flakes, upper grindstone and 2 silicified shale flakes	-33,08415	20,02244	NCW	None required
OY10	**Oya OHL_10**	Weathered silicified shale	-33,08191	20,02330	NCW	None required

OY11	**Oya OHL_11**	Hornfels and silcrete flakes, MSA	-33,07911	20,02463	NCW	None required
OY12	**Oya OHL_12**	4 Silcrete flakes, MSA	-33,07793	20,02531	NCW	None required
OY13	**Oya OHL_13**	1 hornfels flake and 3 Silcrete flakes, MSA	-33,07740	20,02562	NCW	None required
OY14	**Oya OHL_14**	6 Silcrete flakes, MSA	-33,07649	20,02571	NCW	None required
OY15	**Oya OHL_15**	Silcrete flake, MSA	-33,07592	20,02598	NCW	None required
OY16	**Oya OHL_16**	4 Silcrete flakes, MSA	-33,07565	20,02615	NCW	None required
OY17	**Oya OHL_17**	9 Silcrete flakes, MSA	-33,07686	20,02558	NCW	None required
OY18	**Oya OHL_18**	Silcrete LSA flake?	-33,07856	20,02481	NCW	None required
OY19	**Oya OHL_19**	Hornfels flake, MSA	-33,08073	20,02390	NCW	None required
OY20	**Oya OHL_20**	Chert flake	-33,02648	20,08604	NCW	None required
OY21	**Oya OHL_21**	Chert flake, MSA	-33,02610	20,08660	NCW	None required
OY22	**Oya OHL_22**	Chert flake, MSA	-33,02586	20,08704	NCW	None required
OY23	**Oya OHL_23**	2 chert flakes, MSA	-33,02533	20,08787	NCW	None required
OY24	**Oya OHL_24**	Hornfels flake, MSA	-33,02481	20,08868	NCW	None required
OY25	**Oya OHL_25**	Quartzite flake, MSA	-33,02342	20,09091	NCW	None required
OY26	**Oya OHL_26**	Chert flake, MSA	-33,02198	20,09331	NCW	None required
OY27	**Oya OHL_27**	Chert flake, MSA	-33,02074	20,09533	NCW	None required
OY28	**Oya OHL_28**	Quartzite flake, MSA	-33,02055	20,09564	NCW	None required
OY29	**Oya OHL_29**	Chert flake, MSA	-33,01526	20,10425	NCW	None required
OY30	**Oya OHL_30**	Chert flake, MSA	-33,01302	20,10800	NCW	None required
OY31	**Oya OHL_31**	Chert flake, MSA	-32,99546	20,15786	NCW	None required
OY32	**Oya OHL_32**	Pieces of fossil wood	-32,99533	20,15791	NCW	None required
OY33	**Oya OHL_33**	Ceramic sherd	-32,99171	20,15925	NCW	None required
OY34	**Oya OHL_34**	Piece of fossil wood	-32,99107	20,15950	NCW	None required
OY35	**Oya OHL_35**	Chert flake, MSA	-32,97612	20,16534	NCW	None required
OY36	**Oya OHL_36**	Pieces of ostrich egg shell	-32,97608	20,16535	NCW	None required
OY37	**Oya OHL_37**	Ceramic sherd	-32,97281	20,16700	NCW	None required
OY38	**Oya OHL_38**	Silcrete flake, MSA	-32,95695	20,17280	NCW	None required

OY39	**Oya OHL_39**	Chert flake, MSA	-32,96062	20,17138	NCW	None required
KB21	**Kudusberg WEF_21**	Chert adze, single piece no other artefacts evident	-32.8413	20.33519	NCW	None required
KB24	**Kudusberg WEF_24**	Chert core, Only minor flaking around edges	-32.89265	20.24085	NCW	None required

4.3 Selected photographic record

(a full photographic record is available upon request)

Figure 6.1: Observations OY2 (left and middle) and OY03 (right)

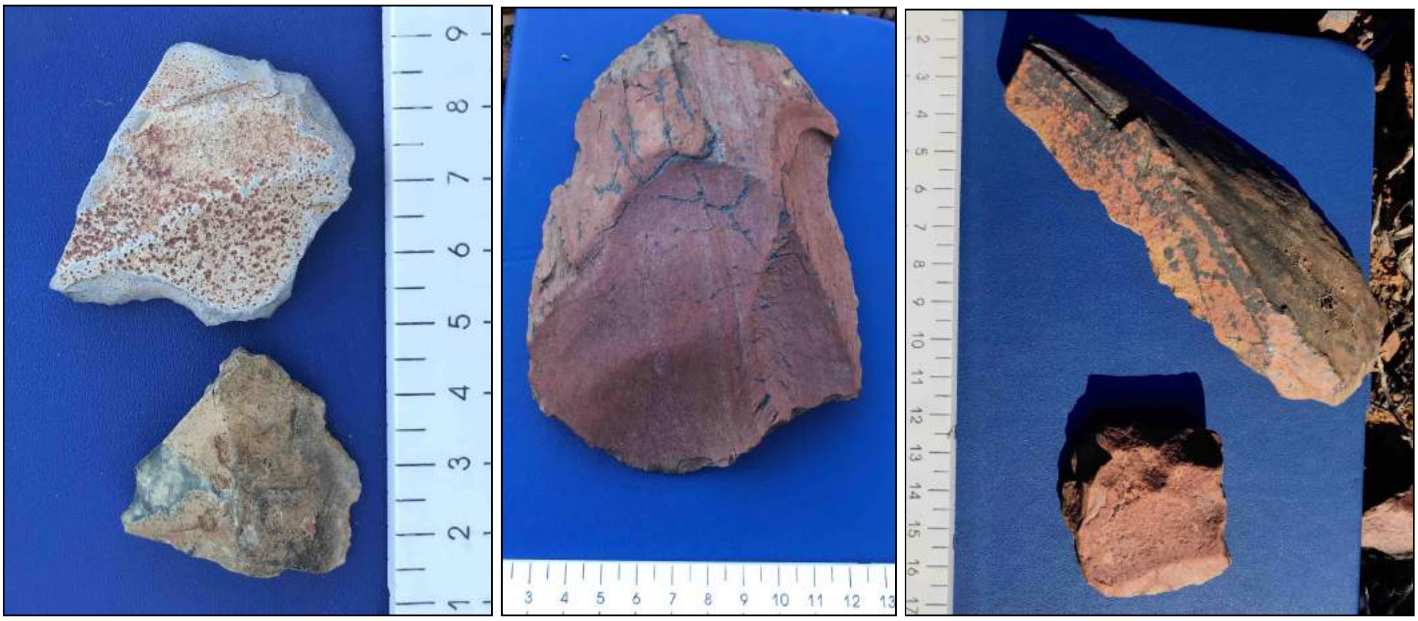

Figure 6.2: OY5 (left) and OY8 (middle and right)

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Figure 6.3: OY9 and OY11

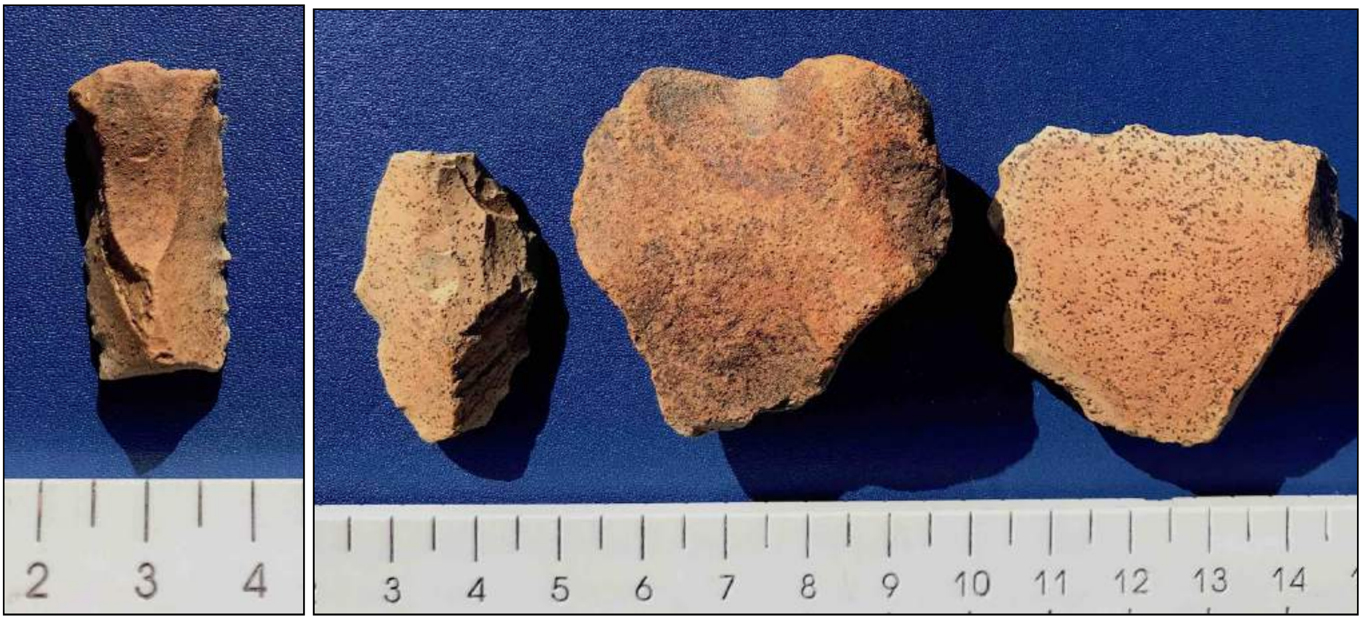

Figure 6.4: OY15 and OY16

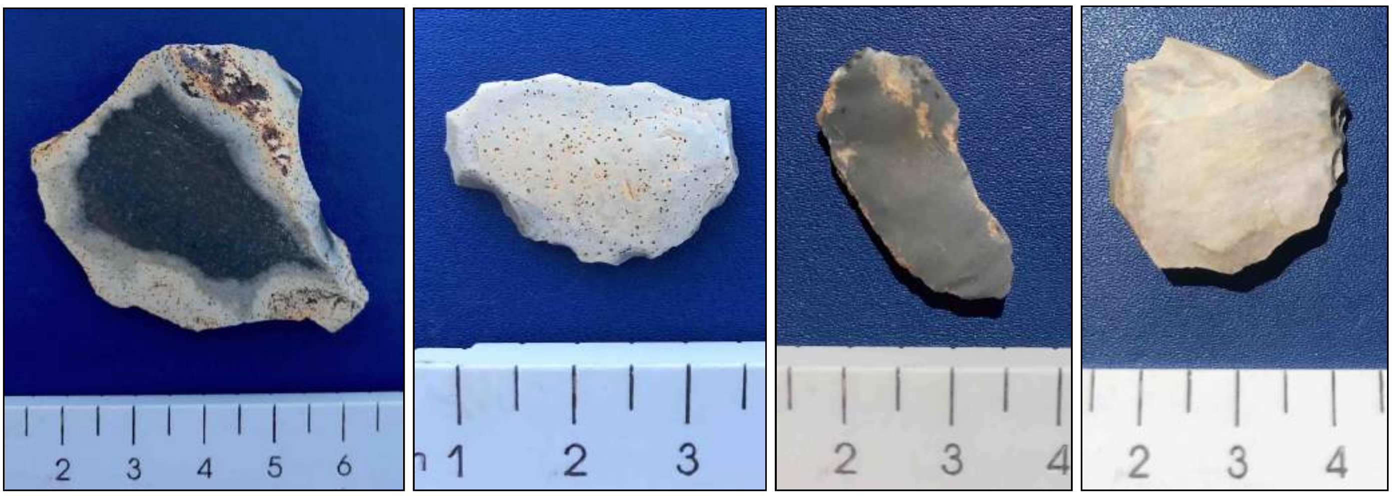

Figure 6.5 OY13, OY18, OY20 and OY21

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Figure 6.6 OY17

Figure 6.7 OY25, OY27 and OY30

Figure 6.8 OY32

Figure 6.9 OY33, OY36 and OY37

Figure 6.10 OY38, OY39 and KB24

5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

5.1 Assessment of impact to Archaeological Resources

Based on the assessment completed, the area proposed for development has an overall low archaeological sensitivity. It is unlikely that the proposed development of the 132kV overhead power line and substations will negatively impact on significant archaeological heritage as the footprint of the power line and substation infrastructure is limited.

Despite the abundance of diffusely scattered archaeological material, no intact and cohesive sites were found that have not been significantly altered through erosion and deflation in the exposed plains covering much of this route.

The survey has provided a very good account of the range of archaeological material that is present in the area and is entirely consistent with the previous studies for the wind and solar farms that are proposed or already constructed.

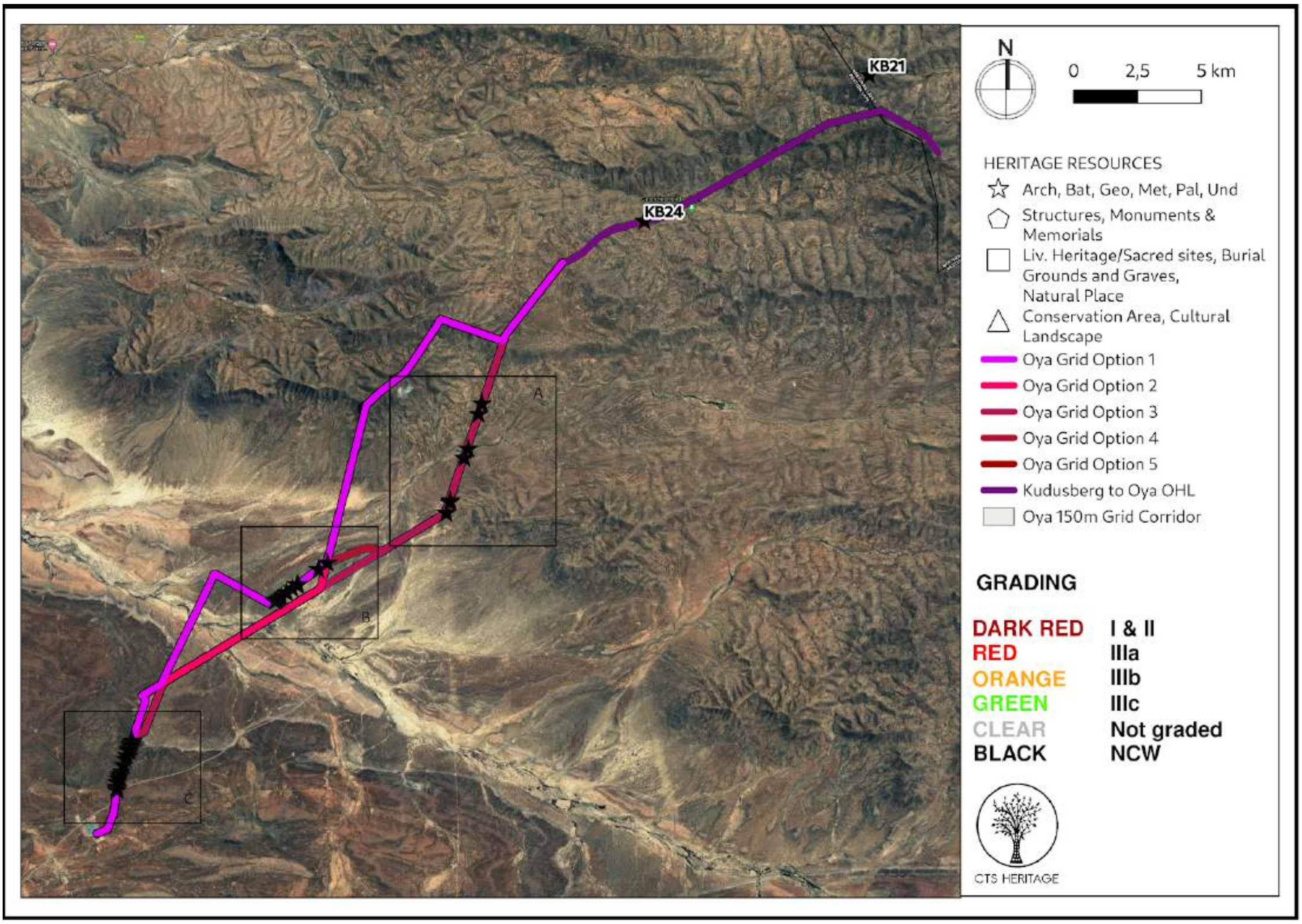

Figure 7: Map of heritage resources identified during the field assessment relative to the proposed development footprint

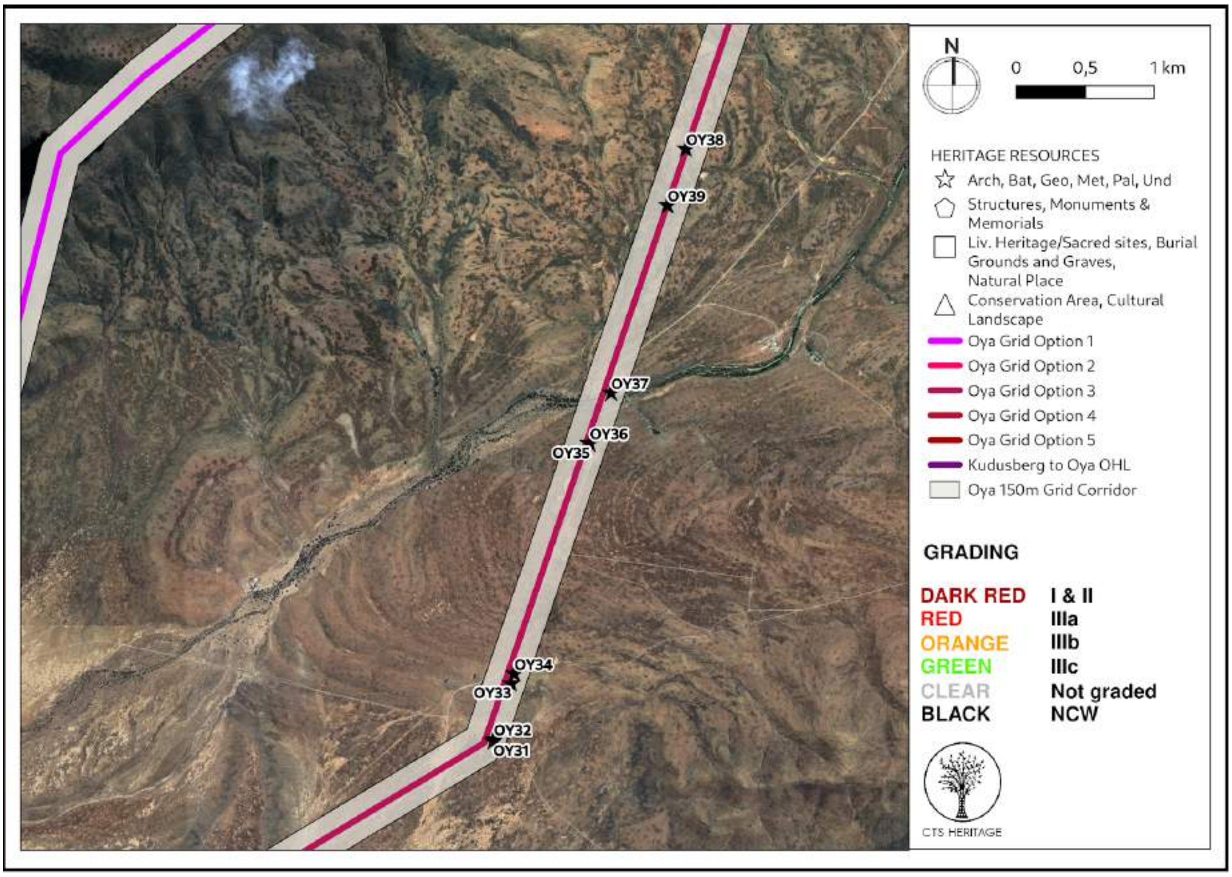

Figure 7.1: Inset A

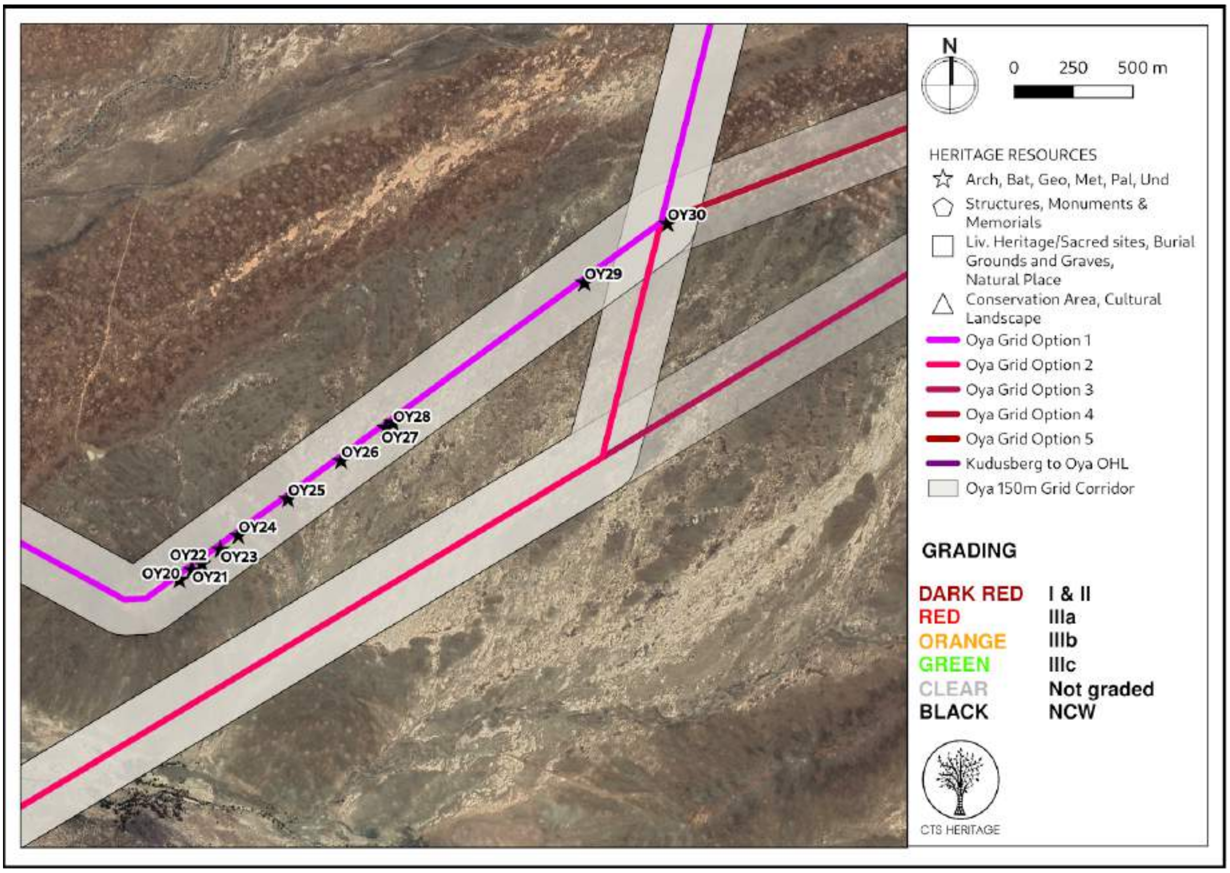

Figure 7.2: Inset B

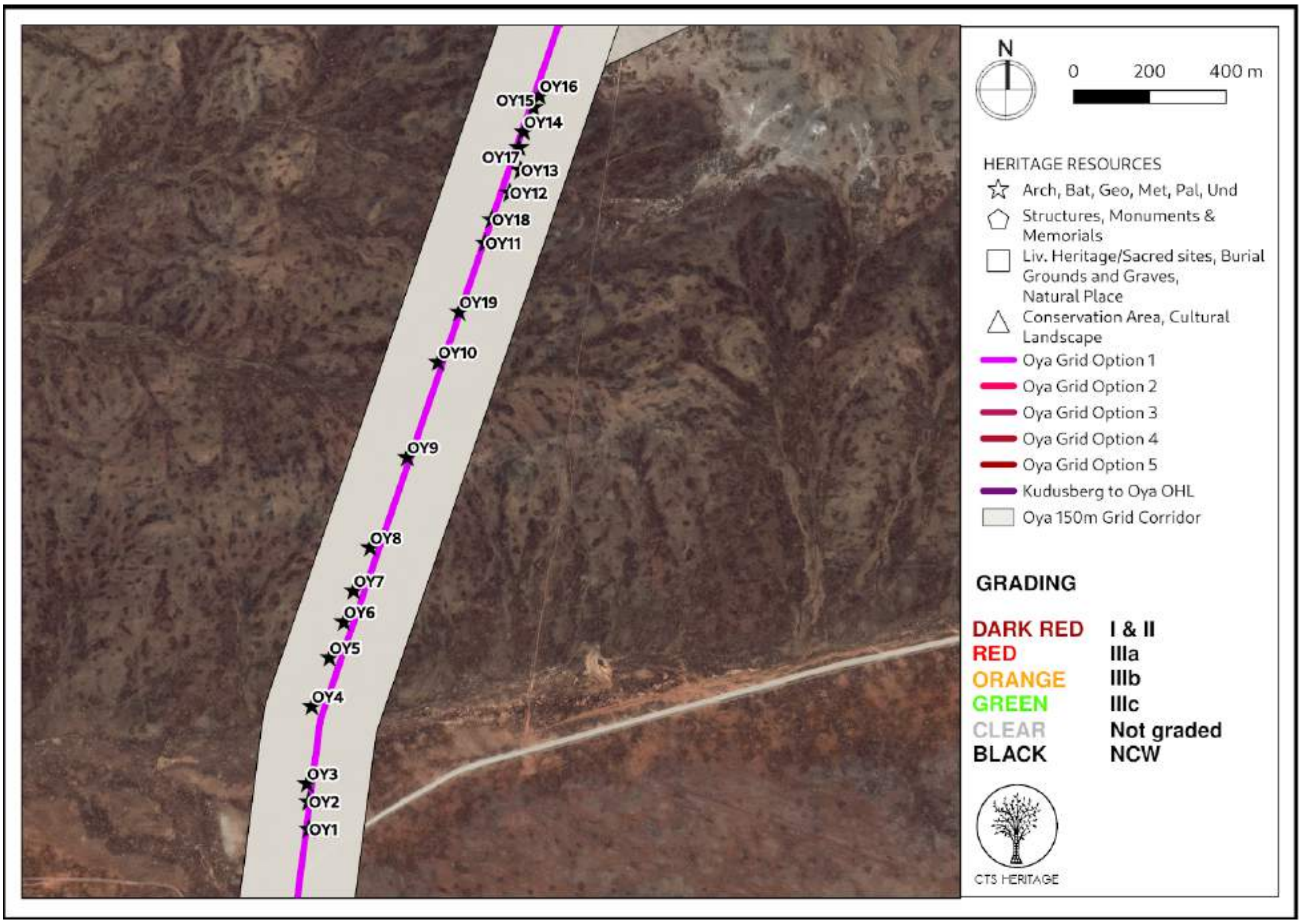

Figure 7.3: Inset C

6. CONCLUSION AND RECOMMENDATIONS

Based on the assessment completed, the area proposed for development has an overall low archaeological sensitivity. It is unlikely that the proposed development of the 132kV overhead power line and substations will negatively impact on significant archaeological heritage as the footprint of the power line and substation infrastructure is limited.

Despite the abundance of diffusely scattered archaeological material, no intact and cohesive sites were found that have not been significantly altered through surface deflation and erosion in the exposed plains covering much of this route. No mitigation is required prior to construction. Alternative 4 is preferred by the developer, and in light of the above information, also in terms of impacts to archaeological resources. The proposed development is unlikely to have a negative impact on significant archaeological resources situated within the corridor for the proposed Oya OHL and substations. The proposed layout is acceptable from an archaeological perspective and should be approved as part of the EA on condition that the proposed mitigation measures including buffer areas and no-go areas are implemented.

Should any significant archaeological resources be identified during the course of development, work must cease and HWC must be contacted regarding an appropriate way forward.

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7. REFERENCES

Heritage Impact Assessments				
Nid	**Report Type**	**Author/s**	**Date**	**Title**
8180	AIA Phase 1	Jayson Orton	01/02/2006	ARCHAEOLOGICAL IMPACT ASSESSMENT FOR THE CONSTRUCTION OF A DAM ON THE VERLORENVLEI FARM (VERLORENVALLEY 344) NEAR TOUWSRIVIER
8181	AIA Phase 1	Jayson Orton	29/09/2009	HERITAGE STATEMENT FOR THE PROPOSED VERLORENVLEI DIVERSION CANAL, CERES MAGISTERIAL DISTRICT, WESTERN CAPE
6644	AIA Phase 1	Jonathan Kaplan	29/09/2009	ARCHAEOLOGICAL IMPACT ASSESSMENT PROPOSED DEVELOPMENT ERF 660 DE DOORNS, WESTERN CAPE PROVINCE
186697	Desktop AIA	Foreman Bandama, Shadrack Chirikure	01/08/2014	An Archaeological Scoping and Assessment report for the proposed Gamma (Victoria West, Northern Cape) - Kappa (Ceres – Western Cape) 765Kv (2) Eskom power transmission line
329647	HIA Phase 1	Dave Halkett	15/06/2012	HERITAGE IMPACT ASSESSMENT OF THE IMPACTS RESULTING FROM THE RAISING OF THE EXISTING KEEROM DAM, SITUATED BETWEEN MONTAGU AND TOUWS RIVER, WESTERN CAPE
359488	Heritage Screener	Mariagrazia Galimberti, Kyla Bluff, Nicholas Wiltshire	09/03/2016	Brandvalley Wind Energy Facility
53187	HIA Phase 1	Timothy Hart, Lita Webley	01/03/2011	HERITAGE IMPACT ASSESSMENT PROPOSED WIND ENERGY FACILITY
337370	PIA Phase 1	Duncan Miller	01/03/2011	Palaeontological Impact Assessment Proposed Roggeveld Wind Energy Facility
356316	Heritage Screener	Mariagrazia Galimberti, Kyla Bluff, Nicholas Wiltshire	02/02/2016	Heritage Screener CTS15_015b EOH Brandvalley Wind Energy Facility
356318	Heritage Screener	Mariagrazia Galimberti, Kyla Bluff, Nicholas Wiltshire	01/02/2016	Heritage Screener CTS15_015a EOH Rietkloof Wind Energy Facility
364162	PIA Phase 1	John E Almond	01/04/2016	PALAEONTOLOGICAL HERITAGE ASSESSMENT: COMBINED DESKTOP & FIELD-BASED STUDY - PROPOSED BRANDVALLEY WIND ENERGY FACILITY LAINGSBURG, WESTERN & NORTHERN CAPE PROVINCES
364163	AIA Phase 1	Celeste Booth	01/04/2016	A PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT (AIA) FOR THE PROPOSED BRANDVALLEY WIND ENERGY FACILITY (WEF) SITUATED IN THE KAROO HOOGLAND LOCAL MUNICIPALITY (NAMAKWA DISTRICT MUNICIPALITY), THE WITZENBURG LOCAL MUNICIPALITY (CAPE WINELANDS DISTRICT MUNICIPALITY) AND LAINGSBURG LOCAL MUNICIPALITY (CENTRAL KAROO DISTRICT MUNICIPALITY).
4843	AIA Phase 1	Hilary Deacon	28/03/2008	Archaeological Impact Assessment: Proposed Breede Valley De Doorns Housing Project

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514990	HIA Phase 1	Katie Smuts, Emmylou Bailey, Madelon Tusenius, John Almond	29/10/2018	HERITAGE IMPACT ASSESSMENT Basic Assessment for the Proposed Development of the 325MW Kudusberg Wind Energy Facility and associated infrastructure, between Matjiesfontein and Sutherland in the Western and Northern Cape Provinces: BA REPORT
375379	AIA Phase 1	Hugo Pinto, Katie Smuts	24/10/2011	Preliminary Archaeological Survey of Karoopoort Farm

Additional References:

Hart, T. et al. (2016). **HERITAGE IMPACT ASSESSMENT (SCOPING) FOR THE PROPOSED KOLKIES WIND ENERGY FACILITY AND ASSOCIATED GRID CONNECTION TO BE SITUATED IN THE SOUTHERN TANKWA KAROO.** (Assessment conducted under Section 38 (8) of the National Heritage Resources Act (No. 25 of 1999) as part of an EIA). For Arcus Consulting. Unpublished and not submitted.

Hart, T. et al. (2016). **HERITAGE IMPACT ASSESSMENT (SCOPING) FOR THE PROPOSED KAREE WIND ENERGY FACILITY AND ASSOCIATED GRID CONNECTION TO BE SITUATED IN THE SOUTHERN TANKWA KAROO.** (Assessment conducted under Section 38 (8) of the National Heritage Resources Act (No. 25 of 1999) as part of an EIA). For Arcus Consulting. Unpublished and not submitted.

Shaw, Matthew & Ames, Christopher & Phillips, Natasha & Chambers, Sherrie & Dosseto, Anthony & Douglas, Matthew & Goble, Ron & Jacobs, Zenobia & Jones, Brian & Lin, Sam & Low, Marika & Mcneil, Jessica-Louise & Nasoordeen, Shezani & O'driscoll, Corey & Saktura, Rosaria & Sumner, T. & Watson, Sara & Will, Manual & Mackay, Alex. (2020). **The Doring River Archaeology Project: Approaching the Evolution of Human Land Use Patterns in the Western Cape, South Africa.**

Smith, Andrew B., and Michael R. Ripp. "**An Archaeological Reconnaissance of the Doorn/Tanqua Karoo.**" The South African Archaeological Bulletin, vol. 33, no. 128, 1978, pp. 118–133

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APPENDIX 2: Palaeontological Assessment

PALAEONTOLOGICAL SPECIALIST STUDY

In terms of Section 38(8) of the NHRA

Proposed development of the 132kV Oya Overhead Power Line near Matjiesfontein, Western and Northern Cape Provinces

Prepared by

Dewald Wilken

and

CTS HERITAGE

In Association with

Oya Energy (Pty) Ltd

October 2020

THE INDEPENDENT PERSON WHO COMPILED A SPECIALIST REPORT OR UNDERTOOK A SPECIALIST PROCESS

I, **Dewald Wilken** as the appointed independent specialist hereby declare that I:

• act/ed as the independent specialist in this application;

• regard the information contained in this report as it relates to my specialist input/study to be true and correct, and

• do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2010 and any specific environmental management Act;

• have and will not have no vested interest in the proposed activity proceeding;

• have disclosed, to the applicant, EAP and competent authority, any material information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations, 2010 and any specific environmental management Act;

• am fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations, 2010 (specifically in terms of regulation 17 of GN No. R. 543) and any specific environmental management Act, and that failure to comply with these requirements may constitute and result in disqualification;

• have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;

• have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;

• have ensured that the names of all interested and affected parties that participated in terms of the specialist input/study were recorded in the register of interested and affected parties who participated in the public participation process;

• have provided the competent authority with access to all information at my disposal regarding the application, whether such information is favorable to the applicant or not; and

• am aware that a false declaration is an offence in terms of regulation 71 of GN No. R. 543.

Signed:

Name: Dewald Wilken

Date: 29 October 2020

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16 Edison Way, Century City, Cape Town, 7441
Tel: (021) 0130131 **Email:** info@ctsheritage.com **Web:** www.ctsheritage.com

EXECUTIVE SUMMARY

Oya Energy (Pty) Ltd is proposing to construct a 132kV overhead power line and 33/132kV substations near Matjiesfontein in the Western and Northern Cape Provinces. A palaeontological Impact assessment was conducted to comply with the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA).

This power line and substations will be installed over The Abrahamskraal Formation of the Beaufort Group, the Waterford Formation, Skoorsteen Formation, Tierberg Formation, Prince Albert Formation of the Ecca Group, and the Dwyka Group.These formations range from highly sensitive to not sensitive on the Palaeontological sensitivity Map.

Although the Abrahamskraal formation is highly sensitive, as it could contain the Tapinocephalus Assemblage Zone, fossils in this area are rare and unpredictably located. The chance of finding a fossil in the area during development is low, but possible. For this reason, a Chance Fossil Find Procedure is added to the end of this report. As far as the palaeontology is concerned the project may proceed.

CONTENTS

1. INTRODUCTION

1.1 Background Information on Project

Oya Energy (Pty) Ltd (hereafter referred to as "Oya Energy") is proposing to construct a 132kV overhead power line and 33/132kV substations near Matjiesfontein in the Western and Northern Cape Provinces (hereafter referred to as the "proposed development"). The overall objective of the proposed development is to feed the electricity generated by the proposed Oya Energy Facility (part of separate on-going EIA process with DEFF Ref No.: 14/12/16/3/3/2/2009) as well as potentially the nearby developments into the national grid. The grid connection and substations (this application) requires a separate EA, in order to allow the EA to be handed over to Eskom. The proposed power line and substation development is located in the Witzenberg and Karoo Hoogland Local Municipalities respectively, which fall within the Cape Winelands and Namakwa District Municipalities.

The entire extent of the proposed overhead power line and substation development is located within one (1) of the Strategic Transmission Corridors as defined and in terms of the procedures laid out in GN No. 1131, namely the Central Corridor. The proposed overhead power line and substation project will irrespective of this be subject to a BA process in terms of the NEMA (as amended) and Appendix 1 of the EIA Regulations, 2014 promulgated in Government Gazette 40772 and GN R326, R327, R325 and R324 on 7 April 2017. The competent authority for this BA is the DEFF.

At this stage, it is anticipated that the proposed development will include a 132kV power line and 33/132kV substations to feed electricity generated by the renewable energy facilities owned by the applicant into the national gird at the Kappa substation.

The type of power line towers being considered at this stage include both lattice and monopole towers and it is assumed that these towers will be located approximately 200m to 250m apart. The towers will be up to 45m in height, depending on the terrain, but will ensure minimum overhead line clearances from buildings and surrounding infrastructure.

300m wide power line corridors (i.e. 150m on either side) are being assessed to allow flexibility when determining the final route alignment. The proposed power line however only requires a 31m wide servitude and as such, this servitude would be positioned within the assessed corridor.

The size of the proposed Oya and Kudusberg substation and O&M building sites will be approximately 4 hectare (ha) each. It should be noted that only one (1) route is possible for the section of the proposed power line which connects the Kudusberg on-site substation (authorised under 14/12/16/3/3/1/1976/AM1) to the Oya on-site substation (i.e. Kudusberg to Oya). No alternatives can therefore be provided for this section of the power line. The Kudusberg to Oya power line corridor route is approximately 16.6km in length and runs from the Kudusberg on-site substation along the RE/194, 1/158, RE/159, RE/156, 1/156 and RE/155 properties to the Oya on-site substation.

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Five (5) power line corridor route alternatives have however been provided for the section of the proposed overhead power line which connects the Oya on-site substation to the Kappa substation (i.e. Oya to Kappa). The above-mentioned alternatives are described below:

- **Power Line Corridor Alternative 1 (Oya to Kappa):** Approximately 34.14km in length and runs along the RE/155, RE/152, 2/152, RE/169, RE/243, 241, 240 and RE/244 properties to the Kappa substation
- **Power Line Corridor Alternative 2 (Oya to Kappa):** Approximately 32.43km in length and runs along the RE/155, 3/155, RE/152, 2/152, RE/169, 13/168, 5/168, 1/243, RE/243, 241 and 240 properties to the Kappa substation
- **Power Line Corridor Alternative 3 (Oya to Kappa):** Approximately 30.56km in length and runs along the RE/155, 4/168, 13/168, 5/168, 1/243, 240 and RE/244 properties to the Kappa substation
- **Power Line Corridor Alternative 4 (Oya to Kappa):** Approximately 32.94km in length and runs along the RE/155, 4/168, 13/168, RE/169, RE/243, 241 and 240 properties to the Kappa substation
- **Power Line Corridor Alternative 5 (Oya to Kappa):** Approximately 32.26km in length and runs along the RE/155, RE/152, 2/152, RE/169, 5/168, 1/243 and 240 properties to the Kappa substation

The power line corridor routes mentioned above provide different route alignments contained within an assessment corridor of up to approximately 300m wide. This is to allow for flexibility to route the power line within the authorised corridors.

- ‘**No-go’ alternative:** The ‘no-go’ alternative is the option of not fulfilling the proposed project as well as prevent the connection of the energy development in the area to feed electricity into the national grid. This alternative would result in no environmental impacts from the proposed project on the site or surrounding local area. It provides the baseline against which other alternatives are compared and will be considered throughout the report. Implementing the ‘no-go’ option would entail no development. The affected properties are currently not used for agricultural activities, although they are suitable for very low-level grazing.

The ‘no-go’ option is a feasible option, however, this would prevent the proposed development from contributing to the environmental, social and economic benefits associated with the development of the renewables sector

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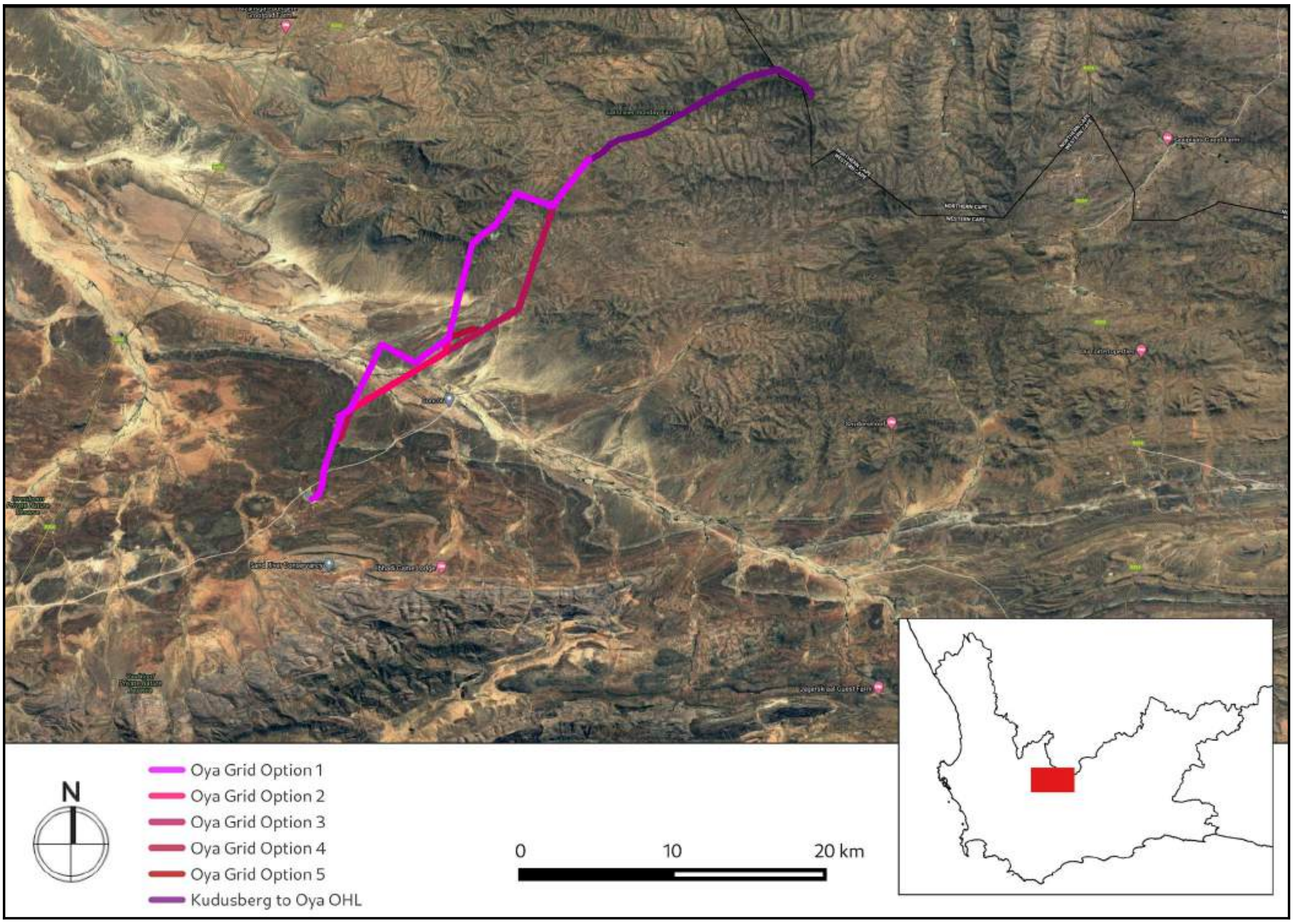

Figure 1. Google Earth© satellite image of the proposed development area

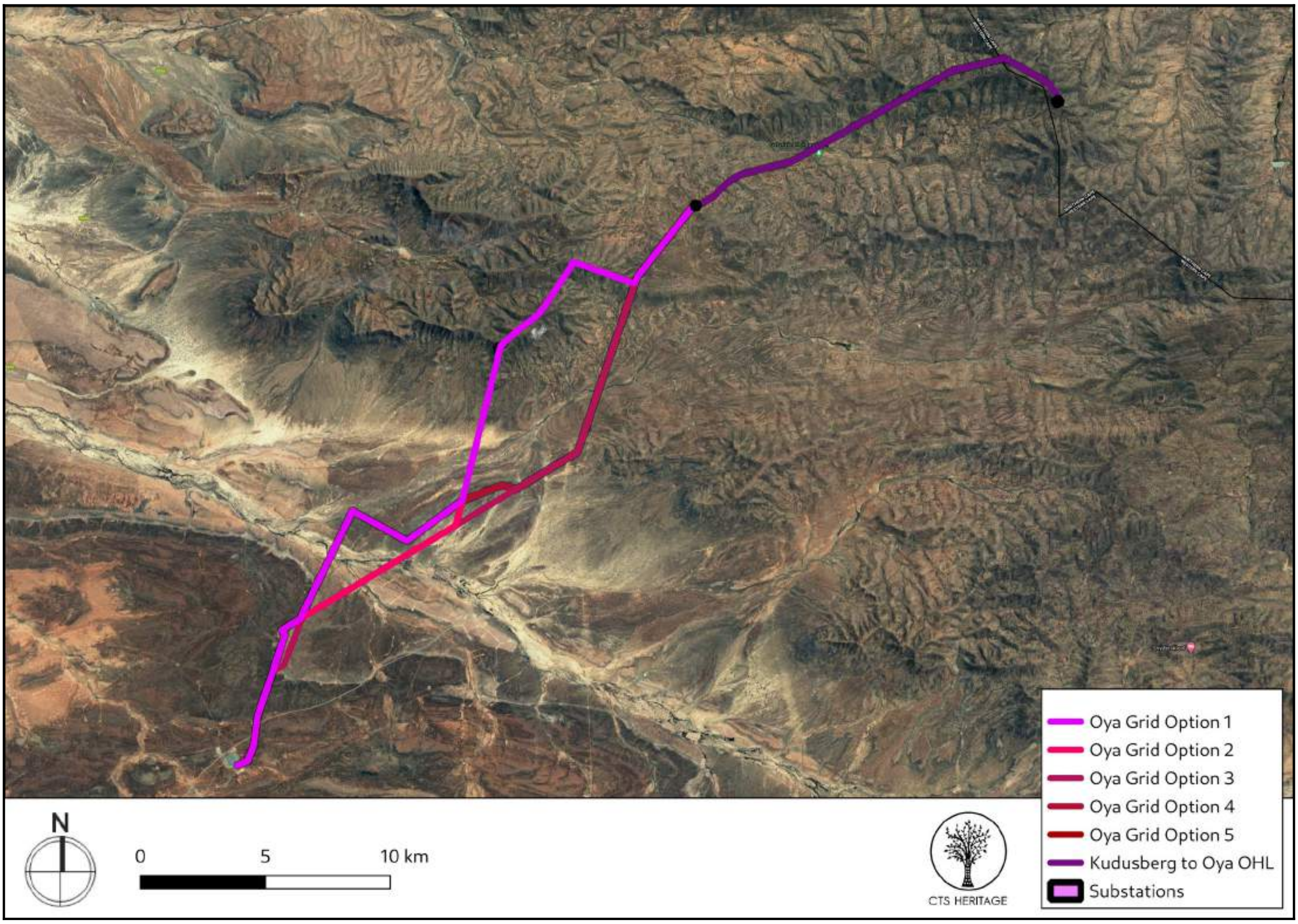

Figure 2. Google Earth© satellite image of the proposed development.

2. METHODOLOGY

2.1 Purpose of Palaeontological Study

According to the SAHRIS Palaeosensitivity Map, the area proposed for development is underlain by sediments that are of low, moderate, high and very high palaeontological sensitivity (Figure 3). Based on the very high palaeontological sensitivities indicated, it is recommended that a palaeontological field assessment of the areas proposed for development is completed and anticipated impacts to such resources assessed. The resulting Palaeontological Specialist Assessment will be integrated into the Heritage Impact Assessment completed for the proposed development and will be submitted to SAHRA and HWC for comment in terms of section 38(8) of the NHRA.

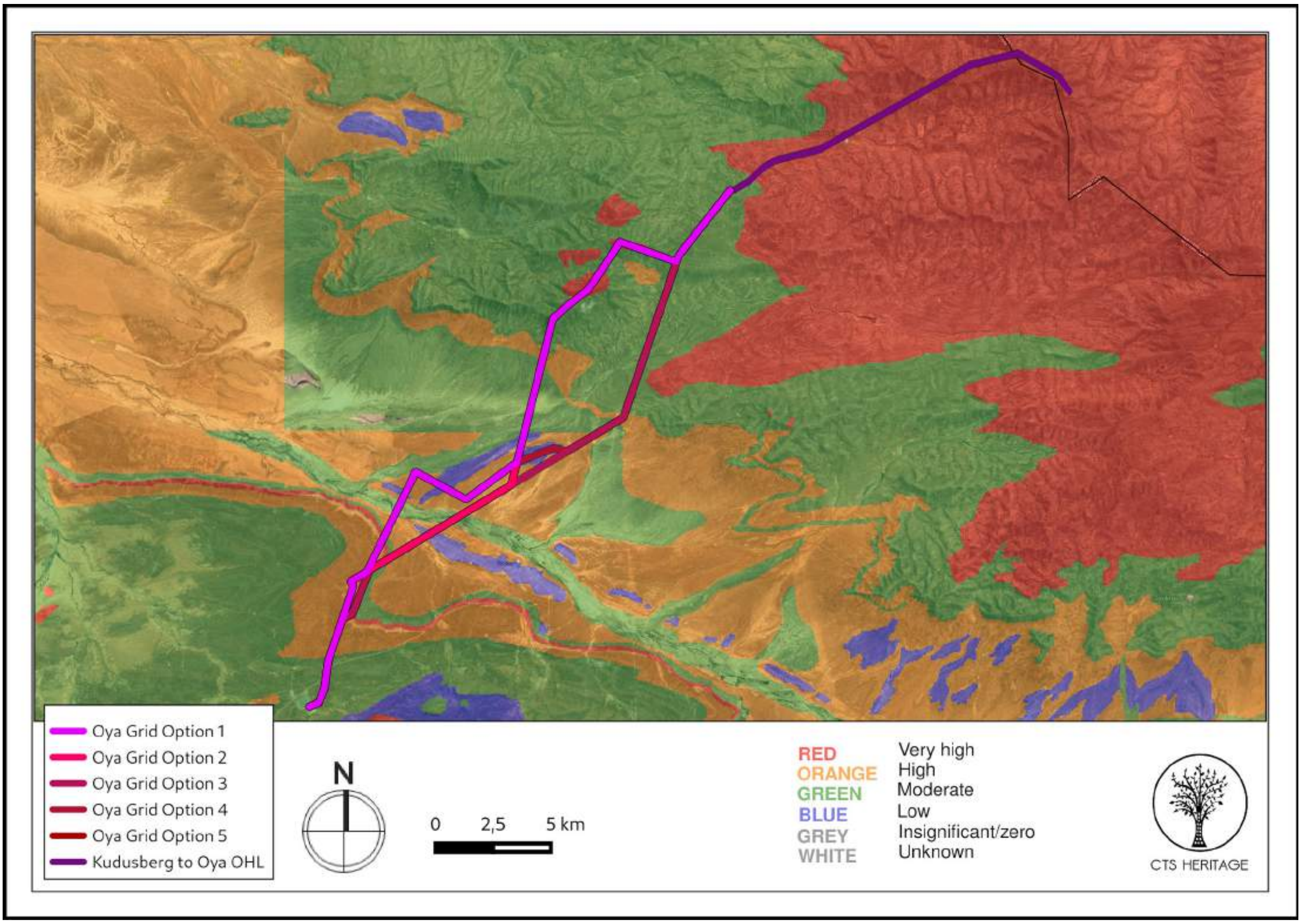

Figure 3. Palaeosensitivity Map. Indicating Moderate to High fossil sensitivity underlying the study area

2.2 Study approach

This PIA report provides a record of the observed or inferred palaeontological heritage resources within the broader project study area. The identified resources have been assessed to evaluate their heritage significance in terms of the grading system outlined in Section 3 of the NHRA (Act 25 of 1999). Recommendations for specialist palaeontological mitigation are made where this is considered necessary. The report is based on (1) a review of the relevant scientific literature, (2) previous palaeontological impact assessments in the broader study region (*e.g.* Almond 2008; 2015, 2020) (3) published geological maps, project data, Google Earth satellite imagery and accompanying sheet explanations, and (4) a field study of the area conducted from 18 – 22 October 2020.

3. GEOLOGICAL AND PALAEONTOLOGICAL CONTEXT OF THE STUDY AREA

According to the extract from the Council for GeoScience Map 3220 for Sutherland (Figure 4) and Map 3320 for Ladismith (Figure 5), the area proposed for development is underlain by sediments of the Karoo Supergroup assigned to the Dwyka, Ecca and Witteberg Groups in addition to Quaternary Sands. The Dwyka Group is known to preserve trace fossils, organic-walled microfossils, rare marine invertebrates (*e.g.* molluscs), fish, vascular plants, predominantly interglacial and post-glacial trace fossil assemblages, possibility of body fossils (*e.g.* molluscs, fish, plants). The Ecca Group is known to conserve non-marine trace fossils, vascular plants (including petrified wood) and palynomorphs of *Glossopteris* flora, mesosaurid reptiles, fish (including microvertebrate remains, coprolites), crustaceans, sparse marine shelly invertebrates (molluscs, brachiopods), microfossils (radiolarians *etc.*) and insects. The Witteberg Group is very palaeontologically sensitive and is known to conserve trace fossils, vascular plants, sparse shelly invertebrates and fish (brachiopods, bivalves *etc.*). In the palaeontological assessment completed for the Oya Energy Facility, Almond (2020) concluded that the Oya project area has low paleontological sensitivity overall, but with small unpredictable areas of high to very high sensitivity. It is therefore likely that the proposed development will impact on significant palaeontological heritage and as such, an assessment of impacts to palaeontological resources is recommended for the portions of the proposed OHL alternatives that have not been previously assessed. Table 1 shows a summary of the geology and palaeontology directly underlying the OHL development.

Table 1. a Summary of the Groups and Formations, with lithology, age and known fossil occurrences, underlying the OHL and substation development.

Symbol	Group	Formation	Lithology	Approximate Age	Palaeontology
Pa	Beaufort, Adelaide Subgroup	Abrahamskraal	Green to blue-grey mudstones	266 – 250 Ma	Bioturbation, Trance fossils ~Tapinocephalus Assemblage Zone
Pko	Ecca	Waterford Fm. (Old Koedoesberg Fm.)	Shales, siltstones, sandstones.	290 – 266 Ma	Wave ripples, silicified wood, Trace fossils.
Ps		Skoorsteensberg	Sandstone interbedded with shale		Trace fossils, Glossopteris
Pt		Tierberg	Dark shales, yellow tuffs.		Invertebrate fossils, sponge spicules, trace fossils, fish scales
Pp		Prince Albert	Shales, wackes, arenite.		Marine invertebrates, fish (Dwykaselachus *oosthuizeni*), coprolites.
C-Pd	Dwyka		Diamictites	290 – 317 Ma	Wood, trace fossils, invertebrates, polen.

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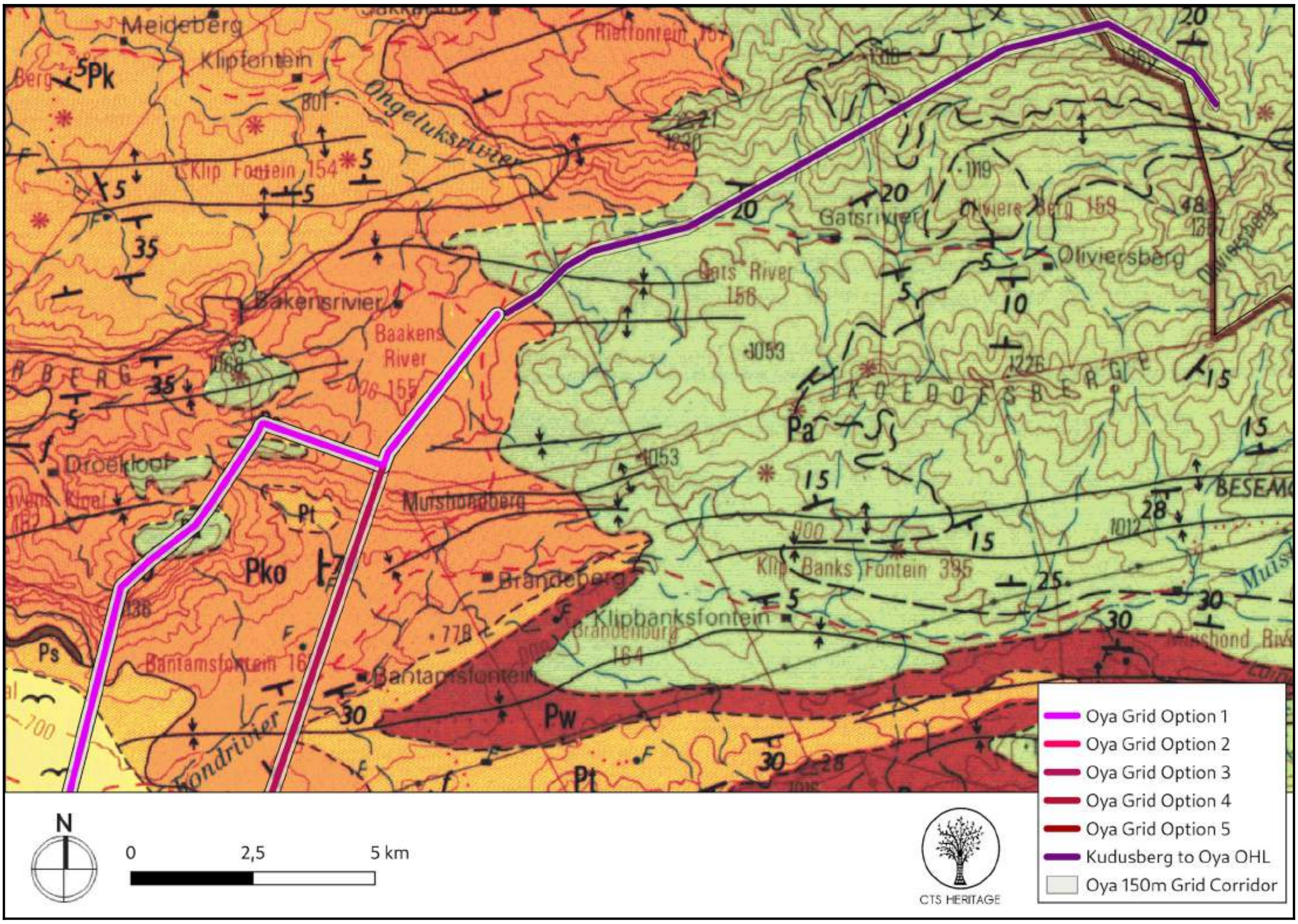

Figure 4. Geology Map. Extract from the CGS 3220 Sutherland Map indicating that the northern portion of the development area is underlain by sediments of the Karoo Supergroup assigned to the Tierberg (Pt) and Koedoesberg (Pko) formations of the Ecca Group, as well as the Abrahamskraal Formation (Pa) of the Beaufort Group and Quaternary Sands

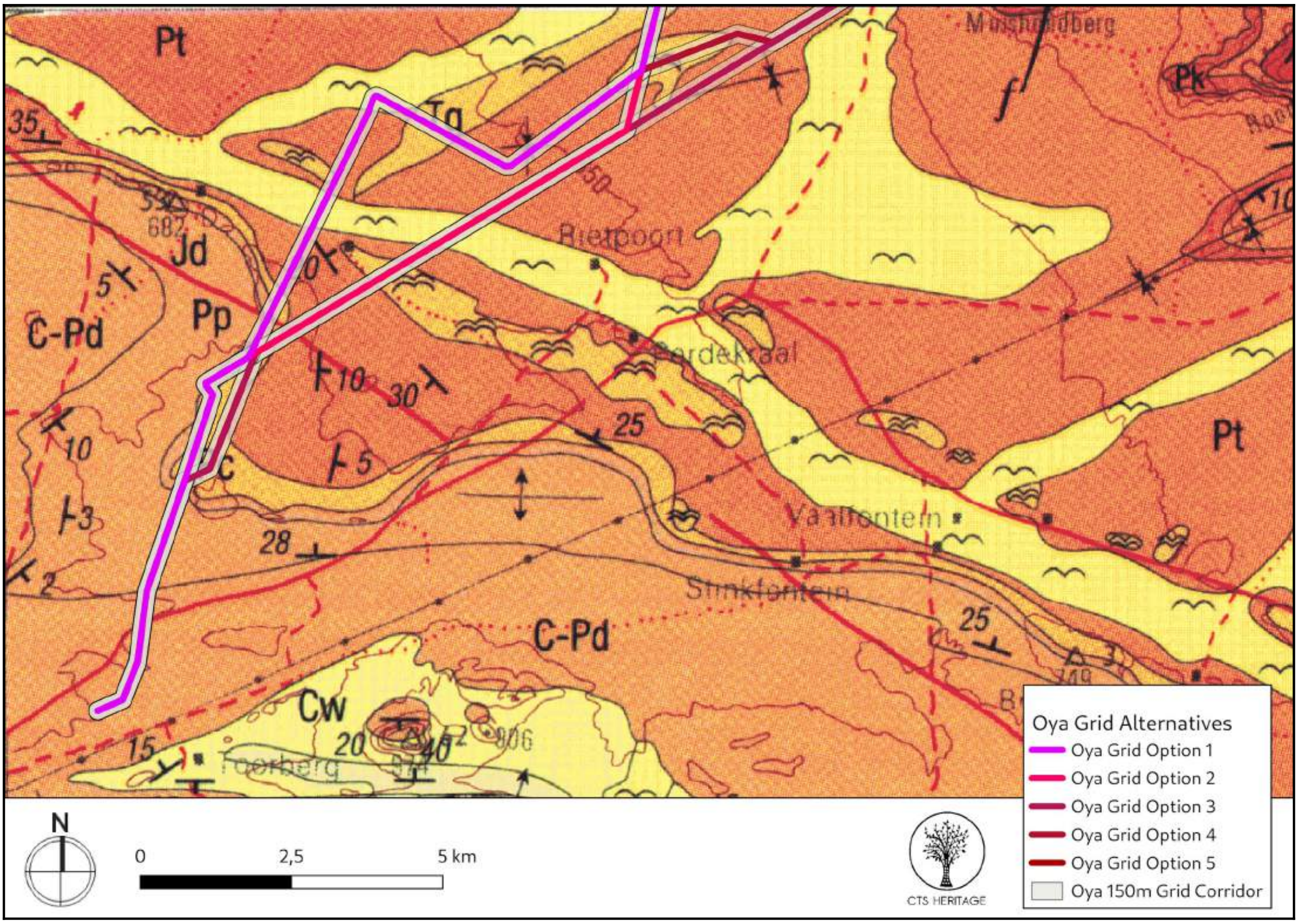

Figure 5. Geology Map. Extract from the CGS 3320 Ladismith Map indicating that the development area is underlain by sediments of the Karoo Supergroup assigned to the Dwyka group (C-Pd), as well as the Prince Albert (Pp), Tierberg (Pt) and Collingwood (Pc formations of the Ecca Group, as well as the Waaipoort (Cw) formation of the Witteberg Group and Quaternary Sands (Tg)

The following section will provide a summary of the geology and palaeontology of the formations that underlie the OHL and substation development.

3.1. Beaufort Group

3.1.1. Abrahamskraal Formation

The rocks of the Abrahamskraal Formation are generally green-grey to blue-grey mudstones, although grey-red, red-brown, or purple mudstones are also found. Calcareous nodules are present, these nodules tend to weather out brown. Within these mudstone layers fine grained green-grey sandstones are found, usually showing an upward fining trend. These sandstones can range from metres to tens of metres in thickness in some areas. These sandstone layers are important stratigraphic markers for geologists and palaeontologist. (Manson, (2007). These mudstones are also interbedded with siltstone beds. These sedimentary rocks tend to reveal a depositional environment in a retro-arc foreland basin (Karoo Basin), where sediment was deposited in a low energy alluvial plain flowing to the north. As indicated by fluvial and lacustrine sediments. (Johnson et al. 2006)

The lower part of the Formation is seen as deltaic (green-grey, blue-grey mudstones) while the upper part of the Formation is seen as fully terrestrial (often indicated by the red mudstones).

The Abrahamskraal Formation correlates well with the Tapinocephalus Assemblage Zone. Therapsids, pareiasaur reptiles and fish fossils have been sparsely reported in this Formation. Plant material (e.g. sphenophyte ferns, fossil wood), freshwater invertebrates (principally smooth-shelled bivalves; and a range of trace fossils including tetrapod trackways (e.g. temnospondyl amphibians, therapsids) have been found.

3.2. Ecca Group

3.2.1. Waterford Formation (previously Carnarvon Fm /Koedoesberg Fm)

The thickness of the Waterford Formation fluctuates between 200m and 800m. The Formation consists of fine-grained sandstones and mudrock or clastic rhythmite units. The individual sandstone units have an average thickness of 6m, with 18m being the maximum. These units are mostly structureless, but horizontal lamination, low angle crossbedding and ripple lamination is found in some areas. Oscillation ripples are more common. The Formation is characterised by ball and pillow structures, as well as other water escape features. Thin mud-flake conglomerates area occasionally found. Brown weathering calcareous concretions can be found in the sandstone and mudstone. Wave ripples indicate a shallow sedimentary environment, in a delta front area / storm dominated shelf. (Johnson et al. 2006)

The Formation is mostly known for petrified wood and other plant material of the Glossopteris Flora (e.g. Glossopteris, Phyllotheca). Large fossil logs (“Dadoxylon”) showing seasonal growth rings are found. Two different genera of gymnospermous woods, Prototaxoxylon and Australoxylon, have been identified (Bamford 1999, 2004). Rolled vertebrate bone fragments, low intensity bioturbation, and trace fossils also found.

3.2.2. Skoorsteen Formation

The Skoorsteen Formation is a lens shaped arenaceous unit. It consists of five sandstone rich units of about 60m in thickness, this brings the total thickness of the Skoorsteen Formation to about 250m. These sandstone units are separated by shale units. A single sandstone is usually about 6m thick, with well-defined upper and lower boundaries. These sandstones are mostly massive, but have been found to contain convolute bedding, rip-up clasts, load clast, dewatering structures, climbing ripple lamination, and sole marks of both physical and biogenic origin. Typical Bouma turbidite sequences area common indicating an unstable delta front slope as a depositional environment of about 500m under water. Trace fossils are found in the form of horizontal feeding traces. Plant fragments of Glossopteris like flora is common. (Johnson et al. 2006)

3.2.3. Tierberg Formation

The Tierberg Formation ranges in thickness form 700m in the west to 350m in the north east. It is a predominantly argillaceous Formation which grades upwards into the Waterford Formation. These grey mudrock and fine sandstones where deposited of shore in an inland sea, with influences of offshore fans, and distal pro-deltaic deposition. There is some occurrence of yellow tuffaceous layers of up to 10cm thick in the lower part of the succession.

The Tierberg Formation is known for a wide range of both vertebrate and invertebrate trace fossils, these include, fish swimming trails (Undichna), crustacean trackways (Umfolozia), arthropod feeding marks (Vadoscavichna) and resting traces (Quadrispinichna / Broomichnium). Boddy fossils are mostly found in the form of plant remains of glossopteris including fossilised wood. Some micro vertebrate remains have been reported. Prinsloo (1989)

3.2.4. Prince Albert Formation

This formation is confined to the south western half of the karoo basin. The thickness of the formation is very variable and range from 10 to 300m. The Formation is divided into a northern and southern facies. The northern facies contain grey to olive green micaceous shales, grey silty shales, and carbonaceous shales, arenites and wackes. It shows a pronounced transition into the underlying glacial deposits. It also contains ice rafted debris, and fossils of cephalopods, lamellibranches, brachiopods, fish remains, coprolites and plant matter.

The southern facies consist of dark grey, pyrite bearing splintery shales, dark coloured cherts, carbonate concreations and phosphatic nodule lenses. Fossils remains of shark, sponge spicules, foraminifera, radiolaria and acritarchs have be found. (Johnson et al. 2006)

3.3 Dwyka Group

Dwyka rest on glaciated Precambrian bedrock. The main sedimentary environment is thought to be in a marine basin. The Group Is known for a massive diamictite facies, these facies contain highly compressed, mostly clast rich diamictite. It attains its greatest thickness in the south where it reaches 800m. The Dwyka Group is known for low diversity plant fossils due the cold glacial environment during deposition. Coprolites fish trace fossils, crustaceans and arthropods have been found in this Group. (Johnson et al. 2006)

4. PALAEONTOLOGICAL HERITAGE RESOURCES

4.1. Review of regional palaeontology

The proposed development spans over three Groups and five formations. All these formations could contain fossils. As seen in Table 1 these could include Plant fragments, silicified wood, multiple trace fossils, coprolites, crustaceans, arthropods and vertebrate bone fragments.

Of these formations the Abrahams kraal Formation is the most sensitive as it contains the Tapinocephalus Assemblage Zone (AZ) (see Figure 6 and Figure 7) which spans the middle part of the Abrahamskraal Formation. Vertebrate fossils of the Tapinocephalus AZ are not as common as in succeeding biozones and are usually found as individual specimens in the mudrock sequences in association with, and often enveloped by, brown-weathering calcareous nodular material. This faunal assemblage is mainly represented by small dicynodonts, large dinocephalians, pareiasaurs and pristerognathid therocephalians. The dinocephalians which consist of Synapsida and Therapsida dominated as one of the tetrapod groups in the Middle Permian. The Tapinocephalus Assemblage Zone (AZ) in the Main Karoo Basin holds the most abundant record of these dinocephalians. The top of the Abrahamskraal Formation marks the extinction of the dinocephalians. Their disappearance is one of the criteria that marks the beginning of the Pristerognathus AZ.

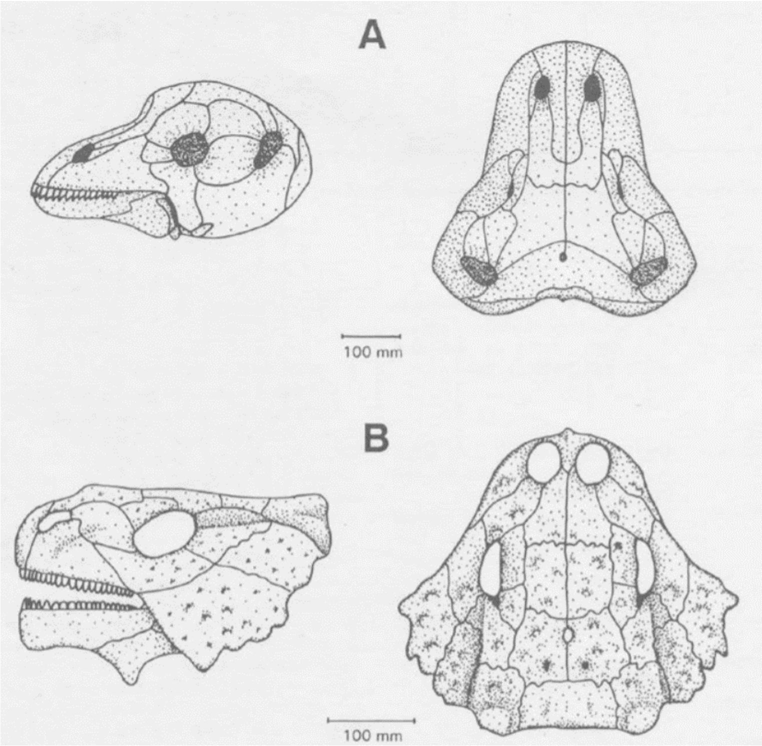

Figure 6 Lateral and dorsal views of biozons-defining fossils of the Tapinocephalus Assemlage Zone. A. Tapinocephalus; B. Bradysaurus modified after Boonstra, 1969 (Rossouw, L. 2019)

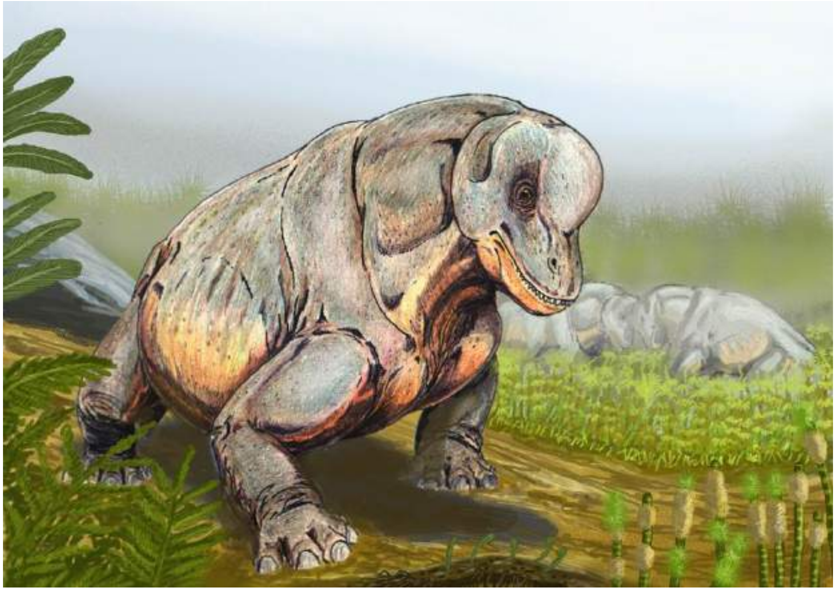

Figure 7 Artist rendition of Tapinocephalus

4.2. Summary of Palaeontological resources identified.

No significant fossils were identified during the field analysis. This is mostly due to the soils cover and lack of outcrop in the area as can be seen in Figure 8 and Figure 9. Fossils were only found in the Abrahamskraal Formation. These can be seen in Table 2. The fossils found were all silicified wood. None of the samples were found in situ.

Figure 8 Soil cover to the south of the proposed development.

Figure 9 Lack of outcrop to the south of the proposed development.

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Table 2 Summary of geology and palaeontological heritage significance

GPS	GEOLOGY	FOSSILS OBSERVED	COMMENTS	PHOTO
32°56'03.34"S 20°10'36.16"E	Abrahamskraal Formation	Silicified Wood	Not in situ	
32°59'38.86"S 20°09'19.23"E	Abrahamskraal Formation	Silicified Wood	Not in situ	
32°59'27.83"S 20°09'34.20"E	Abrahamskraal Formation	Silicified Wood	Not in situ	
32°57'57.33"S 20°10'27.62"E	Abrahamskraal Formation	Silicified Wood	Not in situ	

5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

The proposed development is underlain by potentially fossiliferous sediment of the Karoo Suppergroup. These include daltaic and marine deposits of the Waterford Formation, Tierberg Formation, Skoorsteen Formation, Prince Albert Formation, containing plant and trace fossils, crustaceans, and arthropods, the Dwyka Group glacial sediments, but most importantly the Abrahamskraal Formation with the Tapinocephalus Assemblage Zone. Scientifically valuable, well-preserved fossils are exceedingly rare in this area, with an unpredictable distribution. For this reason, it is unlikely that the development will have a significant effect on the area, provided that the chance fossil find procedure is followed in the possible case of a fossil being found.

Table 3 Impact Assessment Criteria

Criteria	**Category**	**Explanation**
Overall Nature	***Low***	Possible fossils in the construction footprint could be destroyed Impact will remain negligible if the Chance Fossil Find Procedure is followed
Type	***Direct***	The development will directly impact these resources
Extent	***Site***	Impact is limited to the OHL power line and substation area
Duration	***Permanent***	Likely impacts will affect the heritage resources identified permanently
Severity	***Low***	The site is partly located on very sensitive palaeontological strata but fossils in this Formation is Rare. Impact will remain negligible if the Chance Fossil Find Procedure is followed in the case of any fossil finds.
Reversibility	***Irreversible***	The impact cannot be reversed, regardless of the mitigation or rehabilitation measures.
Irreplaceable Loss	***Resource may be partly destroyed***	Partial loss or destruction of the resource might occur but can be mitigated if the Chance Fossil Find Procedure is followed.
Probability	***low***	The site is partly located on very sensitive palaeontological strata but fossils in this Formation is Rare. Impact will remain negligible if the Chance Fossil Find Procedure is followed in the case of any fossil finds.
Mitigation Potential	***High***	If the Chance Fossil Find Procedure is followed in the case of any fossil finds.
Impact Significance	***Negligible***	Impact significance will remain negligible if the Chance Fossil Find Procedure is followed

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6. ASSUMPTIONS AND UNCERTAINTIES

Based on the palaeontological record and the geology of the area it is assumed that the area contains plant, invertebrate and vertebrate fossils, trace fossils should also be common. These fossils are often found as individual specimens.

"The key assumption for this scoping study is that the existing geological maps and datasets used to assess site sensitivity are correct and reliable. However, the geological maps used were not intended for fine scale planning work and are largely based on aerial photographs alone, without ground-truthing. There is also an inadequate database for fossil heritage for much of the RSA, due to the small number of professional palaeontologist carrying out fieldwork in RSA. Most development study areas have never been surveyed by a palaeontologist.

These factors may have a major influence on the assessment of the fossil heritage significance of a given development and without supporting field assessments may lead to either:

- an underestimation of the palaeontological significance of a given study area due to ignorance of significant recorded or unrecorded fossils preserved there, or
- an overestimation of the palaeontological sensitivity of a study area, for example when originally rich fossil assemblages inferred from geological maps have in fact been destroyed by weathering, or are buried beneath a thick mantle of unfossiliferous "drift" (soil, alluvium etc.)." Groenewald (2016)

7. CONCLUSION AND RECOMMENDATIONS

The proposed OHL and substation development may proceed. It is unlikely that this construction will have a great effect on significant palaeontological heritage. Although the area has a rich occurrence of multiple fossil assemblages, fossil finds are often isolated as individuals. Fossils identified were all silicified wood. It is recommended that the responsible ECO monitor the material extracted during excavation.

Alternative 4 is preferred by the developer, and in light of the above information, also in terms of impacts to palaeontological resources. The proposed development is unlikely to have a negative impact on significant palaeontological resources situated within the corridor for the proposed Oya OHL and substations. The proposed layout is acceptable from a palaeontological perspective and should be approved as part of the EA on condition that the proposed mitigation measures including buffer areas and no-go areas are implemented.

Should important new fossil remains - such as insects, vertebrate bones and teeth, petrified wood, plant-rich fossil lenses or dense fossil burrow assemblages - be exposed during construction, the responsible Environmental Control Officer should alert HWC (i.e. Heritage Western Cape. Contact details: Waseefa Dhansay, 021 483 5959, waseefa.dhansay@westerncape.gov.za) as soon as possible. This is so that appropriate action can be taken in good time by a professional palaeontologist at the developer's expense. Palaeontological mitigation would normally involve the scientific recording and judicious sampling or collection of fossil material as well as of associated geological data (e.g. stratigraphy, sedimentology, taphonomy). The palaeontologist concerned with mitigation work will need a valid fossil collection permit from HWC and any material collected would have to be curated in an approved depository (e.g. museum or university collection).

All palaeontological specialist work should conform to international best practice for palaeontological fieldwork and the study (e.g. data recording fossil collection and curation, final report) should adhere as far as possible to the minimum standards for Phase 2 palaeontological studies recently developed by SAHRA (2013). These recommendations are summarized in tabular form in Appendix 1 (Chance Fossil Finds Procedure) and should be incorporated into the Environmental Management Programme (EMPr) for the proposed development.

8. REFERENCES

Almond, J.E. 2008a. Fossil record of the Loeriesfontein sheet area. Unpublished report for the Council for Geoscience, Pretoria, 32pp.

Almond, J.E. 2008b. Palaeozoic fossil record of the Clanwilliam sheet area. Unpublished report for the Council for Geoscience, Pretoria, 49pp.

Almond, J.E. 2015a. Proposed Perdekraal East Wind & Solar Renewable Energy Facility near Touwsrivier, Ceres Magisterial District, Western Cape Province. Palaeontological impact assessment: field study, 68 pp. Natura Viva cc, Cape Town.

Almond, J. E. 2016, SKA Core And Phase 1 Development Area, Great Karoo, Northern Cape – Plaeontological Herritage, Unpublished PIA, Natura Viva

Almond, J. E. 2020, Basic assessment for the proposed development of the 800MW Oya Solar Photovoltiaic Facility near Matjiesfontein in the Western Cape Province, Natura Viva

BAMFORD, M. 1999. Permo-Triassic fossil woods from the South African Karoo Basin. Palaeontologia africana 35, 25-40.

BAMFORD, M.K. 2004. Diversity of woody vegetation of Gondwanan southern Africa. Gondwana Research 7, 153-164

Bamford, M. 2019 Palaeontological Impact Assessment for the proposed construction of three residential townships in Kroonstad, Free State Province, Archaeological and Heritage Services Africa (Pty) Ltd

Day, M.O.; Güven. S.; Abdala; F.; Jirah; S. Rubidge, B.; Almond, J. 2015. Youngest dinocephalian fossils extend the Tapinocephalus Zone, Karoo Basin, South Africa S. Afr. j. sci. vol.111 n.3-4 Pretoria Mar./Apr. 2015 Evolutionary Studies Institute, School of Geosciences, University of the Witwatersrand, Johannesburg, South Africa

Day, M.O. (2013) Charting the fossils of the Great Karoo: a history of tetrapod biostratigraphy in the Lower Beaufort Group, South Africa ISSN 0078-8554.

Day, M. O. (2014) Middle Permian continental biodiversity changes as reflected in the Beaufort Group of South Africa: a bio- and lithostratigraphic review of the Eodicynodon, Tapinocephalus and Pristerognathus assemblage zones (PhD thesis).

Groenewald, G. (2016) palaeontological desktop assessment for the proposed TETRA4 development near Matjhabeng (Virginia), Matjhabeng Local Municipality, Lejweleputswa District Municipality, Free State Province. HIA Consultants.

Johnson, M.R, van Vuuren, C.J. Visser, J.N.J. Cole, D.I. de v. Wickens, H. Christie, A.D.M. Roberts, D.L. Brandl, G. (2006). Sedimentary Rocks Of The Karoo Suppergroup. In: Johnson, M.R., Anhaeusser, C.R. and Thomas, R.J., (Eds.), The Geology of South Africa, Johannesburg/Councel for Geoscience, Pretoria, 461-499 pp.

PRINSLOO, M.C. 1989. Die geologie van die gebied Britstown. Explanation to 1: 250 000 geology Sheet 3022 Britstown, 40 pp. Council for Geoscience, Pretoria.

Rossouw, L. 2019 Exemption from further Heritage Impact Assessment: Rectification in terms of Section 24G for Residential Development in Loxton, Northern Cape Province. Palaeo Field Services PIA Report

Smith, R. M. H. (1989). Fluvial facies, vertebrate taphonomy and palaeosols of the Teekloof Formation (Permian) near Beaufort West, Cape Province, South Africa. Unpublished PhD Thesis, UCT

Viglietti, P. A.; Smith, Roger M.H.; Rubidge, Bruce S. (2018). "Changing palaeoenvironments and tetrapod populations in the Daptocephalus Assemblage Zone (Karoo Basin, South Africa) indicate early onset of the Permo-Triassic mass extinction". Journal of African Earth Sciences. 138: 102–111 Bibcode:2018JAfES.138..102V

Woodford, A.C., and Chevallier, L. 2002. Hydrogeology of the Main Karoo Basin: Current Knowledge and Future Research Needs. Water research commission, Report No TT 179/02, 466pp.

CTS Heritage
16 Edison Way, Century City, Cape Town, 7441
Tel: (021) 0130131 **Email:** info@ctsheritage.com **Web:** www.ctsheritage.com

APPENDIX 1: Fossil Finds Procedure

Chance Fossil Finds Procedure

(Adopted from the HWC Chance Fossils Finds Procedure: June 2016)

Introduction

This document is aimed to inform workmen and foremen working on a construction and/or mining site. It describes the procedure to follow in instances of accidental discovery of palaeontological material (please see attached poster with descriptions of palaeontological material) during construction/mining activities. This protocol does not apply to resources already identified under an assessment undertaken under s. 38 of the National Heritage Resources Act (no 25 of 1999).

Fossils are rare and irreplaceable. Fossils tell us about the environmental conditions that existed in a specific geographical area millions of years ago. As heritage resources that inform us of the history of a place, fossils are public property that the State is required to manage and conserve on behalf of all the citizens of South Africa. Fossils are therefore protected by the National Heritage Resources Act and are the property of the State. Ideally, a qualified person should be responsible for the recovery of fossils noticed during construction/mining to ensure that all relevant contextual information is recorded.

Heritage Authorities often rely on workmen and foremen to report finds, and thereby contribute to our knowledge of South Africa's past and contribute to its conservation for future generations.

Training

Workmen and foremen need to be trained in the procedure to follow in instances of accidental discovery of fossil material, in a similar way to the Health and Safety protocol. A brief introduction to the process to follow in the event of possible accidental discovery of fossils should be conducted by the designated Environmental Control Officer (ECO) for the project, or the foreman or site agent in the absence of the ECO It is recommended that copies of the attached poster and procedure are printed out and displayed at the site office so that workmen may familiarise themselves with them and are thereby prepared in the event that accidental discovery of fossil material takes place.

Actions to be taken

One person in the staff must be identified and appointed as responsible for the implementation of the attached protocol in instances of accidental fossil discovery and must report to the ECO or site agent. If the ECO or site agent is not present on site, then the responsible person on site should follow the protocol correctly in order to not jeopardize the conservation and well-being of the fossil material. Once a workman notices possible fossil material, he/she should report this to the ECO or site agent.

Procedure to follow if it is likely that the material identified is a fossil:

- The ECO or site agent must ensure that all work ceases immediately in the vicinity of the area where the fossil or fossils have been found;

- The ECO or site agent must inform SAHRA of the find immediately. This information must include photographs of the findings and GPS co-ordinates;
- The ECO or site agent must compile a Preliminary Report and fill in the attached Fossil Discoveries: Preliminary Record Form within 24 hours without removing the fossil from its original position. The Preliminary Report records basic information about the find including:
- The date
- A description of the discovery
- A description of the fossil and its context (e.g. position and depth of find)
- Where and how the find has been stored
- Photographs to accompany the preliminary report (the more the better):
- A scale must be used
- Photos of location from several angles
- Photos of vertical section should be provided
- Digital images of hole showing vertical section (side);
- Digital images of fossil or fossils.

Upon receipt of this Preliminary Report, SAHRA will inform the ECO or site agent whether or not a rescue excavation or rescue collection by a palaeontologist is necessary.

- Exposed finds must be stabilised where they are unstable and the site capped, e.g. with a plastic sheet or sandbags. This protection should allow for the later excavation of the finds with due scientific care and diligence. SAHRA can advise on the most appropriate method for stabilisation.
- If the find cannot be stabilised, the fossil may be collected with extreme care by the ECO or the site agent and put aside and protected until SAHRA advises on further action. Finds collected in this way must be safely and securely stored in tissue paper and an appropriate box. Care must be taken to remove all the fossil material and any breakage of fossil material must be avoided at all costs.

No work may continue in the vicinity of the find until SAHRA has indicated, in writing, that it is appropriate to proceed.

FOSSIL DISCOVERIES: PRELIMINARY RECORDING FORM		
Name of project:		
Name of fossil location:		
Date of discovery:		
Description of situation in which the fossil was found:		
Description of context in which the fossil was found:		
Description and condition of fossil identified:		
GPS coordinates:	Lat:	Long:
If no co-ordinates available then please describe the location:		
Time of discovery:		
Depth of find in hole		
Photographs (tick as appropriate and indicate number of the photograph)	Digital image of vertical section (side)	
	Fossil from different angles	
	Wider context of the find	
Wider context of the find. Temporary storage (where it is located and how it is conserved)		
Person identifying the fossil Name:		
Contact:		
Recorder Name:		
Contact:		
Photographer Name:		
Contact:		

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APPENDIX 3: Visual Impact Assessment and Visual Statement

OYA ENERGY (PTY) LTD

Proposed Construction of the Oya 132kV Power Line near Matjiesfontein, Western and Northern Cape Provinces

Visual Impact Assessment Report – Basic Assessment

DEFF Reference: To be Allocated
Issue Date: 12 November 2020
Version No.: **1**
Project No.: 16580

Date:	12-11-20
Document Title:	Proposed Construction of the 132kV Oya Power Line near Matjiesfontein, Western and Northern Cape Provinces
Version Number:	1
Author:	**Kerry Schwartz**
Checked by:	**Liandra Scott-Shaw** B.Sc. (Hons) Ecological Science (UKZN)
Approved by:	**Liandra Scott-Shaw**
Signature:	LScott Shaw
Client:	Oya Energy (Pty) Ltd

Confidentiality Statement

OYA ENERGY (PTY) LTD

PROPOSED CONSTRUCTION OF THE OYA 132KV POWER LINE NEAR MATJIESFONTEIN, WESTERN AND NORTHERN CAPE PROVINCES

VISUAL IMPACT ASSESSMENT REPORT – BASIC ASSESSMENT

Executive Summary

Oya Energy (Pty) Ltd, (hereafter referred to as “Oya Energy") is proposing to construct a 132 kilovolt (kV) overhead power line and substations near Matjiesfontein in the Western and Northern Cape Provinces (hereafter referred to as the “proposed development”). The overall objective of the proposed development is to feed the electricity generated by the proposed Oya Energy Facility (part of separate on-going EIA process under DEFF Ref No.: 14/12/16/3/3/2/2009) as well as potentially the other adjacent energy developments into the national grid. The grid connection and substations (this application) require a separate EA, in order to allow the EA to be handed over to Eskom.

The proposed overhead power line and substation project will be subject to a Basic Assessment (BA) process in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA) (as amended) and Appendix 1 of the Environmental Impact Assessment (EIA) Regulations, 2014 promulgated in Government Gazette 40772 and GN R326, R327, R325 and R324 on 7 April 2017. This visual impact assessment (VIA) is being undertaken as part of the BA process.

The study area has a largely natural, untransformed visual character with some elements of rural / pastoral infrastructure and as such, the proposed power line and substation development would alter the visual character and contrast significantly with the typical land use and/or pattern and form of human elements present across the broader study area. The level of contrast is however reduced by the presence of the Perdekraal East WEF, associated power line infrastructure, Kappa substation and existing high voltage power lines located in the south-western sector of the study area.

A broad-scale assessment of landscape sensitivity, based on the physical characteristics of the study area, economic activities and land use that predominates, determined that the area would have a **low** visual sensitivity. An important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that would potentially be impacted by a proposed development.

The area is not typically valued for its tourism significance and no formal protected areas or recognised tourism routes were identified in the area. In addition, there is limited human habitation resulting in relatively few sensitive or potentially sensitive receptors across the entire extent of the study area (less than 0.3 receptors per square kilometre).

The Visual Impact Assessment (VIA) identified twenty-three (23) potentially sensitive receptors in the study area, i.e. within 5kms from the outer boundary of the combined power line assessment corridors and substation sites. Two (2) of these receptors are considered to be sensitive receptors as they are linked to leisure/nature-based tourism activities in the area. The remaining twenty-one (21) receptors are all farmsteads which are regarded as potentially sensitive visual receptors as they are located within a mostly natural setting and the proposed development will likely alter natural vistas experienced from these dwellings. Five of these potentially sensitive receptor locations were however found to be outside the viewshed of the proposed development and thus are not expected to experience any visual impacts as a result of the proposed development. These receptors were therefore removed from the assessment, leaving only sixteen 16 potentially sensitive receptors.

The VIA determined that the proposed development will have a high level of impact on one (1) of the sensitive receptors (Remainder of the Farm Baakens Rivier No 155). As this receptor is located on the proposed Oya Energy Facility (DEFF Ref No: 14/12/16/3/3/2/2009) development site, the owner of this farm portion has a vested interest in the proposed development and associated grid connection infrastructure and would therefore not perceive the proposed power line and substations in a negative light. The remaining sensitive receptor, which is located on the Remainder of the Farm Gats Rivier No 156, is only expected to experience moderate impacts from the proposed development. As this farm is part of an adjacent WEF (DEFF Ref No: 14/12/16/3/3/2/2009) the owner of this farm portion has a vested interest in the proposed development and associated grid connection infrastructure and would therefore not perceive the proposed power line and substations in a negative light.

Fifteen (15) potentially sensitive receptors will be subjected to moderate levels of visual impact as a result of the proposed power line development, while one (1) receptor will be subjected to low levels of visual impact. It was noted however, that thirteen of these receptors are located on farms which either form part of the power line development project or are located within the development sites for other renewable energy projects and as such the owners / occupants are not expected to perceive the proposed power line and substations in a negative light.

The overall impact rating revealed that the proposed development is expected to have a negative low visual impact rating during construction, operation and decommissioning phases with a number of mitigation measures available to prevent any additional visual impacts.

Several renewable energy developments are being proposed within a 35 km radius of the combined power line assessment corridors and substation sites. These renewable energy developments have the potential to cause large scale visual impacts and the location of several such developments in close proximity to each other could significantly alter the sense of place and visual character in the broader region. It was however determined that only five (5) of these would have any significant impact on the landscape within the study area. These facilities are Kudusberg WEF (14/12/16/3/3/1/1976/AM1) and Oya Energy Facility in the north-eastern sector of the study area and Perdekraal East WEF, Perdekraal West WEF and Tooverberg WEF in the south-west. The concentration of these facilities could potentially alter the inherent sense of place and introduce an increasingly industrial character into a largely rural area, thus giving rise to significant cumulative impacts. In light of this, cumulative impacts have been rated as negative medium during both construction and operation phases of the project. It is however anticipated that these impacts could be mitigated to acceptable levels with the implementation of the recommendations and mitigation measures stipulated for each of these developments by the visual specialists. It is important to note, however, that the study area is located within the Renewable Energy Development Zone (REDZ) 2, namely the Komsberg REDZ[1], and also within a Strategic Transmission Corridor, and thus the relevant authorities support the concentration of renewable energy developments and associated grid connection infrastructure in this area. In addition, it is possible that the renewable energy facilities located in close proximity to each other could be seen as one large facility rather than separate developments. Although this will not necessarily reduce impacts on the visual character of the area, it could potentially reduce the cumulative impacts on the landscape.

A comparative assessment of alternatives was undertaken in order to determine which of the power line corridor alternatives would be preferred from a visual perspective. No fatal flaws were identified for any of the proposed power line corridor alternatives. Power Line Corridor Alternative 3 was identified as the Preferred Alternative, while Power Line Corridor Options 1, 2, 4 and 5 were found to be favourable.

From a visual perspective therefore, the proposed Oya 132kV power line and associated substation project is deemed acceptable and the Environmental Authorization (EA) should be granted. SiVEST is of the opinion that the visual impacts associated with the construction, operation and decommissioning phases can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.

[1] formally gazetted (Gazette Number 41445) on 16 February 2018 by the Minister of Environmental Affairs (GN 114)

National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and Environmental Impact Assessment (EIA) Regulations, 2014 (as amended) - Requirements for Specialist Reports (Appendix 6)

Regulation GNR 326 of 4 December 2014, as amended 7 April 2017, Appendix 6	**Section of Report**
(a) details of the specialist who prepared the report; and the expertise of that specialist to compile a specialist report including a *curriculum vitae*;	**Section 1.3.** Specialist CV's are included in **Appendix B**
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	**Appendix B**
(c) an indication of the scope of, and the purpose for which, the report was prepared;	**Section 1.1.** **Appendix A**
(cA) an indication of the quality and age of base data used for the specialist report;	**Section 1.4.** **Section 1.5.**
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	**Section 6.** **.** **Section 8.**
(d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	**Section 1.4** **Section 2.**
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	**Section 1.4.** **Appendix C**
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	**Section 6.**
(g) an identification of any areas to be avoided, including buffers;	**Section 6.3.** **Section 8.**
(h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	**Section 6.3.**
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	**Section 2.**
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment or activities;	**Section 8.5** **Section 9**
(k) any mitigation measures for inclusion in the EMPr;	**Section 8.5.**
(l) any conditions for inclusion in the environmental authorisation;	No specific conditions relating to the visual environment need to be included in the

	environmental authorisation (EA)
(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	**Section 8.5**
(n) a reasoned opinion— i. whether the proposed activity, activities or portions thereof should be authorised; iA. Regarding the acceptability of the proposed activity or activities; and ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr or Environmental Authorization, and where applicable, the closure plan;	**Section 10.1**
(o) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	**N/A** -No feedback has yet been received from the public participation process regarding the visual environment
(p) any other information requested by the competent authority	**N/A**. No information regarding the visual study has been requested from the competent authority to date.
(2) Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	**N/A**

OYA ENERGY (PTY) LTD

PROPOSED CONSTRUCTION OF THE OYA 132KV POWER LINE NEAR MATJIESFONTEIN, WESTERN AND NORTHERN CAPE PROVINCES

VISUAL IMPACT ASSESSMENT REPORT – BASIC ASSESSMENT

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GLOSSARY OF TERMS

ABBREVIATIONS

BA	Basic Assessment
DBAR	Draft Basic Assessment Report
DM	District Municipality
DoE	Department of Mineral Resources and Energy
DEM	Digital Elevation Model
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EMP	Environmental Management Plan
FBAR	Final Basic Assessment Report
GIS	Geographic Information System
HA	Hectares
HIA	Heritage Impact Assessment
I&AP	Interested and/or Affected Party
IPP	Independent Power Producer
LM	Local Municipality
kV	Kilovolt
MW	Megawatt
NEMA	National Environmental Management Act
NGI	National Geo-Spatial Information
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
O&M	Operation and Maintenance
PPA	Power Purchase Agreement
PV	Photovoltaic
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
SANBI	South African National Biodiversity Institute
SPEF	Solar Photovoltaic Energy Facility
VIA	Visual Impact Assessment
VR	Visual Receptor
WEF	Wind Energy Facility

DEFINITIONS

Anthropogenic feature: An unnatural feature resulting from human activity.

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

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

Scenic route: A linear movement route, usually in the form of a scenic drive, but which could also be a railway, hiking trail, horse-riding trail or 4x4 trail.

Sensitive visual receptors: An individual, group or community that is subject to the visual influence of the proposed development and is adversely impacted by it. They will typically include locations of human habitation and tourism activities.

Slope Aspect: Direction in which a hill or mountain slope faces.

Study area / Visual assessment zone; The study area or visual assessment zone is assumed to encompass a zone of 5km from the outer boundary of the proposed Solar PV Facility application site.

Viewpoint: A point in the landscape from where a particular project or feature can be viewed.

Viewshed / Visual Envelope: The geographical area which is visible from a particular location.

Visual character: The pattern of physical elements, landforms and land use characteristics that occur consistently in the landscape to form a distinctive visual quality or character.

Visual contrast: The degree to which the development would be congruent with the surrounding environment. It is based on whether or not the development would conform with the land use, settlement density, forms and patterns of elements that define the structure of the surrounding landscape.

Visual exposure: The relative visibility of a project or feature in the landscape.

Visual impact: The effect of an aspect of the proposed development on a specified component of the visual, aesthetic or scenic environment within a defined time and space.

Visual receptors: An individual, group or community that is subject to the visual influence of the proposed development but is not necessarily adversely impacted by it. They will typically include commercial activities, residents and motorists travelling along routes that are not regarded as scenic.

Visual sensitivity: The inherent sensitivity of an area to potential visual impacts associated with a proposed development. It is based on the physical characteristics of the area (visual character), spatial distribution of potential receptors, and the likely value judgements of these receptors towards the new development, which are usually based on the perceived aesthetic appeal of the area.

OYA ENERGY (PTY) LTD

PROPOSED DEVELOPMENT OF THE 800MW OYA SOLAR PHOTOVOLTAIC (PV) FACILITY AND ASSOCIATED INFRASTRUCTURE NEAR MATJIESFONTEIN, WESTERN AND NORTHERN CAPE PROVINCES

VISUAL IMPACT ASSESSMENT REPORT – BASIC ASSESSMENT

1 INTRODUCTION

Oya Energy (Pty) Ltd, (hereafter referred to as "Oya Energy") is proposing to construct a 132 kilovolt (kV) overhead power line and substations near Matjiesfontein in the Western and Northern Cape Provinces (hereafter referred to as the "proposed development"). The overall objective of the proposed development is to feed the electricity generated by the proposed Oya Energy Facility (part of separate on-going EIA process under DEFF Ref No.: 14/12/16/3/3/2/2009) as well as potentially the other adjacent energy developments into the national grid. The grid connection and substations (this application) require a separate EA, in order to allow the EA to be handed over to Eskom.

The entire extent of the proposed 132kV overhead power line is located within one the Strategic Transmission Corridors as defined and in terms of the procedures laid out in Government Notice (GN) No. 113[2], namely the Central Corridor. The proposed overhead power line and substation project will therefore be subject to a basic Assessment (BA) process in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA) (as amended) and Appendix 1 of the Environmental Impact Assessment (EIA) Regulations, 2014 promulgated in Government Gazette 40772 and GN R326, R327, R325 and R324 on 7 April 2017. The competent authority for this BA is the national Department of Environment, Forestry and Fisheries (DEFF). Specialist studies have been commissioned to assess and verify the OHL under the new Gazetted specialist protocols[3].

1.1 Scope and Objectives

This visual impact assessment (VIA) is being undertaken as part of the BA process. The aim of the VIA is to identify potential visual issues associated with the proposed 132kV power line and substations, as well as to determine the potential extent of visual impacts. This is done by characterising the visual environment of the area and identifying areas of potential visual

[2] Formally gazetted on 16 February 2018 (GN No. 113)
[3] Formally gazetted on 20 March 2020 (GN No. 320)

sensitivity that may be subject to visual impacts. This visual assessment focuses on the potential sensitive visual receptor locations and provides an assessment of the magnitude and significance of the visual impacts associated with the proposed development.

1.2 Terms of Reference

The terms of reference for this VIA are included in **Appendix A**.

1.3 Specialist Credentials

This VIA was undertaken by Kerry Schwartz, a GIS specialist with more than 20 years' experience in the application of GIS technology in various environmental, regional planning and infrastructural projects undertaken by SiVEST. Kerry's GIS skills have been extensively utilised in projects throughout South Africa and in other Southern African countries. Kerry has also been involved in the compilation of VIA reports. Kerry's relevant VIA project experience is listed in the table below.

Table 1: Relevant project experience

Environmental Practitioner	SiVEST (Pty) Ltd – Kerry Schwartz
Contact Details	kerrys@sivest.co.za
Qualifications	BA (Geography), University of Leeds 1982
Expertise to carry out the Visual Impact Assessment.	**Visual Impact Assessments:** ▪ VIAs (BA) for the proposed Gromis WEF and associated Grid Connection Infrastructure, near Komaggas, Northern Cape Province. ▪ VIAs (BA) for the proposed Komas WEF and associated Grid Connection Infrastructure, near Komaggas, Northern Cape Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Mooi Plaats, Wonderheuvel and Paarde Valley solar PV plants near Noupoort in the Northern and Eastern Cape Provinces. ▪ VIAs (Scoping and Impact Phase) for the proposed Sendawo 1, 2 and 3 solar PV energy facilities near Vryburg, North West Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Tlisitseng 1 and 2 solar PV energy facilities near Lichtenburg, North West Province. ▪ VIA for the proposed Nokukhanya 75MW Solar PV Power Plant near Dennilton, Limpopo Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Helena 1, 2 and 3 75MW Solar PV Energy Facilities near Copperton, Northern Cape Province.

	▪ VIA (EIA) for the proposed Paulputs WEF near Pofadder in the Northern Cape Province. ▪ VIA (EIA) for the proposed development of the Rondekop WEF near Sutherland in the Northern Cape Province. ▪ VIA (BA) for the proposed development of the Tooverberg WEF near Touws Rivier in the Western Cape Province. ▪ VIA (BA) for the proposed development of the Kudusberg WEF near Sutherland, Northern and Western Cape Provinces. ▪ VIA (Scoping and Impact Phase) for the proposed development of the Kuruman Wind Energy Facility near Kuruman, Northern Cape Province. ▪ VIA (Scoping and Impact Phase) for the proposed development of the Phezukomoya Wind Energy Facility near Noupoort, Northern Cape Province. ▪ VIA (Scoping and Impact Phase) for the proposed development of the San Kraal Wind Energy Facility near Noupoort, Northern Cape Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Graskoppies Wind Farm near Loeriesfontein, Northern Cape Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Hartebeest Leegte Wind Farm near Loeriesfontein, Northern Cape Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Ithemba Wind Farm near Loeriesfontein, Northern Cape Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Xha! Boom Wind Farm near Loeriesfontein, Northern Cape Province ▪ Visual Impact Assessments for 5 Solar Power Plants in the Northern Cape ▪ Visual Impact Assessments for 2 Wind Farms in the Northern Cape ▪ Visual Impact Assessment for Mookodi Integration Project (132kV distribution lines) ▪ Landscape Character Assessment for Mogale City Environmental Management Framework
Divisional Manager / Quality Control	SiVEST SA (Pty) Ltd – Tarryn Curtis
Contact Details	tarrync@sivest.co.za
Qualifications	B.Sc. Geographical Science and B.Sc. (Hons) Environmental Management and Geography
Professional Affiliations	IAIAsa Membership Number: 3485
	Tarryn joined SiVEST in January 2011 in her capacity as Environmental Consultant. In May 2015, she was appointed as Divisional Manager for the Environmental Division, Pietermaritzburg Branch. In October 2018, Tarryn was appointed as Divisional Head for the Environmental

	Division nationwide. Tarryn has completed a Bachelor of Science Degree with a Geography Major (University of Natal, PMB), as well as a Bachelor of Science (Honours) in Environmental Management (University of Natal, PMB). Tarryn has been involved in consulting since 2007, which included scoping reports, environmental management plans, integrated management plans, basic assessment reports, environmental impact reports and auditing. Field of specialisation in Environmental Auditing, Environmental Project Management, Environmental Planning and Water Related Projects.

Full CVs are attached as **Appendix B**.

1.4 Assessment Methodology

This VIA has been based on a desktop-level assessment supported by field-based observation drawn from site visits undertaken in July 2018, August 2018 and July 2020.

1.4.1 Physical landscape characteristics

Physical landscape characteristics such as topography, vegetation and land use are important factors influencing the visual character and visual sensitivity of the study area. Baseline information about the physical characteristics of the study area was initially sourced from spatial databases provided by NGI, the South African National Biodiversity Institute (SANBI) and the South African National Land Cover Dataset (Geoterraimage – 2018). The characteristics identified via desktop analysis were later verified during the site visit.

1.4.2 Identification of sensitive receptors

Visual receptor locations and routes that are sensitive and/or potentially sensitive to the visual intrusion of the proposed development were assessed in order to determine the impact of the proposed development on each of the identified receptor locations. Information pertaining to visual receptors was largely drawn from recent visual assessments conducted in the general vicinity of the proposed development. These studies include VIAs for the proposed Kudusberg WEF (14/12/16/3/3/1/1976/AM1), Tooverberg WEF and grid connection infrastructure and Oya Energy Facility (14/12/16/3/3/2/2009).

1.4.3 Fieldwork and photographic review

Given that the proposed grid connection infrastructure is located within project areas already assessed for several renewable energy VIAs, it was not considered necessary to undertake any additional fieldwork. Fieldwork undertaken for VIAs for the Kudusberg WEF

(14/12/16/3/3/1/1976/AM1), Tooverberg WEF and grid connection infrastructure and Oya Energy Facility (14/12/16/3/3/2/2009) has therefore been used to inform this assessment. The fieldwork involved three (3) separate site visits conducted in July 2018, August 2018 and July 2020. The purpose of those site visits was to:

- verify the landscape characteristics identified via desktop means;
- conduct a photographic survey of the study area;
- verify, where possible, the sensitivity of visual receptor locations identified via desktop means;
- eliminate receptor locations that are unlikely to be influenced by the proposed development;
- identify any additional visually sensitive receptor locations within the study area; and
- inform the impact rating assessment of visually sensitive receptor locations (where possible).

1.4.4 Visual / Landscape Sensitivity

Areas of potential visual sensitivity along the power line assessment corridors were demarcated, these being areas where the establishment of a power line or other associated infrastructure would result in the greatest probability of visual impacts on potentially sensitive visual receptors. GIS-based visibility analysis was used to determine which route alternatives would be visible to the highest numbers of receptors in the study area.

In addition, the National Environmental Screening Tool (https://screening.environment.gov.za/screeningtool/) was examined to determine any relative landscape sensitivity in respect of the proposed development.

1.4.5 Impact Assessment

A rating matrix was used to objectively evaluate the significance of the visual impacts associated with the proposed development, both before and after implementing mitigation measures. Mitigation measures were identified (where possible) to minimise the visual impact of the proposed development. The rating matrix made use of several different factors including geographical extent, probability, reversibility, irreplaceable loss of resources, duration and intensity, in order to assign a level of significance to the visual impact of the project.

A separate rating matrix was used to assess the visual impact of the proposed development on each visual receptor location (both sensitive and potentially sensitive), as identified. This matrix is based on three (3) parameters, namely the distance of an identified visual receptor from the proposed development, the presence of screening factors and the degree to which the proposed development would contrast with the surrounding environment.

1.4.6 Consultation with I&APs

Continuous consultation with Interested and Affected Parties (I&APs) undertaken during the public participation process will be used (where available) to help establish how the proposed development will be perceived by the various receptor locations and the degree to which the impact will be regarded as negative. Although I&APs have not yet provided any feedback in this regard, the report will be updated to include relevant information as and when it becomes available. If no relevant comments are received requiring the report to be updated, the report will automatically inform the final BA report.

1.5 Source of Information

The main sources of information utilized for this VIA included:

- Project description for the proposed power line and substation development provided by Oya Energy;
- Elevation data from 25m Digital Elevation model (DEM) from the National Geo-Spatial Information (NGI);
- 1:50 000 topographical maps of South Africa from the NGI;
- Land cover and land use data extracted from the 2018 South African National Land-Cover Dataset provided by GEOTERRAIMAGE;
- Vegetation classification data extracted from the South African National Biodiversity Institute’s (SANBI’s) VEGMAP 2018 dataset;
- Google Earth Satellite imagery 2020;
- South African Renewable Energy EIA Application Database from Department of Environmental Affairs (incremental release Quarter 2 2020);
- The National Web-Based Environmental Screening Tool, Department of Environment, Forestry and Fisheries (DEFF);
- VIA for the proposed Kudusberg WEF, SiVEST 2019;
- VIA for the proposed Tooverberg WEF, SiVEST 2019;
- VIA for the proposed 132kV Power Line and Associated Substation to serve the Tooverberg Wind Energy Facility, SiVEST 2019; and
- VIA for the proposed Oya Energy Facility, SiVEST 2020.

2 ASSUMPTIONS AND LIMTATIONS

- Substations and power lines are very large structures by nature and could impact on receptors that are located relatively far away, particularly in areas of very flat terrain. Given the nature of the receiving environment and the height of the various components of the proposed development, the study area or visual assessment zone is assumed to encompass a zone of 5 km from the outer boundary of the combined power line assessment corridors and substation sites. This 5 km limit on the visual assessment zone relates to the importance of distance when assessing visual impacts. Although the proposed development may still be visible beyond 5 km, the degree of visual impact would diminish considerably and as such the need to assess the impact on potential receptor locations beyond this distance would not be warranted.

- As previously stated, information pertaining to visual receptors is largely drawn from recent visual assessments conducted in the general vicinity of the proposed development. These studies include VIAs for the proposed Kudusberg WEF (SiVEST, 2019), Tooverberg WEF and grid connection infrastructure (SiVEST, 2019) and Oya Energy Facility (SiVEST, 2020). Receptors identification for all of these studies involved a combination of desktop assessment as well as field-based observations. Initially Google Earth imagery was used to identify potential receptors within the study area and where possible, these receptor locations were verified and assessed during site visits undertaken in July / August 2018 and in July 2020.

- Due to the extent of the respective study areas for previous VIA projects and the nature of the terrain, it was not possible to visit or verify every potentially sensitive visual receptor location. As such, several broad assumptions have been made in terms of the likely sensitivity of the receptors to the proposed development. It should be noted that not all receptor locations would necessarily perceive the proposed development in a negative way. This is usually dependent on the use of the facility, the economic dependency of the occupants on the scenic quality of views from the facility and on people's perceptions of the value of "Green Energy". Sensitive receptor locations typically include sites such as tourism facilities and scenic locations within natural settings which are likely to be adversely affected by the visual intrusion of the proposed development. Thus, the presence of a receptor in an area potentially affected by the proposed development does not necessarily mean that any visual impact will be experienced.

- For the purposes of the VIA, all analysis is based on a worst-case scenario where power line tower and substation structure heights are assumed to be 45m.

- Due to the varying scales and sources of information; maps may have minor inaccuracies. Terrain data for the study area derived from the National Geo-Spatial Information (NGI)'s 25m DEM is fairly coarse and somewhat inconsistent and as such, localised topographic variations in the landscape may not be reflected on the Digital Elevation Model (DEM) used to generate the viewsheds.

- In addition, the viewsheds produced do not take into account any existing vegetation cover or built infrastructure which may screen views of the proposed development and as such should be seen as a conceptual representation or a worst-case scenario.

- The potential visual impact at each visual receptor location was assessed using a matrix developed for this purpose. The matrix is based on three main parameters relating to visual impact and, although relatively simplistic, it provides a reasonably accurate indicative assessment of the degree of visual impact likely to be experienced at each receptor location as a result of the proposed development. It is however important to note the limitations of quantitatively assessing a largely subjective or qualitative type of impact and as such the matrix should be seen merely as a representation of the likely visual impact at a receptor location.

- No feedback regarding the visual environment has been received from the public participation process to date. Any feedback from the public during the review period of the Draft Basic Assessment Report (DBAR) will however be incorporated into further drafts of this report, if relevant.

- It is assumed that operational and security lighting will be required for the substation proposed within the Oya Energy Facility (14/12/16/3/3/2/2009) development footprint. At the time of undertaking the visual study no information was available regarding the type and intensity of lighting required and therefore the potential impact of lighting at night has not been assessed at a detailed level. Accordingly, general measures to mitigate the impact of additional light sources on the ambiance of the nightscape have been provided.

- This study includes an assessment of the potential cumulative impacts of other renewable energy developments on the existing landscape character and on the identified sensitive receptors. This assessment is based on the information available at the time of writing the report and where information has not been available, broad assumptions have been made as to the likely impacts of these developments.

- SiVEST made every effort to obtain information for the surrounding planned renewable energy developments (including specialist studies, assessment reports and Environmental Management Programmes). However, some of the documents are not currently publicly available for download. The available information was factored into the cumulative impact assessment (**Section 8.4**).

- No visualisation modelling was undertaken for the proposed development as this is not normally required for linear infrastructure. This can however be provided should the Public Participation process identify the need for this exercise.

- It should be noted that all the site visits were undertaken during the winter months of July or August. The study area is however typically characterised by low levels of rainfall all year round and therefore the season is not expected to affect the significance of the visual impact of the proposed development.

- Clear weather conditions tend to prevail throughout most of the year in this area, and in these clear conditions, power lines and associated infrastructure would present a greater contrast with the surrounding landscape than they would on a cloudy overcast day. Both clear and cloudy weather conditions were experienced during the different site visits and these factors were taken into consideration when undertaking this VIA.

3 TECHNICAL DESCRIPTION

3.1 Project Location

The proposed power line and substations project area is located approximately 50 km north-west of Matjiesfontein, originating in the Namakwa Local Municipality in the Northern Cape and linking in to the Kappa substation in the Witzenberg Local Municipality in the Western Cape Province (**Figure 1**).

The proposed overhead power line corridors and substations will affect the following properties:

- Portion 2 of the Farm Bakovens Kloof No 152 (2/152);
- Remainder of the Farm Bakovens Kloof No 152 (RE/152);
- Portion 3 of the Farm Baakens Rivier No 155 (3/155);
- Remainder of the Farm Baakens Rivier No 155 (RE/155);
- Portion 1 of the Farm Gats Rivier No 156 (1/156);
- Remainder of the Farm Gats Rivier No 156 (RE/156);
- Portion 1 of the Farm Amandelboom No 158 (1/158);
- Remainder of the Farm Oliviers Berg No 159 (RE/159);
- Portion 2 of the Farm Bantamsfontein No 168 (2/168);
- Portion 4 of the Farm Bantamsfontein No 168 (4/168);
- Portion 5 of the Farm Bantamsfontein No 168 (5/168);
- Portion 7 of the Farm Bantamsfontein No 168 (7/168);
- Portion 13 of the Farm Bantamsfontein No 168 (13/168);
- Remainder of the Farm Bantamsfontein No 168 (RE/168);
- Remainder of the Farm Lower Roodewal No 169 (RE/169);
- Remainder of the Farm Matjes Fontein No 194 (RE/194);
- The Farm Platfontein No 240 (240);
- The Farm Die Brak No 241 (241);
- Portion 1 of the Farm Rietpoort No 243 (1/243);
- Remainder of the Farm Rietpoort No 243 (RE/243); and
- Remainder of the Farm Toover berg No 244 (RE/244).

As previously stated, the entire extent of the proposed 132kV overhead power line is located within a Strategic Transmission Corridor as defined and in terms of the procedures laid out in Government Notice (GN) No. 113, namely the Central Corridor.

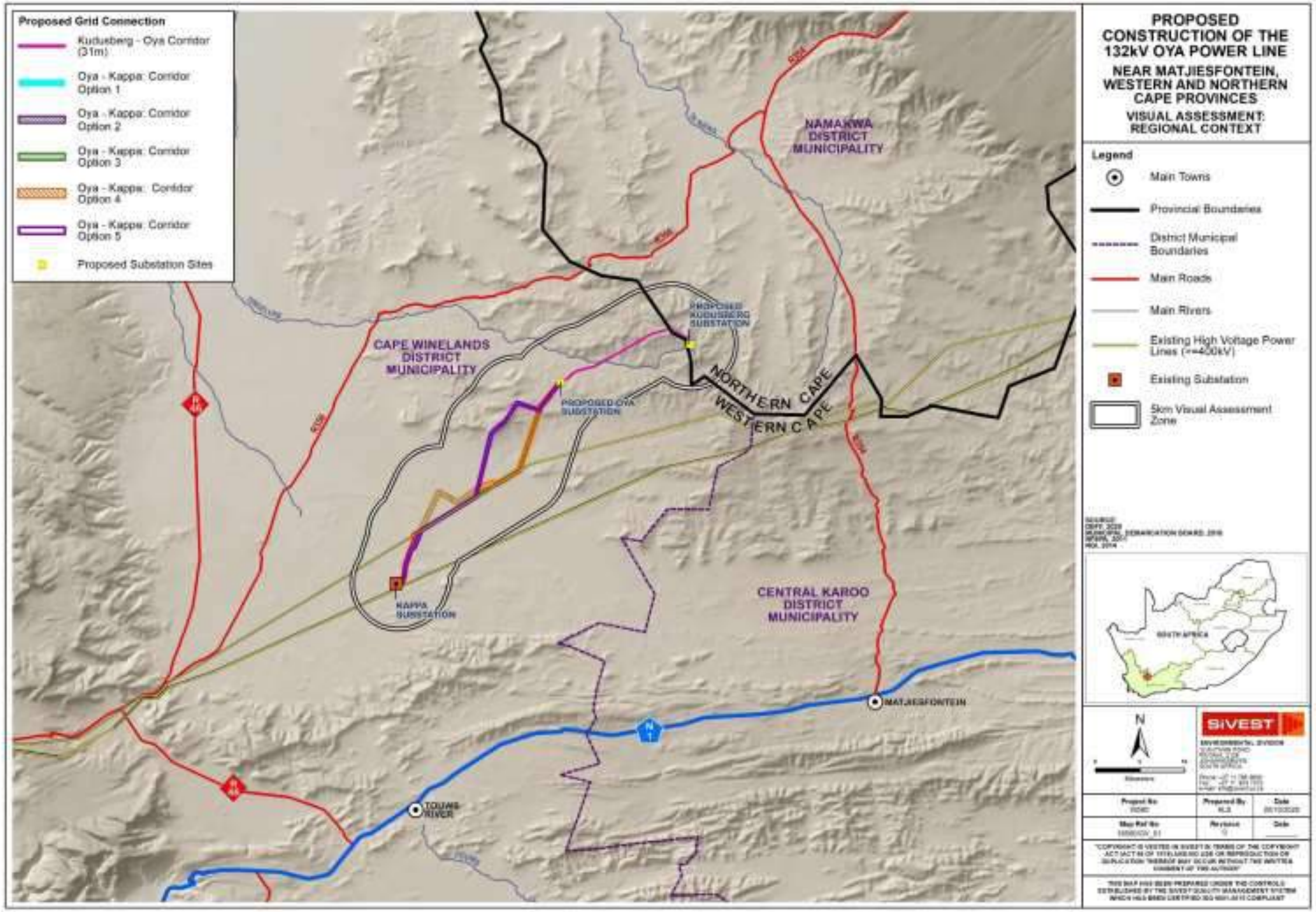


Figure 1: Proposed Power Line Route Alternatives and Substation in the Regional Context

3.2 Project Technical Details

At this stage, it is anticipated that the proposed development will include a 132kV power line and 2 (two) 33/132kV substations to feed electricity generated by the renewable energy facilities owned by the applicant into the national gird at the Kappa substation.

The type of power line towers being considered at this stage include both lattice and monopole towers and it is assumed that these towers will be located approximately 200m to 250m apart. The towers will be up to 45m in height, depending on the terrain, but will ensure minimum overhead line clearances from buildings and surrounding infrastructure.

300m wide power line corridors are being assessed to allow flexibility when determining the final route alignment. The proposed power line however only requires a 31m wide servitude and as such, this servitude would be positioned within the assessed corridor.

The size of the proposed Oya and Kudusberg substation sites will be approximately 4 hectares (ha) each.

3.2.1 Route Alternatives

Only one (1) route is technically feasible for the section of the proposed power line connecting the Kudusberg on-site substation (authorised under 14/12/16/3/3/1/1976/AM1) to the Oya on-site substation (i.e. Kudusberg to Oya). This section of the power line corridor route is approximately 16.6km in length and runs from the Kudusberg on-site substation along the RE/194, 1/158, RE/159, RE/156, 1/156 and RE/155 properties to the Oya on-site substation.

Five (5) power line corridor route alternatives are being assessed for the section of the proposed overhead power line which connects the Oya on-site substation to the Kappa substation (i.e. Oya to Kappa). These alternatives, as depicted in **Figure 2**, are described below:

- **Power Line Corridor Alternative 1 (Oya to Kappa):** Approximately 34.14km in length and running across or along the boundaries of the farms RE/155, RE/152, 2/152, RE/169, RE/243, 241, 240 and RE/244 properties to the Kappa substation;
- **Power Line Corridor Alternative 2 (Oya to Kappa):** Approximately 32.43km in length and running across or along the boundaries of the farms RE/155, 3/155, RE/152, 2/152, RE/169, 13/168, 5/168, 1/243, RE/243, 241 and 240 properties to the Kappa substation;
- **Power Line Corridor Alternative 3 (Oya to Kappa):** Approximately 30.56km in length and running across or along the boundaries of the farms RE/155, 4/168, 13/168, 5/168, 1/243, 240 and RE/244 properties to the Kappa substation;
- **Power Line Corridor Alternative 4 (Oya to Kappa):** Approximately 32.94km in length and running across or along the boundaries of the farms RE/155, 4/168, 13/168, RE/169, RE/243, 241 and 240 properties to the Kappa substation;
- **Power Line Corridor Alternative 5 (Oya to Kappa):** Approximately 32.26km in length and running across or along the boundaries of the farms RE/155, RE/152, 2/152, RE/169, 5/168, 1/243 and 240 properties to the Kappa substation.

3.2.2 'No-Go' Alternative

The 'no-go' alternative is the option of not developing the proposed project, thus preventing the energy facilities in the area from feeding electricity into the national grid. This alternative would not result in any environmental impacts within the assessment corridors or in the surrounding local area and the status quo would remain. This scenario provides the baseline against which other alternatives are compared and will be considered throughout the report.

While the 'no-go' option is a feasible option, it would prevent the proposed development from contributing to the environmental, social and economic benefits associated with the development of the renewables sector.

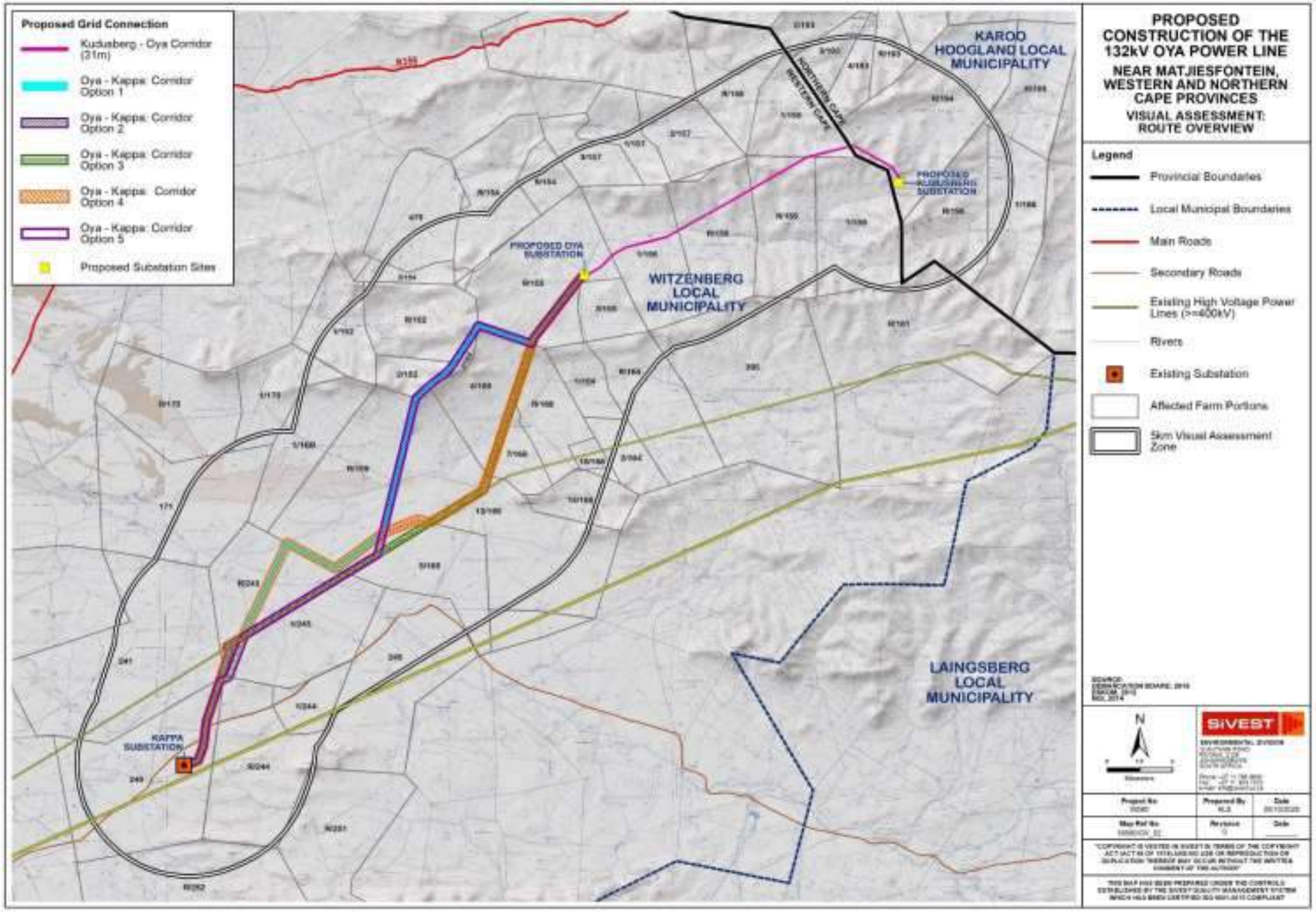


Figure 2: Overview of Power Line Route Alternatives

4 LEGAL REQUIREMENTS AND GUIDELINES

Key legal requirements pertaining to the proposed development are as follows:

In terms of the NEMA and the EIA Regulations 2014 (as amended), the proposed development includes listed activities which require a BA to be undertaken. As previously stated, the entire extent of the proposed 132kV overhead power line is located within one of the Strategic Transmission Corridors as defined and in terms of the procedures laid out in Government Notice (GN) No. 113, namely the Central Corridor. The proposed overhead power line and substation project irrespective would be subject to a BA process in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA) (as amended) and Appendix 1 of the EIA Regulations, 2014 promulgated in Government Gazette 40772 and GN R326, R327, R325 and R324 on 7 April 2017. The competent authority for this BA is the national Department of Environment, Forestry and Fisheries (DEFF).

As part of this BA process, the need for a VIA to be undertaken has been identified in order to assess the visual impact of the proposed grid connection infrastructure. The VIA must adhere to the requirements for specialist studies as stipulated in Appendix 6 of the NEMA EIA Regulations, 2014, as amended;

There is currently no legislation within South Africa that explicitly pertains to the assessment of visual impacts, however, in addition to the NEMA the following legislation has relevance to the protection of scenic resources:

- National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003); and
- National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA).

Based on these Acts, protected or conservation areas and sites or routes with cultural or symbolic value have been taken into consideration when identifying sensitive and potentially sensitive receptor locations and rating the sensitivity of the study area.

5 FACTORS INFLUENCING VISUAL IMPACT

5.1 Subjective experience of the viewer

The perception of the viewer/receptor toward an impact is highly subjective and involves 'value judgements' on behalf of the receptor. It is largely based on the viewer's perception and is usually dependent on the age, gender, activity preferences, time spent within the landscape and traditions of the viewer (Barthwal, 2002). Thus, certain receptors may not consider power lines and associated infrastructure to be a negative visual impact as they are often associated with employment creation, social upliftment and the general growth and progression of an area, and thus the development could even have positive connotations.

5.2 Visual environment

Power lines and substations are not features of the natural environment but are rather a representation of human (anthropogenic) alteration. As such, this type of development is likely to be perceived as visually intrusive when placed in largely undeveloped landscapes that have a natural scenic quality and where tourism activities, based upon the enjoyment of (or exposure to) the scenic or aesthetic character of the area, are practiced. Residents and visitors to these areas could perceive the power lines, substations and associated infrastructure to be highly incongruous in this context and may regard these features as an unwelcome intrusion which degrade the natural character and scenic beauty of the area, and which could potentially even compromise the practising of tourism activities in the area. The experience of the viewer is however highly subjective and there are those who may not perceive features such as power lines and substations as a visual intrusion.

The presence of other anthropogenic features associated with the built environment may not only obstruct views but also influence the perception of whether a development is a visual impact. In industrial areas for example, where other infrastructure and built form already exists, the visual environment could be considered to be 'degraded' and thus the introduction of a new power line or substation into this setting may be considered to be less visually intrusive than if there was no existing built infrastructure visible.

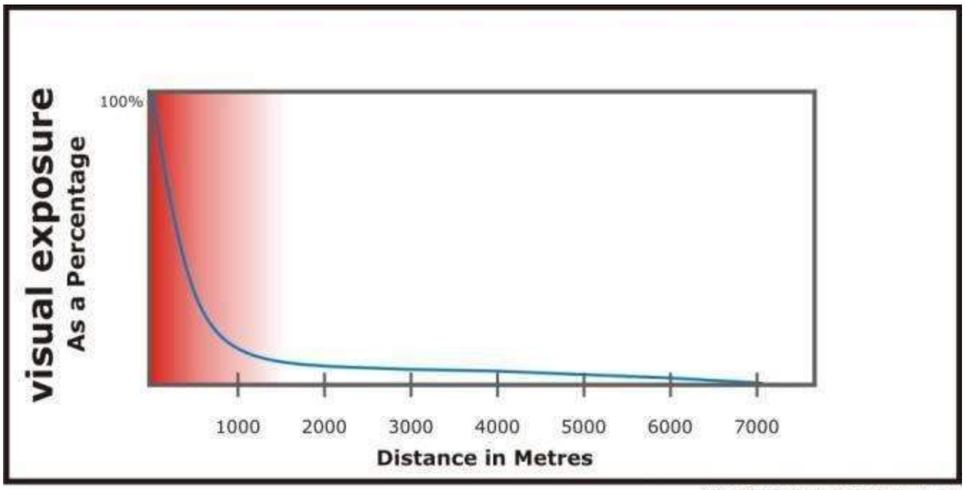
5.3 Type of visual receptor

Visual impacts can be experienced by different types of receptors, including people living, working or driving along roads within the viewshed of the proposed development. The receptor type in turn affects the nature of the typical 'view', with views being permanent in the case of a residence or other places of human habitation, or transient in the case of vehicles moving along a road. The nature of the view experienced affects the intensity of the visual impact experienced.

It is important to note that visual impacts are only experienced when there are receptors present to experience this impact. Thus, where there are no human receptors or viewers present there are not likely to be any visual impacts experienced.

5.4 Viewing distance

Viewing distance is a critical factor in the experiencing of visual impacts, as beyond a certain distance, even large developments tend to be much less visible, and difficult to differentiate from the surrounding landscape. The visibility of an object is likely to decrease exponentially as one moves away from the source of impact, with the impact at 1 000m being considerably less than the impact at a distance of 500m **(Figure 3)**.



SOURCE: Hull, RB; Bishop, ID

Figure 3: Conceptual representation of diminishing visual exposure over distance

6 VISUAL CHARACTER AND SENSITIVITY OF THE STUDY AREA

Defining the visual character of an area is an important factor in the assessment of visual impacts as it establishes the visual baseline or existing visual environment in which the development would be constructed. The visual impact of a development is measured by establishing the degree to which the development would contrast with, or conform to, the visual character of the surrounding area. The inherent sensitivity of the area to visual impacts or visual sensitivity is thereafter determined, based on the visual character, the economic importance of the scenic quality of the area, inherent cultural value of the area and the presence of visual receptors.

Physical and land use related characteristics, as outlined below, are important factors contributing to the visual character of an area.

6.1 Physical and Land Use Characteristics

6.1.1 Topography

The proposed power line and substations are located in the scenic Karoo region of the Western / Northern Cape which is generally associated with wide vistas and mountainous landscapes. The topography in the broader study area is largely dominated by the mountains/hills at the southern end of the Klein Roggeveld range. Much of the north-eastern sector of the study area is therefore dominated by the steep slopes and broad ridges of these mountains and escarpments **(Figure 4)**.

The south-eastern sector of the study area is however characterised by flat to gently undulating plains interspersed with areas of localised hills and koppies **(Figure 5 and Figure 6)**.

Maps showing the topography and slopes within and in the immediate vicinity of the combined assessment area are provided in **Figure 7** and **Figure 8** below**.**

Figure 4: View (NE), from Portion 1 of the Farm Brandenburg No 164 (-32.950424S; 20.2035E) showing mountainous terrain to the north.

Figure 5: View (NE) from the Gatsrivier road (-33.139302S; 19.957718E), some 2kms south-west of Kappa Substation showing the relatively flat terrain of in the southern section of the assessment area, with more mountainous terrain to the north.

Figure 6: Example of some of the localised hills / koppies in the study area.

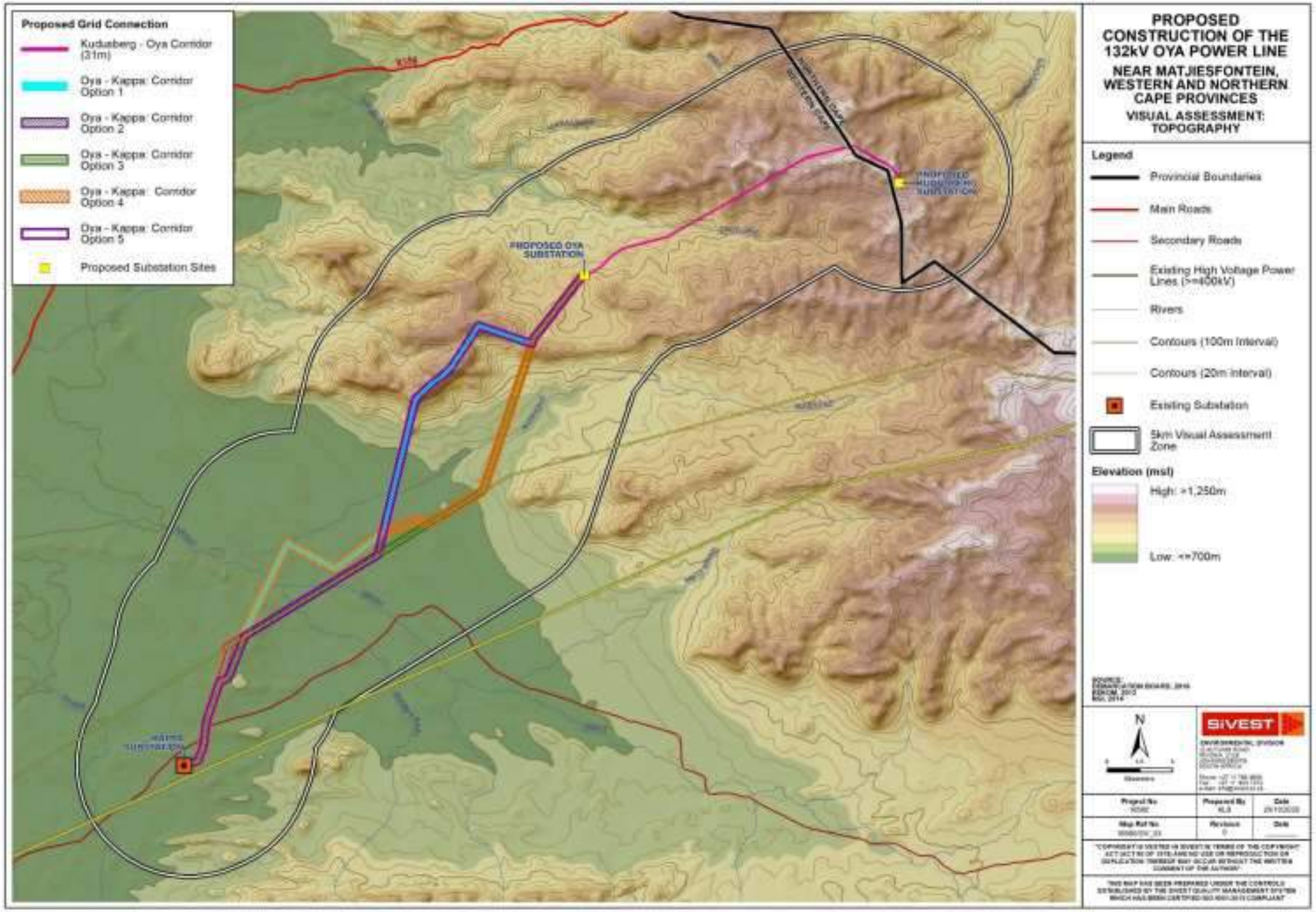


Figure 7: Topography of the study area

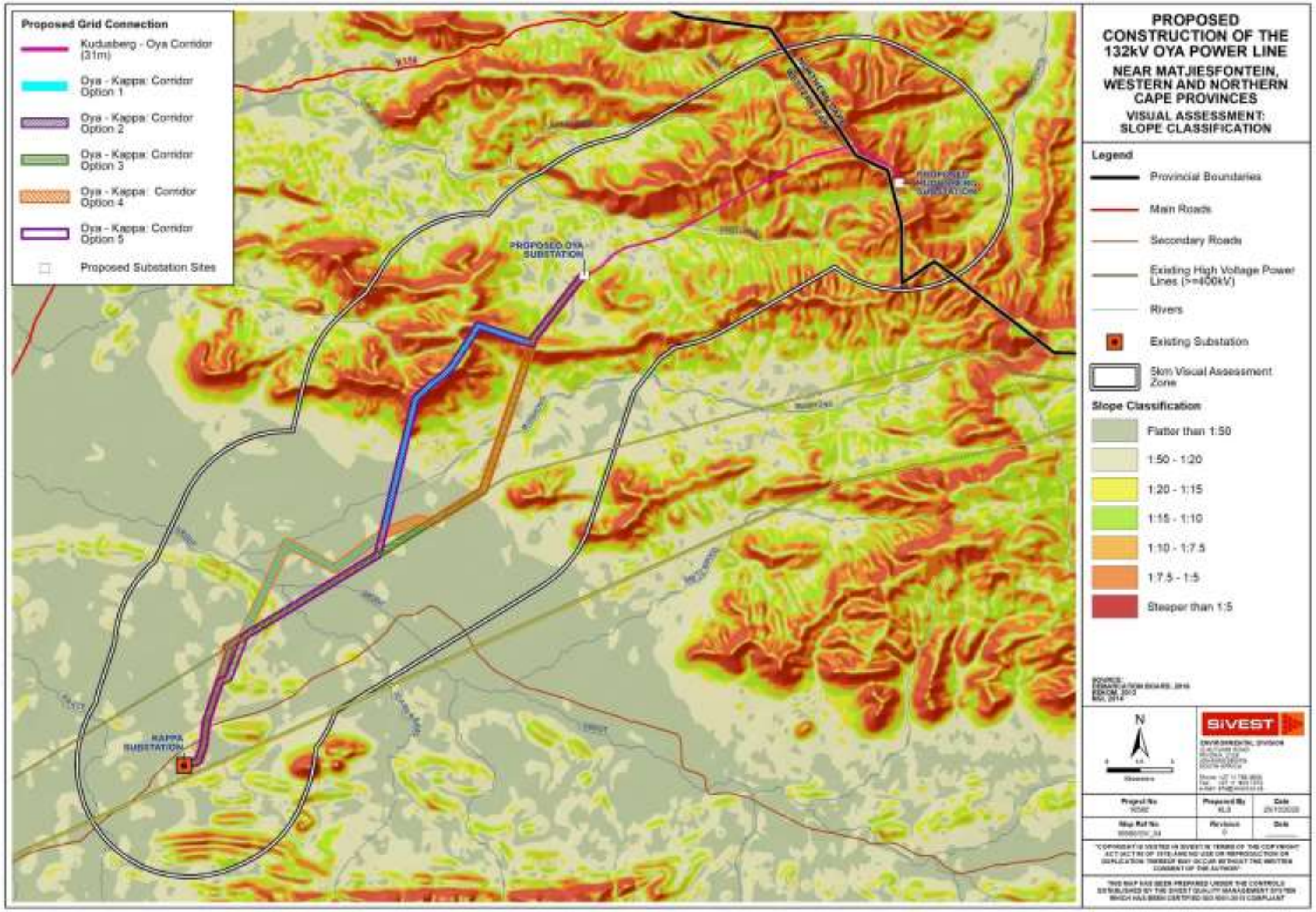


Figure 8: Slope classification of the study area

Visual Implications

Areas of flatter relief, including the plains and the higher-lying plateaus, are characterised by wide ranging vistas (**Figure 9**), although views to the north and south will be somewhat constrained by the hilly terrain in these sectors of the study area which enclose the visual envelope. In the hillier and higher-lying terrain, the vistas will depend on the position of the viewer. Viewers located within some of the more incised valleys for example, would have limited vistas, whereas a much wider vista would be experienced by viewers on higher-lying ridge tops or slopes. Importantly in the context of this study, the same is true of objects placed at different elevations and within different landscape settings. Objects placed on high-elevation slopes or ridge tops would be highly visible, while those placed in valleys or enclosed plateaus would be far less visible.

Bearing in mind that power line towers and substations are large structures (towers could potentially be up to 45 m in height), these elements of the grid connection could be visible from a relatively extensive area around the grid connection infrastructure. Topographic shielding in the north-eastern sector would reduce the visibility of the power lines and substations from many of the locally occurring receptor locations. Across the south-western sector of the study area however there would be very little topographic shielding to lessen the visual impact of the proposed power line and substations.

Figure 9: View west-south-west from the southern section of the study area **(**-33.066028S**;** 20.090783**E)** showing wide-ranging vistas experienced from higher elevations.

GIS technology was used to undertake a preliminary visibility analysis for the proposed power line routes and substation sites. This analysis was based on points at 250 m intervals along the centre line of the corridor alternatives, and assumes a tower height of 45 m. The resulting viewshed indicates the geographical area from where the proposed power lines and substation sites would theoretically be visible, i.e. the zone of visual influence. This analysis is based entirely on topography (relative elevation and aspect) and does not take into account any existing vegetation cover or built infrastructure which may screen views of the proposed development. In addition, detailed topographic data was not available for the broader study area and as such the viewshed analysis does not take into account any localised topographic variations which may constrain views. This analysis should therefore be seen as a conceptual representation or a worst case scenario.

The results of this analysis, as per **Figure 10** below, show that elements of the proposed grid connection infrastructure would be visible from most parts of the study area.

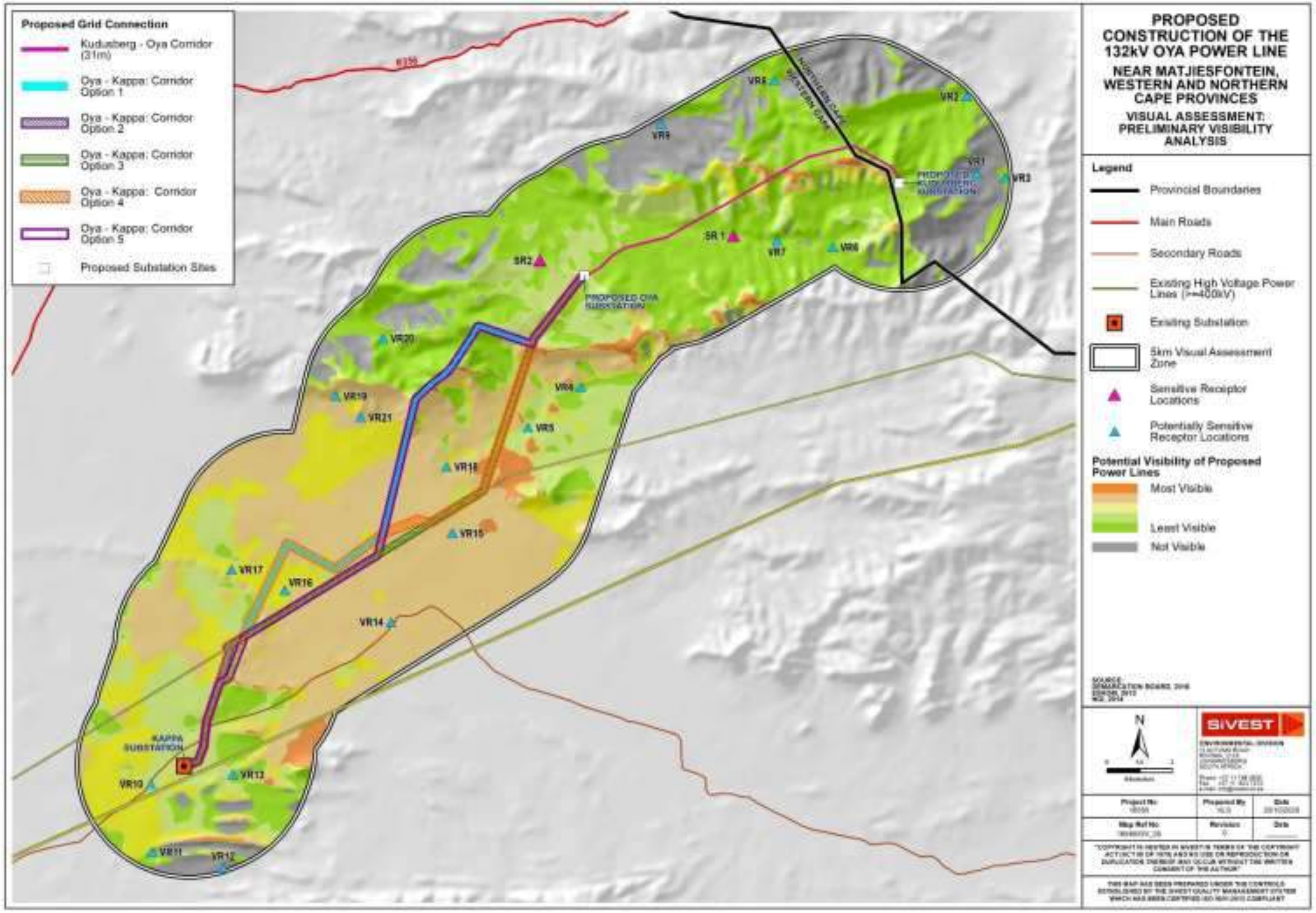


Figure 10: Preliminary visibility analysis of proposed development

6.1.2 Vegetation

According to Mucina and Rutherford (2012), much of the north-eastern sector of the study area is covered by the Koedoesberge – Moordenaars Karoo vegetation type, which tends to occur on slightly undulating hills to hilly landscapes. This vegetation type comprises low succulent scrubs, scattered tall shrubs and patches of “white” grass visible on plains **(Figure 11)**. The dwarf shrubs include Pteronia, Drosanthemum and Galenia.

Figure 11: Typical vegetation cover prevalent across the study area

The northern and eastern sections of the study area which are dominated by high mountains / hills, are however classified as Central Mountain Shale Renosterveld. This vegetation type is typically found on slopes and broad ridges of low mountains and escarpments, with taller shrubland dominated by renosterbos and large areas of mainly non-succulent karoo shrubs and with a rich geophytic flora in the undergrowth or in more open, wetter or rocky habitats (**Figure 12**).

Figure 12: Typical vegetation cover found on slopes and broad ridges of the mountains / hills

The south-western sector of the study area is covered by the Tanqua Karoo vegetation type which tends to occur in intra-mountain basin landscapes where slightly undulating terrain is sheltered by the steep slopes of mountain ranges (**Figure 12**). On the flatter plains which tend to be sparsely vegetated, this vegetation type comprises low succulent shrubs. The slopes of the koppies and the adjacent foothills however support medium-tall succulent shrubland (**Figure 13**). The flatter plains in the central sector of the study area are covered by the Tanqua Wash Riviere vegetation type which largely comprises sparse shrubland in these areas.

Figure 13: Typical vegetation cover in the south-western sector of the study area

Much of the study area however is still characterised by natural low shrubland with transformation limited to patches of cultivation and a few isolated areas where pastoral activities such as livestock rearing are taking place.

Vegetation classifications across the study area are shown in **Figure 16** below.

Visual Implications

Vegetation cover across the study area is predominantly short and sparse and thus will not provide any visual screening (**Figure 14)**. In some instances however, taller trees have been planted around farmhouses, possibly restricting views from these receptor locations to some degree (**Figure 15**).

Figure 14: Short, sparse vegetation cover in the area does not provide any visual screening

Figure 15: Trees planted around a farmstead in the south-western sector of the study area

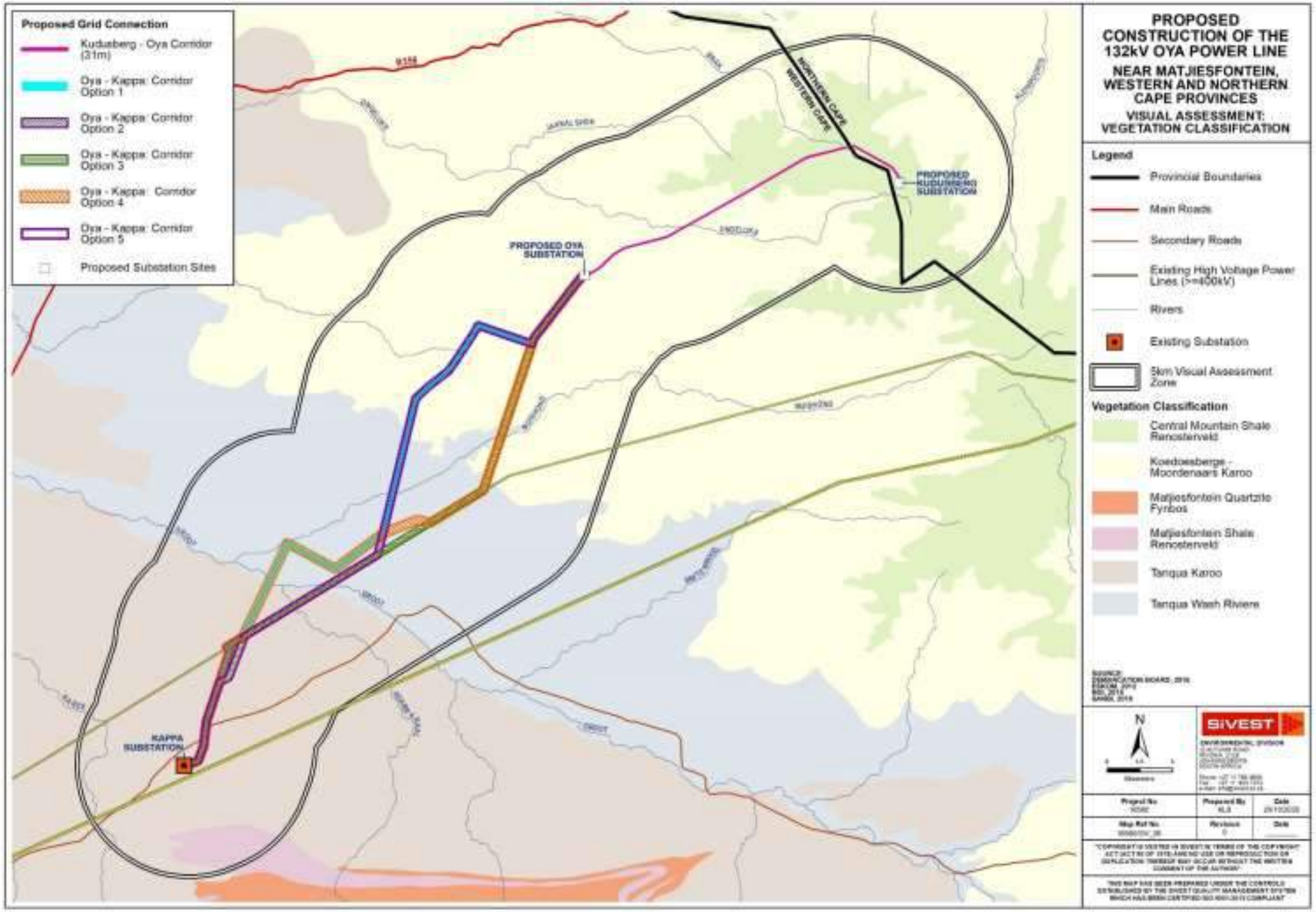


Figure 16: Vegetation Classification in the Study Area

6.1.3 Land Use

According to the South African National Land Cover dataset (GeoTerra Image 2018), much of the visual assessment area is characterised by natural vegetation which is dominated by Karoo and Fynbos shrubland interspersed with natural grassland (**Figure 17**).

Agricultural activity in the area is restricted by the arid nature of the local climate and areas of cultivation are largely confined to relatively limited areas distributed along drainage lines. As such, the natural vegetation has been retained across much of the study area. Livestock farming (mostly sheep) is the dominant activity (**Figure 18**), although the climatic and soil conditions have resulted in low densities of livestock and relatively large farm properties across the area. Thus, the area has a very low density of rural settlement, with relatively few scattered farmsteads in evidence (**Figure 19**). Built form in much of the study area is limited to isolated farmsteads, including farm worker's dwellings and ancillary farm buildings, gravel access roads, telephone lines, fences and windmills (**Figure 20**).

High voltage power lines in the study area however form significant man-made features in an otherwise undeveloped landscape. These power lines include 765kV power lines (**Figure 21**) and 400kV power lines which bisect the south-western sector of the study area in a south-west to north-east alignment. In addition, the Kappa 765/400kV substation, situated at the southern end of the power line assessment corridors, is a substantial anthropogenic feature with a distinctly more industrial character, resulting in a significant degree of transformation in the landscape (**Figure 22**).

In addition, the Perdekraal East wind farm is located in the south-western sector of the study area. Construction of this facility has only recently been completed and the landscape has undergone significant transformation as a result of the construction activities (**Figure 23**).

Further human influence is visible in the area in the form of the DR1475 District Road which traverses the south-western sector of the study area in a west to north-east direction. This is however a gravel road and thus conforms to the typical natural rural character of the study area.

The closest built-up area is the small town of Touws River which is situated approximately 26km south of Kappa Substation while Matjiesfontein is some 55kms to the south-east. These small towns are well outside the visual assessment zone and thus not expected to have an impact on the visual character of the study area.

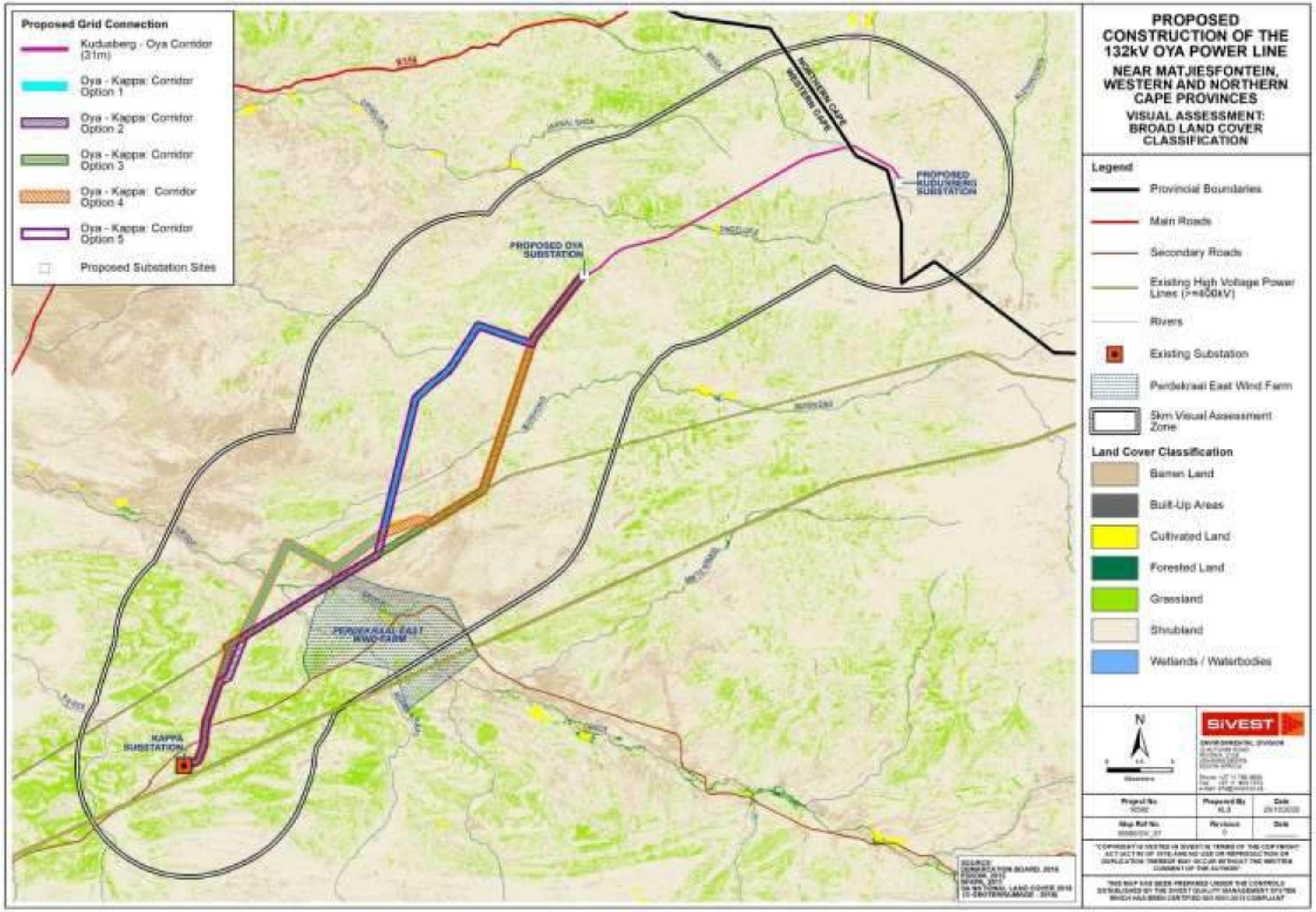


Figure 17: Land Cover Classification of the study area

Figure 18: Sheep grazing near Kappa Substation

Figure 19: Isolated farmstead on Portion 1 of the Farm Brandenburg No 164

Figure 20: Typical view of built form in the study area, including scattered farmhouses, power lines and telephone poles.

Figure 21: View of high voltage power lines in the study area

Figure 22: Kappa Substation

Figure 23: Operational wind turbines at Perdekraal East Wind Farm

<u>Visual Implications</u>

Sparse human habitation and the predominance of natural vegetation cover across much of the study area would give the viewer the general impression of a largely natural setting with some pastoral elements. In addition, there are no towns or settlements in the study area and thus, there are very low levels of human transformation and visual degradation across much of the study area.

Significant elements of human transformation are however present in the south-western sector of the study area, including high voltage power lines, Kappa Substation and the Perdekraal East Wind Farm. These elements are considered to have degraded the visual character to some degree.

The influence of the level of human transformation on the visual character of the area is described in more detail below.

6.2 Visual Character and Cultural Value

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

Agricultural activities in the area have not transformed the natural landscape to any significant degree and there are no towns or built-up areas in the study area influencing the overall visual character. Thus there are very low levels of human transformation and visual degradation across much of the study area and the natural character has been retained.

Prominent anthropogenic elements in the study area however include a large electrical substation (Kappa), associated high voltage power lines and the recently constructed Perdekraal East wind farm. The presence of this infrastructure is an important factor in this context, as the introduction of the proposed power line and substation infrastructure would result in less visual contrast where other anthropogenic elements are already present.

The construction of the Perdekraal East WEF and the associated 132kV power line is a significant factor in the visual character of the study area. WEFs and their associated infrastructure typically consist of very large structures which are highly visible. As such, this facility has significantly altered the visual character and baseline in the south-eastern sector of the study area, resulting in a more industrial-type visual character.

The scenic quality of the landscape is also an important factor contributing to the visual character of an area or the inherent sense of place. Visual appeal is often associated with unique natural features or distinct variations in landform. As such, the hilly / mountainous terrain which occurs in the north-eastern sector of the study area is considered to be an important feature that increases the scenic appeal and visual interest in the area.

The greater area surrounding the proposed development is an important component when assessing visual character. The area can be considered to be typical of a Karoo or “platteland” landscape that would characteristically be encountered across the high-lying dry western and central interior of South Africa. Much of South Africa’s dry Karoo interior consists of wide open, uninhabited spaces sparsely punctuated by scattered farmsteads and small towns. Over the last couple of decades an increasing number of tourism routes have been established in the Karoo and in a context of increasing urbanisation in South Africa’s major centres, the Karoo is being marketed as an undisturbed getaway. Examples of this may be found in the "Getaway Guide to Karoo, Namaqualand and Kalahari" (Moseley and Naude-Moseley, 2008).

The typical Karoo landscape can be considered a valuable 'cultural landscape' in the South African context. Although the cultural landscape concept is relatively new, it is becoming an increasingly important concept in terms of the preservation and management of rural and urban settings across the world (Breedlove, 2002).

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

In light of this, it is important to assess whether the introduction of a new power line and associated infrastructure into the study area would be a degrading factor in the context of the natural Karoo character of the landscape. Broadly speaking, visual impacts on the cultural landscape in the area around the proposed development would be reduced by the fact that the area is very remote and there are no significant tourism enterprises attracting visitors into the study area. In addition, the nearest major scenic routes (N1 and R355) are some considerable distance away and are not expected to experience any visual impacts from the proposed development.

A detailed assessment of the potential impacts of the proposed power line and substation development on the cultural landscape has been included in the Heritage Impact Assessment (HIA) undertaken by CTS Heritage in respect of the proposed project. Although this study identified cultural landscape features of significance, it was concluded that the proposed development is unlikely to have a negative impact on significant heritage resources situated within the corridor for the proposed Oya power line provided that the proposed mitigation measures including buffer areas and 'no-go' areas are implemented.

6.3 Visual Sensitivity

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

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

Based on the criteria in the matrix (**Table 2**), the visual sensitivity of the area is broken up into a number of categories, as described below:

i) **High** - The introduction of a new development such as a power line and/or substation would be likely to be perceived negatively by receptors in this area; it would be considered to be a visual intrusion and may elicit opposition from these receptors.

ii) **Moderate** – Receptors are present, but due to the nature of the existing visual character of the area and likely value judgements of receptors, there would be limited negative perception towards the new development as a source of visual impact.

iii) **Low** - The introduction of a new development would not be perceived to be negative, there would be little opposition or negative perception towards it.

The table below outlines the factors used to rate the visual sensitivity of the study area. The ratings are specific to the visual context of the receiving environment within the study area.

Table 2: Environmental factors used to define visual sensitivity of the study area

FACTORS	DESCRIPTION	RATING									
		LOW									*HIGH*
		1	2	3	4	5	6	7	8	9	10
Pristine / natural / scenic character of the environment	Study area is largely natural with areas of scenic value and some pastoral elements.										
Presence of sensitive visual receptors	Relatively few sensitive receptors have been identified in the study area.										
Aesthetic sense of place / visual character	Visual character is typical of Karoo Cultural landscape.										
Irreplaceability / uniqueness / scarcity value	Although there are areas of scenic value within the study area, these are not rated as highly unique.										
Cultural or symbolic meaning	Much of the area is typical of a Karoo Cultural landscape.										
Protected / conservation areas in the study area	No protected or conservation areas were identified in the study area.										
Sites of special interest present in the study area	No sites of special interest were identified in the study area.										
Economic dependency on scenic quality	Few tourism/leisure-based facilities in the area										
International / regional / local status of the environment	Study area is typical of Karoo landscapes										
**Scenic quality under threat / at risk of change	Introduction of grid connection infrastructure will alter the visual character and sense of place. In addition, the development of other renewable energy facilities in the broader area as planned or under construction will introduce an increasingly industrial character, giving rise to significant cumulative impacts										

**Any rating above '5' for this specific aspect will trigger the need to undertake an assessment of cumulative visual impacts.

Low				Moderate					High
10	20	30	40	50	60	70	80	90	100

Based on the above factors, the total score for the study area is 41, which according to the scale above, would result in the area being rated as having a low visual sensitivity. It should be stressed however that the concept of visual sensitivity has been utilised indicatively to provide a broad-scale indication of whether the landscape is likely to be sensitive to visual impacts, and is based on the physical characteristics of the study area, economic activities and land use that predominates. An important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that may value the aesthetic quality of the landscape and depend on it to produce revenue and create jobs.

No formal protected areas were identified in the study area and relatively few sensitive or potentially sensitive receptors were found to be present.

As part of the visual sensitivity assessment, a screening exercise was undertaken with the aim of indicating any areas that should be precluded from the proposed development footprint. From a visual perspective, these are areas where the establishment of power lines and/or substations would result in the greatest probability of visual impacts on sensitive or potentially sensitive visual receptors.

Using GIS-based visibility analysis, it was possible to determine which sectors of the application site would be visible to the highest numbers of receptors in the study area (**Figure 24**). This analysis considered all the sensitive and potentially sensitive receptor locations identified (**Section 8.1**). Due to the fact that there are relatively few receptors, widely scattered across the area, no sections of the proposed route alignments were found to be significantly more sensitive than any others. Accordingly, areas visible to more than 33% of the receptors were rated as areas of potentially 'high visual sensitivity'. However, as the study area as a whole is rated as having a low to moderate visual sensitivity, the sensitivity rating would be reduced to "Medium-High". Hence these areas are **not** considered to be "no go areas", but rather should be viewed as zones where development would be least preferred.

It should be noted that the visibility analysis is based purely on topographic data available for the broader study area and does not take into account any localised topographic variations or any existing infrastructure and / or vegetation which may constrain views. In addition, the analysis does not consider differing perceptions of the viewer which would largely determine the degree of visual impact being experienced.

The visual sensitivity analysis should therefore be seen as a conceptual representation or a worst-case scenario which rates the visibility of the site in relation to potentially sensitive receptors.

In addition to the sensitivity ratings, a 500 m exclusion zone has been delineated around the identified receptors in the study area. It is recommended that grid infrastructure should not be developed within these buffer zones so as to reduce visual impacts of the power line on these receptors.

These areas of visual sensitivity are shown in **Figure 24** below.

In assessing visual sensitivity, the Landscape Theme of the National Environmental Screening Tool was used to determine the relative landscape sensitivity for the development of grid connection infrastructure. The tool does not however identify any landscape sensitivities in respect of the proposed power line or substation.

6.4 Visual Absorption Capacity

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

Although the undulating topography in the study would increase the visual absorption capacity, this would be offset by the lack of screening provided by the dominant shrubland vegetation. A significant portion of the study area has however already undergone significant transformation as a result of the Kappa substation and associated high voltage power lines and further transformation has occurred with the construction of the Perdekraal East Windfarm, thus increasing the visual absorption capacity of the landscape.

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

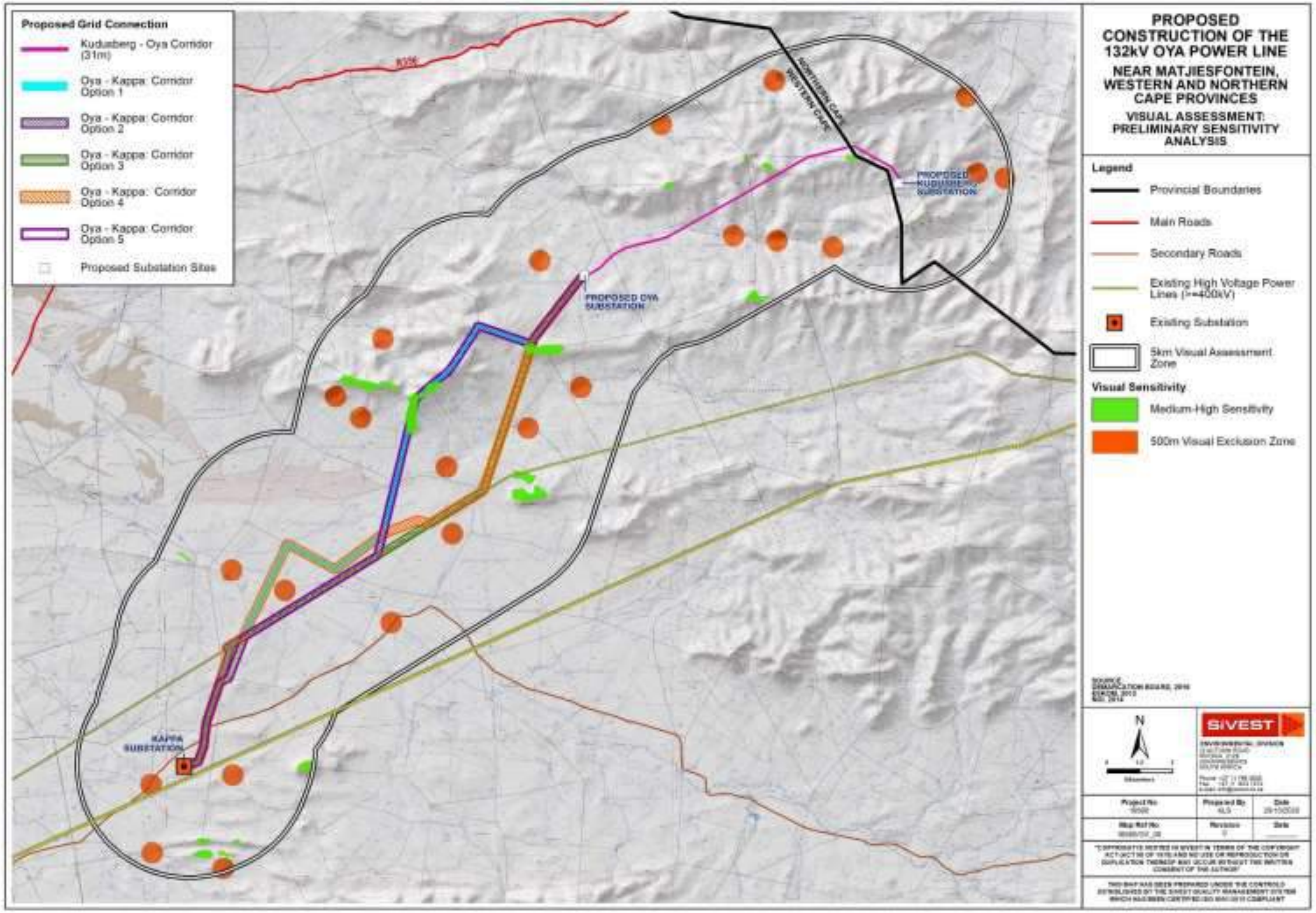


Figure 24: Preliminary visual sensitivity analysis of proposed development**.**

7 TYPICAL VISUAL IMPACTS ASSOCIATED WITH ON-SITE SUBSTATIONS AND POWER LINES

In this section, the typical visual issues related to the establishment of a 132kV power line and substation are discussed

Power line towers and substations are very large objects and thus highly visible. According to the project description provided by Oya Energy, the maximum tower height envisaged for the proposed power line is 45m (equivalent in height to a fifteen storey building). Although a tower structure would be less visible than a building, the height of the structure means that the tower would still typically be visible from a considerable distance. Visibility would be increased by the fact that the power line comprises a series of towers typically spaced approximately 200m to 250m apart in a linear alignment.

The degree of visibility of an object informs the level and intensity of the visual impact, but other factors also influence the nature of the visual impact. The landscape and aesthetic context of the environment in which the object is placed, as well as the perception of the viewer are also important factors. In the context of a power line, the type of tower used as well as the degree to which the towers would impinge upon or obscure a view is also a factor that will influence the experience of the visual impacts.

As described above, a power line or substation could be perceived to be highly incongruous in the context of a largely natural landscape. The height and linear nature of the power line will exacerbate this incongruity, as the towers may impinge on views within the landscape. In addition, the practice of clearing any taller vegetation from areas within the power line servitude can increase the visibility and incongruity of the power line. In a largely natural, bushier setting, vegetation clearance will cause fragmentation of the natural vegetation cover, thus making the power line more visible and drawing the viewer’s attention to the power line servitude.

Sensitivity to visual impacts is typically most pronounced in areas set aside for conservation of the natural environment (such as protected natural areas or conservancies), or in areas in where the natural character or scenic beauty of the area attracts visitors (tourists). In this instance however, the area is not typically valued for its tourism significance and no formal protected areas, leisure-based tourism activities or recognised tourism routes were identified in the area.

Conversely, the presence of other anthropogenic objects associated with the built environment may “degrade” the visual environment and thus the introduction of a new power line and substation into this setting may be considered to be less of a visual impact than if there was no existing built infrastructure visible. In this context therefore, the presence of the Kappa substation and the existing high voltage power lines traversing the study area, in conjunction with the Perdekraal East WEF, is expected to lessen the visual contrast associated with the introduction of a new power line and substation.

Other factors, as listed below, can also affect the nature and intensity of a potential visual impact associated with a power line and substation:

- The location of the development in the landform setting – i.e. in a valley bottom or on a ridge top. In the latter example the development would be much more visible and would “break” the horizon;
- The presence of macro- or micro-topographical features, built form or vegetation that would screen views of the development from a receptor location;
- The presence of existing, similar features in the area and their alignment in relation to the proposed new development; and
- Temporary factors such as weather conditions (presence of haze, rainfall or heavy mist) which would affect visibility.

In this instance, the proposed power line and substations are intended to serve the proposed Oya Energy Facility and, potentially, other proposed renewable energy facilities (REFs) in the area. As such, the power line and substations will only be built if one of these energy facilities is developed. The power line and substations are therefore likely to be perceived to be part of the greater energy facility development and the visual impact will be relatively minor when compared to the visual impact associated with energy facility as a whole.

8 SENSITIVE VISUAL RECEPTORS

A sensitive visual receptor location is defined as a location from where receptors would potentially be impacted by a proposed development. Adverse impacts often arise where a new development is seen as an intrusion which alters the visual character of the area and affects the ‘sense of place’. The degree of visual impact experienced will however vary from one receptor to another, as it is largely based on the viewer’s perception.

A distinction must be made between a receptor location and a sensitive receptor location. A receptor location is a site from where the proposed development may be visible, but the receptor may not necessarily be adversely affected by any visual intrusion associated with the development. Less sensitive receptor locations include locations of commercial activities and certain movement corridors, such as roads that are not tourism routes. More sensitive receptor locations typically include sites that are likely to be adversely affected by the visual intrusion of the proposed development. They include tourism facilities, scenic sites and residential dwellings in natural settings.

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

- the visual character of the area, especially taking into account visually scenic areas and areas of visual sensitivity;
- the presence of leisure-based (especially nature-based) tourism in an area;

- the presence of sites or routes that are valued for their scenic quality and sense of place;
- the presence of homesteads / farmsteads in a largely natural setting where the development may influence the typical character of their views; and
- feedback from interested and affected parties, as raised during the public participation process conducted as part of the BA study.

Viewing distance is also a critical factor in the experiencing of visual impacts. As the visibility of the development would diminish exponentially over distance (refer to **section 5.4** above), receptor locations which are closer to the proposed development would experience greater adverse visual impacts than those located further away.

The degree of visual impact experienced will however vary from one inhabitant to another, as it is largely based on the viewer's perception. Factors influencing the degree of visual impact experienced by the viewer include the following:

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

8.1 Receptor Identification

Preliminary desktop assessment of the study area identified twenty-three (23) potentially sensitive visual receptor locations within the study area, most of which appear to be existing farmsteads (**Figure 25**). These farmsteads are regarded as potentially sensitive visual receptors as they are located within a mostly rural setting and the proposed development will likely alter natural vistas experienced from these locations, although the residents' sentiments toward the proposed development are unknown.

The findings of the desktop assessment were largely confirmed by field assessments conducted in the study area for other VIAs, although it was not possible to confirm the presence of farmsteads at all the identified locations due to access restrictions. Notwithstanding this limitation, all the identified receptor locations were assessed as part of this VIA as they are still regarded as being potentially sensitive to the visual impacts associated with the proposed.

Two (2) of the identified receptor locations were confirmed to be sensitive receptors, these being tourism / accommodation facilities at the Gats Rivier Holiday Farm and Baakens Rivier. It was established that Baakens River comprises accommodation facilities that are part of the Gats Rivier Holiday Farm facility, even though these facilities are located on a different farm located some distance from the main Gats Rivier farm.

Five (5) identified receptors were found to be outside the viewshed for the combined grid infrastructure proposals.

In many cases, roads along which people travel, are regarded as sensitive receptors. The primary thoroughfare in the broader region is the R356 main road which connects the R46 near Ceres with Loxton by way of Sutherland and Fraserburg. This is a gravel road, primarily used as an access route by the local farmers and is not valued or utilised for its scenic or tourism potential. As a result, this road is not considered to be visually sensitive. In addition, the road is more than 8kms from the nearest power line route alternative and well outside the 5km visual assessment area. At this distance, motorists travelling along this road are not expected to experience any adverse visual impacts as a result of the proposed development.

The DR1475 is the primary thoroughfare in the south-western sector of the study area. This gravel road is used mainly as an access route by the local farmers and is therefore not valued or utilised for its scenic or tourism potential. As a result, this road is not considered to be visually sensitive.

Other roads in the study area are primarily farm access roads and do not form part of any scenic tourist routes and are therefore not regarded as visually sensitive.

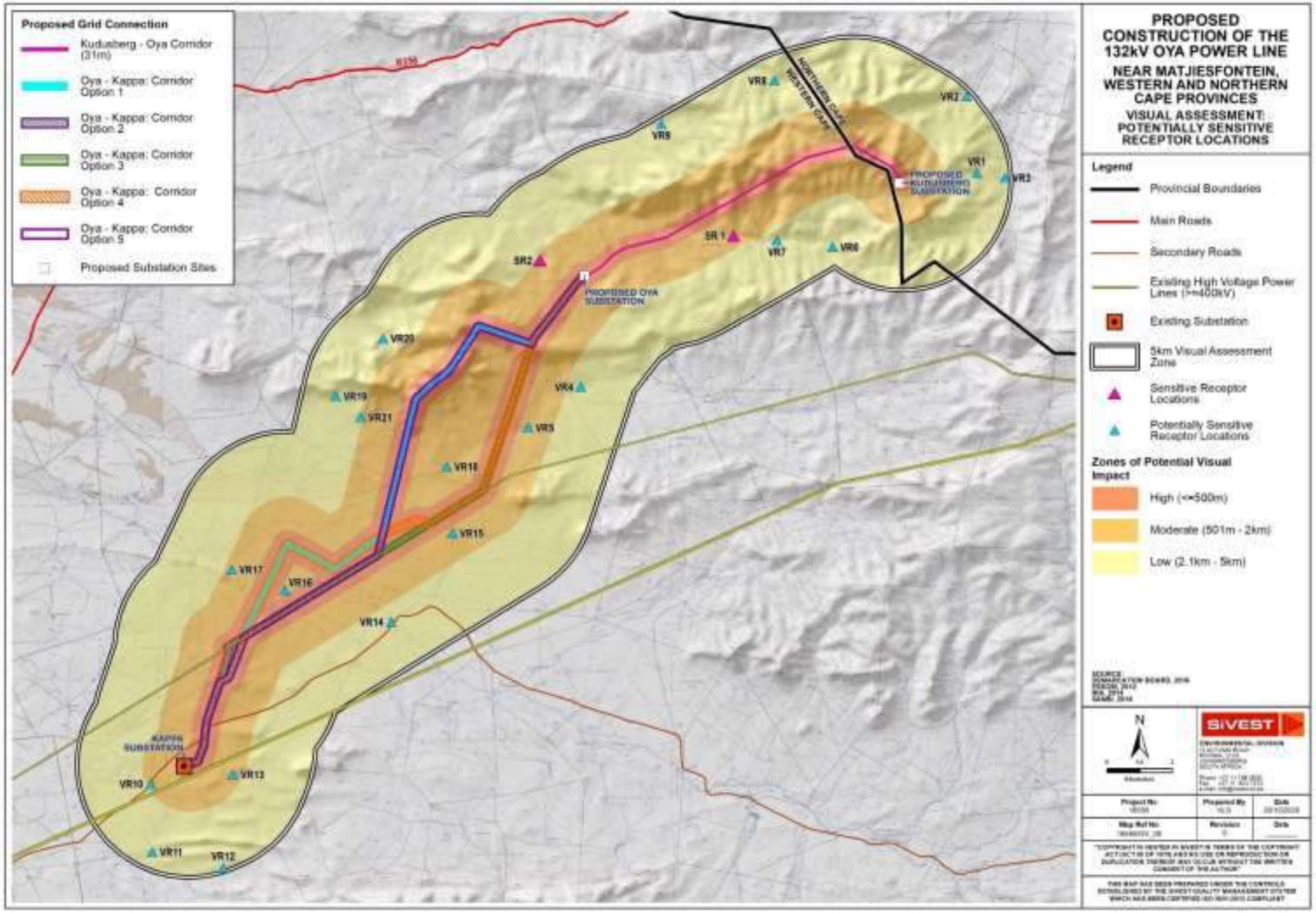


Figure 25: Potentially sensitive receptor locations within 5kms of the Oya Solar PV Facility application site.

8.2 Receptor Impact Rating

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

The matrix is based on a number of factors as listed below:

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

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

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

Zones of visual impact for the proposed development were therefore delineated according to distance from the proposed power line assessment corridors. Based on the height and project, the distance intervals chosen for the zones of visual impact are as follows:

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

The presence of screening elements is an equally important factor in this context. Screening elements can be vegetation, buildings and topographic features. For example, a grove of trees or a series of low hills located between a receptor location and an object could completely shield the object from the receptor. As such, where views of the proposed development are completely screened, or where the receptor is outside the viewshed for the proposed development, the receptor has been assigned an overriding nil impact rating, as the development would not impose any impact on the receptor.

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

In light of the fact that the study area is located within the Central Strategic Transmission Corridor, and also within Renewable Energy Development Zone 2 (Komsberg REDZ[4]), the concentration of renewable energy developments and associated grid connection infrastructure is supported in this area. This could result in an incremental change in the visual character of the area and in the typical land use patterns towards a less rural environment within which power lines and substations would be less incongruous.

The matrix returns a score which in turn determines the visual impact rating assigned to each receptor location (**Table 3**) below.

Table 3: Rating scores

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

An explanation of the matrix is provided in **Table 4** below.

[4] formally gazetted (Gazette Number 41445) on 16 February 2018 by the Minister of Environmental Affairs (GN 114)

Table 4: Visual assessment matrix used to rate the impact of the proposed development on potentially sensitive receptors

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

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

Table 5: Summary Receptor Impact Rating

Receptor Number	Distance to nearest Corridor Alternative		Screening	Contrast	OVERALL IMPACT RATING
SR1 – Baakens Rivier[1]	*Mod (2)*	*1.4km*	*High (3)*	*High (3)*	**HIGH (8)**
SR2 – Gats Rivier[2]	*Mod (2)*	*1.8km*	*Mod (2)*	*Mod (2)*	**MODERATE (5)**
VR 1 – Farmstead[3]	*Low (1)*	*3.4km*		***NIL***	
VR 2 – Farmstead[4]	*Low (1)*	*4.7km*	*Mod (2)*	*High (3)*	**MODERATE (6)**
VR 3 – Farmstead	Low (1)	4.7km	Mod (2)	High (3)	**MODERATE (6)**
VR 4 – Farmstead	Low (1)	2.6km	Mod (2)	High (3)	**MODERATE (6)**
VR 5 – Farmstead[6]	*Mod (2)*	*0.9km*	*Mod (2)*	*High (3)*	**MODERATE (7)**
VR 6 – Farmstead[4]	*Low (1)*	*4.2km*	*Mod (2)*	*High (3)*	**MODERATE (6)**
VR 7 – Farmstead[3]	*Low (1)*	*2.6km*		***NIL***	
VR 8 – Farmstead[4]	*Low (1)*	*3.8km*	*Mod (2)*	*High (3)*	**MODERATE (6)**
VR 9 – Farmstead[3]	*Low (1)*	*4.6km*		***Nil***	
VR 10 – Farmstead[5]	*Mod (2)*	*1.8km*	*Mod (2)*	*Mod (2)*	**MODERATE (5)**
VR 11 - Farmstead[3]	*Low (1)*	*4.2km*		***NIL***	
VR 12 - Farmstead[3]	*Low (1)*	*4.8km*		***NIL***	
VR 13 – Farmstead[5]	*Mod (2)*	*1.6km*	*Mod (2)*	*High (3)*	**MODERATE (7)**
VR 14 - Farmstead[5]	*Low (1)*	*2.8km*	*Mod (2)*	*Low (1)*	**LOW**
VR 15 - Farmstead[6]	*Mod (2)*	*0.8km*	*Mod (2)*	*High (3)*	**MODERATE (6)**
VR 16 – Farmstead[5]	*Mod (2)*	*0.7km*	*Mod (2)*	*Low (1)*	**MODERATE (5)**
VR 17 - Farmstead[5]	*Mod (2)*	*1.6km*	*Mod (2)*	*High (3)*	**MODERATE (7)**
VR 18 - Farmstead[6]	*Mod (2)*	*1.7km*	*Mod (2)*	*Mod (2)*	**MODERATE (6)**
VR 19 - Farmstead	Low (1)	3.4km	High (3)	High (3)	**MODERATE (7)**
VR 20 - Farmstead[6]	*Low (1)*	*2.8km*	*Mod (2)*	*High (3)*	**MODERATE (6)**
VR 21 - Farmstead[6]	*Low (1)*	*2.1km*	*Mod (2)*	*High (3)*	**MODERATE (6)**

[1]Baakens Rivier is located within the proposed Kudusberg WEF development area. It is known that the occupants have a vested interest in the proposed WEF and associated infrastructure development and would therefore not perceive the proposed power line in a negative light.

[2]Gats Rivier is located within the proposed Oya Energy Facility development area. It is known that the occupants have a vested interest in the proposed energy facility and associated infrastructure development and would therefore not perceive the proposed power line in a negative light.

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

[4]Receptor is located within the Kudusberg WEF development area. It is known that the occupants have a vested interest in the proposed WEF and associated infrastructure development and would therefore not perceive the proposed power line in a negative light.

[5]Receptor is located within the Tooverberg and Perdekraal WEF development area. It is known that the occupants have a vested interest in the proposed WEF and associated infrastructure development and would therefore not perceive the proposed power line in a negative light.

[6]Receptor is located on a property which is affected by all of the proposed power line route alignments. It is assumed that the respective land owners have consented to the proposed development on their property and do not perceive the proposed power line in a negative light.

The table above shows that one (1) of the sensitive receptors would experience high levels of visual impact as a result of the proposed development, this being the farmstead on Baakens Rivier. As previously mentioned, this property forms part of the Kudusberg WEF application site, and as such the owner has a vested interest in the development of the facility and the associated grid connection infrastructure. The other sensitive receptor, Gats Rivier Holiday Farm, will be subjected to moderate levels of visual impact, and as the property is under the same ownership as Baakens Rivier, and is part of the adjacent Oya Energy Facility project, it is unlikely that the owners will perceive the proposed development in a negative light.

Fifteen (15) potentially sensitive receptors, will be subjected to moderate levels of visual impact as a result of the proposed power line development, while one receptor will be subjected to low levels of visual impact. It should be noted however, that thirteen of these receptors are located on farms which either form part of the power line development project or are located within the development sites for other renewable energy projects. As such the owners / occupants are not expected to perceive the proposed power line and substations in a negative light.

The remaining five (5) receptors are outside the viewshed of the proposed development and are therefore not expected to be subjected to any visual impacts as a result of the power line development.

8.3 Night-time Impacts

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

Much of the study area is characterised by natural areas with pastoral elements and low densities of human settlement. As a result, relatively few light sources are present in the broader area surrounding the proposed development site. The closest built-up area is the town of Touws River which is situated approximately 26km south of Kappa Substation and is thus too far away to have significant impacts on the night scene. At night, the general study area is characterised by a picturesque dark starry sky and the visual character of the night environment is largely ‘unpolluted’ and pristine. Sources of light in the area are largely limited to isolated lighting from surrounding farmsteads and transient light from the passing cars travelling along the gravel access roads. Some light pollution is however likely to emanate from the operational and security lighting at Kappa substation and Perdekraal WEF and this would reduce the impacts of additional lighting in the area.

Power lines and associated towers or pylons are not lit up at night and, thus light spill associated with the proposed electrical infrastructure project is only likely to emanate from the proposed substations. Although the lighting required at the substation sites would normally be expected to intrude on the nightscape, night time impacts of this lighting will be reduced by the existing light spill emanating from Kappa substation and Perdekraal WEF. It should also be noted that the power line and substations will only be constructed if the proposed Oya Energy Facility (or any other proposed REF in the area) is also developed. Light sources for these facilities will include operational and security lighting and thus the lighting impacts from the proposed substations would be subsumed by the glare and contrast of the lights associated with the energy facility or REFs. As such, the substations alone are not expected to result in significant lighting impacts.

8.4 Cumulative Impacts

Although it is important to assess the potential visual impacts of the proposed power line and substations specifically, it is equally important to assess the potential cumulative visual impact that could materialise if other renewable energy facilities (both wind and solar facilities) and associated infrastructure projects are developed in the broader area. Cumulative impacts occur where existing or planned developments, in conjunction with the proposed development, result in significant incremental changes in the broader study area. In this instance, such developments would include renewable energy facilities and associated infrastructure development.

Renewable energy facilities have the potential to cause large scale visual impacts and the location of several such developments in close proximity to each other could significantly alter the sense of place and visual character in the broader region. Although power lines and substations are relatively small developments when compared to renewable energy facilities, they may still introduce a more industrial character into the landscape, thus altering the sense of place.

Fifteen (15) renewable energy projects were identified within a 35 km radius of the proposed development as shown in **Figure 26** below. These projects were identified using the DEFF's Renewable Energy EIA Application Database for SA in conjunction with information provided by Independent Power Producers (IPPs) operating in the broader region. Three (3) of these projects, namely Touws River Solar, Montagu Solar and Witberg WEF, are all located south of the N1 national route and the Bontberg mountain range. Given the visual divide provided by the mountains, it is not anticipated that these developments will result in any significant cumulative impacts affecting the landscape in the vicinity of the study area.

The remaining twelve (12) projects are listed in **Table 6** below. It is assumed that all of these renewable energy developments include grid connection infrastructure, although few details of this infrastructure were available at the time of writing this report. It should be noted that this list is based on information available at the time of writing this report and as such there may be several other renewable energy projects proposed within the study area.

The relatively large number of renewable energy facilities within the surrounding area and their potential for large-scale visual impacts could significantly alter the sense of place and visual character in the broader region, as well as exacerbate the visual impacts on surrounding visual receptors, once constructed.

Table 6: Renewable energy developments proposed within a 35km radius of the proposed 132kV Oya power line and substations

Applicant	Project	Technology	Capacity	Status of Application / Development
Oya Energy (Pty) Ltd	Oya Energy Facility	Hybrid	305MW	EIA Process underway
Brandvalley Wind Farm (Pty) Ltd	Brandvalley WEF	Wind	140MW	Approved
Biotherm Energy (Pty) Ltd	Esizayo WEF	Wind	140MW	Approved
African Clean Energy Developments Renewables	Hidden Valley (Karusa & Soetwater) WEF	Wind	140MW	Under Construction
Karreebosch Wind Farm (Pty) Ltd	Kareebosch WEF	Wind	140W	Approved
Rondekop Wind Farm (Pty) Ltd	Rondekop WEF	Wind	325MW	Approved
Kudusberg Wind Farm (Pty) Ltd	Kudusberg WEF	Wind	325W	Approved
South Africa Mainstream Renewable Power Perdekraal West (Pty) Ltd	Perdekraal West WEF & Associated Grid Connection Infrastructure	Wind	150M	Approved
South Africa Mainstream Renewable Power Perdekraal East (Pty) Ltd	Perdekraal East WEF & Associated Grid Connection Infrastructure	Wind	110MW	Operational
Rietkloof Wind Farm (Pty) Ltd	Rietkloof WEF& Associated Grid Connection Infrastructure	Wind	186MW	Approved
Roggeveld Wind Power (Pty) Ltd	Roggeveld WEF& Associated Grid Connection Infrastructure	Wind	140MW	Under Construction
ENERTRAG SA (Pty) Ltd	Tooverberg WEF & Associated Grid Connection Infrastructure	Wind	140MW	Approved

These renewable energy projects include eleven (11) WEFs and one (1) combined Solar PV and Fuel-based Generator Facility (FBGF). Although the different technologies are expected to have different impacts, all renewable energy developments and associated grid connection infrastructure are relevant as they contribute to the alteration of the visual character of the area.

Figure 26 below shows a concentration of sites proposed for WEF development to the north-east of the application site, and also to the south-west, with many of these being located outside the 5 km visual assessment zone. Given the distance from the study area and the hilly topography in the broader area, it is not anticipated that the WEF developments beyond the 5 km study area will result in any significant cumulative impacts affecting the landscape or the visual receptors within the power line visual assessment zone.

The north-eastern sector of the study area is affected by two (2) renewable energy projects, located on adjoining farm portions, namely Kudusberg WEF and Oya Energy Facility. These projects and associated infrastructure will inevitably introduce an increasingly industrial character into a largely natural, pastoral landscape in this sector of the study area, thus giving rise to significant cumulative impacts. It should be noted however that that PV panels, at an approximate height of 4m, are considerably less visible than wind turbines and as such the proposed Oya solar arrays would be outside the viewshed of many of the potentially sensitive receptor locations identified in the study area. Cumulative impacts affecting these receptors would therefore be reduced and the severity of these impacts would depend on the perceptions of the receptors.

The south- western sector of the study area is affected by three (3) WEF projects, namely Perdekraal East WEF, Perdekraal West WEF and Tooverberg WEF. These projects are all located on adjoining farm portions and are in close proximity to Kappa substation and both sets of high voltage power lines. Grid connection infrastructure for all of these projects include 132kV power lines routed along the same alignment, adjacent to the existing 765kV power lines, traversing the Tooverberg WEF application site to connect into Kappa substation. Although Perdekraal West and Tooverberg WEFs have not yet been developed, Perdekraal East WEF and the associated power line are now operational and the landscape has already undergone noticeable change, which will be exacerbated with further WEF development in the area. Impacts of this transformation will however be reduced by the fact the landscape in the vicinity of these proposed WEF developments has already been disturbed by Perdekraal East WEF, Kappa substation and the existing power lines.

An examination of the literature available for the environmental assessments undertaken for many of these renewable energy applications showed that the visual impacts identified and the recommendations and mitigation measures provided are largely consistent with those identified in this report. Where additional, relevant mitigation measures were provided in respect of the other renewable energy applications, these have been incorporated into this report where relevant.

From a visual perspective, the further concentration of renewable energy facilities with associated grid connection infrastructure as proposed will inevitably change the visual character of the area and alter the inherent sense of place, introducing an increasingly industrial character into the broader area, and resulting in significant cumulative impacts. It is however anticipated that these impacts could be mitigated to acceptable levels with the implementation of the recommendations and mitigation measures put forward by the visual specialists in their respective reports.

It is important to note however that the study area is located within the REDZ 2, known as Komsberg REDZ, and also within a Strategic Transmission Corridor and thus the relevant authorities support the concentration of renewable energy developments and associated power line infrastructure in this area. In addition, it is possible that the renewable energy facilities located in close proximity to each other could be seen as one large facility rather than separate developments. Although this will not necessarily reduce impacts on the visual character of the area, it could potentially reduce the cumulative impacts on the landscape.

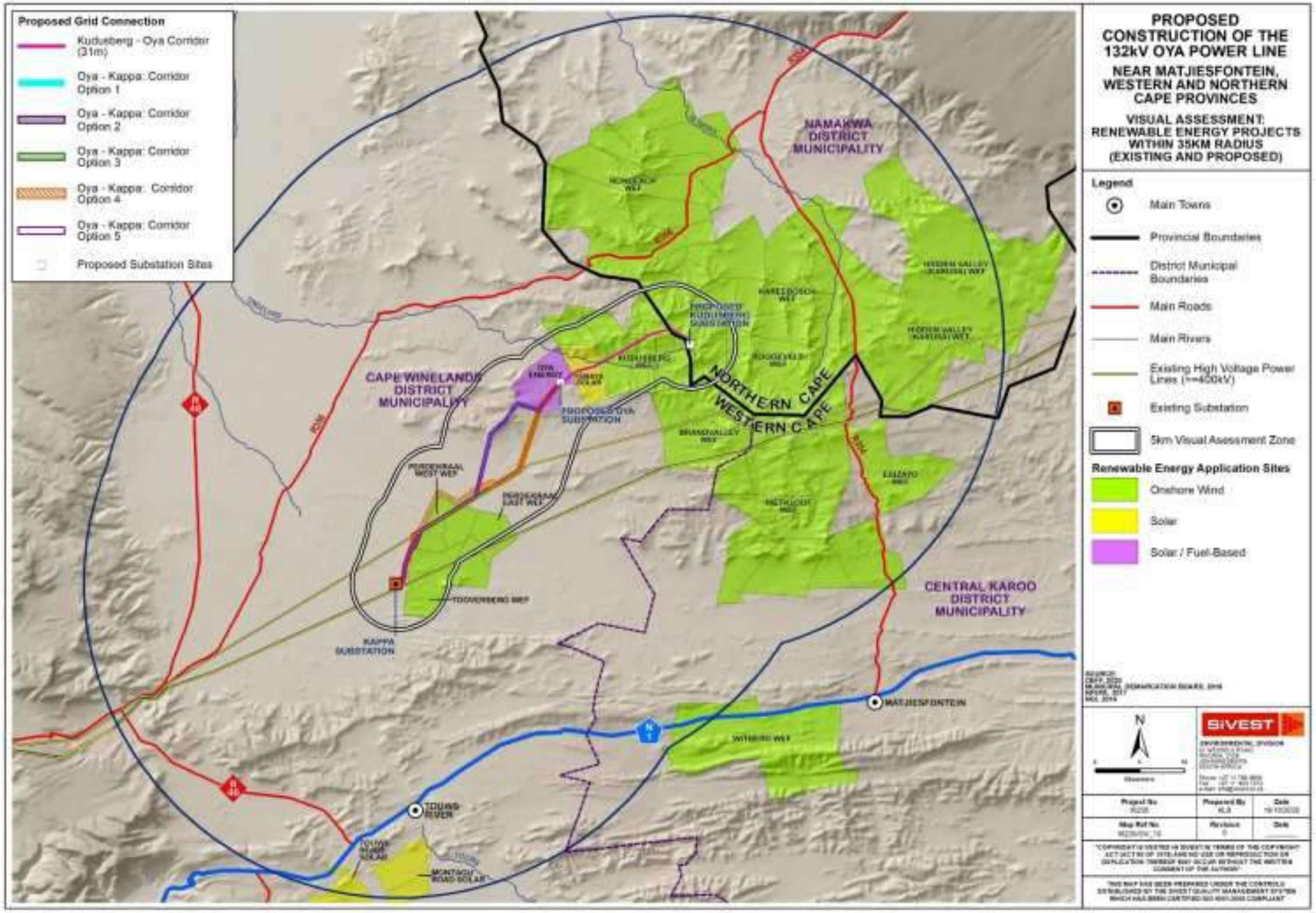


Figure 26: Renewable energy facilities proposed within a 35km radius of the 132kV Oya Power Line.

8.5 Overall Visual Impact Rating

The EIA Regulations, 2014 (as amended) require that an overall rating for visual impact be provided to allow the visual impact to be assessed alongside other environmental parameters. **Table 6 and 7** below present the impact matrix for visual impacts associated with the proposed construction and operation of the proposed 132kV power line and substations. Preliminary mitigation measures have been determined based on best practice and literature reviews.

Please refer to **Appendix D** for an explanation of the impact rating methodology.

Table 7: Impact Rating for 132kV Oya Power Line and Substations

132kV OYA POWER LINE AND SUBSTATIONS																				
ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Construction Phase (Direct Impacts)																				
▪ Potential alteration of the visual character and sense of place ▪ Potential visual impact on receptors in the study area	▪ Large construction vehicles and equipment will alter the natural character of the study area and expose visual receptors to impacts associated with construction. ▪ Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. ▪ Dust emissions and dust plumes from increased traffic on the gravel roads serving the construction site may evoke negative sentiments from surrounding viewers. ▪ Surface disturbance during construction would expose bare soil (scarring) which could visually contrast with the surrounding environment. ▪ Temporary stockpiling of soil during construction may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.	2	3	1	2	1	2	18	-	Low	▪ Carefully plan to mimimise the construction period and avoid construction delays. ▪ Inform receptors of the construction programme and schedules. ▪ Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. ▪ Vegetation clearing should take place in a phased manner. ▪ Maintain a neat construction site by removing rubble and waste materials regularly. ▪ Make use of existing gravel access roads where possible. ▪ Limit the number of vehicles and trucks travelling to and from the construction site, where possible. ▪ Ensure that dust suppression techniques are implemented: ▪ on all access roads;	2	2	1	2	1	2	14	-	Low

											▪ in all areas where vegetation clearing has taken place; ▪ on all soil stockpiles.									
Operational Phase																				
▪ Potential alteration of the visual character and sense of place. ▪ Potential visual impact on receptors in the study area. ▪ Potential visual impact on the night time visual environment.	▪ The proposed power line and substations could alter the visual character of the surrounding area and expose sensitive visual receptor locations to visual impacts. ▪ The development may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. ▪ Dust emissions and dust plumes from maintenance vehicles accessing the site via gravel roads may evoke negative sentiments from surrounding viewers. ▪ The night time visual environment will be altered as a result of operational and security lighting at the proposed substations.	2	4	2	2	3	1	13	-	Low	▪ As far as possible, limit the number of maintenance vehicles using access roads. ▪ As far as possible, limit the amount of security and operational lighting at the proposed substations. ▪ Light fittings for security at night should reflect the light toward the ground and prevent light spill. ▪ Lighting fixtures should make use of minimum lumen or wattage. ▪ Mounting heights of lighting fixtures should be limited, or alternatively, foot-light or bollard level lights should be used. ▪ If possible, make use of motion detectors on security lighting. ▪ Buildings on the substation site should be painted with natural tones that fit with the surrounding environment. ▪ Non-reflective surfaces should be utilised where possible.	2	4	2	2	3	1	13	-	Low
Decommissioning Phase																				
▪ Potential visual intrusion resulting from vehicles and equipment involved in the decommissioning process; ▪ Potential visual impacts of increased dust emissions from decommissioning activities and related traffic; and	▪ Vehicles and equipment required for decommissioning will alter the natural character of the study area and expose visual receptors to visual impacts.	2	3	1	2	1	2	18	-	Low	▪ All infrastructure that is not required for post-decommissioning use should be removed.	2	2	1	1	1	2	14	-	Low

▪ Potential visual intrusion of any remaining infrastructure on the site.	▪ Decommissioning activities may be perceived as an unwelcome visual intrusion. ▪ Dust emissions and dust plumes from increased traffic on the gravel roads serving the decommissioning site may evoke negative sentiments from surrounding viewers. ▪ Surface disturbance during decommissioning would expose bare soil (scarring) which could visually contrast with the surrounding environment. ▪ Temporary stockpiling of soil during decommissioning may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.										▪ Carefully plan to minimize the decommissioning period and avoid delays. ▪ Maintain a neat decommissioning site by removing rubble and waste materials regularly. ▪ Ensure that dust suppression procedures are maintained on all gravel access roads throughout the decommissioning phase. ▪ All cleared areas should be rehabilitated in accordance with the recommendations of the Terrestrial Ecology assessment. ▪									
Cumulative																				
▪ Potential alteration of the visual character and sense of place in the broader area. ▪ Potential visual impact on receptors in the study area. ▪ Potential visual impact on the night time visual environment.	▪ Additional renewable energy and associated grid connection infrastructure developments in the broader area will alter the natural character of the study area towards a more industrial landscape and expose a greater number of receptors to visual impacts. ▪ Visual intrusion of multiple renewable energy developments may be exacerbated, particularly in more natural undisturbed settings. ▪ Additional renewable energy facilities in the area would generate additional traffic on gravel roads thus resulting in increased impacts from dust emissions and dust plumes. ▪ The night time visual environment could be altered as a result of operational and security lighting at multiple renewable energy facilities in the broader area.	3	3	2	3	3	2	28	-	Medium	▪ Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. ▪ Vegetation clearing should take place in a phased manner. ▪ As far as possible, limit the number of maintenance vehicles using access roads. ▪ As far as possible, limit the amount of security and operational lighting at the proposed substations. ▪ Light fittings for security at night should reflect the light toward the ground and prevent light spill. ▪ Lighting fixtures should make use of minimum lumen or wattage.	3	3	2	2	2	2	24	-	Medium

										▪ Mounting heights of lighting fixtures should be limited, or alternatively, foot-light or bollard level lights should be used. ▪ If possible, make use of motion detectors on security lighting. ▪ Buildings on the substation site should be painted with natural tones that fit with the surrounding environment. ▪ Non-reflective surfaces should be utilised where possible. ▪ Ensure that appropriate dust suppression techniques are implemented on all gravel access roads.									

Table 8: Impact Rating for 'No-Go' Alternative

NO-GO ALTERNATIVE																				
ENVIRONMENTAL PARAMETER	**ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE**	**ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION**									**RECOMMENDED MITIGATION MEASURES**	**ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION**								
		E	**P**	**R**	**L**	**D**	**I / M**	**TOTAL**	**STATUS (+ OR -)**	**S**		**E**	**P**	**R**	**L**	**D**	**I / M**	**TOTAL**	**STATUS (+ OR -)**	**S**
▪ Potential alteration of the visual character and sense of place in the broader area. ▪ Potential visual impact on receptors in the study area. ▪ Potential visual impact on the night time visual environment.	▪ If the 132kV power line and associated substations are not developed in this area, there will be no change in the visual character or the sense of place. There will be no visual impacts on receptors or on the night-time visual environment.	NIL	NIL	NIL	NIL	NIL	NIL	NIL	-	NIL	▪ N / A	NIL	NIL	NIL	NIL	NIL	NIL	NIL	-	Low

9 COMPARATIVE ASSESSMENT OF ALTERNATIVES

As previously mentioned, only one (1) route is technically feasible for the section of the proposed power line connecting the Kudusberg on-site substation (authorised under 14/12/16/3/3/1/1976/AM1) to the Oya on-site substation (i.e. Kudusberg to Oya). Accordingly, no comparative assessment is required in respect of this route alignment.

Five (5) power line corridor route alternatives however are being assessed for the section of the proposed overhead power line which connects the Oya on-site substation to the Kappa substation (i.e. Oya to Kappa). These alternatives, as described in Section **3.2.1** and depicted in **Figure 2**, have been comparatively assessed to determine which of the alternatives would be preferred from a visual perspective.

Preference ratings for each alternative are provided in **Table 9** below. The alternatives are rated as "preferred"; "favourable", "least-preferred" or "no-preference". The degree of visual impact and the preference rating has been determined based on the following factors:

- The location of each proposed power line corridor route alignment alternative in relation to areas of high elevation, especially ridges, koppies or hills;
- The location of each proposed power line corridor route alternative in relation to sensitive visual receptor locations; and
- The location of each proposed power line corridor route alternative in relation to areas of natural vegetation (clearing site for the development worsens the visibility).

Key

PREFERRED	The alternative will result in a low impact / reduce the impact
FAVOURABLE	The impact will be relatively insignificant
LEAST PREFERRED	The alternative will result in a high impact / increase the impact
NO PREFERENCE	The alternative will result in equal impacts

Table 9: Comparative Assessment of Power Line Corridor Route Alternatives

Alternative	Preference	Reasons (incl. potential issues)
POWER LINE CORRIDOR ROUTE ALTERNATIVES		
Power Line Corridor Alternative 1 (Oya to Kappa) - 34.14km	Favourable	▪ Although a section of Alternative 1 is traverses ridges near the proposed Oya Substation, the visibility analysis does not indicate that these ridges are highly visible from the surrounding landscape. The remainder of this alternative is the located on relatively flat terrain and as such the power lines would only be moderately exposed on the skyline. ▪ The closest sensitive receptor to this alternative is 1.8kms away, this being SR2.

Alternative	Preference	Reasons (incl. potential issues)
		The visual impacts from Alternative 1 affecting this receptor are therefore rated as moderate. As SR2 is located on the Oya Energy Facility application site, it is assumed that the owner has a vested interest in the proposed development and thus the associated power lines would not be perceived in a negative light. ▪ Fourteen (14) potentially sensitive receptors are located within 5kms of Alternative 1, although the proposed power lines are only expected to be visible from twelve (12) of these locations. The closest potentially sensitive receptor to this alternative is approximately 672m away, this being VR16. The visual impacts from Alternative 1 affecting this receptor are therefore rated as moderate. As VR16 is located on a property which is affected by all of the proposed power line route alignments, it is assumed that the land owner has consented to the proposed development on their property and does not perceive the proposed power line in a negative light. The remaining receptors are all more than 1.5kms away and, would only be subjected to moderate or low levels of impact. ▪ Much of the southern section of this alternative is in close proximity to Kappa Substation and the associated high voltage power lines, as well as the Perdekraal East WEF. As such this section of the route alignment is already largely transformed from its natural state. This would lessen the impacts of the new power line in this area. ▪ In light of the above, there are no fatal flaws associated with Alternative 1 and this alternative is considered favourable from a visual perspective.
Power Line Corridor Alternative 2 (Oya to Kappa) - 32.43km	Favourable	▪ Although a section of Alternative 2 is traverses ridges near the proposed Oya Substation, the visibility analysis does not indicate that these ridges are highly visible from the surrounding landscape. The remainder of this alternative is the located on relatively flat terrain and as such the power lines would only be moderately exposed on the skyline. ▪ The closest sensitive receptor to this alternative is 1.8kms away, this being SR2. The visual impacts from Alternative 2 affecting this receptor are therefore rated as moderate. As SR2 is located on the Oya Energy Facility application site, it is assumed that the owner has a vested interest in the proposed development and thus the associated power lines would not be perceived in a negative light.

Alternative	Preference	Reasons (incl. potential issues)
		▪ Fourteen (14) potentially sensitive receptors are located within 5kms of Alternative 2, although the proposed power lines are only expected to be visible from twelve (12) of these locations. The closest potentially sensitive receptor to this alternative is approximately 700m away, this being VR16. The visual impacts from Alternative 2 affecting this receptor are therefore rated as moderate. As VR16 is located on a property which is affected by all of the proposed power line route alignments, it is assumed that the land owner has consented to the proposed development on their property and does not perceive the proposed power line in a negative light. The remaining receptors are all more than 1.5kms away and, would only be subjected to moderate or low levels of impact. ▪ Much of the southern section of this alternative is follows the alignment of the existing 765kW power lines and traverses an area which has already undergone significant transformation as a result of the power lines, Kappa Substation and the Perdekraal East WEF. This would lessen the impacts of the new power line in this area. ▪ In light of the above, there are no fatal flaws associated with Alternative 2 and this alternative is considered favourable from a visual perspective.
Power Line Corridor Alternative 3 (Oya to Kappa) - 30.56km	Preferred	▪ Alternative 3 largely avoids the ridge lines near the proposed Oya substation and as such, most of this route alternative is located on relatively flat terrain. As such, the power lines would only be moderately exposed on the skyline. ▪ The closest sensitive receptor to this alternative is 1.8kms away, this being SR2. The visual impacts from Alternative 3 affecting this receptor are therefore rated as moderate. As SR2 is located on the Oya Energy Facility application site, it is assumed that the owner has a vested interest in the proposed development and thus the associated power lines would not be perceived in a negative light. ▪ Eleven (11) potentially sensitive receptors are located within 5kms of Alternative 3, although the proposed power lines are only expected to be visible from nine (9) of these locations. The closest potentially sensitive receptor to this alternative is approximately 700m away, this being VR16. The visual impacts from Alternative 3 affecting this receptor are therefore rated as moderate. As VR16 is located on a property which is affected by all of

Alternative	Preference	Reasons (incl. potential issues)
		the proposed power line route alignments, it is assumed that the land owner has consented to the proposed development on their property and does not perceive the proposed power line in a negative light. The remaining receptors are all more than 780m away and, would only be subjected to moderate or low levels of impact. ▪ Much of this alternative is follows the alignment of the existing 765kW power lines and traverses an area which has already undergone significant transformation as a result of the power lines, Kappa Substation and the Perdekraal East WEF. This would lessen the impacts of the new power line in this area. ▪ In light of the above, there are no fatal flaws associated with Alternative 3. As this route is shorter than the others, and follows the alignment of the existing 765kV power lines over a significant distance and affects fewer potentially sensitive receptors, this alternative is considered preferred from a visual perspective.
Power Line Corridor Alternative 4 (Oya to Kappa) - 32.94km	Favourable	▪ Alternative 4 largely avoids the ridge lines near the proposed Oya substation and as such, most of this route alternative is located on relatively flat terrain. As such, the power lines would only be moderately exposed on the skyline. ▪ The closest sensitive receptor to this alternative is 1.8kms away, this being SR2. The visual impacts from Alternative 4 affecting this receptor are therefore rated as moderate. As SR2 is located on the Oya Energy Facility application site, it is assumed that the owner has a vested interest in the proposed development and thus the associated power lines would not be perceived in a negative light. ▪ Eleven (11) potentially sensitive receptors are located within 5kms of Alternative 4, although the proposed power lines are only expected to be visible from nine (9) of these locations. The closest potentially sensitive receptor to this alternative is approximately 672m away, this being VR16. The visual impacts from Alternative 3 affecting this receptor are therefore rated as moderate. As VR16 is located on a property which is affected by all of the proposed power line route alignments, it is assumed that the land owner has consented to the proposed development on their property and does not perceive the proposed power line in a negative light.The remaining receptors are all more than 780m away and, would only be subjected to moderate or low levels of impact.

Alternative	Preference	Reasons (incl. potential issues)
		▪ Much of this alternative is follows the alignment of the existing 765kW power lines and traverses an area which has already undergone significant transformation as a result of the power lines, Kappa Substation and the Perdekraal East WEF. This would lessen the impacts of the new power line in this area. ▪ In light of the above, there are no fatal flaws associated with Alternative 4 and this alternative is considered favourable from a visual perspective.
Power Line Corridor Alternative 5 (Oya to Kappa) – 32.26km	Favourable	▪ Although a section of Alternative 5 is traverses ridges near the proposed Oya Substation, the visibility analysis does not indicate that these ridges are highly visible from the surrounding landscape. The remainder of this alternative is the located on relatively flat terrain and as such the power lines would only be moderately exposed on the skyline. ▪ The closest sensitive receptor to this alternative is 1.8kms away, this being SR2. The visual impacts from Alternative 5 affecting this receptor are therefore rated as moderate. As SR2 is located on the Oya Energy Facility application site, it is assumed that the owner has a vested interest in the proposed development and thus the associated power lines would not be perceived in a negative light. ▪ Fourteen (4) potentially sensitive receptors are located within 5kms of Alternative 5, although the proposed power lines are only expected to be visible from twelve (12) of these locations. The closest potentially sensitive receptor to this alternative is approximately 700m away, this being VR16. The visual impacts from Alternative 5 affecting this receptor are therefore rated as moderate. As VR16 is located on a property which is affected by all of the proposed power line route alignments, it is assumed that the land owner has consented to the proposed development on their property and does not perceive the proposed power line in a negative light. The remaining receptors are all more than 1.5km away and, would only be subjected to moderate or low levels of impact. ▪ Much of the southern section of this alternative is follows the alignment of the existing 765kW power lines and traverses an area which has already undergone significant transformation as a result of the power lines, Kappa Substation and the Perdekraal East WEF. This would lessen the impacts of the new power line in this area.

Alternative	Preference	Reasons (incl. potential issues)
		▪ In light of the above, there are no fatal flaws associated with Alternative 5 and this alternative is considered favourable from a visual perspective.

9.1 No Go Alternative

The 'No Go' alternative is essentially the option of not developing power lines or substations in this area. The area would thus retain its visual character and sense of place and no visual impacts would be experienced by any locally occurring receptors.

10 CONCLUSION

A VIA has been conducted to assess the magnitude and significance of the potential visual impacts associated with the construction of a proposed 132 kV power line and associated substations to support the proposed renewable energy facilities owned by the applicant near Matjiesfontein in the Western Cape Province. Overall, sparse human habitation and the predominance of natural vegetation cover across much of the study area would give the viewer the general impression of a largely natural setting with some pastoral elements. As such, the proposed power line and substation development would alter the visual character and contrast significantly with the typical land use and/or pattern and form of human elements present across the broader study area. The level of contrast is however reduced by the presence of the Perdekraal East WEF, Kappa substation and existing high voltage power lines located in the south-western sector of the study area.

The area is not however typically valued for its tourism significance and there is limited human habitation resulting in relatively few potentially sensitive receptors in the area. A total of twenty-three (23) potentially sensitive receptors were identified in the study area, two (2) of which are considered to be sensitive receptors as they are linked to leisure/nature-based tourism activities in the area.

One of the sensitive receptors (Remainder of the Farm Baakens Rivier No 155) is expected to experience high levels of visual impact from the proposed power line development. As this receptor is located on the proposed Kudusberg WEF development site, it is believed that the owner has a vested interest in the proposed WEF development and would therefore not perceive the associated power lines and substations in a negative light. The remaining sensitive receptor, which is located on the Remainder of the Farm Gats Rivier No 156, is only expected to experience moderate impacts from the proposed development. This property is however under the same ownership as Baakens Rivier, and is part of the adjacent Oya Energy Facility project, and as such, it is unlikely that the owners will perceive the proposed development in a negative light.

Fifteen (15) potentially sensitive receptors, will be subjected to moderate levels of visual impact as a result of the proposed power line and substation development, while one (1) receptor will be subjected to low levels of visual impact. It was noted however, that thirteen of these receptors are located on farms which either form part of the power line development project or are located within the development sites for other renewable energy projects and as such the owners / occupants are not expected to perceive the proposed power line and substations in a negative light.

The remaining five (5) receptors are outside the viewshed of the proposed development and are therefore not expected to be subjected to any visual impacts as a result of the power line and substation development.

An overall impact rating was also conducted in order to allow the visual impact to be assessed alongside other environmental parameters. The assessment revealed that impacts associated with the proposed 132kV power line and associated substations will be of low significance during construction, operation and decommissioning phases with a number of mitigation measures available.

Although other renewable energy developments and infrastructure projects, either proposed or in operation, were identified within a 35km radius of the proposed development, it was determined that only five (5) of these would have any significant impact on the landscape within the visual assessment zone. These facilities are Kudusberg WEF (14/12/16/3/3/1/1976/AM1) and Oya Energy Facility (14/12/16/3/3/2/2009) in the north-eastern sector of the study area and Perdekraal East WEF, Perdekraal West WEF and Tooverberg WEF in the south-west. These facilities and the associated grid connection infrastructure will alter the inherent sense of place and introduce an increasingly industrial character into a largely natural, pastoral landscape, thus giving rise to significant cumulative impacts. It is however anticipated that these impacts could be mitigated to acceptable levels with the implementation of the recommendations and mitigation measures stipulated for each of these developments by the visual specialists. In light of this and the relatively low level of human habitation in the study area however, cumulative impacts have been rated as medium.

It is important to note that the study area is located within the REDZ 2, known as Komsberg REDZ, and also within a Strategic Transmission Corridor, and thus the relevant authorities support the concentration of renewable energy developments and associated grid connection infrastructure in this area. In addition, it is possible that the renewable energy facilities located in close proximity to each other could be seen as one large facility rather than separate developments. Although this will not necessarily reduce impacts on the visual character of the area, it could potentially reduce the cumulative impacts on the landscape.

No fatal flaws were identified for any of the proposed power line corridor alternatives (i.e. Oya to Kappa). Power Line Corridor Alternative 3 was identified as the Preferred Alternative, while Power Line Corridor Options 1, 2, 4 and 5 were found to be favourable.

10.1 Visual Impact Statement

It is SiVEST's opinion that the visual impacts associated with the proposed Oya 132kV power line and associated substations are of moderate significance. Given the low level of human habitation and the relative absence of sensitive receptors, the project is deemed acceptable from a visual impact perspective and the EA should be granted for the BA application. SiVEST is of the opinion that the visual impacts associated with the construction, operation and decommissioning phases can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.

11 REFERENCES

- Barthwal, R. 2002. Environmental Impact Assessment. New Age International Publishes, New Delhi.
- Breedlove, G., 2002. A systematic for the South African Cultural Landscapes with a view to implementation. Thesis – University of Pretoria.
- Ecotricity Website: http://www.ecotricity.co.uk.
- Moseley, S., and Naude-Moseley, B., 2008. Getaway Guide to the Karoo, Namaqualand and Kalahari, Sunbird.
- Mucina L., and Rutherford M.C., (eds) 2006. The Vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria.
- Oberholzer, B. 2005. Guideline for involving visual & aesthetic specialists in EIA processes: *Edition 1.* CSIR Report No ENV-S-C 2005 053 F. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town.
- SiVEST, 2019. VIA for the Proposed Kudusberg WEF.
- SiVEST, 2019. VIA for the Proposed Tooverberg WEF.
- SiVEST, 2019. VIA for the Proposed 132kV Power Line and Associated Substation to serve the Tooverberg WEF.
- SiVEST, 2020. VIA for the Proposed Oya Solar Photovoltaic (PV) Facility.
- Treasure Karoo Action Group website: http://treasurethekaroo.co.za/
- Vissering, J., Sinclair, M., Margolis, A. 2011. State Clean Energy Program Guide: A Visual Impact Assessment Process for Wind Energy Projects. Clean Energy State Alliance.
- UNESCO. 2005. Operational Guidelines for the Implementation of the World Heritage Convention. UNESCO World Heritage Centre. Paris.

SiVEST Environmental Division
12 Autumn, Rivonia. 2128. South Africa
PO Box 2921, Rivonia. 2128. South Africa

Tel + 27 11 798 0600
Fax +27 11 803 7272
Email info@sivest.co.za
www.sivest.co.za

Contact Person:Kerry Schwartz
Tel No.: +27 11 798 0632
Email: kerrys@sivest.co.za

OYA ENERGY (PTY) LTD

Proposed Construction of the Oya 132kV Power Line near Matjiesfontein, Western and Northern Cape Provinces

Visual Impact Assessment Report – Basic Assessment

DEFF Reference: To be Allocated
Issue Date: 12 November 2020
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Version Number:	1
Author:	**Kerry Schwartz**
Checked by:	**Liandra Scott-Shaw** B.Sc. (Hons) Ecological Science (UKZN)
Approved by:	**Liandra Scott-Shaw**
Signature:	LScott Shaw
Client:	Oya Energy (Pty) Ltd

OYA ENERGY (PTY) LTD

PROPOSED CONSTRUCTION OF THE OYA 132KV POWER LINE NEAR MATJIESFONTEIN, WESTERN AND NORTHERN CAPE PROVINCES

VISUAL IMPACT ASSESSMENT REPORT – BASIC ASSESSMENT

Executive Summary

Oya Energy (Pty) Ltd, (hereafter referred to as “Oya Energy") is proposing to construct a 132 kilovolt (kV) overhead power line and substations near Matjiesfontein in the Western and Northern Cape Provinces (hereafter referred to as the “proposed development”). The overall objective of the proposed development is to feed the electricity generated by the proposed Oya Energy Facility (part of separate on-going EIA process under DEFF Ref No.: 14/12/16/3/3/2/2009) as well as potentially the other adjacent energy developments into the national grid. The grid connection and substations (this application) require a separate EA, in order to allow the EA to be handed over to Eskom.

The proposed overhead power line and substation project will be subject to a Basic Assessment (BA) process in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA) (as amended) and Appendix 1 of the Environmental Impact Assessment (EIA) Regulations, 2014 promulgated in Government Gazette 40772 and GN R326, R327, R325 and R324 on 7 April 2017. This visual impact assessment (VIA) is being undertaken as part of the BA process.

The study area has a largely natural, untransformed visual character with some elements of rural / pastoral infrastructure and as such, the proposed power line and substation development would alter the visual character and contrast significantly with the typical land use and/or pattern and form of human elements present across the broader study area. The level of contrast is however reduced by the presence of the Perdekraal East WEF, associated power line infrastructure, Kappa substation and existing high voltage power lines located in the south-western sector of the study area.

A broad-scale assessment of landscape sensitivity, based on the physical characteristics of the study area, economic activities and land use that predominates, determined that the area would have a **low** visual sensitivity. An important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that would potentially be impacted by a proposed development.

The area is not typically valued for its tourism significance and no formal protected areas or recognised tourism routes were identified in the area. In addition, there is limited human habitation resulting in relatively few sensitive or potentially sensitive receptors across the entire extent of the study area (less than 0.3 receptors per square kilometre).

The Visual Impact Assessment (VIA) identified twenty-three (23) potentially sensitive receptors in the study area, i.e. within 5kms from the outer boundary of the combined power line assessment corridors and substation sites. Two (2) of these receptors are considered to be sensitive receptors as they are linked to leisure/nature-based tourism activities in the area. The remaining twenty-one (21) receptors are all farmsteads which are regarded as potentially sensitive visual receptors as they are located within a mostly natural setting and the proposed development will likely alter natural vistas experienced from these dwellings. Five of these potentially sensitive receptor locations were however found to be outside the viewshed of the proposed development and thus are not expected to experience any visual impacts as a result of the proposed development. These receptors were therefore removed from the assessment, leaving only sixteen 16 potentially sensitive receptors.

The VIA determined that the proposed development will have a high level of impact on one (1) of the sensitive receptors (Remainder of the Farm Baakens Rivier No 155). As this receptor is located on the proposed Oya Energy Facility (DEFF Ref No: 14/12/16/3/3/2/2009) development site, the owner of this farm portion has a vested interest in the proposed development and associated grid connection infrastructure and would therefore not perceive the proposed power line and substations in a negative light. The remaining sensitive receptor, which is located on the Remainder of the Farm Gats Rivier No 156, is only expected to experience moderate impacts from the proposed development. As this farm is part of an adjacent WEF (DEFF Ref No: 14/12/16/3/3/2/2009) the owner of this farm portion has a vested interest in the proposed development and associated grid connection infrastructure and would therefore not perceive the proposed power line and substations in a negative light.

Fifteen (15) potentially sensitive receptors will be subjected to moderate levels of visual impact as a result of the proposed power line development, while one (1) receptor will be subjected to low levels of visual impact. It was noted however, that thirteen of these receptors are located on farms which either form part of the power line development project or are located within the development sites for other renewable energy projects and as such the owners / occupants are not expected to perceive the proposed power line and substations in a negative light.

The overall impact rating revealed that the proposed development is expected to have a negative low visual impact rating during construction, operation and decommissioning phases with a number of mitigation measures available to prevent any additional visual impacts.

Several renewable energy developments are being proposed within a 35 km radius of the combined power line assessment corridors and substation sites. These renewable energy developments have the potential to cause large scale visual impacts and the location of several such developments in close proximity to each other could significantly alter the sense of place and visual character in the broader region. It was however determined that only five (5) of these would have any significant impact on the landscape within the study area. These facilities are Kudusberg WEF (14/12/16/3/3/1/1976/AM1) and Oya Energy Facility in the north-eastern sector of the study area and Perdekraal East WEF, Perdekraal West WEF and Tooverberg WEF in the south-west. The concentration of these facilities could potentially alter the inherent sense of place and introduce an increasingly industrial character into a largely rural area, thus giving rise to significant cumulative impacts. In light of this, cumulative impacts have been rated as negative medium during both construction and operation phases of the project. It is however anticipated that these impacts could be mitigated to acceptable levels with the implementation of the recommendations and mitigation measures stipulated for each of these developments by the visual specialists. It is important to note, however, that the study area is located within the Renewable Energy Development Zone (REDZ) 2, namely the Komsberg REDZ[1], and also within a Strategic Transmission Corridor, and thus the relevant authorities support the concentration of renewable energy developments and associated grid connection infrastructure in this area. In addition, it is possible that the renewable energy facilities located in close proximity to each other could be seen as one large facility rather than separate developments. Although this will not necessarily reduce impacts on the visual character of the area, it could potentially reduce the cumulative impacts on the landscape.

A comparative assessment of alternatives was undertaken in order to determine which of the power line corridor alternatives would be preferred from a visual perspective. No fatal flaws were identified for any of the proposed power line corridor alternatives. Power Line Corridor Alternative 3 was identified as the Preferred Alternative, while Power Line Corridor Options 1, 2, 4 and 5 were found to be favourable.

From a visual perspective therefore, the proposed Oya 132kV power line and associated substation project is deemed acceptable and the Environmental Authorization (EA) should be granted. SiVEST is of the opinion that the visual impacts associated with the construction, operation and decommissioning phases can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.

[1] formally gazetted (Gazette Number 41445) on 16 February 2018 by the Minister of Environmental Affairs (GN 114)

National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and Environmental Impact Assessment (EIA) Regulations, 2014 (as amended) - Requirements for Specialist Reports (Appendix 6)

Regulation GNR 326 of 4 December 2014, as amended 7 April 2017, Appendix 6	Section of Report
(a) details of the specialist who prepared the report; and the expertise of that specialist to compile a specialist report including a *curriculum vitae*;	**Section 1.3.** Specialist CV's are included in **Appendix B**
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	**Appendix B**
(c) an indication of the scope of, and the purpose for which, the report was prepared;	**Section 1.1.** **Appendix A**
(cA) an indication of the quality and age of base data used for the specialist report;	**Section 1.4.** **Section 1.5.**
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	**Section 6.** **.** **Section 8.**
(d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	**Section 1.4** **Section 2.**
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	**Section 1.4.** **Appendix C**
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	**Section 6.**
(g) an identification of any areas to be avoided, including buffers;	**Section 6.3.** **Section 8.**
(h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	**Section 6.3.**
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	**Section 2.**
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment or activities;	**Section 8.5** **Section 9**
(k) any mitigation measures for inclusion in the EMPr;	**Section 8.5.**
(l) any conditions for inclusion in the environmental authorisation;	No specific conditions relating to the visual environment need to be included in the

	environmental authorisation (EA)
(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	**Section 8.5**
(n) a reasoned opinion— i. whether the proposed activity, activities or portions thereof should be authorised; iA. Regarding the acceptability of the proposed activity or activities; and ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr or Environmental Authorization, and where applicable, the closure plan;	**Section 10.1**
(o) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	**N/A** -No feedback has yet been received from the public participation process regarding the visual environment
(p) any other information requested by the competent authority	**N/A**. No information regarding the visual study has been requested from the competent authority to date.
(2) Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	**N/A**

OYA ENERGY (PTY) LTD

PROPOSED CONSTRUCTION OF THE OYA 132KV POWER LINE NEAR MATJIESFONTEIN, WESTERN AND NORTHERN CAPE PROVINCES

VISUAL IMPACT ASSESSMENT REPORT – BASIC ASSESSMENT

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GLOSSARY OF TERMS

ABBREVIATIONS

BA	Basic Assessment
DBAR	Draft Basic Assessment Report
DM	District Municipality
DoE	Department of Mineral Resources and Energy
DEM	Digital Elevation Model
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EMP	Environmental Management Plan
FBAR	Final Basic Assessment Report
GIS	Geographic Information System
HA	Hectares
HIA	Heritage Impact Assessment
I&AP	Interested and/or Affected Party
IPP	Independent Power Producer
LM	Local Municipality
kV	Kilovolt
MW	Megawatt
NEMA	National Environmental Management Act
NGI	National Geo-Spatial Information
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
O&M	Operation and Maintenance
PPA	Power Purchase Agreement
PV	Photovoltaic
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
SANBI	South African National Biodiversity Institute
SPEF	Solar Photovoltaic Energy Facility
VIA	Visual Impact Assessment
VR	Visual Receptor
WEF	Wind Energy Facility

DEFINITIONS

Anthropogenic feature: An unnatural feature resulting from human activity.

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

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

Scenic route: A linear movement route, usually in the form of a scenic drive, but which could also be a railway, hiking trail, horse-riding trail or 4x4 trail.

Sensitive visual receptors: An individual, group or community that is subject to the visual influence of the proposed development and is adversely impacted by it. They will typically include locations of human habitation and tourism activities.

Slope Aspect: Direction in which a hill or mountain slope faces.

Study area / Visual assessment zone; The study area or visual assessment zone is assumed to encompass a zone of 5km from the outer boundary of the proposed Solar PV Facility application site.

Viewpoint: A point in the landscape from where a particular project or feature can be viewed.

Viewshed / Visual Envelope: The geographical area which is visible from a particular location.

Visual character: The pattern of physical elements, landforms and land use characteristics that occur consistently in the landscape to form a distinctive visual quality or character.

Visual contrast: The degree to which the development would be congruent with the surrounding environment. It is based on whether or not the development would conform with the land use, settlement density, forms and patterns of elements that define the structure of the surrounding landscape.

Visual exposure: The relative visibility of a project or feature in the landscape.

Visual impact: The effect of an aspect of the proposed development on a specified component of the visual, aesthetic or scenic environment within a defined time and space.

Visual receptors: An individual, group or community that is subject to the visual influence of the proposed development but is not necessarily adversely impacted by it. They will typically include commercial activities, residents and motorists travelling along routes that are not regarded as scenic.

Visual sensitivity: The inherent sensitivity of an area to potential visual impacts associated with a proposed development. It is based on the physical characteristics of the area (visual character), spatial distribution of potential receptors, and the likely value judgements of these receptors towards the new development, which are usually based on the perceived aesthetic appeal of the area.

OYA ENERGY (PTY) LTD

PROPOSED DEVELOPMENT OF THE 800MW OYA SOLAR PHOTOVOLTAIC (PV) FACILITY AND ASSOCIATED INFRASTRUCTURE NEAR MATJIESFONTEIN, WESTERN AND NORTHERN CAPE PROVINCES

VISUAL IMPACT ASSESSMENT REPORT – BASIC ASSESSMENT

1 INTRODUCTION

Oya Energy (Pty) Ltd, (hereafter referred to as “Oya Energy") is proposing to construct a 132 kilovolt (kV) overhead power line and substations near Matjiesfontein in the Western and Northern Cape Provinces (hereafter referred to as the “proposed development”). The overall objective of the proposed development is to feed the electricity generated by the proposed Oya Energy Facility (part of separate on-going EIA process under DEFF Ref No.: 14/12/16/3/3/2/2009) as well as potentially the other adjacent energy developments into the national grid. The grid connection and substations (this application) require a separate EA, in order to allow the EA to be handed over to Eskom.

The entire extent of the proposed 132kV overhead power line is located within one the Strategic Transmission Corridors as defined and in terms of the procedures laid out in Government Notice (GN) No. 113[2], namely the Central Corridor. The proposed overhead power line and substation project will therefore be subject to a basic Assessment (BA) process in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA) (as amended) and Appendix 1 of the Environmental Impact Assessment (EIA) Regulations, 2014 promulgated in Government Gazette 40772 and GN R326, R327, R325 and R324 on 7 April 2017. The competent authority for this BA is the national Department of Environment, Forestry and Fisheries (DEFF). Specialist studies have been commissioned to assess and verify the OHL under the new Gazetted specialist protocols[3].

1.1 Scope and Objectives

This visual impact assessment (VIA) is being undertaken as part of the BA process. The aim of the VIA is to identify potential visual issues associated with the proposed 132kV power line and substations, as well as to determine the potential extent of visual impacts. This is done by characterising the visual environment of the area and identifying areas of potential visual

[2] Formally gazetted on 16 February 2018 (GN No. 113)
[3] Formally gazetted on 20 March 2020 (GN No. 320)

sensitivity that may be subject to visual impacts. This visual assessment focuses on the potential sensitive visual receptor locations and provides an assessment of the magnitude and significance of the visual impacts associated with the proposed development.

1.2 Terms of Reference

The terms of reference for this VIA are included in **Appendix A**.

1.3 Specialist Credentials

This VIA was undertaken by Kerry Schwartz, a GIS specialist with more than 20 years' experience in the application of GIS technology in various environmental, regional planning and infrastructural projects undertaken by SiVEST. Kerry's GIS skills have been extensively utilised in projects throughout South Africa and in other Southern African countries. Kerry has also been involved in the compilation of VIA reports. Kerry's relevant VIA project experience is listed in the table below.

Table 1: Relevant project experience

Environmental Practitioner	SiVEST (Pty) Ltd – Kerry Schwartz
Contact Details	kerrys@sivest.co.za
Qualifications	BA (Geography), University of Leeds 1982
Expertise to carry out the Visual Impact Assessment.	**<u>Visual Impact Assessments</u>:** ▪ VIAs (BA) for the proposed Gromis WEF and associated Grid Connection Infrastructure, near Komaggas, Northern Cape Province. ▪ VIAs (BA) for the proposed Komas WEF and associated Grid Connection Infrastructure, near Komaggas, Northern Cape Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Mooi Plaats, Wonderheuvel and Paarde Valley solar PV plants near Noupoort in the Northern and Eastern Cape Provinces. ▪ VIAs (Scoping and Impact Phase) for the proposed Sendawo 1, 2 and 3 solar PV energy facilities near Vryburg, North West Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Tlisitseng 1 and 2 solar PV energy facilities near Lichtenburg, North West Province. ▪ VIA for the proposed Nokukhanya 75MW Solar PV Power Plant near Dennilton, Limpopo Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Helena 1, 2 and 3 75MW Solar PV Energy Facilities near Copperton, Northern Cape Province.

	▪ VIA (EIA) for the proposed Paulputs WEF near Pofadder in the Northern Cape Province. ▪ VIA (EIA) for the proposed development of the Rondekop WEF near Sutherland in the Northern Cape Province. ▪ VIA (BA) for the proposed development of the Tooverberg WEF near Touws Rivier in the Western Cape Province. ▪ VIA (BA) for the proposed development of the Kudusberg WEF near Sutherland, Northern and Western Cape Provinces. ▪ VIA (Scoping and Impact Phase) for the proposed development of the Kuruman Wind Energy Facility near Kuruman, Northern Cape Province. ▪ VIA (Scoping and Impact Phase) for the proposed development of the Phezukomoya Wind Energy Facility near Noupoort, Northern Cape Province. ▪ VIA (Scoping and Impact Phase) for the proposed development of the San Kraal Wind Energy Facility near Noupoort, Northern Cape Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Graskoppies Wind Farm near Loeriesfontein, Northern Cape Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Hartebeest Leegte Wind Farm near Loeriesfontein, Northern Cape Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Ithemba Wind Farm near Loeriesfontein, Northern Cape Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Xha! Boom Wind Farm near Loeriesfontein, Northern Cape Province ▪ Visual Impact Assessments for 5 Solar Power Plants in the Northern Cape ▪ Visual Impact Assessments for 2 Wind Farms in the Northern Cape ▪ Visual Impact Assessment for Mookodi Integration Project (132kV distribution lines) ▪ Landscape Character Assessment for Mogale City Environmental Management Framework
Divisional Manager / Quality Control	SiVEST SA (Pty) Ltd – Tarryn Curtis
Contact Details	tarrync@sivest.co.za
Qualifications	B.Sc. Geographical Science and B.Sc. (Hons) Environmental Management and Geography
Professional Affiliations	IAIAsa Membership Number: 3485
	Tarryn joined SiVEST in January 2011 in her capacity as Environmental Consultant. In May 2015, she was appointed as Divisional Manager for the Environmental Division, Pietermaritzburg Branch. In October 2018, Tarryn was appointed as Divisional Head for the Environmental

	Division nationwide. Tarryn has completed a Bachelor of Science Degree with a Geography Major (University of Natal, PMB), as well as a Bachelor of Science (Honours) in Environmental Management (University of Natal, PMB). Tarryn has been involved in consulting since 2007, which included scoping reports, environmental management plans, integrated management plans, basic assessment reports, environmental impact reports and auditing. Field of specialisation in Environmental Auditing, Environmental Project Management, Environmental Planning and Water Related Projects.

Full CVs are attached as **Appendix B**.

1.4 Assessment Methodology

This VIA has been based on a desktop-level assessment supported by field-based observation drawn from site visits undertaken in July 2018, August 2018 and July 2020.

1.4.1 Physical landscape characteristics

Physical landscape characteristics such as topography, vegetation and land use are important factors influencing the visual character and visual sensitivity of the study area. Baseline information about the physical characteristics of the study area was initially sourced from spatial databases provided by NGI, the South African National Biodiversity Institute (SANBI) and the South African National Land Cover Dataset (Geoterraimage – 2018). The characteristics identified via desktop analysis were later verified during the site visit.

1.4.2 Identification of sensitive receptors

Visual receptor locations and routes that are sensitive and/or potentially sensitive to the visual intrusion of the proposed development were assessed in order to determine the impact of the proposed development on each of the identified receptor locations. Information pertaining to visual receptors was largely drawn from recent visual assessments conducted in the general vicinity of the proposed development. These studies include VIAs for the proposed Kudusberg WEF (14/12/16/3/3/1/1976/AM1), Tooverberg WEF and grid connection infrastructure and Oya Energy Facility (14/12/16/3/3/2/2009).

1.4.3 Fieldwork and photographic review

Given that the proposed grid connection infrastructure is located within project areas already assessed for several renewable energy VIAs, it was not considered necessary to undertake any additional fieldwork. Fieldwork undertaken for VIAs for the Kudusberg WEF

(14/12/16/3/3/1/1976/AM1), Tooverberg WEF and grid connection infrastructure and Oya Energy Facility (14/12/16/3/3/2/2009) has therefore been used to inform this assessment. The fieldwork involved three (3) separate site visits conducted in July 2018, August 2018 and July 2020. The purpose of those site visits was to:

- verify the landscape characteristics identified via desktop means;
- conduct a photographic survey of the study area;
- verify, where possible, the sensitivity of visual receptor locations identified via desktop means;
- eliminate receptor locations that are unlikely to be influenced by the proposed development;
- identify any additional visually sensitive receptor locations within the study area; and
- inform the impact rating assessment of visually sensitive receptor locations (where possible).

1.4.4 Visual / Landscape Sensitivity

Areas of potential visual sensitivity along the power line assessment corridors were demarcated, these being areas where the establishment of a power line or other associated infrastructure would result in the greatest probability of visual impacts on potentially sensitive visual receptors. GIS-based visibility analysis was used to determine which route alternatives would be visible to the highest numbers of receptors in the study area.

In addition, the National Environmental Screening Tool (https://screening.environment.gov.za/screeningtool/) was examined to determine any relative landscape sensitivity in respect of the proposed development.

1.4.5 Impact Assessment

A rating matrix was used to objectively evaluate the significance of the visual impacts associated with the proposed development, both before and after implementing mitigation measures. Mitigation measures were identified (where possible) to minimise the visual impact of the proposed development. The rating matrix made use of several different factors including geographical extent, probability, reversibility, irreplaceable loss of resources, duration and intensity, in order to assign a level of significance to the visual impact of the project.

A separate rating matrix was used to assess the visual impact of the proposed development on each visual receptor location (both sensitive and potentially sensitive), as identified. This matrix is based on three (3) parameters, namely the distance of an identified visual receptor from the proposed development, the presence of screening factors and the degree to which the proposed development would contrast with the surrounding environment.

1.4.6 Consultation with I&APs

Continuous consultation with Interested and Affected Parties (I&APs) undertaken during the public participation process will be used (where available) to help establish how the proposed development will be perceived by the various receptor locations and the degree to which the impact will be regarded as negative. Although I&APs have not yet provided any feedback in this regard, the report will be updated to include relevant information as and when it becomes available. If no relevant comments are received requiring the report to be updated, the report will automatically inform the final BA report.

1.5 Source of Information

The main sources of information utilized for this VIA included:

- Project description for the proposed power line and substation development provided by Oya Energy;
- Elevation data from 25m Digital Elevation model (DEM) from the National Geo-Spatial Information (NGI);
- 1:50 000 topographical maps of South Africa from the NGI;
- Land cover and land use data extracted from the 2018 South African National Land-Cover Dataset provided by GEOTERRAIMAGE;
- Vegetation classification data extracted from the South African National Biodiversity Institute's (SANBI's) VEGMAP 2018 dataset;
- Google Earth Satellite imagery 2020;
- South African Renewable Energy EIA Application Database from Department of Environmental Affairs (incremental release Quarter 2 2020);
- The National Web-Based Environmental Screening Tool, Department of Environment, Forestry and Fisheries (DEFF);
- VIA for the proposed Kudusberg WEF, SiVEST 2019;
- VIA for the proposed Tooverberg WEF, SiVEST 2019;
- VIA for the proposed 132kV Power Line and Associated Substation to serve the Tooverberg Wind Energy Facility, SiVEST 2019; and
- VIA for the proposed Oya Energy Facility, SiVEST 2020.

2 ASSUMPTIONS AND LIMTATIONS

- Substations and power lines are very large structures by nature and could impact on receptors that are located relatively far away, particularly in areas of very flat terrain. Given the nature of the receiving environment and the height of the various components of the proposed development, the study area or visual assessment zone is assumed to encompass a zone of 5 km from the outer boundary of the combined power line assessment corridors and substation sites. This 5 km limit on the visual assessment zone relates to the importance of distance when assessing visual impacts. Although the proposed development may still be visible beyond 5 km, the degree of visual impact would diminish considerably and as such the need to assess the impact on potential receptor locations beyond this distance would not be warranted.

- As previously stated, information pertaining to visual receptors is largely drawn from recent visual assessments conducted in the general vicinity of the proposed development. These studies include VIAs for the proposed Kudusberg WEF (SiVEST, 2019), Tooverberg WEF and grid connection infrastructure (SiVEST, 2019) and Oya Energy Facility (SiVEST, 2020). Receptors identification for all of these studies involved a combination of desktop assessment as well as field-based observations. Initially Google Earth imagery was used to identify potential receptors within the study area and where possible, these receptor locations were verified and assessed during site visits undertaken in July / August 2018 and in July 2020.

- Due to the extent of the respective study areas for previous VIA projects and the nature of the terrain, it was not possible to visit or verify every potentially sensitive visual receptor location. As such, several broad assumptions have been made in terms of the likely sensitivity of the receptors to the proposed development. It should be noted that not all receptor locations would necessarily perceive the proposed development in a negative way. This is usually dependent on the use of the facility, the economic dependency of the occupants on the scenic quality of views from the facility and on people's perceptions of the value of "Green Energy". Sensitive receptor locations typically include sites such as tourism facilities and scenic locations within natural settings which are likely to be adversely affected by the visual intrusion of the proposed development. Thus, the presence of a receptor in an area potentially affected by the proposed development does not necessarily mean that any visual impact will be experienced.

- For the purposes of the VIA, all analysis is based on a worst-case scenario where power line tower and substation structure heights are assumed to be 45m.

- Due to the varying scales and sources of information; maps may have minor inaccuracies. Terrain data for the study area derived from the National Geo-Spatial Information (NGI)'s 25m DEM is fairly coarse and somewhat inconsistent and as such, localised topographic variations in the landscape may not be reflected on the Digital Elevation Model (DEM) used to generate the viewsheds.

- In addition, the viewsheds produced do not take into account any existing vegetation cover or built infrastructure which may screen views of the proposed development and as such should be seen as a conceptual representation or a worst-case scenario.

- The potential visual impact at each visual receptor location was assessed using a matrix developed for this purpose. The matrix is based on three main parameters relating to visual impact and, although relatively simplistic, it provides a reasonably accurate indicative assessment of the degree of visual impact likely to be experienced at each receptor location as a result of the proposed development. It is however important to note the limitations of quantitatively assessing a largely subjective or qualitative type of impact and as such the matrix should be seen merely as a representation of the likely visual impact at a receptor location.

- No feedback regarding the visual environment has been received from the public participation process to date. Any feedback from the public during the review period of the Draft Basic Assessment Report (DBAR) will however be incorporated into further drafts of this report, if relevant.

- It is assumed that operational and security lighting will be required for the substation proposed within the Oya Energy Facility (14/12/16/3/3/2/2009) development footprint. At the time of undertaking the visual study no information was available regarding the type and intensity of lighting required and therefore the potential impact of lighting at night has not been assessed at a detailed level. Accordingly, general measures to mitigate the impact of additional light sources on the ambiance of the nightscape have been provided.

- This study includes an assessment of the potential cumulative impacts of other renewable energy developments on the existing landscape character and on the identified sensitive receptors. This assessment is based on the information available at the time of writing the report and where information has not been available, broad assumptions have been made as to the likely impacts of these developments.

- SiVEST made every effort to obtain information for the surrounding planned renewable energy developments (including specialist studies, assessment reports and Environmental Management Programmes). However, some of the documents are not currently publicly available for download. The available information was factored into the cumulative impact assessment (**Section 8.4**).

- No visualisation modelling was undertaken for the proposed development as this is not normally required for linear infrastructure. This can however be provided should the Public Participation process identify the need for this exercise.

- It should be noted that all the site visits were undertaken during the winter months of July or August. The study area is however typically characterised by low levels of rainfall all year round and therefore the season is not expected to affect the significance of the visual impact of the proposed development.

- Clear weather conditions tend to prevail throughout most of the year in this area, and in these clear conditions, power lines and associated infrastructure would present a greater contrast with the surrounding landscape than they would on a cloudy overcast day. Both clear and cloudy weather conditions were experienced during the different site visits and these factors were taken into consideration when undertaking this VIA.

3 TECHNICAL DESCRIPTION

3.1 Project Location

The proposed power line and substations project area is located approximately 50 km north-west of Matjiesfontein, originating in the Namakwa Local Municipality in the Northern Cape and linking in to the Kappa substation in the Witzenberg Local Municipality in the Western Cape Province (**Figure 1**).

The proposed overhead power line corridors and substations will affect the following properties:

- Portion 2 of the Farm Bakovens Kloof No 152 (2/152);
- Remainder of the Farm Bakovens Kloof No 152 (RE/152);
- Portion 3 of the Farm Baakens Rivier No 155 (3/155);
- Remainder of the Farm Baakens Rivier No 155 (RE/155);
- Portion 1 of the Farm Gats Rivier No 156 (1/156);
- Remainder of the Farm Gats Rivier No 156 (RE/156);
- Portion 1 of the Farm Amandelboom No 158 (1/158);
- Remainder of the Farm Oliviers Berg No 159 (RE/159);
- Portion 2 of the Farm Bantamsfontein No 168 (2/168);
- Portion 4 of the Farm Bantamsfontein No 168 (4/168);
- Portion 5 of the Farm Bantamsfontein No 168 (5/168);
- Portion 7 of the Farm Bantamsfontein No 168 (7/168);
- Portion 13 of the Farm Bantamsfontein No 168 (13/168);
- Remainder of the Farm Bantamsfontein No 168 (RE/168);
- Remainder of the Farm Lower Roodewal No 169 (RE/169);
- Remainder of the Farm Matjes Fontein No 194 (RE/194);
- The Farm Platfontein No 240 (240);
- The Farm Die Brak No 241 (241);
- Portion 1 of the Farm Rietpoort No 243 (1/243);
- Remainder of the Farm Rietpoort No 243 (RE/243); and
- Remainder of the Farm Toover berg No 244 (RE/244).

As previously stated, the entire extent of the proposed 132kV overhead power line is located within a Strategic Transmission Corridor as defined and in terms of the procedures laid out in Government Notice (GN) No. 113, namely the Central Corridor.

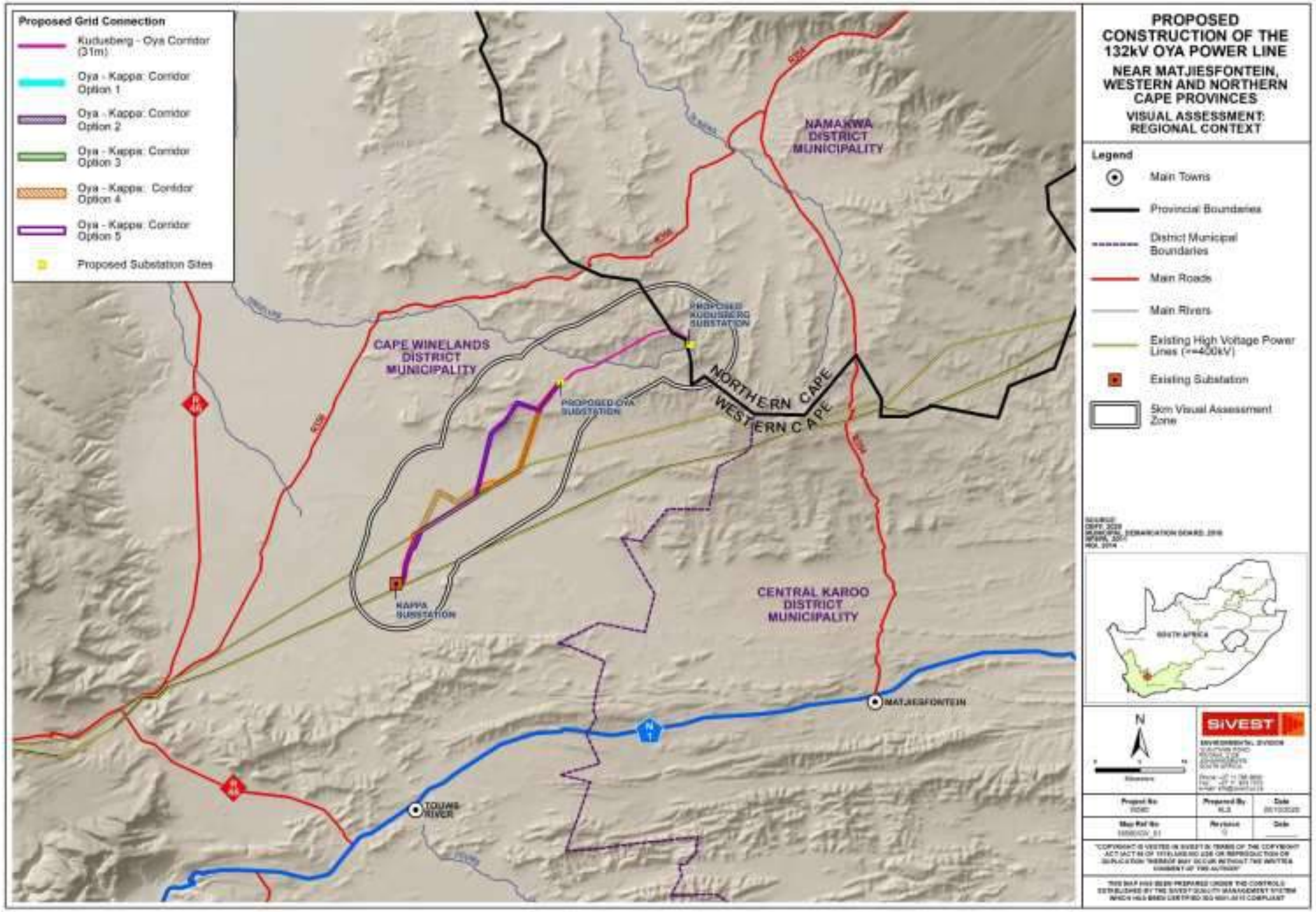


Figure 1: Proposed Power Line Route Alternatives and Substation in the Regional Context

3.2 Project Technical Details

At this stage, it is anticipated that the proposed development will include a 132kV power line and 2 (two) 33/132kV substations to feed electricity generated by the renewable energy facilities owned by the applicant into the national gird at the Kappa substation.

The type of power line towers being considered at this stage include both lattice and monopole towers and it is assumed that these towers will be located approximately 200m to 250m apart. The towers will be up to 45m in height, depending on the terrain, but will ensure minimum overhead line clearances from buildings and surrounding infrastructure.

300m wide power line corridors are being assessed to allow flexibility when determining the final route alignment. The proposed power line however only requires a 31m wide servitude and as such, this servitude would be positioned within the assessed corridor.

The size of the proposed Oya and Kudusberg substation sites will be approximately 4 hectares (ha) each.

3.2.1 Route Alternatives

Only one (1) route is technically feasible for the section of the proposed power line connecting the Kudusberg on-site substation (authorised under 14/12/16/3/3/1/1976/AM1) to the Oya on-site substation (i.e. Kudusberg to Oya). This section of the power line corridor route is approximately 16.6km in length and runs from the Kudusberg on-site substation along the RE/194, 1/158, RE/159, RE/156, 1/156 and RE/155 properties to the Oya on-site substation.

Five (5) power line corridor route alternatives are being assessed for the section of the proposed overhead power line which connects the Oya on-site substation to the Kappa substation (i.e. Oya to Kappa). These alternatives, as depicted in **Figure 2**, are described below:

- **Power Line Corridor Alternative 1 (Oya to Kappa):** Approximately 34.14km in length and running across or along the boundaries of the farms RE/155, RE/152, 2/152, RE/169, RE/243, 241, 240 and RE/244 properties to the Kappa substation;
- **Power Line Corridor Alternative 2 (Oya to Kappa):** Approximately 32.43km in length and running across or along the boundaries of the farms RE/155, 3/155, RE/152, 2/152, RE/169, 13/168, 5/168, 1/243, RE/243, 241 and 240 properties to the Kappa substation;
- **Power Line Corridor Alternative 3 (Oya to Kappa):** Approximately 30.56km in length and running across or along the boundaries of the farms RE/155, 4/168, 13/168, 5/168, 1/243, 240 and RE/244 properties to the Kappa substation;
- **Power Line Corridor Alternative 4 (Oya to Kappa):** Approximately 32.94km in length and running across or along the boundaries of the farms RE/155, 4/168, 13/168, RE/169, RE/243, 241 and 240 properties to the Kappa substation;
- **Power Line Corridor Alternative 5 (Oya to Kappa):** Approximately 32.26km in length and running across or along the boundaries of the farms RE/155, RE/152, 2/152, RE/169, 5/168, 1/243 and 240 properties to the Kappa substation.

3.2.2 'No-Go' Alternative

The 'no-go' alternative is the option of not developing the proposed project, thus preventing the energy facilities in the area from feeding electricity into the national grid. This alternative would not result in any environmental impacts within the assessment corridors or in the surrounding local area and the status quo would remain. This scenario provides the baseline against which other alternatives are compared and will be considered throughout the report.

While the 'no-go' option is a feasible option, it would prevent the proposed development from contributing to the environmental, social and economic benefits associated with the development of the renewables sector.

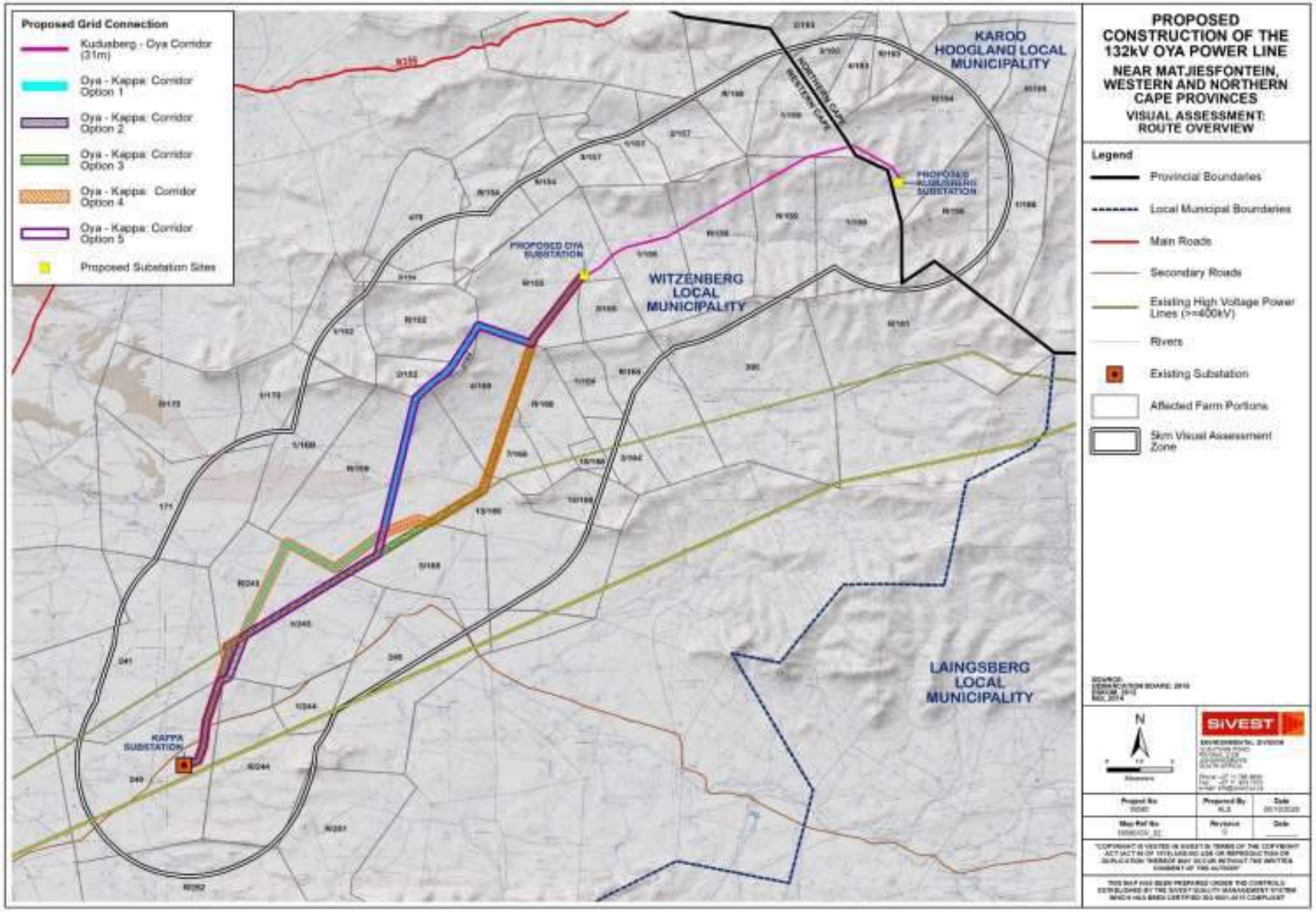


Figure 2: Overview of Power Line Route Alternatives

4 LEGAL REQUIREMENTS AND GUIDELINES

Key legal requirements pertaining to the proposed development are as follows:

In terms of the NEMA and the EIA Regulations 2014 (as amended), the proposed development includes listed activities which require a BA to be undertaken. As previously stated, the entire extent of the proposed 132kV overhead power line is located within one of the Strategic Transmission Corridors as defined and in terms of the procedures laid out in Government Notice (GN) No. 113, namely the Central Corridor. The proposed overhead power line and substation project irrespective would be subject to a BA process in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA) (as amended) and Appendix 1 of the EIA Regulations, 2014 promulgated in Government Gazette 40772 and GN R326, R327, R325 and R324 on 7 April 2017. The competent authority for this BA is the national Department of Environment, Forestry and Fisheries (DEFF).

As part of this BA process, the need for a VIA to be undertaken has been identified in order to assess the visual impact of the proposed grid connection infrastructure. The VIA must adhere to the requirements for specialist studies as stipulated in Appendix 6 of the NEMA EIA Regulations, 2014, as amended;

There is currently no legislation within South Africa that explicitly pertains to the assessment of visual impacts, however, in addition to the NEMA the following legislation has relevance to the protection of scenic resources:

- National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003); and
- National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA).

Based on these Acts, protected or conservation areas and sites or routes with cultural or symbolic value have been taken into consideration when identifying sensitive and potentially sensitive receptor locations and rating the sensitivity of the study area.

5 FACTORS INFLUENCING VISUAL IMPACT

5.1 Subjective experience of the viewer

The perception of the viewer/receptor toward an impact is highly subjective and involves 'value judgements' on behalf of the receptor. It is largely based on the viewer's perception and is usually dependent on the age, gender, activity preferences, time spent within the landscape and traditions of the viewer (Barthwal, 2002). Thus, certain receptors may not consider power lines and associated infrastructure to be a negative visual impact as they are often associated with employment creation, social upliftment and the general growth and progression of an area, and thus the development could even have positive connotations.

5.2 Visual environment

Power lines and substations are not features of the natural environment but are rather a representation of human (anthropogenic) alteration. As such, this type of development is likely to be perceived as visually intrusive when placed in largely undeveloped landscapes that have a natural scenic quality and where tourism activities, based upon the enjoyment of (or exposure to) the scenic or aesthetic character of the area, are practiced. Residents and visitors to these areas could perceive the power lines, substations and associated infrastructure to be highly incongruous in this context and may regard these features as an unwelcome intrusion which degrade the natural character and scenic beauty of the area, and which could potentially even compromise the practising of tourism activities in the area. The experience of the viewer is however highly subjective and there are those who may not perceive features such as power lines and substations as a visual intrusion.

The presence of other anthropogenic features associated with the built environment may not only obstruct views but also influence the perception of whether a development is a visual impact. In industrial areas for example, where other infrastructure and built form already exists, the visual environment could be considered to be 'degraded' and thus the introduction of a new power line or substation into this setting may be considered to be less visually intrusive than if there was no existing built infrastructure visible.

5.3 Type of visual receptor

Visual impacts can be experienced by different types of receptors, including people living, working or driving along roads within the viewshed of the proposed development. The receptor type in turn affects the nature of the typical 'view', with views being permanent in the case of a residence or other places of human habitation, or transient in the case of vehicles moving along a road. The nature of the view experienced affects the intensity of the visual impact experienced.

It is important to note that visual impacts are only experienced when there are receptors present to experience this impact. Thus, where there are no human receptors or viewers present there are not likely to be any visual impacts experienced.

5.4 Viewing distance

Viewing distance is a critical factor in the experiencing of visual impacts, as beyond a certain distance, even large developments tend to be much less visible, and difficult to differentiate from the surrounding landscape. The visibility of an object is likely to decrease exponentially as one moves away from the source of impact, with the impact at 1 000m being considerably less than the impact at a distance of 500m **(Figure 3)**.

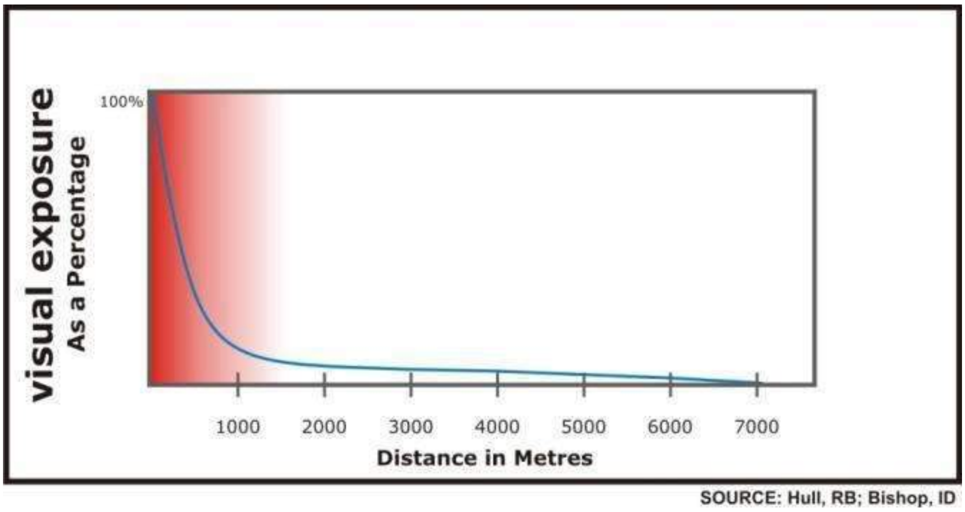


Figure 3: Conceptual representation of diminishing visual exposure over distance

6 VISUAL CHARACTER AND SENSITIVITY OF THE STUDY AREA

Defining the visual character of an area is an important factor in the assessment of visual impacts as it establishes the visual baseline or existing visual environment in which the development would be constructed. The visual impact of a development is measured by establishing the degree to which the development would contrast with, or conform to, the visual character of the surrounding area. The inherent sensitivity of the area to visual impacts or visual sensitivity is thereafter determined, based on the visual character, the economic importance of the scenic quality of the area, inherent cultural value of the area and the presence of visual receptors.

Physical and land use related characteristics, as outlined below, are important factors contributing to the visual character of an area.

6.1 Physical and Land Use Characteristics

6.1.1 Topography

The proposed power line and substations are located in the scenic Karoo region of the Western / Northern Cape which is generally associated with wide vistas and mountainous landscapes. The topography in the broader study area is largely dominated by the mountains/hills at the southern end of the Klein Roggeveld range. Much of the north-eastern sector of the study area is therefore dominated by the steep slopes and broad ridges of these mountains and escarpments **(Figure 4)**.

The south-eastern sector of the study area is however characterised by flat to gently undulating plains interspersed with areas of localised hills and koppies **(Figure 5 and Figure 6)**.

Maps showing the topography and slopes within and in the immediate vicinity of the combined assessment area are provided in **Figure 7** and **Figure 8** below**.**

Figure 4: View (NE), from Portion 1 of the Farm Brandenburg No 164 (-32.950424S; 20.2035E) showing mountainous terrain to the north.

Figure 5: View (NE) from the Gatsrivier road (-33.139302S; 19.957718E), some 2kms south-west of Kappa Substation showing the relatively flat terrain of in the southern section of the assessment area, with more mountainous terrain to the north.

Figure 6: Example of some of the localised hills / koppies in the study area.

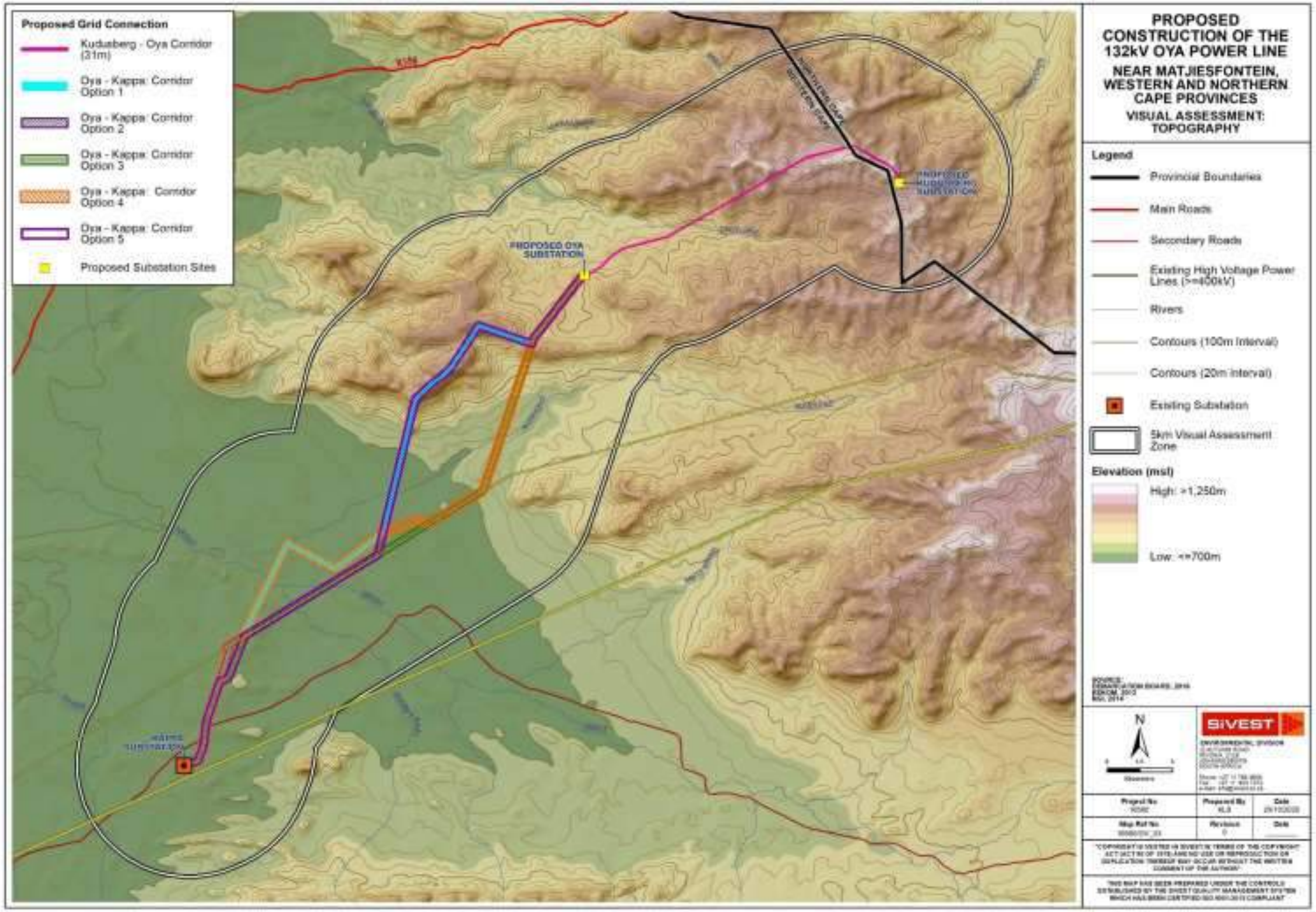


Figure 7: Topography of the study area

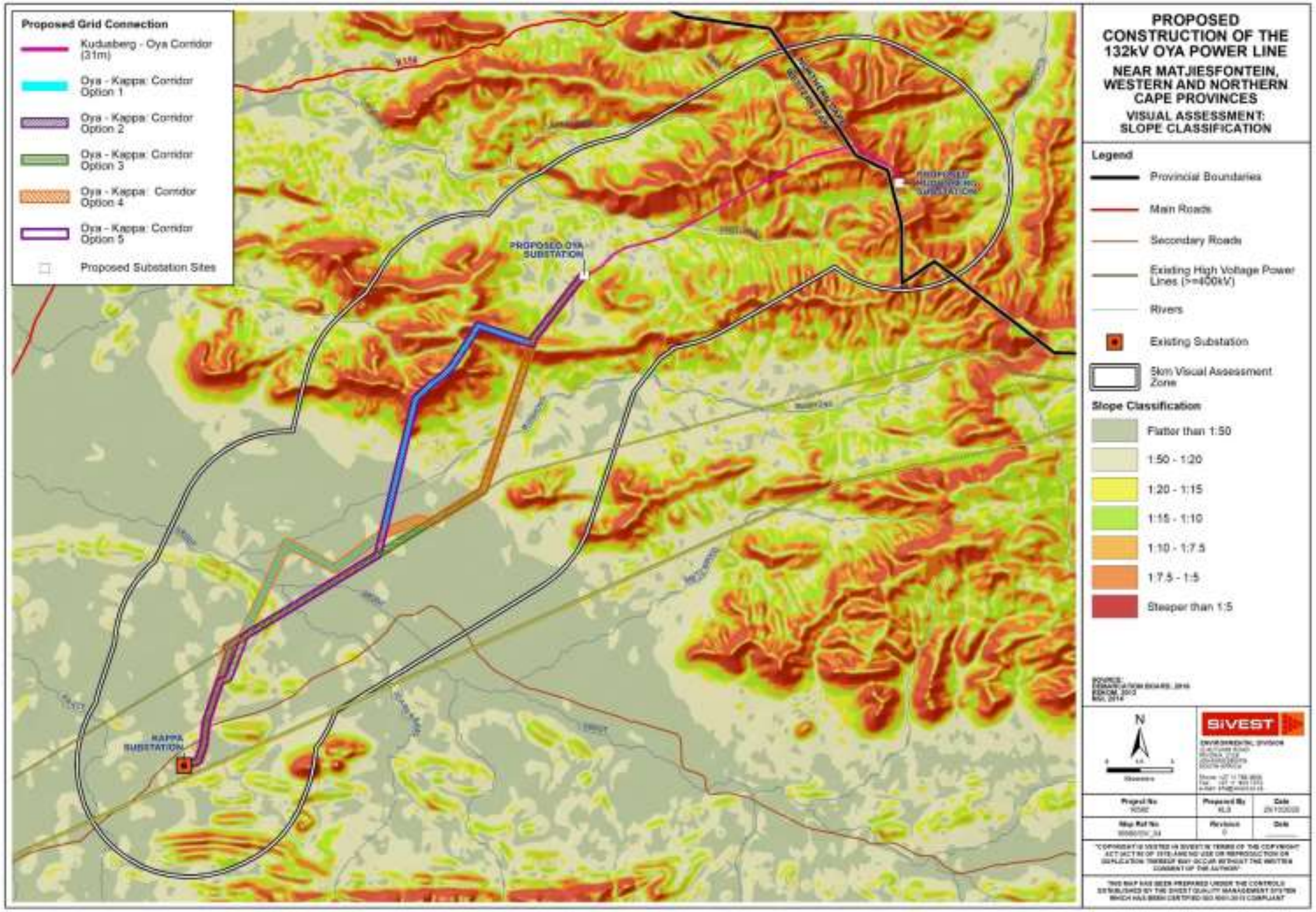


Figure 8: Slope classification of the study area

Visual Implications

Areas of flatter relief, including the plains and the higher-lying plateaus, are characterised by wide ranging vistas (**Figure 9**), although views to the north and south will be somewhat constrained by the hilly terrain in these sectors of the study area which enclose the visual envelope. In the hillier and higher-lying terrain, the vistas will depend on the position of the viewer. Viewers located within some of the more incised valleys for example, would have limited vistas, whereas a much wider vista would be experienced by viewers on higher-lying ridge tops or slopes. Importantly in the context of this study, the same is true of objects placed at different elevations and within different landscape settings. Objects placed on high-elevation slopes or ridge tops would be highly visible, while those placed in valleys or enclosed plateaus would be far less visible.

Bearing in mind that power line towers and substations are large structures (towers could potentially be up to 45 m in height), these elements of the grid connection could be visible from a relatively extensive area around the grid connection infrastructure. Topographic shielding in the north-eastern sector would reduce the visibility of the power lines and substations from many of the locally occurring receptor locations. Across the south-western sector of the study area however there would be very little topographic shielding to lessen the visual impact of the proposed power line and substations.

Figure 9: View west-south-west from the southern section of the study area **(**-33.066028S**;** 20.090783**E)** showing wide-ranging vistas experienced from higher elevations.

GIS technology was used to undertake a preliminary visibility analysis for the proposed power line routes and substation sites. This analysis was based on points at 250 m intervals along the centre line of the corridor alternatives, and assumes a tower height of 45 m. The resulting viewshed indicates the geographical area from where the proposed power lines and substation sites would theoretically be visible, i.e. the zone of visual influence. This analysis is based entirely on topography (relative elevation and aspect) and does not take into account any existing vegetation cover or built infrastructure which may screen views of the proposed development. In addition, detailed topographic data was not available for the broader study area and as such the viewshed analysis does not take into account any localised topographic variations which may constrain views. This analysis should therefore be seen as a conceptual representation or a worst case scenario.

The results of this analysis, as per **Figure 10** below, show that elements of the proposed grid connection infrastructure would be visible from most parts of the study area.

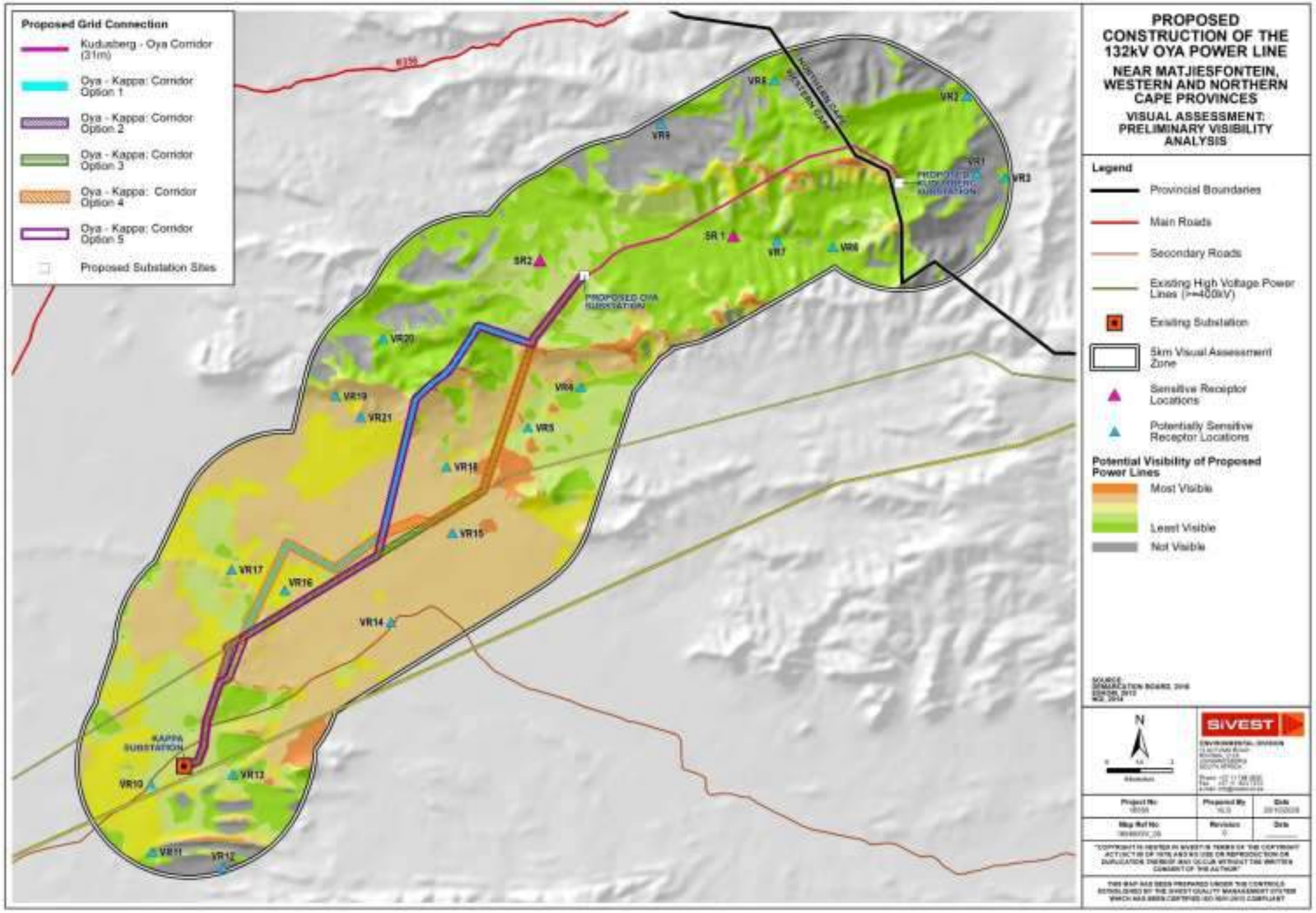


Figure 10: Preliminary visibility analysis of proposed development

6.1.2 Vegetation

According to Mucina and Rutherford (2012), much of the north-eastern sector of the study area is covered by the Koedoesberge – Moordenaars Karoo vegetation type, which tends to occur on slightly undulating hills to hilly landscapes. This vegetation type comprises low succulent scrubs, scattered tall shrubs and patches of “white” grass visible on plains **(Figure 11)**. The dwarf shrubs include Pteronia, Drosanthemum and Galenia.

Figure 11: Typical vegetation cover prevalent across the study area

The northern and eastern sections of the study area which are dominated by high mountains / hills, are however classified as Central Mountain Shale Renosterveld. This vegetation type is typically found on slopes and broad ridges of low mountains and escarpments, with taller shrubland dominated by renosterbos and large areas of mainly non-succulent karoo shrubs and with a rich geophytic flora in the undergrowth or in more open, wetter or rocky habitats (**Figure 12**).

Figure 12: Typical vegetation cover found on slopes and broad ridges of the mountains / hills

The south-western sector of the study area is covered by the Tanqua Karoo vegetation type which tends to occur in intra-mountain basin landscapes where slightly undulating terrain is sheltered by the steep slopes of mountain ranges (**Figure 12**). On the flatter plains which tend to be sparsely vegetated, this vegetation type comprises low succulent shrubs. The slopes of the koppies and the adjacent foothills however support medium-tall succulent shrubland (**Figure 13**). The flatter plains in the central sector of the study area are covered by the Tanqua Wash Riviere vegetation type which largely comprises sparse shrubland in these areas.

Figure 13: Typical vegetation cover in the south-western sector of the study area

Much of the study area however is still characterised by natural low shrubland with transformation limited to patches of cultivation and a few isolated areas where pastoral activities such as livestock rearing are taking place.

Vegetation classifications across the study area are shown in **Figure 16** below.

<u>Visual Implications</u>

Vegetation cover across the study area is predominantly short and sparse and thus will not provide any visual screening (**Figure 14)**. In some instances however, taller trees have been planted around farmhouses, possibly restricting views from these receptor locations to some degree (**Figure 15**).

Figure 14: Short, sparse vegetation cover in the area does not provide any visual screening

Figure 15: Trees planted around a farmstead in the south-western sector of the study area

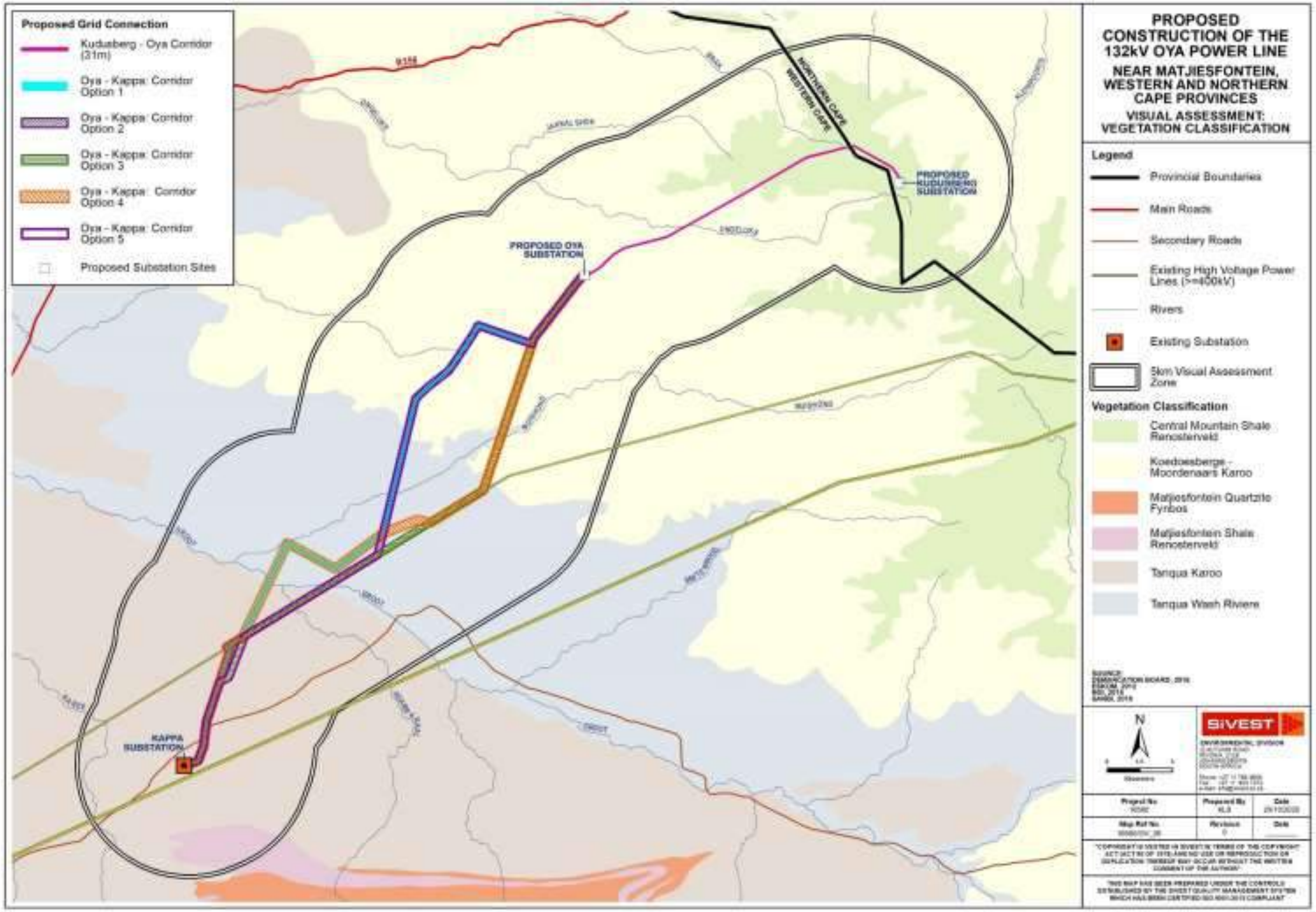


Figure 16: Vegetation Classification in the Study Area

6.1.3 Land Use

According to the South African National Land Cover dataset (GeoTerra Image 2018), much of the visual assessment area is characterised by natural vegetation which is dominated by Karoo and Fynbos shrubland interspersed with natural grassland (**Figure 17**).

Agricultural activity in the area is restricted by the arid nature of the local climate and areas of cultivation are largely confined to relatively limited areas distributed along drainage lines. As such, the natural vegetation has been retained across much of the study area. Livestock farming (mostly sheep) is the dominant activity (**Figure 18**), although the climatic and soil conditions have resulted in low densities of livestock and relatively large farm properties across the area. Thus, the area has a very low density of rural settlement, with relatively few scattered farmsteads in evidence (**Figure 19**). Built form in much of the study area is limited to isolated farmsteads, including farm worker's dwellings and ancillary farm buildings, gravel access roads, telephone lines, fences and windmills (**Figure 20**).

High voltage power lines in the study area however form significant man-made features in an otherwise undeveloped landscape. These power lines include 765kV power lines (**Figure 21**) and 400kV power lines which bisect the south-western sector of the study area in a south-west to north-east alignment. In addition, the Kappa 765/400kV substation, situated at the southern end of the power line assessment corridors, is a substantial anthropogenic feature with a distinctly more industrial character, resulting in a significant degree of transformation in the landscape (**Figure 22**).

In addition, the Perdekraal East wind farm is located in the south-western sector of the study area. Construction of this facility has only recently been completed and the landscape has undergone significant transformation as a result of the construction activities (**Figure 23**).

Further human influence is visible in the area in the form of the DR1475 District Road which traverses the south-western sector of the study area in a west to north-east direction. This is however a gravel road and thus conforms to the typical natural rural character of the study area.

The closest built-up area is the small town of Touws River which is situated approximately 26km south of Kappa Substation while Matjiesfontein is some 55kms to the south-east. These small towns are well outside the visual assessment zone and thus not expected to have an impact on the visual character of the study area.

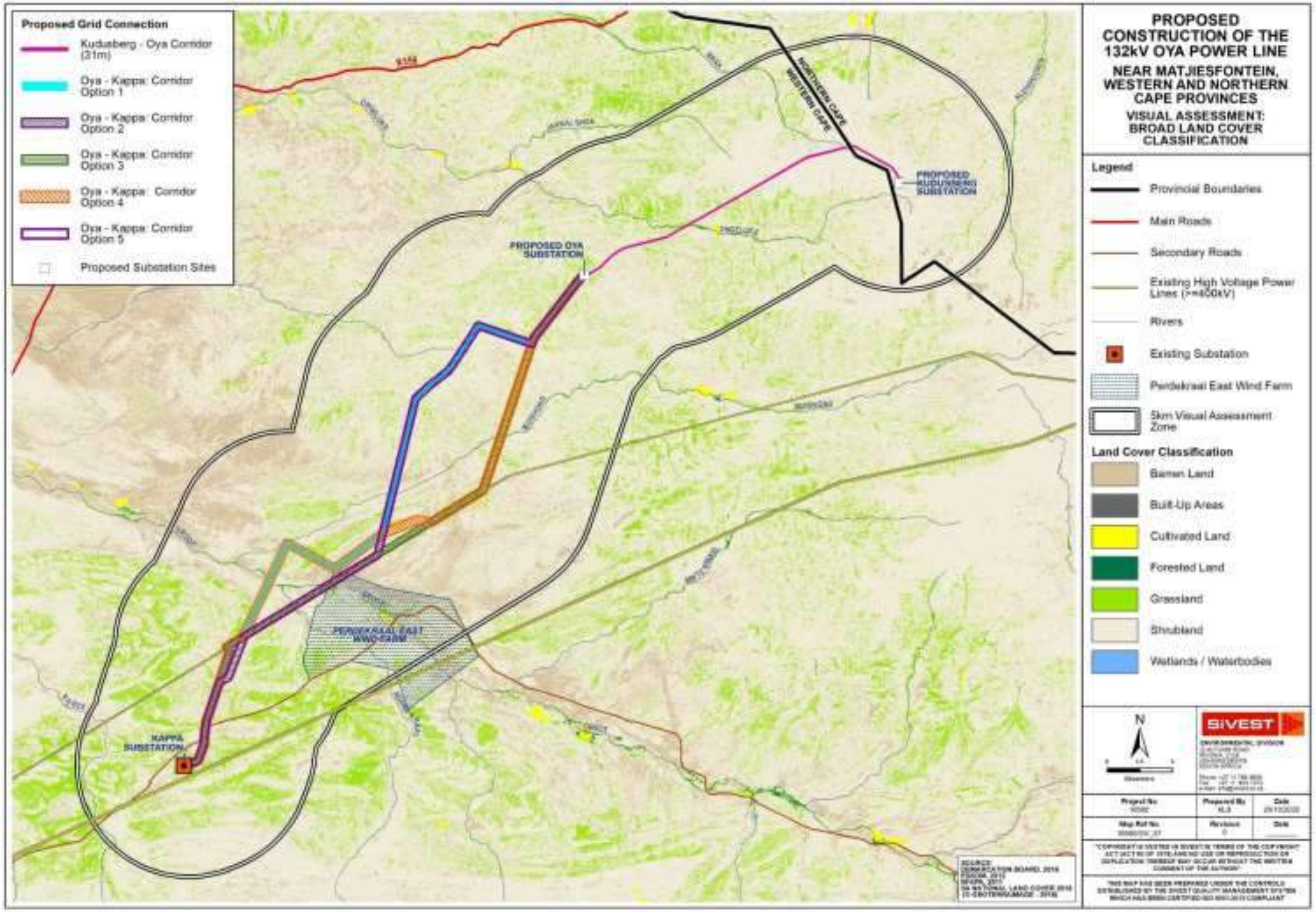


Figure 17: Land Cover Classification of the study area

Figure 18: Sheep grazing near Kappa Substation

Figure 19: Isolated farmstead on Portion 1 of the Farm Brandenburg No 164

Figure 20: Typical view of built form in the study area, including scattered farmhouses, power lines and telephone poles.

Figure 21: View of high voltage power lines in the study area

Figure 22: Kappa Substation

Figure 23: Operational wind turbines at Perdekraal East Wind Farm

Visual Implications

Sparse human habitation and the predominance of natural vegetation cover across much of the study area would give the viewer the general impression of a largely natural setting with some pastoral elements. In addition, there are no towns or settlements in the study area and thus, there are very low levels of human transformation and visual degradation across much of the study area.

Significant elements of human transformation are however present in the south-western sector of the study area, including high voltage power lines, Kappa Substation and the Perdekraal East Wind Farm. These elements are considered to have degraded the visual character to some degree.

The influence of the level of human transformation on the visual character of the area is described in more detail below.

6.2 Visual Character and Cultural Value

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

Agricultural activities in the area have not transformed the natural landscape to any significant degree and there are no towns or built-up areas in the study area influencing the overall visual character. Thus there are very low levels of human transformation and visual degradation across much of the study area and the natural character has been retained.

Prominent anthropogenic elements in the study area however include a large electrical substation (Kappa), associated high voltage power lines and the recently constructed Perdekraal East wind farm. The presence of this infrastructure is an important factor in this context, as the introduction of the proposed power line and substation infrastructure would result in less visual contrast where other anthropogenic elements are already present.

The construction of the Perdekraal East WEF and the associated 132kV power line is a significant factor in the visual character of the study area. WEFs and their associated infrastructure typically consist of very large structures which are highly visible. As such, this facility has significantly altered the visual character and baseline in the south-eastern sector of the study area, resulting in a more industrial-type visual character.

The scenic quality of the landscape is also an important factor contributing to the visual character of an area or the inherent sense of place. Visual appeal is often associated with unique natural features or distinct variations in landform. As such, the hilly / mountainous terrain which occurs in the north-eastern sector of the study area is considered to be an important feature that increases the scenic appeal and visual interest in the area.

The greater area surrounding the proposed development is an important component when assessing visual character. The area can be considered to be typical of a Karoo or “platteland” landscape that would characteristically be encountered across the high-lying dry western and central interior of South Africa. Much of South Africa’s dry Karoo interior consists of wide open, uninhabited spaces sparsely punctuated by scattered farmsteads and small towns. Over the last couple of decades an increasing number of tourism routes have been established in the Karoo and in a context of increasing urbanisation in South Africa’s major centres, the Karoo is being marketed as an undisturbed getaway. Examples of this may be found in the "Getaway Guide to Karoo, Namaqualand and Kalahari" (Moseley and Naude-Moseley, 2008).

The typical Karoo landscape can be considered a valuable 'cultural landscape' in the South African context. Although the cultural landscape concept is relatively new, it is becoming an increasingly important concept in terms of the preservation and management of rural and urban settings across the world (Breedlove, 2002).

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

In light of this, it is important to assess whether the introduction of a new power line and associated infrastructure into the study area would be a degrading factor in the context of the natural Karoo character of the landscape. Broadly speaking, visual impacts on the cultural landscape in the area around the proposed development would be reduced by the fact that the area is very remote and there are no significant tourism enterprises attracting visitors into the study area. In addition, the nearest major scenic routes (N1 and R355) are some considerable distance away and are not expected to experience any visual impacts from the proposed development.

A detailed assessment of the potential impacts of the proposed power line and substation development on the cultural landscape has been included in the Heritage Impact Assessment (HIA) undertaken by CTS Heritage in respect of the proposed project. Although this study identified cultural landscape features of significance, it was concluded that the proposed development is unlikely to have a negative impact on significant heritage resources situated within the corridor for the proposed Oya power line provided that the proposed mitigation measures including buffer areas and 'no-go' areas are implemented.

6.3 Visual Sensitivity

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

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

Based on the criteria in the matrix (**Table 2**), the visual sensitivity of the area is broken up into a number of categories, as described below:

i) **High** - The introduction of a new development such as a power line and/or substation would be likely to be perceived negatively by receptors in this area; it would be considered to be a visual intrusion and may elicit opposition from these receptors.

ii) **Moderate** – Receptors are present, but due to the nature of the existing visual character of the area and likely value judgements of receptors, there would be limited negative perception towards the new development as a source of visual impact.

iii) **Low** - The introduction of a new development would not be perceived to be negative, there would be little opposition or negative perception towards it.

The table below outlines the factors used to rate the visual sensitivity of the study area. The ratings are specific to the visual context of the receiving environment within the study area.

Table 2: Environmental factors used to define visual sensitivity of the study area

FACTORS	DESCRIPTION	RATING									
		LOW									*HIGH*
		1	2	3	4	5	6	7	8	9	10
Pristine / natural / scenic character of the environment	Study area is largely natural with areas of scenic value and some pastoral elements.										
Presence of sensitive visual receptors	Relatively few sensitive receptors have been identified in the study area.										
Aesthetic sense of place / visual character	Visual character is typical of Karoo Cultural landscape.										
Irreplaceability / uniqueness / scarcity value	Although there are areas of scenic value within the study area, these are not rated as highly unique.										
Cultural or symbolic meaning	Much of the area is typical of a Karoo Cultural landscape.										
Protected / conservation areas in the study area	No protected or conservation areas were identified in the study area.										
Sites of special interest present in the study area	No sites of special interest were identified in the study area.										
Economic dependency on scenic quality	Few tourism/leisure-based facilities in the area										
International / regional / local status of the environment	Study area is typical of Karoo landscapes										
**Scenic quality under threat / at risk of change	Introduction of grid connection infrastructure will alter the visual character and sense of place. In addition, the development of other renewable energy facilities in the broader area as planned or under construction will introduce an increasingly industrial character, giving rise to significant cumulative impacts										

**Any rating above '5' for this specific aspect will trigger the need to undertake an assessment of cumulative visual impacts.

Low				Moderate					High
10	20	30	40	50	60	70	80	90	100

Based on the above factors, the total score for the study area is 41, which according to the scale above, would result in the area being rated as having a low visual sensitivity. It should be stressed however that the concept of visual sensitivity has been utilised indicatively to provide a broad-scale indication of whether the landscape is likely to be sensitive to visual impacts, and is based on the physical characteristics of the study area, economic activities and land use that predominates. An important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that may value the aesthetic quality of the landscape and depend on it to produce revenue and create jobs.

No formal protected areas were identified in the study area and relatively few sensitive or potentially sensitive receptors were found to be present.

As part of the visual sensitivity assessment, a screening exercise was undertaken with the aim of indicating any areas that should be precluded from the proposed development footprint. From a visual perspective, these are areas where the establishment of power lines and/or substations would result in the greatest probability of visual impacts on sensitive or potentially sensitive visual receptors.

Using GIS-based visibility analysis, it was possible to determine which sectors of the application site would be visible to the highest numbers of receptors in the study area (**Figure 24**). This analysis considered all the sensitive and potentially sensitive receptor locations identified (**Section 8.1**). Due to the fact that there are relatively few receptors, widely scattered across the area, no sections of the proposed route alignments were found to be significantly more sensitive than any others. Accordingly, areas visible to more than 33% of the receptors were rated as areas of potentially ‘high visual sensitivity’. However, as the study area as a whole is rated as having a low to moderate visual sensitivity, the sensitivity rating would be reduced to “Medium-High”. Hence these areas are **not** considered to be “no go areas”, but rather should be viewed as zones where development would be least preferred.

It should be noted that the visibility analysis is based purely on topographic data available for the broader study area and does not take into account any localised topographic variations or any existing infrastructure and / or vegetation which may constrain views. In addition, the analysis does not consider differing perceptions of the viewer which would largely determine the degree of visual impact being experienced.

The visual sensitivity analysis should therefore be seen as a conceptual representation or a worst-case scenario which rates the visibility of the site in relation to potentially sensitive receptors.

In addition to the sensitivity ratings, a 500 m exclusion zone has been delineated around the identified receptors in the study area. It is recommended that grid infrastructure should not be developed within these buffer zones so as to reduce visual impacts of the power line on these receptors.

These areas of visual sensitivity are shown in **Figure 24** below.

In assessing visual sensitivity, the Landscape Theme of the National Environmental Screening Tool was used to determine the relative landscape sensitivity for the development of grid connection infrastructure. The tool does not however identify any landscape sensitivities in respect of the proposed power line or substation.

6.4 Visual Absorption Capacity

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

Although the undulating topography in the study would increase the visual absorption capacity, this would be offset by the lack of screening provided by the dominant shrubland vegetation. A significant portion of the study area has however already undergone significant transformation as a result of the Kappa substation and associated high voltage power lines and further transformation has occurred with the construction of the Perdekraal East Windfarm, thus increasing the visual absorption capacity of the landscape.

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

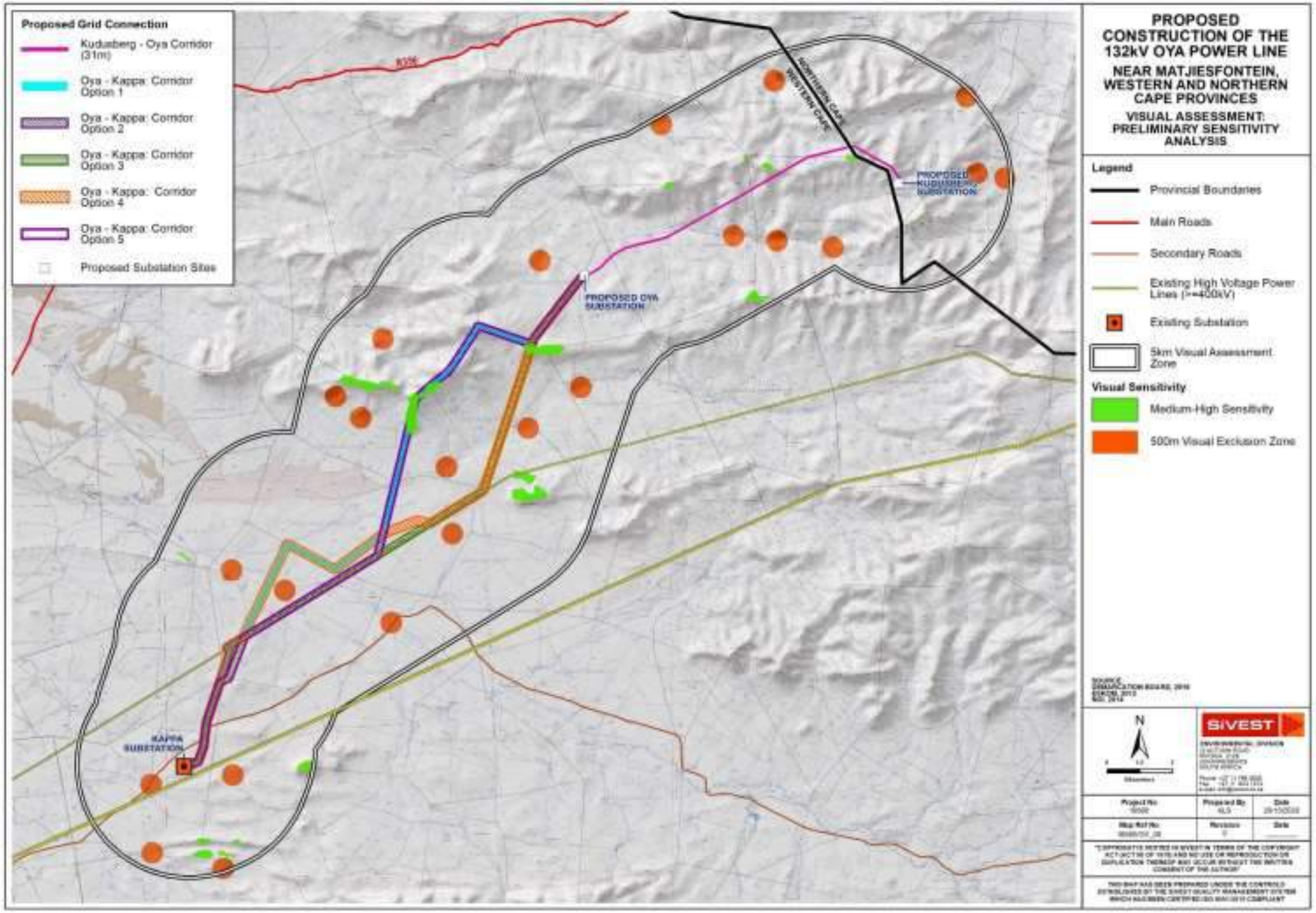


Figure 24: Preliminary visual sensitivity analysis of proposed development**.**

7 TYPICAL VISUAL IMPACTS ASSOCIATED WITH ON-SITE SUBSTATIONS AND POWER LINES

In this section, the typical visual issues related to the establishment of a 132kV power line and substation are discussed

Power line towers and substations are very large objects and thus highly visible. According to the project description provided by Oya Energy, the maximum tower height envisaged for the proposed power line is 45m (equivalent in height to a fifteen storey building). Although a tower structure would be less visible than a building, the height of the structure means that the tower would still typically be visible from a considerable distance. Visibility would be increased by the fact that the power line comprises a series of towers typically spaced approximately 200m to 250m apart in a linear alignment.

The degree of visibility of an object informs the level and intensity of the visual impact, but other factors also influence the nature of the visual impact. The landscape and aesthetic context of the environment in which the object is placed, as well as the perception of the viewer are also important factors. In the context of a power line, the type of tower used as well as the degree to which the towers would impinge upon or obscure a view is also a factor that will influence the experience of the visual impacts.

As described above, a power line or substation could be perceived to be highly incongruous in the context of a largely natural landscape. The height and linear nature of the power line will exacerbate this incongruity, as the towers may impinge on views within the landscape. In addition, the practice of clearing any taller vegetation from areas within the power line servitude can increase the visibility and incongruity of the power line. In a largely natural, bushier setting, vegetation clearance will cause fragmentation of the natural vegetation cover, thus making the power line more visible and drawing the viewer's attention to the power line servitude.

Sensitivity to visual impacts is typically most pronounced in areas set aside for conservation of the natural environment (such as protected natural areas or conservancies), or in areas in where the natural character or scenic beauty of the area attracts visitors (tourists). In this instance however, the area is not typically valued for its tourism significance and no formal protected areas, leisure-based tourism activities or recognised tourism routes were identified in the area.

Conversely, the presence of other anthropogenic objects associated with the built environment may "degrade" the visual environment and thus the introduction of a new power line and substation into this setting may be considered to be less of a visual impact than if there was no existing built infrastructure visible. In this context therefore, the presence of the Kappa substation and the existing high voltage power lines traversing the study area, in conjunction with the Perdekraal East WEF, is expected to lessen the visual contrast associated with the introduction of a new power line and substation.

Other factors, as listed below, can also affect the nature and intensity of a potential visual impact associated with a power line and substation:

- The location of the development in the landform setting – i.e. in a valley bottom or on a ridge top. In the latter example the development would be much more visible and would “break” the horizon;
- The presence of macro- or micro-topographical features, built form or vegetation that would screen views of the development from a receptor location;
- The presence of existing, similar features in the area and their alignment in relation to the proposed new development; and
- Temporary factors such as weather conditions (presence of haze, rainfall or heavy mist) which would affect visibility.

In this instance, the proposed power line and substations are intended to serve the proposed Oya Energy Facility and, potentially, other proposed renewable energy facilities (REFs) in the area. As such, the power line and substations will only be built if one of these energy facilities is developed. The power line and substations are therefore likely to be perceived to be part of the greater energy facility development and the visual impact will be relatively minor when compared to the visual impact associated with energy facility as a whole.

8 SENSITIVE VISUAL RECEPTORS

A sensitive visual receptor location is defined as a location from where receptors would potentially be impacted by a proposed development. Adverse impacts often arise where a new development is seen as an intrusion which alters the visual character of the area and affects the ‘sense of place’. The degree of visual impact experienced will however vary from one receptor to another, as it is largely based on the viewer’s perception.

A distinction must be made between a receptor location and a sensitive receptor location. A receptor location is a site from where the proposed development may be visible, but the receptor may not necessarily be adversely affected by any visual intrusion associated with the development. Less sensitive receptor locations include locations of commercial activities and certain movement corridors, such as roads that are not tourism routes. More sensitive receptor locations typically include sites that are likely to be adversely affected by the visual intrusion of the proposed development. They include tourism facilities, scenic sites and residential dwellings in natural settings.

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

- the visual character of the area, especially taking into account visually scenic areas and areas of visual sensitivity;
- the presence of leisure-based (especially nature-based) tourism in an area;

- the presence of sites or routes that are valued for their scenic quality and sense of place;
- the presence of homesteads / farmsteads in a largely natural setting where the development may influence the typical character of their views; and
- feedback from interested and affected parties, as raised during the public participation process conducted as part of the BA study.

Viewing distance is also a critical factor in the experiencing of visual impacts. As the visibility of the development would diminish exponentially over distance (refer to **section 5.4** above), receptor locations which are closer to the proposed development would experience greater adverse visual impacts than those located further away.

The degree of visual impact experienced will however vary from one inhabitant to another, as it is largely based on the viewer's perception. Factors influencing the degree of visual impact experienced by the viewer include the following:

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

8.1 Receptor Identification

Preliminary desktop assessment of the study area identified twenty-three (23) potentially sensitive visual receptor locations within the study area, most of which appear to be existing farmsteads (**Figure 25**). These farmsteads are regarded as potentially sensitive visual receptors as they are located within a mostly rural setting and the proposed development will likely alter natural vistas experienced from these locations, although the residents' sentiments toward the proposed development are unknown.

The findings of the desktop assessment were largely confirmed by field assessments conducted in the study area for other VIAs, although it was not possible to confirm the presence of farmsteads at all the identified locations due to access restrictions. Notwithstanding this limitation, all the identified receptor locations were assessed as part of this VIA as they are still regarded as being potentially sensitive to the visual impacts associated with the proposed.

Two (2) of the identified receptor locations were confirmed to be sensitive receptors, these being tourism / accommodation facilities at the Gats Rivier Holiday Farm and Baakens Rivier. It was established that Baakens River comprises accommodation facilities that are part of the Gats Rivier Holiday Farm facility, even though these facilities are located on a different farm located some distance from the main Gats Rivier farm.

Five (5) identified receptors were found to be outside the viewshed for the combined grid infrastructure proposals.

In many cases, roads along which people travel, are regarded as sensitive receptors. The primary thoroughfare in the broader region is the R356 main road which connects the R46 near Ceres with Loxton by way of Sutherland and Fraserburg. This is a gravel road, primarily used as an access route by the local farmers and is not valued or utilised for its scenic or tourism potential. As a result, this road is not considered to be visually sensitive. In addition, the road is more than 8kms from the nearest power line route alternative and well outside the 5km visual assessment area. At this distance, motorists travelling along this road are not expected to experience any adverse visual impacts as a result of the proposed development.

The DR1475 is the primary thoroughfare in the south-western sector of the study area. This gravel road is used mainly as an access route by the local farmers and is therefore not valued or utilised for its scenic or tourism potential. As a result, this road is not considered to be visually sensitive.

Other roads in the study area are primarily farm access roads and do not form part of any scenic tourist routes and are therefore not regarded as visually sensitive.

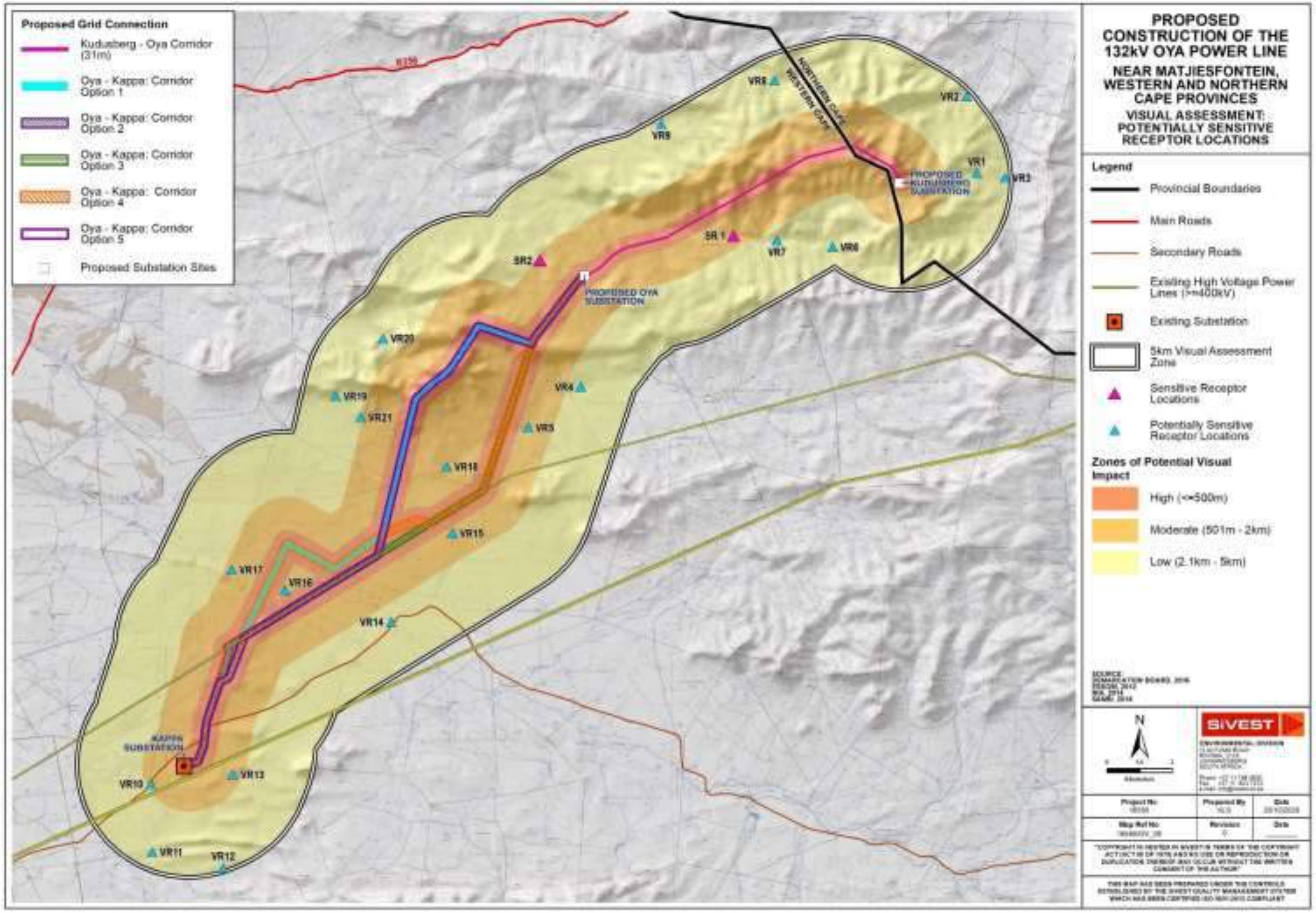


Figure 25: Potentially sensitive receptor locations within 5kms of the Oya Solar PV Facility application site.

8.2 Receptor Impact Rating

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

The matrix is based on a number of factors as listed below:

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

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

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

Zones of visual impact for the proposed development were therefore delineated according to distance from the proposed power line assessment corridors. Based on the height and project, the distance intervals chosen for the zones of visual impact are as follows:

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

The presence of screening elements is an equally important factor in this context. Screening elements can be vegetation, buildings and topographic features. For example, a grove of trees or a series of low hills located between a receptor location and an object could completely shield the object from the receptor. As such, where views of the proposed development are completely screened, or where the receptor is outside the viewshed for the proposed development, the receptor has been assigned an overriding nil impact rating, as the development would not impose any impact on the receptor.

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

In light of the fact that the study area is located within the Central Strategic Transmission Corridor, and also within Renewable Energy Development Zone 2 (Komsberg REDZ[4]), the concentration of renewable energy developments and associated grid connection infrastructure is supported in this area. This could result in an incremental change in the visual character of the area and in the typical land use patterns towards a less rural environment within which power lines and substations would be less incongruous.

The matrix returns a score which in turn determines the visual impact rating assigned to each receptor location (**Table 3**) below.

Table 3: Rating scores

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

An explanation of the matrix is provided in **Table 4** below.

[4] formally gazetted (Gazette Number 41445) on 16 February 2018 by the Minister of Environmental Affairs (GN 114)

Table 4: Visual assessment matrix used to rate the impact of the proposed development on potentially sensitive receptors

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

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

Table 5: Summary Receptor Impact Rating

Receptor Number	Distance to nearest Corridor Alternative		Screening	Contrast	OVERALL IMPACT RATING
SR1 – Baakens Rivier[1]	Mod (2)	1.4km	High (3)	High (3)	**HIGH (8)**
SR2 – Gats Rivier[2]	Mod (2)	1.8km	Mod (2)	Mod (2)	**MODERATE (5)**
VR 1 – Farmstead[3]	Low (1)	3.4km	**NIL**		
VR 2 – Farmstead[4]	Low (1)	4.7km	Mod (2)	High (3)	**MODERATE (6)**
VR 3 – Farmstead	Low (1)	4.7km	Mod (2)	High (3)	**MODERATE (6)**
VR 4 – Farmstead	Low (1)	2.6km	Mod (2)	High (3)	**MODERATE (6)**
VR 5 – Farmstead[6]	Mod (2)	0.9km	Mod (2)	High (3)	**MODERATE (7)**
VR 6 – Farmstead[4]	Low (1)	4.2km	Mod (2)	High (3)	**MODERATE (6)**
VR 7 – Farmstead[3]	Low (1)	2.6km	**NIL**		
VR 8 – Farmstead[4]	Low (1)	3.8km	Mod (2)	High (3)	**MODERATE (6)**
VR 9 – Farmstead[3]	Low (1)	4.6km	**Nil**		
VR 10 – Farmstead[5]	Mod (2)	1.8km	Mod (2)	Mod (2)	**MODERATE (5)**
VR 11 - Farmstead[3]	Low (1)	4.2km	**NIL**		
VR 12 - Farmstead[3]	Low (1)	4.8km	**NIL**		
VR 13 – Farmstead[5]	Mod (2)	1.6km	Mod (2)	High (3)	**MODERATE (7)**
VR 14 - Farmstead[5]	Low (1)	2.8km	Mod (2)	Low (1)	**LOW**
VR 15 - Farmstead[6]	Mod (2)	0.8km	Mod (2)	High (3)	**MODERATE (6)**
VR 16 – Farmstead[5]	Mod (2)	0.7km	Mod (2)	Low (1)	**MODERATE (5)**
VR 17 - Farmstead[5]	Mod (2)	1.6km	Mod (2)	High (3)	**MODERATE (7)**
VR 18 - Farmstead[6]	Mod (2)	1.7km	Mod (2)	Mod (2)	**MODERATE (6)**
VR 19 - Farmstead	Low (1)	3.4km	High (3)	High (3)	**MODERATE (7)**
VR 20 - Farmstead[6]	Low (1)	2.8km	Mod (2)	High (3)	**MODERATE (6)**
VR 21 - Farmstead[6]	Low (1)	2.1km	Mod (2)	High (3)	**MODERATE (6)**

[1]Baakens Rivier is located within the proposed Kudusberg WEF development area. It is known that the occupants have a vested interest in the proposed WEF and associated infrastructure development and would therefore not perceive the proposed power line in a negative light.

[2]Gats Rivier is located within the proposed Oya Energy Facility development area. It is known that the occupants have a vested interest in the proposed energy facility and associated infrastructure development and would therefore not perceive the proposed power line in a negative light.

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

[4]Receptor is located within the Kudusberg WEF development area. It is known that the occupants have a vested interest in the proposed WEF and associated infrastructure development and would therefore not perceive the proposed power line in a negative light.

[5]Receptor is located within the Tooverberg and Perdekraal WEF development area. It is known that the occupants have a vested interest in the proposed WEF and associated infrastructure development and would therefore not perceive the proposed power line in a negative light.

[6]Receptor is located on a property which is affected by all of the proposed power line route alignments. It is assumed that the respective land owners have consented to the proposed development on their property and do not perceive the proposed power line in a negative light.

The table above shows that one (1) of the sensitive receptors would experience high levels of visual impact as a result of the proposed development, this being the farmstead on Baakens Rivier. As previously mentioned, this property forms part of the Kudusberg WEF application site, and as such the owner has a vested interest in the development of the facility and the associated grid connection infrastructure. The other sensitive receptor, Gats Rivier Holiday Farm, will be subjected to moderate levels of visual impact, and as the property is under the same ownership as Baakens Rivier, and is part of the adjacent Oya Energy Facility project, it is unlikely that the owners will perceive the proposed development in a negative light.

Fifteen (15) potentially sensitive receptors, will be subjected to moderate levels of visual impact as a result of the proposed power line development, while one receptor will be subjected to low levels of visual impact. It should be noted however, that thirteen of these receptors are located on farms which either form part of the power line development project or are located within the development sites for other renewable energy projects. As such the owners / occupants are not expected to perceive the proposed power line and substations in a negative light.

The remaining five (5) receptors are outside the viewshed of the proposed development and are therefore not expected to be subjected to any visual impacts as a result of the power line development.

8.3 Night-time Impacts

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

Much of the study area is characterised by natural areas with pastoral elements and low densities of human settlement. As a result, relatively few light sources are present in the broader area surrounding the proposed development site. The closest built-up area is the town of Touws River which is situated approximately 26km south of Kappa Substation and is thus too far away to have significant impacts on the night scene. At night, the general study area is characterised by a picturesque dark starry sky and the visual character of the night environment is largely ‘unpolluted’ and pristine. Sources of light in the area are largely limited to isolated lighting from surrounding farmsteads and transient light from the passing cars travelling along the gravel access roads. Some light pollution is however likely to emanate from the operational and security lighting at Kappa substation and Perdekraal WEF and this would reduce the impacts of additional lighting in the area.

Power lines and associated towers or pylons are not lit up at night and, thus light spill associated with the proposed electrical infrastructure project is only likely to emanate from the proposed substations. Although the lighting required at the substation sites would normally be expected to intrude on the nightscape, night time impacts of this lighting will be reduced by the existing light spill emanating from Kappa substation and Perdekraal WEF. It should also be noted that the power line and substations will only be constructed if the proposed Oya Energy Facility (or any other proposed REF in the area) is also developed. Light sources for these facilities will include operational and security lighting and thus the lighting impacts from the proposed substations would be subsumed by the glare and contrast of the lights associated with the energy facility or REFs. As such, the substations alone are not expected to result in significant lighting impacts.

8.4 Cumulative Impacts

Although it is important to assess the potential visual impacts of the proposed power line and substations specifically, it is equally important to assess the potential cumulative visual impact that could materialise if other renewable energy facilities (both wind and solar facilities) and associated infrastructure projects are developed in the broader area. Cumulative impacts occur where existing or planned developments, in conjunction with the proposed development, result in significant incremental changes in the broader study area. In this instance, such developments would include renewable energy facilities and associated infrastructure development.

Renewable energy facilities have the potential to cause large scale visual impacts and the location of several such developments in close proximity to each other could significantly alter the sense of place and visual character in the broader region. Although power lines and substations are relatively small developments when compared to renewable energy facilities, they may still introduce a more industrial character into the landscape, thus altering the sense of place.

Fifteen (15) renewable energy projects were identified within a 35 km radius of the proposed development as shown in **Figure 26** below. These projects were identified using the DEFF's Renewable Energy EIA Application Database for SA in conjunction with information provided by Independent Power Producers (IPPs) operating in the broader region. Three (3) of these projects, namely Touws River Solar, Montagu Solar and Witberg WEF, are all located south of the N1 national route and the Bontberg mountain range. Given the visual divide provided by the mountains, it is not anticipated that these developments will result in any significant cumulative impacts affecting the landscape in the vicinity of the study area.

The remaining twelve (12) projects are listed in **Table 6** below. It is assumed that all of these renewable energy developments include grid connection infrastructure, although few details of this infrastructure were available at the time of writing this report. It should be noted that this list is based on information available at the time of writing this report and as such there may be several other renewable energy projects proposed within the study area.

The relatively large number of renewable energy facilities within the surrounding area and their potential for large-scale visual impacts could significantly alter the sense of place and visual character in the broader region, as well as exacerbate the visual impacts on surrounding visual receptors, once constructed.

Table 6: Renewable energy developments proposed within a 35km radius of the proposed 132kV Oya power line and substations

Applicant	Project	Technology	Capacity	Status of Application / Development
Oya Energy (Pty) Ltd	Oya Energy Facility	Hybrid	305MW	EIA Process underway
Brandvalley Wind Farm (Pty) Ltd	Brandvalley WEF	Wind	140MW	Approved
Biotherm Energy (Pty) Ltd	Esizayo WEF	Wind	140MW	Approved
African Clean Energy Developments Renewables	Hidden Valley (Karusa & Soetwater) WEF	Wind	140MW	Under Construction
Karreebosch Wind Farm (Pty) Ltd	Kareebosch WEF	Wind	140W	Approved
Rondekop Wind Farm (Pty) Ltd	Rondekop WEF	Wind	325MW	Approved
Kudusberg Wind Farm (Pty) Ltd	Kudusberg WEF	Wind	325W	Approved
South Africa Mainstream Renewable Power Perdekraal West (Pty) Ltd	Perdekraal West WEF & Associated Grid Connection Infrastructure	Wind	150M	Approved
South Africa Mainstream Renewable Power Perdekraal East (Pty) Ltd	Perdekraal East WEF & Associated Grid Connection Infrastructure	Wind	110MW	Operational
Rietkloof Wind Farm (Pty) Ltd	Rietkloof WEF& Associated Grid Connection Infrastructure	Wind	186MW	Approved
Roggeveld Wind Power (Pty) Ltd	Roggeveld WEF& Associated Grid Connection Infrastructure	Wind	140MW	Under Construction
ENERTRAG SA (Pty) Ltd	Tooverberg WEF & Associated Grid Connection Infrastructure	Wind	140MW	Approved

These renewable energy projects include eleven (11) WEFs and one (1) combined Solar PV and Fuel-based Generator Facility (FBGF). Although the different technologies are expected to have different impacts, all renewable energy developments and associated grid connection infrastructure are relevant as they contribute to the alteration of the visual character of the area.

Figure 26 below shows a concentration of sites proposed for WEF development to the north-east of the application site, and also to the south-west, with many of these being located outside the 5 km visual assessment zone. Given the distance from the study area and the hilly topography in the broader area, it is not anticipated that the WEF developments beyond the 5 km study area will result in any significant cumulative impacts affecting the landscape or the visual receptors within the power line visual assessment zone.

The north-eastern sector of the study area is affected by two (2) renewable energy projects, located on adjoining farm portions, namely Kudusberg WEF and Oya Energy Facility. These projects and associated infrastructure will inevitably introduce an increasingly industrial character into a largely natural, pastoral landscape in this sector of the study area, thus giving rise to significant cumulative impacts. It should be noted however that that PV panels, at an approximate height of 4m, are considerably less visible than wind turbines and as such the proposed Oya solar arrays would be outside the viewshed of many of the potentially sensitive receptor locations identified in the study area. Cumulative impacts affecting these receptors would therefore be reduced and the severity of these impacts would depend on the perceptions of the receptors.

The south- western sector of the study area is affected by three (3) WEF projects, namely Perdekraal East WEF, Perdekraal West WEF and Tooverberg WEF. These projects are all located on adjoining farm portions and are in close proximity to Kappa substation and both sets of high voltage power lines. Grid connection infrastructure for all of these projects include 132kV power lines routed along the same alignment, adjacent to the existing 765kV power lines, traversing the Tooverberg WEF application site to connect into Kappa substation. Although Perdekraal West and Tooverberg WEFs have not yet been developed, Perdekraal East WEF and the associated power line are now operational and the landscape has already undergone noticeable change, which will be exacerbated with further WEF development in the area. Impacts of this transformation will however be reduced by the fact the landscape in the vicinity of these proposed WEF developments has already been disturbed by Perdekraal East WEF, Kappa substation and the existing power lines.

An examination of the literature available for the environmental assessments undertaken for many of these renewable energy applications showed that the visual impacts identified and the recommendations and mitigation measures provided are largely consistent with those identified in this report. Where additional, relevant mitigation measures were provided in respect of the other renewable energy applications, these have been incorporated into this report where relevant.

From a visual perspective, the further concentration of renewable energy facilities with associated grid connection infrastructure as proposed will inevitably change the visual character of the area and alter the inherent sense of place, introducing an increasingly industrial character into the broader area, and resulting in significant cumulative impacts. It is however anticipated that these impacts could be mitigated to acceptable levels with the implementation of the recommendations and mitigation measures put forward by the visual specialists in their respective reports.

It is important to note however that the study area is located within the REDZ 2, known as Komsberg REDZ, and also within a Strategic Transmission Corridor and thus the relevant authorities support the concentration of renewable energy developments and associated power line infrastructure in this area. In addition, it is possible that the renewable energy facilities located in close proximity to each other could be seen as one large facility rather than separate developments. Although this will not necessarily reduce impacts on the visual character of the area, it could potentially reduce the cumulative impacts on the landscape.

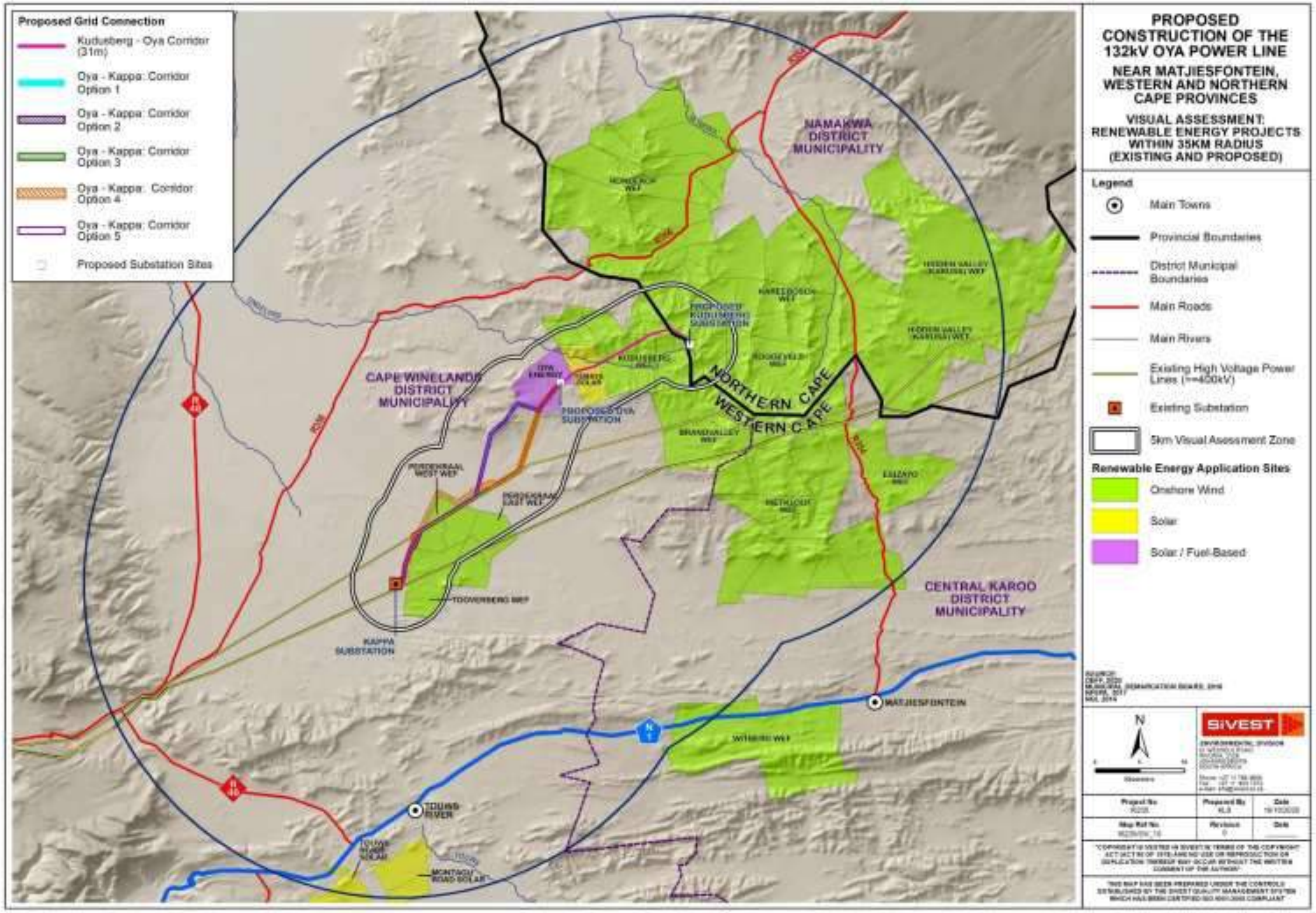


Figure 26: Renewable energy facilities proposed within a 35km radius of the 132kV Oya Power Line.

8.5 Overall Visual Impact Rating

The EIA Regulations, 2014 (as amended) require that an overall rating for visual impact be provided to allow the visual impact to be assessed alongside other environmental parameters. **Table 6 and 7** below present the impact matrix for visual impacts associated with the proposed construction and operation of the proposed 132kV power line and substations. Preliminary mitigation measures have been determined based on best practice and literature reviews.

Please refer to **Appendix D** for an explanation of the impact rating methodology.

Table 7: Impact Rating for 132kV Oya Power Line and Substations

132kV OYA POWER LINE AND SUBSTATIONS																				
ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Construction Phase (Direct Impacts)																				
▪ Potential alteration of the visual character and sense of place ▪ Potential visual impact on receptors in the study area	▪ Large construction vehicles and equipment will alter the natural character of the study area and expose visual receptors to impacts associated with construction. ▪ Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. ▪ Dust emissions and dust plumes from increased traffic on the gravel roads serving the construction site may evoke negative sentiments from surrounding viewers. ▪ Surface disturbance during construction would expose bare soil (scarring) which could visually contrast with the surrounding environment. ▪ Temporary stockpiling of soil during construction may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.	2	3	1	2	1	2	18	-	Low	▪ Carefully plan to mimimise the construction period and avoid construction delays. ▪ Inform receptors of the construction programme and schedules. ▪ Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. ▪ Vegetation clearing should take place in a phased manner. ▪ Maintain a neat construction site by removing rubble and waste materials regularly. ▪ Make use of existing gravel access roads where possible. ▪ Limit the number of vehicles and trucks travelling to and from the construction site, where possible. ▪ Ensure that dust suppression techniques are implemented: ▪ on all access roads;	2	2	1	2	1	2	14	-	Low

										▪ in all areas where vegetation clearing has taken place; ▪ on all soil stockpiles.									
Operational Phase																			
▪ Potential alteration of the visual character and sense of place. ▪ Potential visual impact on receptors in the study area. ▪ Potential visual impact on the night time visual environment.	▪ The proposed power line and substations could alter the visual character of the surrounding area and expose sensitive visual receptor locations to visual impacts. ▪ The development may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. ▪ Dust emissions and dust plumes from maintenance vehicles accessing the site via gravel roads may evoke negative sentiments from surrounding viewers. ▪ The night time visual environment will be altered as a result of operational and security lighting at the proposed substations.	2	4	2	2	3	1	13	-	Low	▪ As far as possible, limit the number of maintenance vehicles using access roads. ▪ As far as possible, limit the amount of security and operational lighting at the proposed substations. ▪ Light fittings for security at night should reflect the light toward the ground and prevent light spill. ▪ Lighting fixtures should make use of minimum lumen or wattage. ▪ Mounting heights of lighting fixtures should be limited, or alternatively, foot-light or bollard level lights should be used. ▪ If possible, make use of motion detectors on security lighting. ▪ Buildings on the substation site should be painted with natural tones that fit with the surrounding environment. ▪ Non-reflective surfaces should be utilised where possible.	2	4	2	2	3	1	13	-	Low
Decommissioning Phase																			
▪ Potential visual intrusion resulting from vehicles and equipment involved in the decommissioning process; ▪ Potential visual impacts of increased dust emissions from decommissioning activities and related traffic; and	▪ Vehicles and equipment required for decommissioning will alter the natural character of the study area and expose visual receptors to visual impacts.	2	3	1	2	1	2	18	-	Low	▪ All infrastructure that is not required for post-decommissioning use should be removed.	2	2	1	1	1	2	14	-	Low

▪ Potential visual intrusion of any remaining infrastructure on the site.	▪ Decommissioning activities may be perceived as an unwelcome visual intrusion. ▪ Dust emissions and dust plumes from increased traffic on the gravel roads serving the decommissioning site may evoke negative sentiments from surrounding viewers. ▪ Surface disturbance during decommissioning would expose bare soil (scarring) which could visually contrast with the surrounding environment. ▪ Temporary stockpiling of soil during decommissioning may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.										▪ Carefully plan to minimize the decommissioning period and avoid delays. ▪ Maintain a neat decommissioning site by removing rubble and waste materials regularly. ▪ Ensure that dust suppression procedures are maintained on all gravel access roads throughout the decommissioning phase. ▪ All cleared areas should be rehabilitated in accordance with the recommendations of the Terrestrial Ecology assessment. ▪									
Cumulative																				
▪ Potential alteration of the visual character and sense of place in the broader area. ▪ Potential visual impact on receptors in the study area. ▪ Potential visual impact on the night time visual environment.	▪ Additional renewable energy and associated grid connection infrastructure developments in the broader area will alter the natural character of the study area towards a more industrial landscape and expose a greater number of receptors to visual impacts. ▪ Visual intrusion of multiple renewable energy developments may be exacerbated, particularly in more natural undisturbed settings. ▪ Additional renewable energy facilities in the area would generate additional traffic on gravel roads thus resulting in increased impacts from dust emissions and dust plumes. ▪ The night time visual environment could be altered as a result of operational and security lighting at multiple renewable energy facilities in the broader area.	3	3	2	3	3	2	28	-	Medium	▪ Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. ▪ Vegetation clearing should take place in a phased manner. ▪ As far as possible, limit the number of maintenance vehicles using access roads. ▪ As far as possible, limit the amount of security and operational lighting at the proposed substations. ▪ Light fittings for security at night should reflect the light toward the ground and prevent light spill. ▪ Lighting fixtures should make use of minimum lumen or wattage.	3	3	2	2	2	2	24	-	Medium

											▪ Mounting heights of lighting fixtures should be limited, or alternatively, foot-light or bollard level lights should be used. ▪ If possible, make use of motion detectors on security lighting. ▪ Buildings on the substation site should be painted with natural tones that fit with the surrounding environment. ▪ Non-reflective surfaces should be utilised where possible. ▪ Ensure that appropriate dust suppression techniques are implemented on all gravel access roads.									

Table 8: Impact Rating for 'No-Go' Alternative

NO-GO ALTERNATIVE																				
ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
▪ Potential alteration of the visual character and sense of place in the broader area. ▪ Potential visual impact on receptors in the study area. ▪ Potential visual impact on the night time visual environment.	▪ If the 132kV power line and associated substations are not developed in this area, there will be no change in the visual character or the sense of place. There will be no visual impacts on receptors or on the night-time visual environment.	NIL	NIL	NIL	NIL	NIL	NIL	NIL	-	NIL	▪ N / A	NIL	NIL	NIL	NIL	NIL	NIL	NIL	-	Low

9 COMPARATIVE ASSESSMENT OF ALTERNATIVES

As previously mentioned, only one (1) route is technically feasible for the section of the proposed power line connecting the Kudusberg on-site substation (authorised under 14/12/16/3/3/1/1976/AM1) to the Oya on-site substation (i.e. Kudusberg to Oya). Accordingly, no comparative assessment is required in respect of this route alignment.

Five (5) power line corridor route alternatives however are being assessed for the section of the proposed overhead power line which connects the Oya on-site substation to the Kappa substation (i.e. Oya to Kappa). These alternatives, as described in Section **3.2.1** and depicted in **Figure 2**, have been comparatively assessed to determine which of the alternatives would be preferred from a visual perspective.

Preference ratings for each alternative are provided in **Table 9** below. The alternatives are rated as “preferred”; “favourable”, “least-preferred” or “no-preference”. The degree of visual impact and the preference rating has been determined based on the following factors:

- The location of each proposed power line corridor route alignment alternative in relation to areas of high elevation, especially ridges, koppies or hills;
- The location of each proposed power line corridor route alternative in relation to sensitive visual receptor locations; and
- The location of each proposed power line corridor route alternative in relation to areas of natural vegetation (clearing site for the development worsens the visibility).

Key

PREFERRED	The alternative will result in a low impact / reduce the impact
FAVOURABLE	The impact will be relatively insignificant
LEAST PREFERRED	The alternative will result in a high impact / increase the impact
NO PREFERENCE	The alternative will result in equal impacts

Table 9: Comparative Assessment of Power Line Corridor Route Alternatives

Alternative	Preference	Reasons (incl. potential issues)
POWER LINE CORRIDOR ROUTE ALTERNATIVES		
Power Line Corridor Alternative 1 (Oya to Kappa) - 34.14km	Favourable	▪ Although a section of Alternative 1 is traverses ridges near the proposed Oya Substation, the visibility analysis does not indicate that these ridges are highly visible from the surrounding landscape. The remainder of this alternative is the located on relatively flat terrain and as such the power lines would only be moderately exposed on the skyline. ▪ The closest sensitive receptor to this alternative is 1.8kms away, this being SR2.

Alternative	Preference	Reasons (incl. potential issues)
		The visual impacts from Alternative 1 affecting this receptor are therefore rated as moderate. As SR2 is located on the Oya Energy Facility application site, it is assumed that the owner has a vested interest in the proposed development and thus the associated power lines would not be perceived in a negative light. ▪ Fourteen (14) potentially sensitive receptors are located within 5kms of Alternative 1, although the proposed power lines are only expected to be visible from twelve (12) of these locations. The closest potentially sensitive receptor to this alternative is approximately 672m away, this being VR16. The visual impacts from Alternative 1 affecting this receptor are therefore rated as moderate. As VR16 is located on a property which is affected by all of the proposed power line route alignments, it is assumed that the land owner has consented to the proposed development on their property and does not perceive the proposed power line in a negative light. The remaining receptors are all more than 1.5kms away and, would only be subjected to moderate or low levels of impact. ▪ Much of the southern section of this alternative is in close proximity to Kappa Substation and the associated high voltage power lines, as well as the Perdekraal East WEF. As such this section of the route alignment is already largely transformed from its natural state. This would lessen the impacts of the new power line in this area. ▪ In light of the above, there are no fatal flaws associated with Alternative 1 and this alternative is considered favourable from a visual perspective.
Power Line Corridor Alternative 2 (Oya to Kappa) - 32.43km	Favourable	▪ Although a section of Alternative 2 is traverses ridges near the proposed Oya Substation, the visibility analysis does not indicate that these ridges are highly visible from the surrounding landscape. The remainder of this alternative is the located on relatively flat terrain and as such the power lines would only be moderately exposed on the skyline. ▪ The closest sensitive receptor to this alternative is 1.8kms away, this being SR2. The visual impacts from Alternative 2 affecting this receptor are therefore rated as moderate. As SR2 is located on the Oya Energy Facility application site, it is assumed that the owner has a vested interest in the proposed development and thus the associated power lines would not be perceived in a negative light.

Alternative	Preference	Reasons (incl. potential issues)
		▪ Fourteen (14) potentially sensitive receptors are located within 5kms of Alternative 2, although the proposed power lines are only expected to be visible from twelve (12) of these locations. The closest potentially sensitive receptor to this alternative is approximately 700m away, this being VR16. The visual impacts from Alternative 2 affecting this receptor are therefore rated as moderate. As VR16 is located on a property which is affected by all of the proposed power line route alignments, it is assumed that the land owner has consented to the proposed development on their property and does not perceive the proposed power line in a negative light. The remaining receptors are all more than 1.5kms away and, would only be subjected to moderate or low levels of impact. ▪ Much of the southern section of this alternative is follows the alignment of the existing 765kW power lines and traverses an area which has already undergone significant transformation as a result of the power lines, Kappa Substation and the Perdekraal East WEF. This would lessen the impacts of the new power line in this area. ▪ In light of the above, there are no fatal flaws associated with Alternative 2 and this alternative is considered favourable from a visual perspective.
Power Line Corridor Alternative 3 (Oya to Kappa) - 30.56km	Preferred	▪ Alternative 3 largely avoids the ridge lines near the proposed Oya substation and as such, most of this route alternative is located on relatively flat terrain. As such, the power lines would only be moderately exposed on the skyline. ▪ The closest sensitive receptor to this alternative is 1.8kms away, this being SR2. The visual impacts from Alternative 3 affecting this receptor are therefore rated as moderate. As SR2 is located on the Oya Energy Facility application site, it is assumed that the owner has a vested interest in the proposed development and thus the associated power lines would not be perceived in a negative light. ▪ Eleven (11) potentially sensitive receptors are located within 5kms of Alternative 3, although the proposed power lines are only expected to be visible from nine (9) of these locations. The closest potentially sensitive receptor to this alternative is approximately 700m away, this being VR16. The visual impacts from Alternative 3 affecting this receptor are therefore rated as moderate. As VR16 is located on a property which is affected by all of

Alternative	Preference	Reasons (incl. potential issues)
		the proposed power line route alignments, it is assumed that the land owner has consented to the proposed development on their property and does not perceive the proposed power line in a negative light. The remaining receptors are all more than 780m away and, would only be subjected to moderate or low levels of impact. ▪ Much of this alternative is follows the alignment of the existing 765kW power lines and traverses an area which has already undergone significant transformation as a result of the power lines, Kappa Substation and the Perdekraal East WEF. This would lessen the impacts of the new power line in this area. ▪ In light of the above, there are no fatal flaws associated with Alternative 3. As this route is shorter than the others, and follows the alignment of the existing 765kV power lines over a significant distance and affects fewer potentially sensitive receptors, this alternative is considered preferred from a visual perspective.
Power Line Corridor Alternative 4 (Oya to Kappa) - 32.94km	Favourable	▪ Alternative 4 largely avoids the ridge lines near the proposed Oya substation and as such, most of this route alternative is located on relatively flat terrain. As such, the power lines would only be moderately exposed on the skyline. ▪ The closest sensitive receptor to this alternative is 1.8kms away, this being SR2. The visual impacts from Alternative 4 affecting this receptor are therefore rated as moderate. As SR2 is located on the Oya Energy Facility application site, it is assumed that the owner has a vested interest in the proposed development and thus the associated power lines would not be perceived in a negative light. ▪ Eleven (11) potentially sensitive receptors are located within 5kms of Alternative 4, although the proposed power lines are only expected to be visible from nine (9) of these locations. The closest potentially sensitive receptor to this alternative is approximately 672m away, this being VR16. The visual impacts from Alternative 3 affecting this receptor are therefore rated as moderate. As VR16 is located on a property which is affected by all of the proposed power line route alignments, it is assumed that the land owner has consented to the proposed development on their property and does not perceive the proposed power line in a negative light.The remaining receptors are all more than 780m away and, would only be subjected to moderate or low levels of impact.

Alternative	Preference	Reasons (incl. potential issues)
		▪ Much of this alternative is follows the alignment of the existing 765kW power lines and traverses an area which has already undergone significant transformation as a result of the power lines, Kappa Substation and the Perdekraal East WEF. This would lessen the impacts of the new power line in this area. ▪ In light of the above, there are no fatal flaws associated with Alternative 4 and this alternative is considered favourable from a visual perspective.
Power Line Corridor Alternative 5 (Oya to Kappa) – 32.26km	Favourable	▪ Although a section of Alternative 5 is traverses ridges near the proposed Oya Substation, the visibility analysis does not indicate that these ridges are highly visible from the surrounding landscape. The remainder of this alternative is the located on relatively flat terrain and as such the power lines would only be moderately exposed on the skyline. ▪ The closest sensitive receptor to this alternative is 1.8kms away, this being SR2. The visual impacts from Alternative 5 affecting this receptor are therefore rated as moderate. As SR2 is located on the Oya Energy Facility application site, it is assumed that the owner has a vested interest in the proposed development and thus the associated power lines would not be perceived in a negative light. ▪ Fourteen (4) potentially sensitive receptors are located within 5kms of Alternative 5, although the proposed power lines are only expected to be visible from twelve (12) of these locations. The closest potentially sensitive receptor to this alternative is approximately 700m away, this being VR16. The visual impacts from Alternative 5 affecting this receptor are therefore rated as moderate. As VR16 is located on a property which is affected by all of the proposed power line route alignments, it is assumed that the land owner has consented to the proposed development on their property and does not perceive the proposed power line in a negative light. The remaining receptors are all more than 1.5km away and, would only be subjected to moderate or low levels of impact. ▪ Much of the southern section of this alternative is follows the alignment of the existing 765kW power lines and traverses an area which has already undergone significant transformation as a result of the power lines, Kappa Substation and the Perdekraal East WEF. This would lessen the impacts of the new power line in this area.

Alternative	Preference	Reasons (incl. potential issues)
		▪ In light of the above, there are no fatal flaws associated with Alternative 5 and this alternative is considered favourable from a visual perspective.

9.1 No Go Alternative

The ‘No Go’ alternative is essentially the option of not developing power lines or substations in this area. The area would thus retain its visual character and sense of place and no visual impacts would be experienced by any locally occurring receptors.

10 CONCLUSION

A VIA has been conducted to assess the magnitude and significance of the potential visual impacts associated with the construction of a proposed 132 kV power line and associated substations to support the proposed renewable energy facilities owned by the applicant near Matjiesfontein in the Western Cape Province. Overall, sparse human habitation and the predominance of natural vegetation cover across much of the study area would give the viewer the general impression of a largely natural setting with some pastoral elements. As such, the proposed power line and substation development would alter the visual character and contrast significantly with the typical land use and/or pattern and form of human elements present across the broader study area. The level of contrast is however reduced by the presence of the Perdekraal East WEF, Kappa substation and existing high voltage power lines located in the south-western sector of the study area.

The area is not however typically valued for its tourism significance and there is limited human habitation resulting in relatively few potentially sensitive receptors in the area. A total of twenty-three (23) potentially sensitive receptors were identified in the study area, two (2) of which are considered to be sensitive receptors as they are linked to leisure/nature-based tourism activities in the area.

One of the sensitive receptors (Remainder of the Farm Baakens Rivier No 155) is expected to experience high levels of visual impact from the proposed power line development. As this receptor is located on the proposed Kudusberg WEF development site, it is believed that the owner has a vested interest in the proposed WEF development and would therefore not perceive the associated power lines and substations in a negative light. The remaining sensitive receptor, which is located on the Remainder of the Farm Gats Rivier No 156, is only expected to experience moderate impacts from the proposed development. This property is however under the same ownership as Baakens Rivier, and is part of the adjacent Oya Energy Facility project, and as such, it is unlikely that the owners will perceive the proposed development in a negative light.

Fifteen (15) potentially sensitive receptors, will be subjected to moderate levels of visual impact as a result of the proposed power line and substation development, while one (1) receptor will be subjected to low levels of visual impact. It was noted however, that thirteen of these receptors are located on farms which either form part of the power line development project or are located within the development sites for other renewable energy projects and as such the owners / occupants are not expected to perceive the proposed power line and substations in a negative light.

The remaining five (5) receptors are outside the viewshed of the proposed development and are therefore not expected to be subjected to any visual impacts as a result of the power line and substation development.

An overall impact rating was also conducted in order to allow the visual impact to be assessed alongside other environmental parameters. The assessment revealed that impacts associated with the proposed 132kV power line and associated substations will be of low significance during construction, operation and decommissioning phases with a number of mitigation measures available.

Although other renewable energy developments and infrastructure projects, either proposed or in operation, were identified within a 35km radius of the proposed development, it was determined that only five (5) of these would have any significant impact on the landscape within the visual assessment zone. These facilities are Kudusberg WEF (14/12/16/3/3/1/1976/AM1) and Oya Energy Facility (14/12/16/3/3/2/2009) in the north-eastern sector of the study area and Perdekraal East WEF, Perdekraal West WEF and Tooverberg WEF in the south-west. These facilities and the associated grid connection infrastructure will alter the inherent sense of place and introduce an increasingly industrial character into a largely natural, pastoral landscape, thus giving rise to significant cumulative impacts. It is however anticipated that these impacts could be mitigated to acceptable levels with the implementation of the recommendations and mitigation measures stipulated for each of these developments by the visual specialists. In light of this and the relatively low level of human habitation in the study area however, cumulative impacts have been rated as medium.

It is important to note that the study area is located within the REDZ 2, known as Komsberg REDZ, and also within a Strategic Transmission Corridor, and thus the relevant authorities support the concentration of renewable energy developments and associated grid connection infrastructure in this area. In addition, it is possible that the renewable energy facilities located in close proximity to each other could be seen as one large facility rather than separate developments. Although this will not necessarily reduce impacts on the visual character of the area, it could potentially reduce the cumulative impacts on the landscape.

No fatal flaws were identified for any of the proposed power line corridor alternatives (i.e. Oya to Kappa). Power Line Corridor Alternative 3 was identified as the Preferred Alternative, while Power Line Corridor Options 1, 2, 4 and 5 were found to be favourable.

10.1 Visual Impact Statement

It is SiVEST's opinion that the visual impacts associated with the proposed Oya 132kV power line and associated substations are of moderate significance. Given the low level of human habitation and the relative absence of sensitive receptors, the project is deemed acceptable from a visual impact perspective and the EA should be granted for the BA application. SiVEST is of the opinion that the visual impacts associated with the construction, operation and decommissioning phases can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.

11 REFERENCES

- Barthwal, R. 2002. Environmental Impact Assessment. New Age International Publishes, New Delhi.
- Breedlove, G., 2002. A systematic for the South African Cultural Landscapes with a view to implementation. Thesis – University of Pretoria.
- Ecotricity Website: http://www.ecotricity.co.uk.
- Moseley, S., and Naude-Moseley, B., 2008. Getaway Guide to the Karoo, Namaqualand and Kalahari, Sunbird.
- Mucina L., and Rutherford M.C., (eds) 2006. The Vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria.
- Oberholzer, B. 2005. Guideline for involving visual & aesthetic specialists in EIA processes: *Edition 1.* CSIR Report No ENV-S-C 2005 053 F. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town.
- SiVEST, 2019. VIA for the Proposed Kudusberg WEF.
- SiVEST, 2019. VIA for the Proposed Tooverberg WEF.
- SiVEST, 2019. VIA for the Proposed 132kV Power Line and Associated Substation to serve the Tooverberg WEF.
- SiVEST, 2020. VIA for the Proposed Oya Solar Photovoltaic (PV) Facility.
- Treasure Karoo Action Group website: http://treasurethekaroo.co.za/
- Vissering, J., Sinclair, M., Margolis, A. 2011. State Clean Energy Program Guide: A Visual Impact Assessment Process for Wind Energy Projects. Clean Energy State Alliance.
- UNESCO. 2005. Operational Guidelines for the Implementation of the World Heritage Convention. UNESCO World Heritage Centre. Paris.

SiVEST Environmental Division
12 Autumn, Rivonia. 2128. South Africa
PO Box 2921, Rivonia. 2128. South Africa

Tel + 27 11 798 0600
Fax +27 11 803 7272
Email info@sivest.co.za
www.sivest.co.za

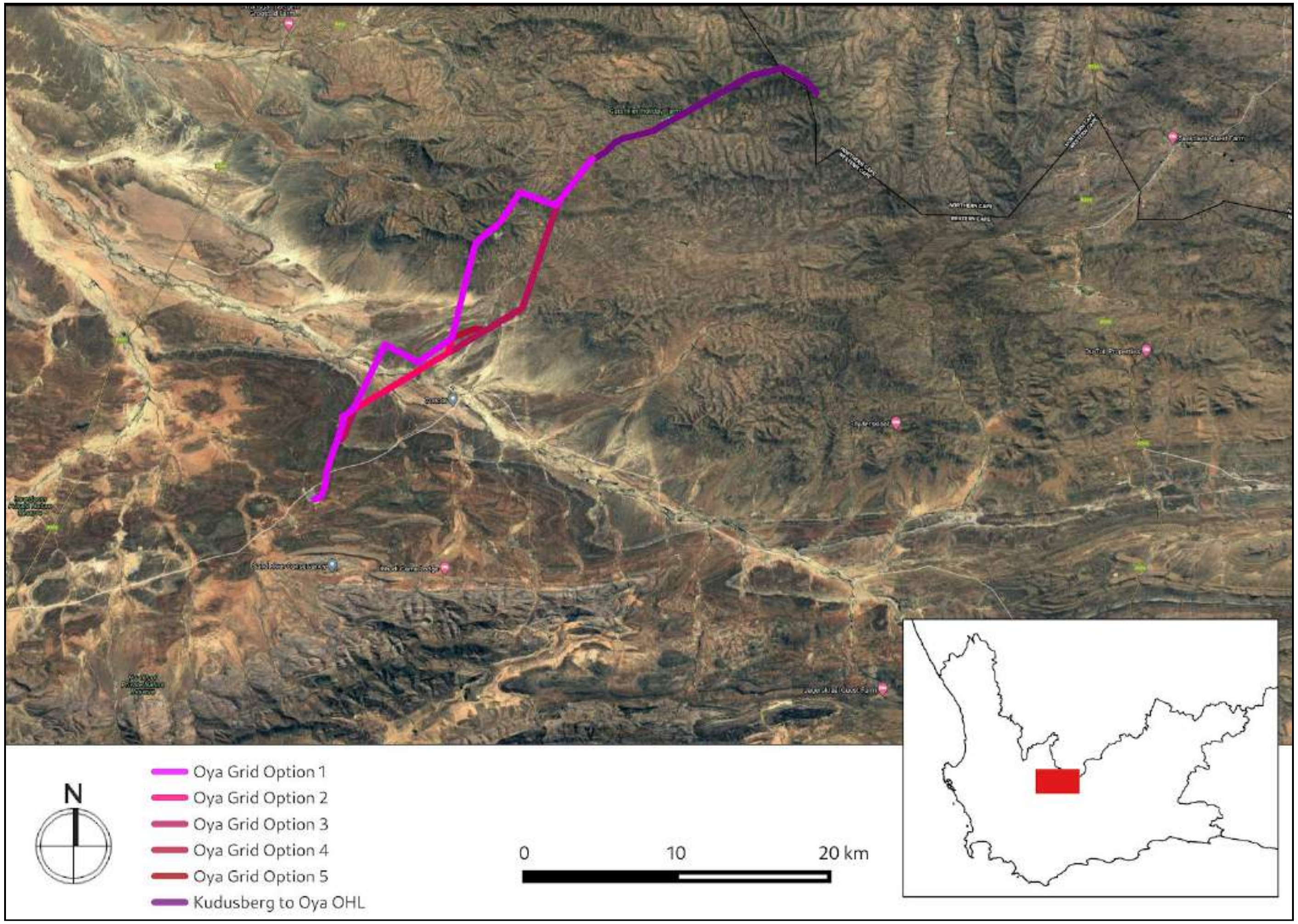
Contact Person:Kerry Schwartz
Tel No.: +27 11 798 0632
Email: kerrys@sivest.co.za

CTS HERITAGE

APPENDIX 4: Heritage Screening Assessment

CTS HERITAGE

HERITAGE SCREENER

CTS Reference Number:	**CTS20_182**	 **Figure 1a**. Satellite map indicating the location of the proposed development in the Western Cape
HWC Reference:	**20103006**	
SAHRIS Case No.	**15709**	
Client:	**SiVEST**	
Date:	**October 2020**	
Title:	**Proposed development of an overhead powerline for the approved Oya PV Facility, Western and Northern Cape**	
CTS Heritage Recommendation	**RECOMMENDATION** **Based on the available information, it is likely that the proposed development will negatively impact on significant archaeological and palaeontological heritage resources. As such, it is recommended that an HIA is required that assesses these impacts and proposes mitigation measures.**	

1. Proposed Development Summary

Oya Energy (Pty) Ltd (hereafter referred to as "Oya Energy") is proposing to construct a 132kV overhead power line near Matjiesfontein in the Western and Northern Cape Provinces (hereafter referred to as the "proposed development"). The overall objective of the proposed development is to feed the electricity generated by the proposed 750MW Oya Energy Facility (part of separate on-going EIA process with DEFF Ref No.: 14/12/16/3/3/2/2009) as well as potentially the nearby developments into the national grid. The grid connection and substation (this application) will requires a separate EA, in order to allow the EA to be handed over to Eskom. The proposed power line is located in the Witzenberg and Karoo Hoogland Local Municipalities respectively, which fall within the Cape Winelands and Namakwa District Municipalities.

The entire extent of the proposed overhead power line is located within one (1) of the Strategic Transmission Corridors as defined and in terms of the procedures laid out in GN No. 1131, namely the Central Corridor. The proposed overhead power line project will therefore be subject to a BA process in terms of the NEMA (as amended) and Appendix 1 of the EIA Regulations, 2014 promulgated in Government Gazette 40772 and GN R326, R327, R325 and R324 on 7 April 2017. The competent authority for this BA is the DEFF.

At this stage, it is anticipated that the proposed development will include a 132kV power line and a 33/132kV substation to feed electricity generated by the renewable energy facilities owned by the applicant into the national gird at the Kappa substation.

The type of power line towers being considered at this stage include both lattice and monopole towers and it is assumed that these towers will be located approximately 200m to 250m apart. The towers will be up to 45m in height, depending on the terrain, but will ensure minimum overhead line clearances from buildings and surrounding infrastructure. The exact location of the towers will be determined during the final design stages of the power line design process and will be submitted along with the Final Basic Assessment report.

300m wide power line corridors (i.e. 150m on either side) are being assessed to allow flexibility when determining the final route alignment. The proposed power line however only requires a 31m wide servitude and as such, this servitude would be positioned within the assessed corridor.

The size of the proposed Oya and Kudusberg on-site Eskom substation and O&M building site will be approximately 200m x 200m [i.e. 2 hectare (ha)] each. It should be noted that only one (1) route is possible for the section of the proposed power line which connects the Kudusberg WEF on-site substation (authorised under 14/12/16/3/3/1/1976/AM1) to the Oya Energy Facility on-site substation. No alternatives can therefore be provided for this section of the power line. The Kudusberg to Oya power line corridor route is approximately 16.6km in length and runs from the Kudusberg on-site substation along the RE/194, 1/158, RE/159, RE/156, 1/156 and RE/155 properties to the Oya on-site substation. This power line corridor route is to be assessed with each alternative mentioned below (i.e. Alternative 1-5) as these cannot be developed without this power line corridor (i.e. cannot have alternatives mentioned below without this power line corridor).

Five (5) power line corridor route alternatives have however been provided for the section of the proposed overhead power line which connects the Oya Energy Facility on-site substation to the Kappa substation. The power line corridor route alternatives provide different route alignments contained within an assessment corridor of up to approximately 300m wide. This is to allow for flexibility to route the power line within the authorised corridor. The above-mentioned alternatives are described below:

- Power Line Corridor Alternative 1 (Oya to Kappa): Approximately 34.14km in length and runs along the RE/155, RE/152, 2/152, RE/169, RE/243, 241, 240 and RE/244 properties to the Kappa substation
- Power Line Corridor Alternative 2 (Oya to Kappa): Approximately 32.43km in length and runs along the RE/155, 3/155, RE/152, 2/152, RE/169, 13/168, 5/168, 1/243, RE/243, 241 and 240 properties to the Kappa substation
- Power Line Corridor Alternative 3 (Oya to Kappa): Approximately 30.56km in length and runs along the RE/155, 4/168, 13/168, 5/168, 1/243, 240 and RE/244 properties to the Kappa substation

- Power Line Corridor Alternative 4 (Oya to Kappa): Approximately 32.94km in length and runs along the RE/155, 4/168, 13/168, RE/169, RE/243, 241 and 240 properties to the Kappa substation
- Power Line Corridor Alternative 5 (Oya to Kappa): Approximately 32.26km in length and runs along the RE/155, RE/152, 2/152, RE/169, 5/168, 1/243 and 240 properties to the Kappa substation
- ‘No-go’ alternative: The ‘no-go’ alternative is the option of not fulfilling the proposed project as well as prevent the connection of the energy development in the area to feed electricity into the national grid. This alternative would result in no environmental impacts from the proposed project on the site or surrounding local area. It provides the baseline against which other alternatives are compared and will be considered throughout the report. Implementing the ‘no-go’ option would entail no development. The affected properties are currently not used for agricultural activities, although they are suitable for very low-level grazing.

The ‘no-go’ option is a feasible option, however, this would prevent the proposed development from contributing to the environmental, social and economic benefits associated with the development of the renewables sector.

2. Application References

Name of relevant heritage authority(s)	HWC and NBKB
Name of decision making authority(s)	DEFF

3. Property Information

Latitude / Longitude	Centre Point: -33.0218 S 20.1050 E
Erf number / Farm number	Portion 2 of the Farm Bakovens Kloof No 152 (2/152): C01900000000015200002 Remainder of the Farm Bakovens Kloof No 152 (RE/152): C01900000000015200000 Portion 3 of the Farm Baakens Rivier No 155 (3/155): C01900000000015500003 Remainder of the Farm Baakens Rivier No 155 (RE/155): C01900000000015500000 Portion 1 of the Farm Gats Rivier No 156 (1/156): C01900000000015600001 Remainder of the Farm Gats Rivier No 156 (RE/156): C01900000000015600000 Portion 1 of the Farm Amandelboom No 158 (1/158): C01900000000015800001 Remainder of the Farm Oliviers Berg No 159 (RE/159): C01900000000015900000 Portion 2 of the Farm Bantamsfontein No 168 (2/168): C01900000000016800002 Portion 4 of the Farm Bantamsfontein No 168 (4/168): C01900000000016800004 Portion 5 of the Farm Bantamsfontein No 168 (5/168): C01900000000016800005

	Portion 7 of the Farm Bantamsfontein No 168 (7/168): C01900000000016800007 Portion 13 of the Farm Bantamsfontein No 168 (13/168): C01900000000016800013 Remainder of the Farm Bantamsfontein No 168 (RE/168): C01900000000016800000 Remainder of the Farm Lower Roodewal No 169 (RE/169): C01900000000016900000 Remainder of the Farm Matjes Fontein No 194 (RE/194): C07200000000019400000 The Farm Platfontein No 240 (240): C01900000000024000000 The Farm Die Brak No 241 (241): C01900000000024100000 Portion 1 of the Farm Rietpoort No 243 (1/243): C01900000000024300001 Remainder of the Farm Rietpoort No 243 (RE/243): C01900000000024300000 Remainder of the Farm Toover berg No 244 (RE/244): C01900000000024400000
Local Municipality	Witzenberg Local Municipality and Karoo Hooglands Local Municipality
District Municipality	Cape Winelands District Municipality and Namakwa District Multiplicity
Province	Western Cape and Northern Cape
Current Zoning	Agriculture

4. Nature of the Proposed Development

Total Area	Maximum 35km x 300m assessment corridor and 16km x 300m assessment corridor
Depth of excavation (m)	up to 5m (will confirm ASAP)
Height of development (m)	45m (pylons will be 200-250m apart)

5. Category of Development

x	**Triggers: Section 38(8) of the National Heritage Resources Act**
	Triggers: Section 38(1) of the National Heritage Resources Act
x	1. Construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier over 300m in length.
	2. Construction of a bridge or similar structure exceeding 50m in length.
	3. Any development or activity that will change the character of a site-

	a) exceeding 5 000m^2 in extent
	b) involving three or more existing erven or subdivisions thereof
	c) involving three or more erven or divisions thereof which have been consolidated within the past five years
	4. Rezoning of a site exceeding 10 000m^2
	5. Other (state):

6. Additional Infrastructure Required for this Development

The substations will expand on either side of Kudusberg and Oya Energy Facility when approved

7. Mapping (please see Appendix 3 and 4 for a full description of our methodology and map legends)

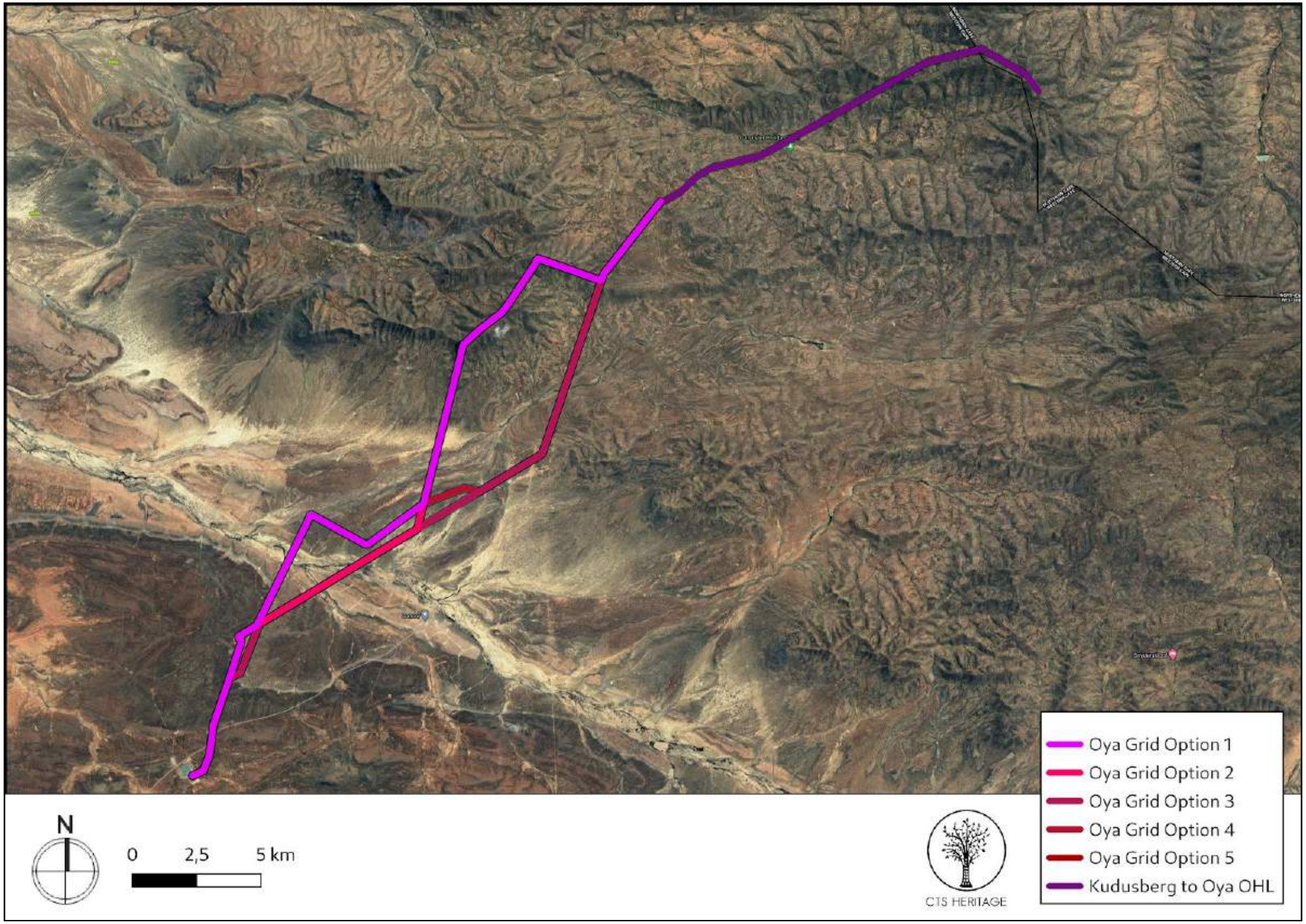


Figure 1b. Overview Map. Satellite image (2020) indicating the proposed development area

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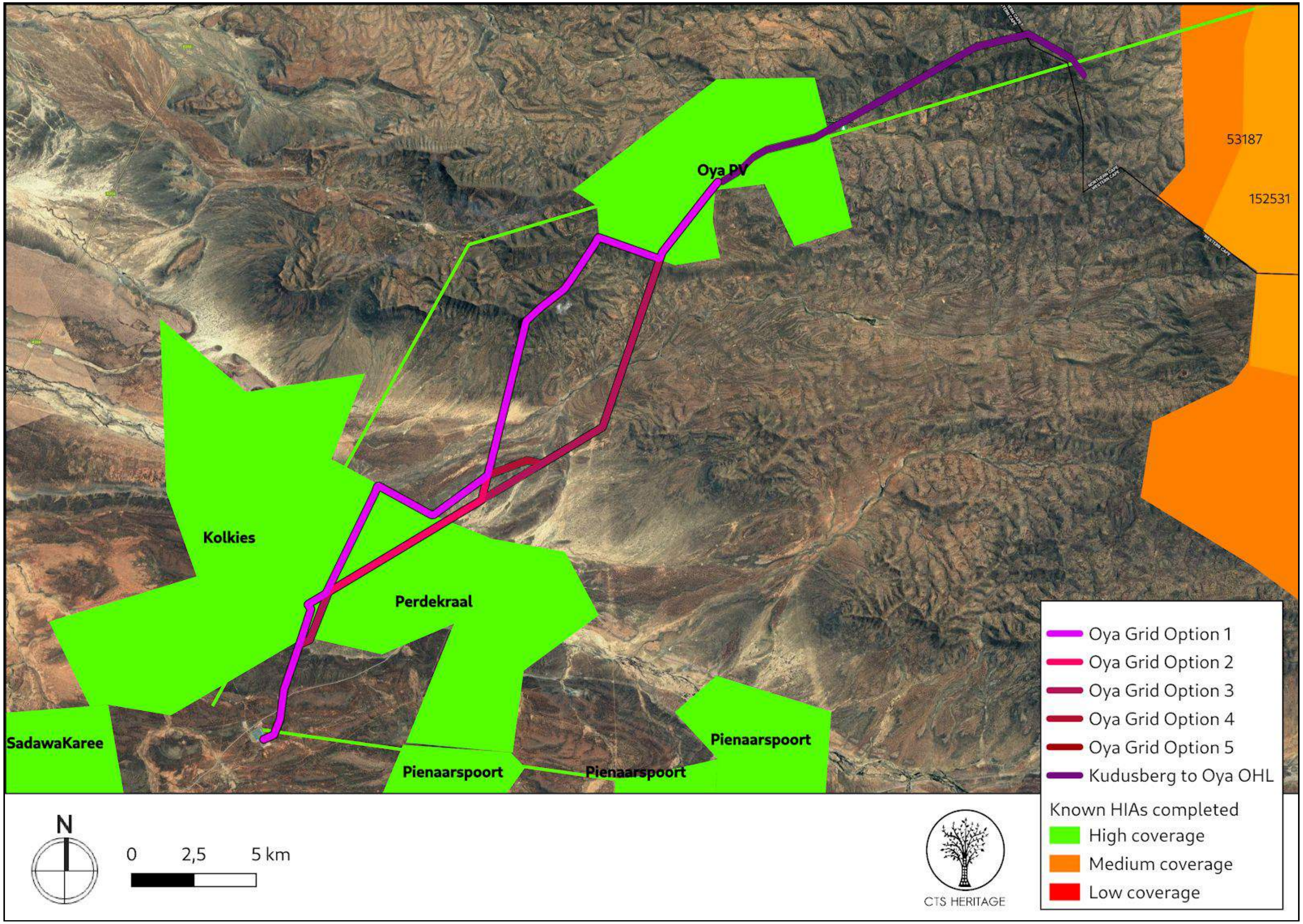

Figure 2. Previous HIAs Map. Previous Heritage Impact Assessments covering the proposed development area. Please see Appendix 2 for a full reference list.

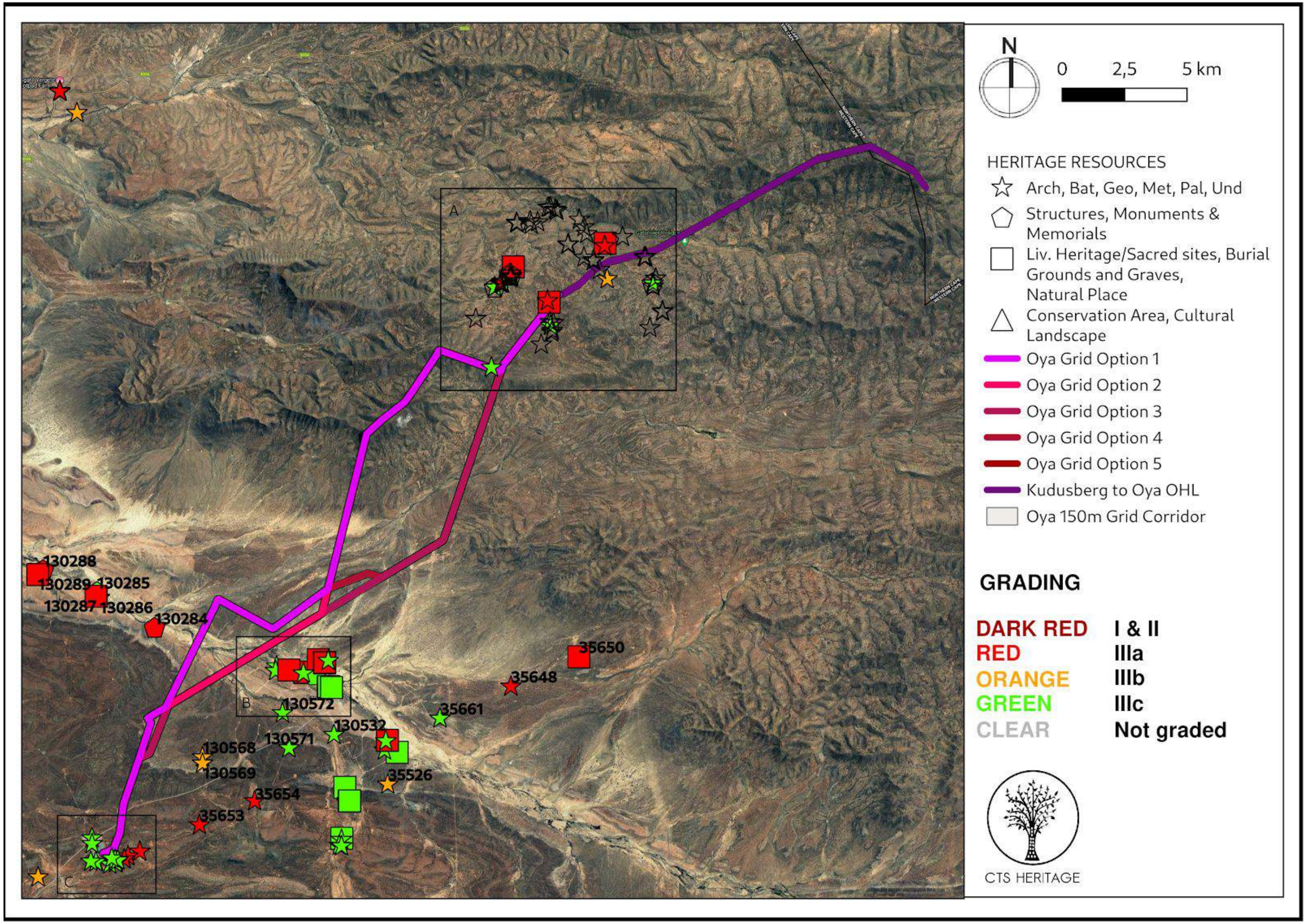

Figure 3. Heritage Resources Map. Heritage Resources previously identified within the study area, with SAHRIS Site IDs indicated in the insets below. Please See Appendix 4 for a full description of heritage resource types.

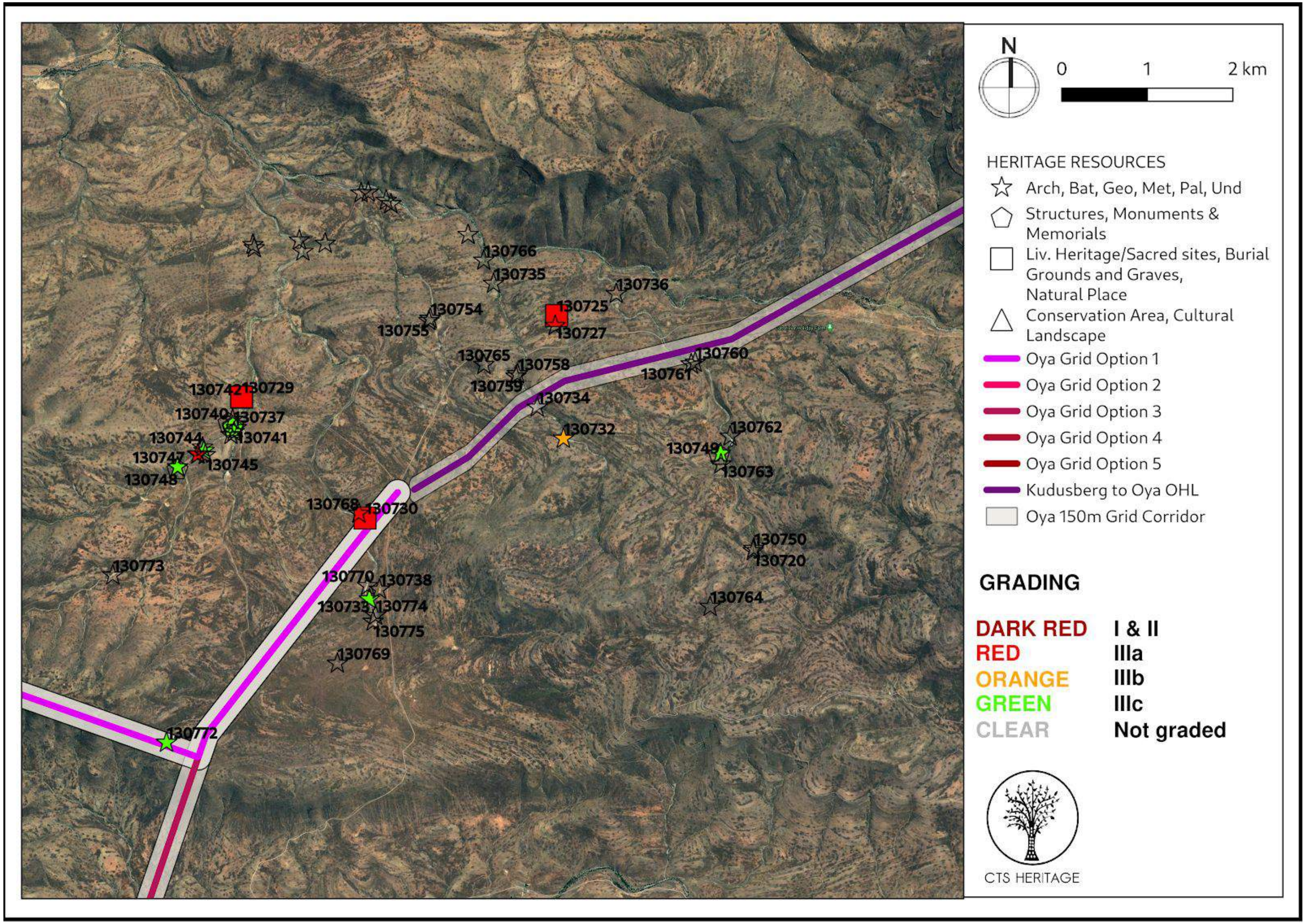

Figure 3a. Heritage Resources Map Inset A

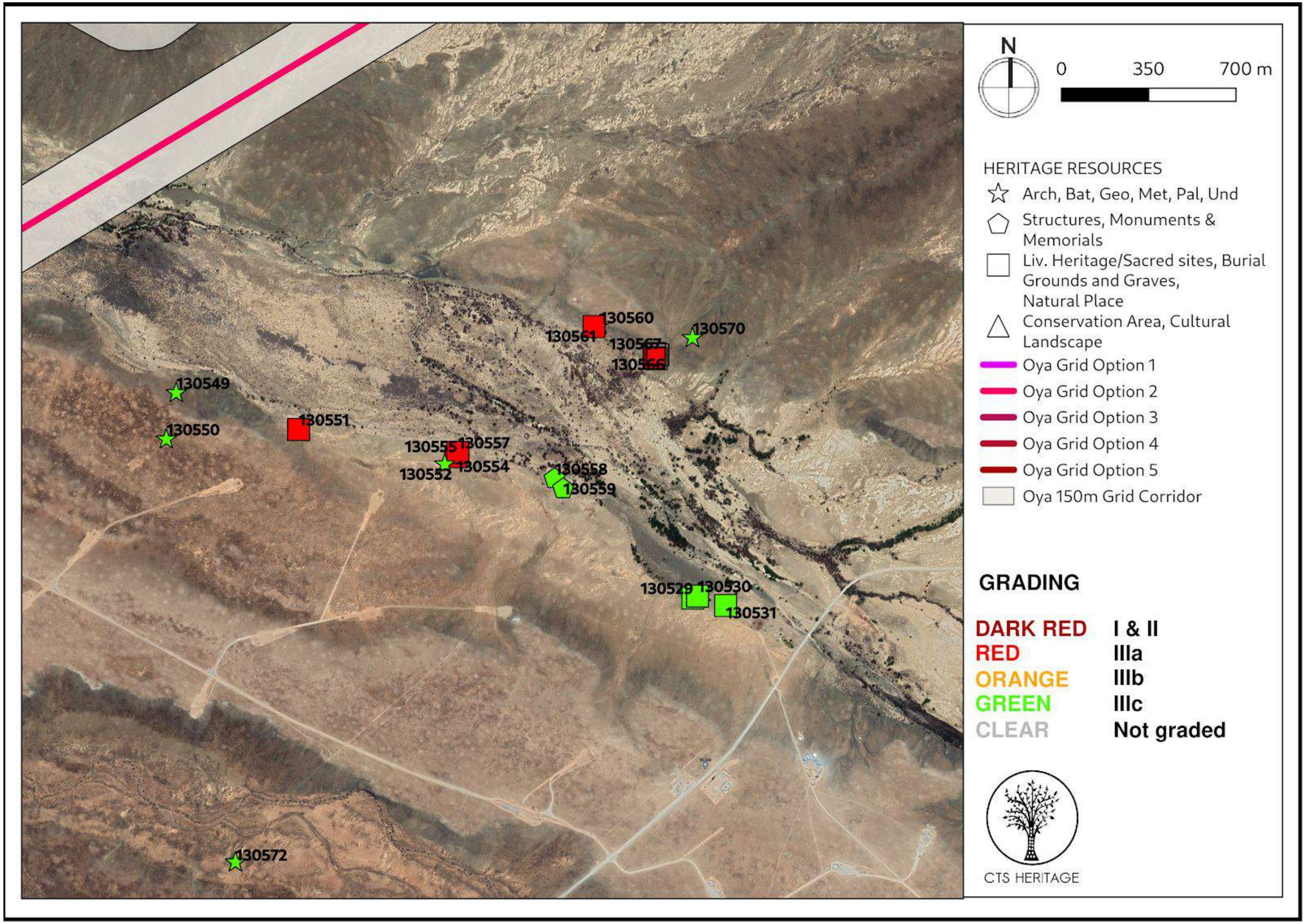

Figure 3b. Heritage Resources Map Inset B

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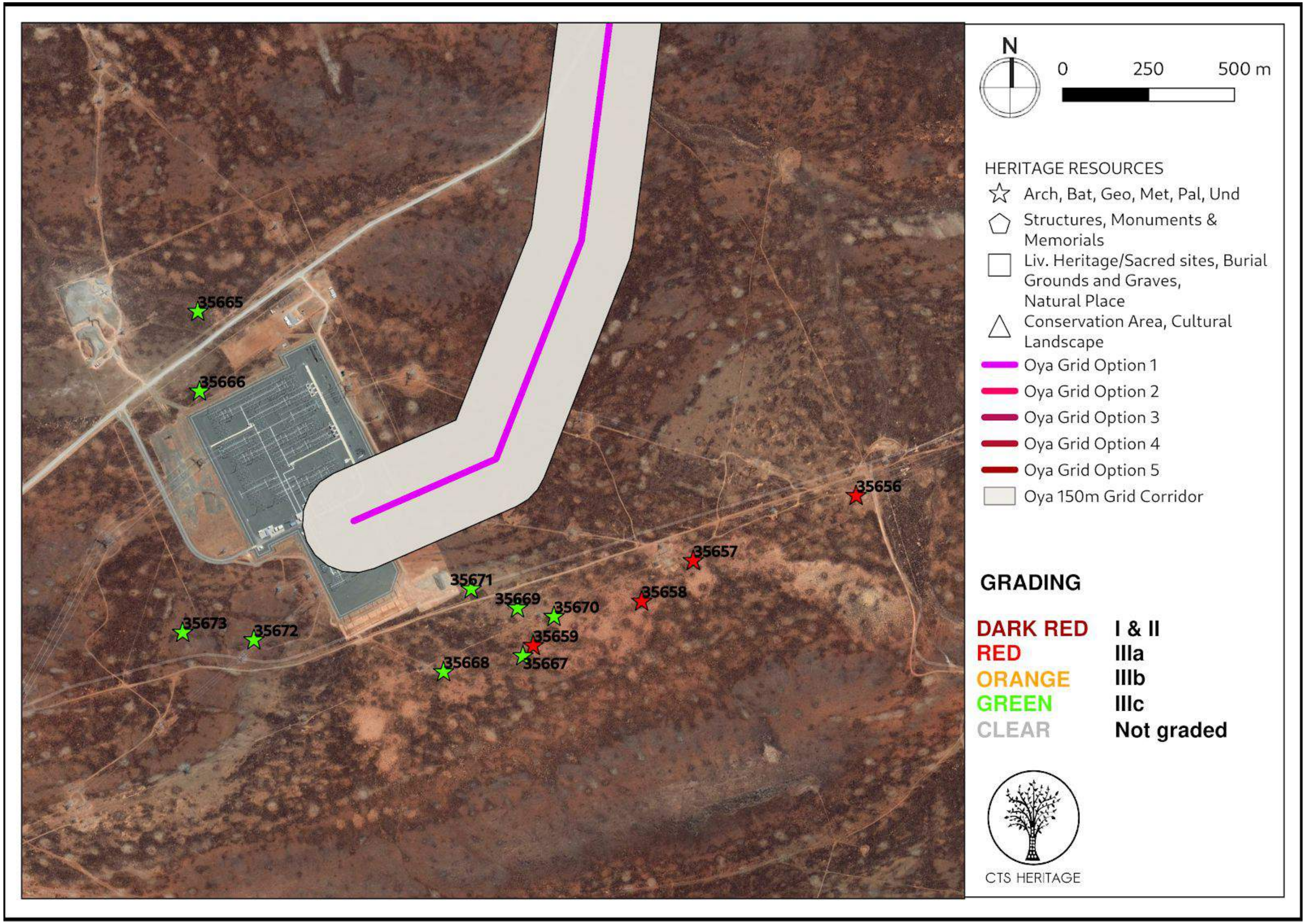

Figure 3c. Heritage Resources Map Inset C

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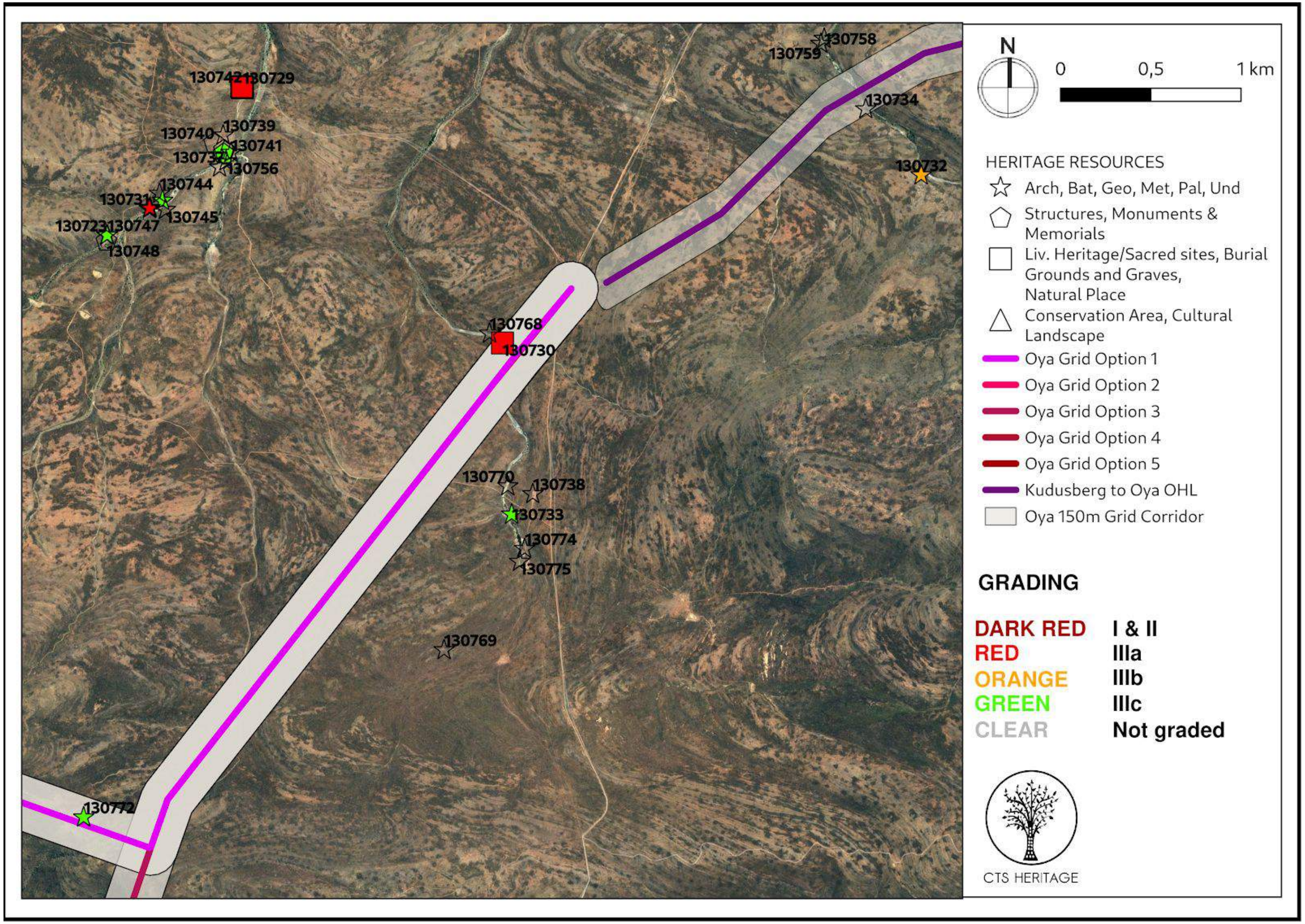

Figure 3d. Heritage Resources Map Map highlighting the known heritage resources of significance that fall within the proposed grid corridor - Sites 130772 (Grade IIIC) and 130730 (Grade IIIA)

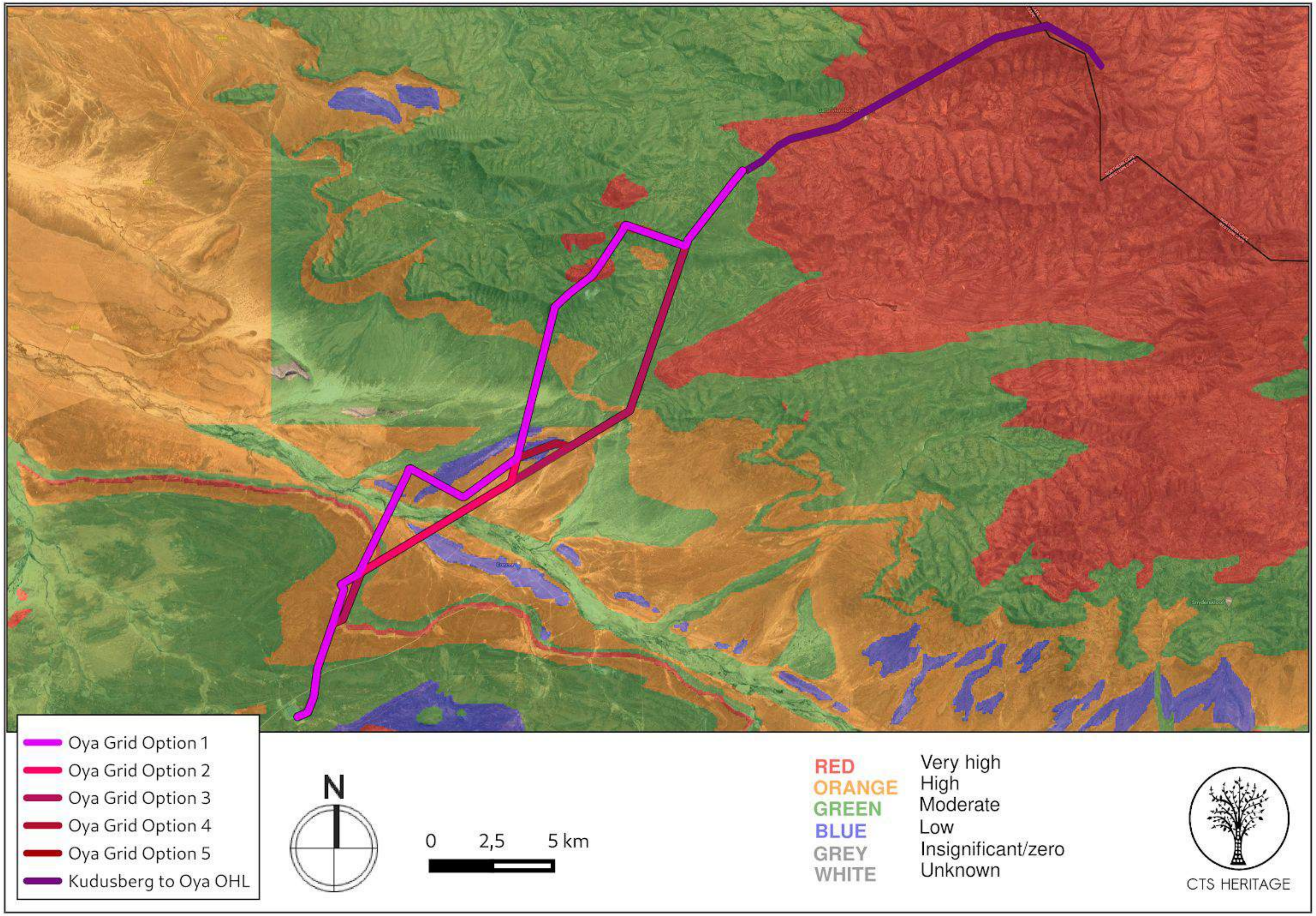

Figure 4a. Palaeosensitivity Map. Indicating fossil sensitivity underlying the study area. Please See Appendix 3 for a full guide to the legend.

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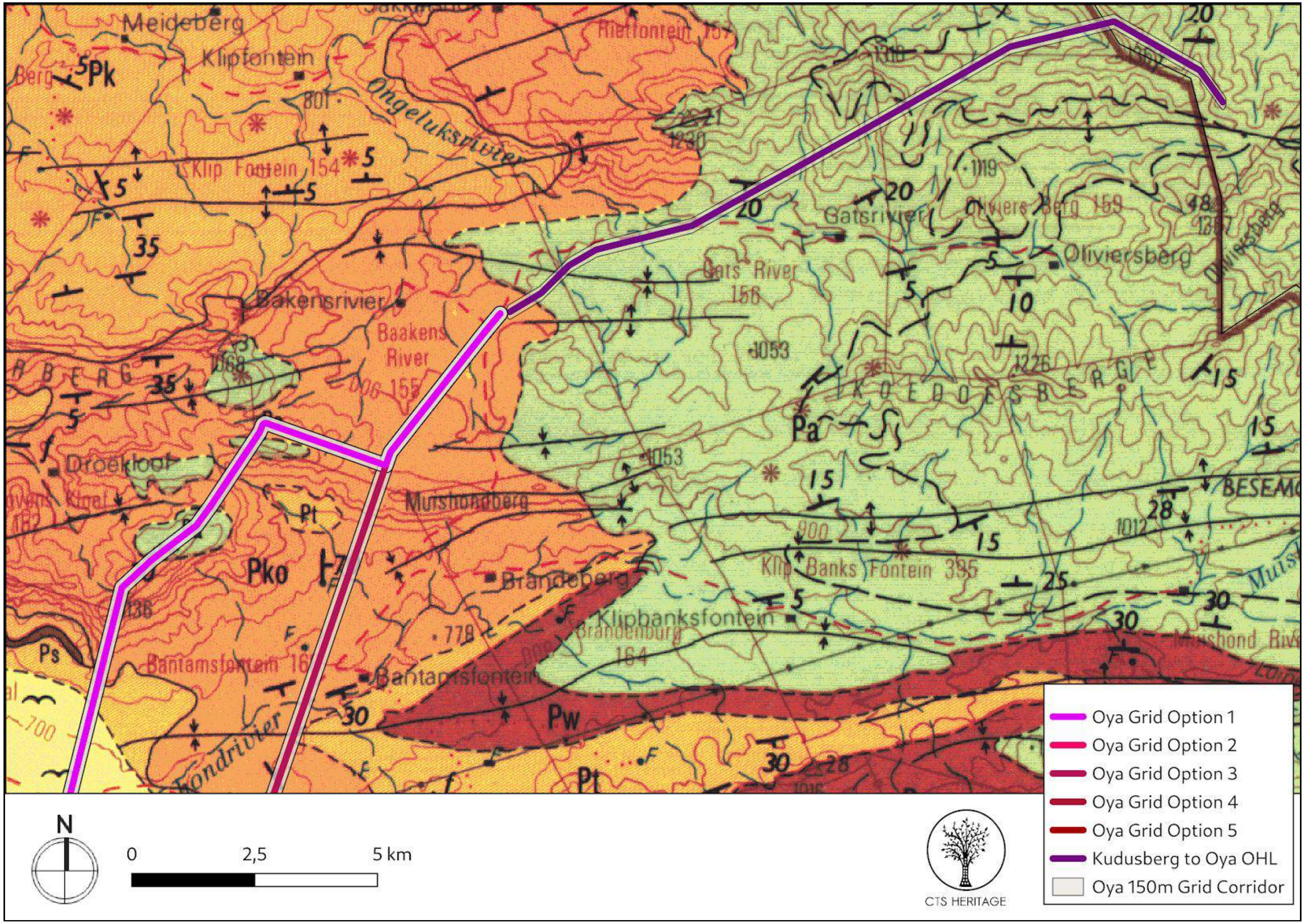

Figure 5a. Geology Map. Extract from the CGS 3220 Sutherland Map indicating that the northern portion of the development area is underlain by sediments of the Karoo Supergroup assigned to the Tierberg (Pt) and Koedoesberg (Pko) formations of the Ecca Group, as well as the Abrahamskraal Formation (Pa) of the Beaufort Group and Quaternary Sands

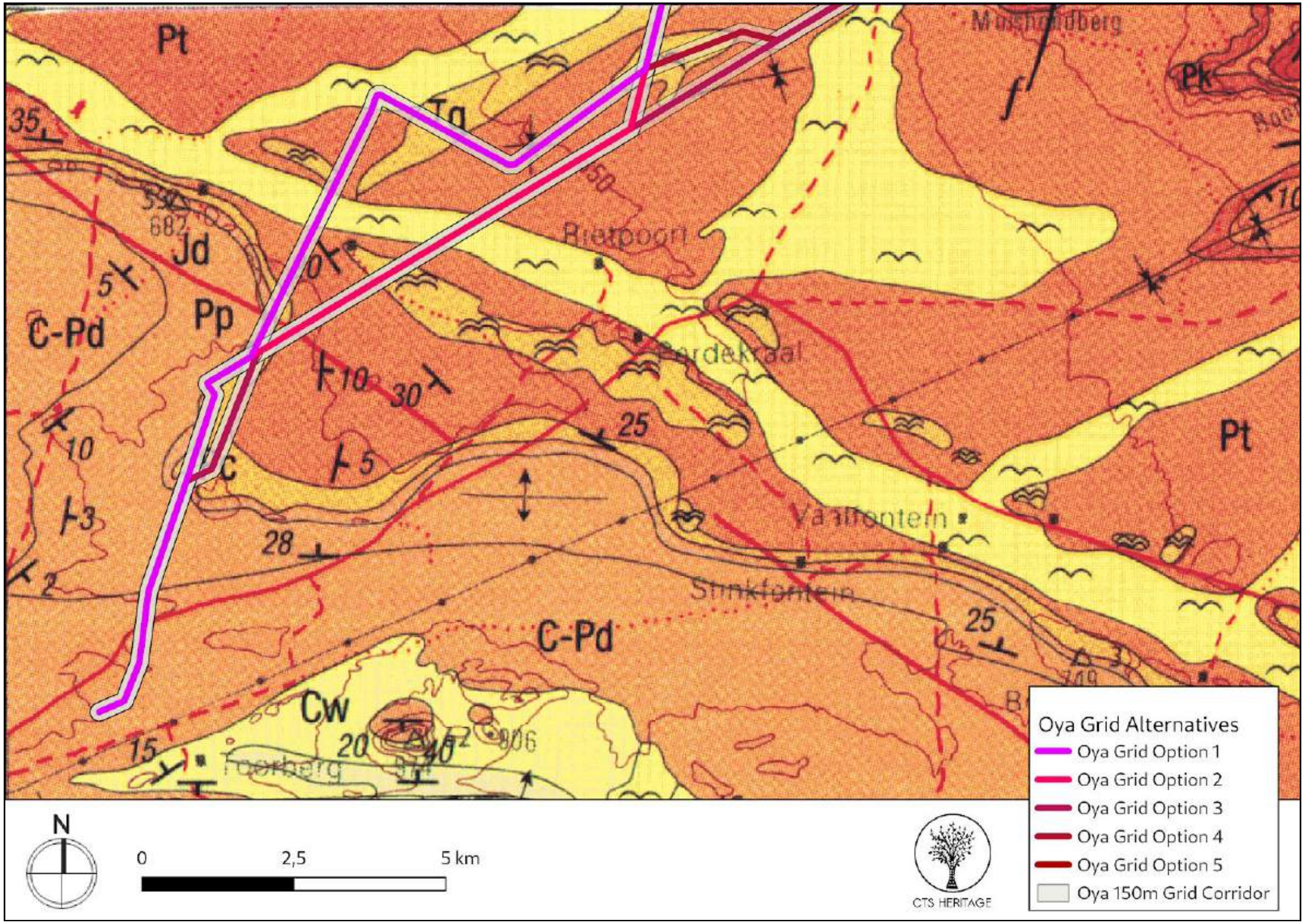

Figure 5b. Geology Map. Extract from the CGS 3320 Ladismith Map indicating that the development area is underlain by sediments of the Karoo Supergroup assigned to the Dwyka group (C-Pd), as well as the Prince Albert (Pp), Tierberg (Pt) and Collingwood (Pc) formations of the Ecca Group, as well as the Waaipoort (Cw) formation of the Witteberg Group and Quaternary Sands (Tg)

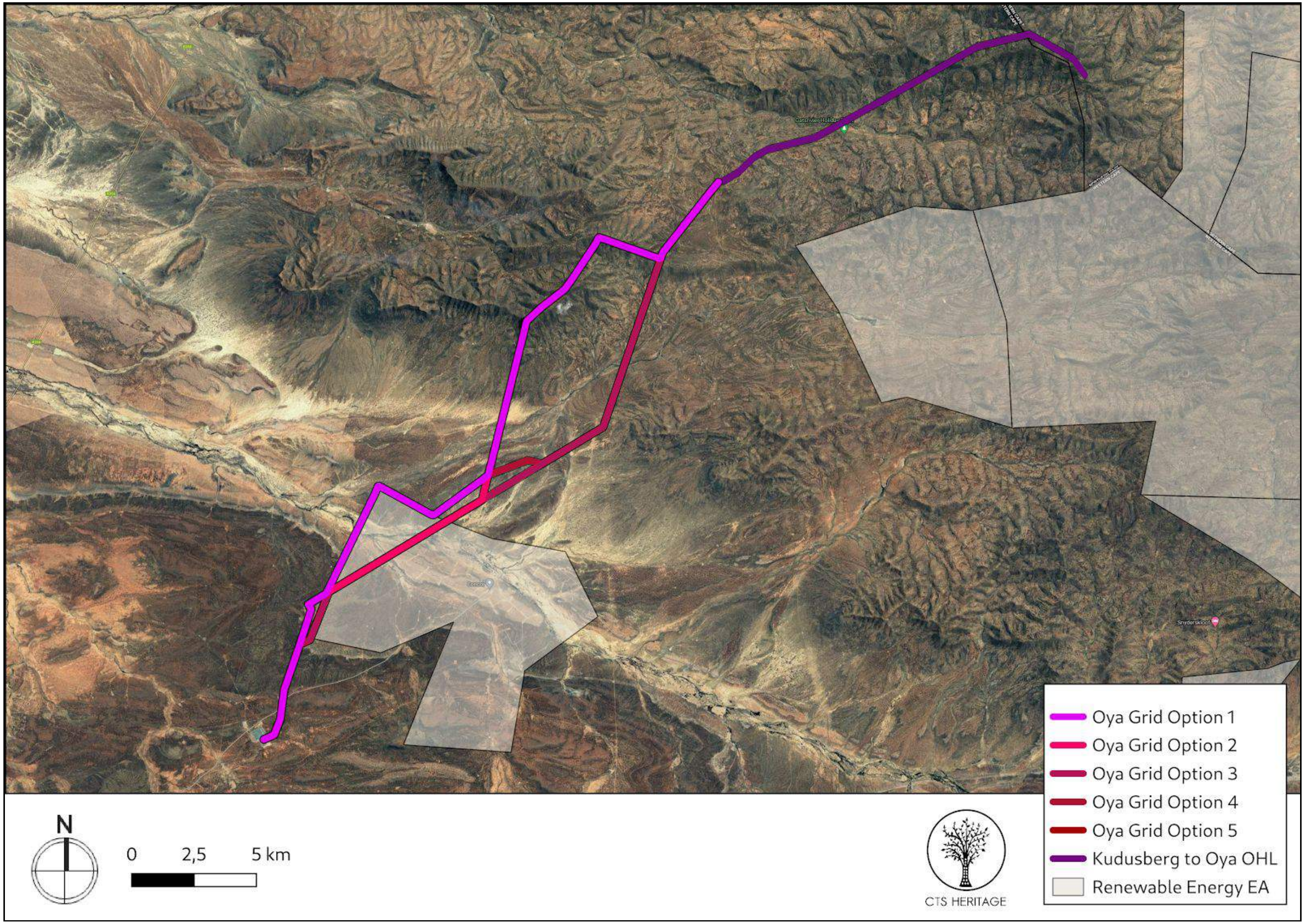

Figure 6. Cumulative Impact Map. Indicating other Renewable Energy Facilities that have been granted Environmental Authorisation (EA).

8. Heritage Assessment

Background

Oya Energy (Pty) Ltd (hereafter referred to as "Oya Energy") is proposing to construct a 132kV overhead power line near Matjiesfontein in the Western and Northern Cape Provinces (hereafter referred to as the "proposed development"). The overall objective of the proposed development is to feed the electricity generated by the proposed 750MW Oya Energy Facility (hereafter referred to as Oya)(part of separate on-going EIA process with DEFF Ref No.: 14/12/16/3/3/2/2009) as well as potentially the nearby developments into the national grid. The grid connection and substation (this application) will require a separate EA, in order to allow the EA to be handed over to Eskom.

Cultural Landscape

The proposed power line is located in the Witzenberg and Karoo Hoogland Local Municipalities respectively, which fall within the Cape Winelands and Namakwa District Municipalities. The area proposed for development is located within a REDZ area and is firmly located within the Tanqua and Ceres Karoo. This part of the Karoo is prized for its wide-open spaces and expansive vistas. Hart et al. (2016) note that the cultural landscape of this area is agricultural in nature, and consists of mostly stock farming with very occasional agriculture. The area is isolated with natural qualities and semi-desert landscapes. Many of the farm werfs in the broader area include historic structures. These are usually a modest size farm dwelling made from local rocks, and painted white with an outbuilding. Some of these structures are no longer in use, or are converted into farm sheds, housing animals, or any other use that supports farming activities.Other infrastructure typically found in the karoo is a round concrete dam, with a wind pump. The broader cultural landscape associated with the Baakens River Cultural Landscape has been previously thoroughly assessed by Bailey (2020) for the Oya HIA.

The interaction between the topography, geology, flora and historical remnants of human occupation of the area form a unique cultural landscape that may be negatively impacted by the proposed development. However, it must be noted that there are a number of approved Renewable Energy Facilities in the area, furthermore, the proposed OHL alignment falls within a Strategic Transmission Corridor which already contains existing powerline infrastructure (Figure 6). As noted in the Cultural Landscape Assessment for Oya (Bailey 2020), the negative impact of the development of such infrastructure on the Cultural Landscape is unavoidably high and are inevitable. The only mitigation option available is to develop this infrastructure in clusters, such as within the Komsberg REDZ (as with this project). As the cultural landscape for this area has already been assessed by Bailey (2020) as well as Jansen (2020), it is recommended that no additional Cultural Landscape assessment is necessary for this project.

Archaeology and the Built Environment

Heritage Impact Assessments have been completed within 20km of the area proposed for development and are recorded on SAHRIS, the South African Heritage Resources Information System, or have been sourced for this desktop screening assessment. It is noted that wherever an assessment has been completed, heritage resources of significance have been identified. According to Deacon (2008, SAHRIS ID 4843), this area "is well known for its rock art. However this is restricted to the kloofs and higher lying areas. There is the possibility that stone artefacts of different ages may occur in well-watered lowlands and valley margins." In addition, according to Pinto and Smuts (2011, SAHRIS ID 375379), "Agriculture since colonial times has been, to a large extent, marginal and has had a low impact on the archaeological evidence for these early communities. Prehistoric sites in the area, consisting predominantly of surface and sub-surface stone artefact scatters in the open landscape together with overhangs and recesses in the sandstone hills used as shelters, are likely to be well preserved with little disturbance from later historic periods." According to Smuts et al. (2018, SAHRIS NID 514990), studies completed in the broader area identified surprisingly little pre-colonial or stone age archaeology, and distinct spatial patterning to the little that was found. Almost all archaeological material, predominantly in the form of scatters, has been identified on the flat floodplains up to the foothills of the mountains, and within river valleys along watercourses… The area is known to have been inhabited since the Early Stone Age (ESA) and throughout the Middle Stone Age (MSA). Later Stone Age (LSA) scatters have also been documented throughout the region, although at remarkably low density, although excavations at cave sites near Sutherland yielded significant LSA cultural material" Furthermore, Smuts et al (2018) notes that rock art and archaeological resources associated with the trek boers and historical occupation of the area are known from the region. In addition, it has been noted that there is often a more dense accumulation of archaeological artefactual material along an exposure of the Collingwood Formation (Pc) as this formation provides an excellent raw material source. Part of the proposed OHL lies along this formation (Figure 5b).

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In 2016 a Draft HIA (Hart et al.) for the proposed Kolkies and Karee WEFs on neighbouring properties was not completed as the project was cancelled. Hart et al. (2016) note that in terms of impacts to archaeology, sites tend to be found on the banks of river beds. Discrete scatters of Middle Stone Age artefacts are often identified in sheet washed locations at several farms in the area but they are not considered to be of high significance. In general, Hart et al. (2016) found that Late and Early Stone Age Archaeology is sparse. Hart et al. (2016) also found that the built environment is sparse. Hart et al. (2016) note that previous heritage work has shown there are numerous stone cairns along the dry river beds which may represent graves. Similarly, in the archaeological assessment completed for the Oya PV facility by Fourie (2020), burial grounds and graves, some old farmsteads and kraals. Lavin and Wiltshire (2020) identified diffuse scatters of Middle and Later Stone Age artefacts in the neighbouring Pienaarspoort REF area.

As such, it is likely that the proposed OHL development will impact on significant archaeological and other heritage resources and as such, an assessment that identifies this impact is recommended. However, much of the OHL alternative alignments have been covered by existing completed heritage assessments (Figure 2). It is therefore recommended that only the portions of the alternatives that have not yet been assessed are surveyed for impacts to archaeological heritage.

Palaeontology

According to the SAHRIS Palaeosensitivity Map, the area proposed for development is underlain by sediments that are of low, moderate, high and very high palaeontological sensitivity (Figure 4a). According to the extract from the Council for GeoScience Map 3220 for Sutherland (Figure 5a) and Map 3320 for Ladismith (Figure 5b), the area proposed for development is underlain by sediments of the Karoo Supergroup assigned to the Dwyka, Ecca and Witteberg Groups in addition to Quaternary Sands. The Dwyka Group is known to preserve trace fossils, organic-walled microfossils, rare marine invertebrates (*eg* molluscs), fish, vascular plants, predominantly interglacial and post-glacial trace fossil assemblages, possibility of body fossils (*eg* molluscs, fish, plants). The Ecca Group is known to conserve non-marine trace fossils, vascular plants (including petrified wood) and palynomorphs of *Glossopteris* flora, mesosaurid reptiles, fish (including microvertebrate remains, coprolites), crustaceans, sparse marine shelly invertebrates (molluscs, brachiopods), microfossils (radiolarians *etc*) and insects. The Witteberg Group is very palaeontologically sensitive and is known to conserve trace fossils, vascular plants, sparse shelly invertebrates and fish (brachiopods, bivalves *etc*). In the palaeontological assessment completed for the Oya Energy Facility, Almond (2020) concluded that the Oya project area has low paleontological sensitivity overall, but with small unpredictable areas of high to very high sensitivity. It is therefore likely that the proposed development will impact on significant palaeontological heritage and as such, an assessment of impacts to palaeontological resources is recommended for the portions of the proposed OHL alternatives that have not been previously assessed.

Known Resources

Four known heritage resources fall within the 300m buffer area proposed for the Oya OHL. These are SAHRIS Site ID 130730, 130734, 130768 and 130772. Site 130730 is graded IIIA and is described by Fourie (2020) as “Three grave features including a medium-density scatter of MSA and LSA stone tools... The site is located on the eastern bank of a river and has evidence of flooding. Three possible stone grave features were identified. The first grave (OYPV-10a) consists of packed stones in a semi-rectangular shape. The second grave (OYPV- 10b) has two sharp rectangular stones placed in one corner, most likely forming part of a grave marker that has been washed away or covered by sand from the river. The third grave feature (OYPV-10c) contains two stones placed on the eastern and western end, marking the feature as a grave. A medium-density scatter of MSA and LSA tools were found around the site. The stone tools mostly consist of cores, flakes, blades and chunks, and formal tools such as scrapers. The tools were made from chert, shale, and hornfels. Burial grounds and graves are protected under Section 36 of the NHRA 25 of 1999. Thus, the site is provisionally rated as having a high heritage significance with a heritage rating of IIIA. All graves have high levels of emotional, religious and in some cases historical significance. It is also important to understand that the identified graves could have significant heritage value to the relevant families.”

Site 130734 is not graded as significant and is described by Fourie (2020) as consisting of “Several LSA stone tools were found scattered over an area of 107,23m 2 near the river on the farm Gats Rivier 156. The flakes were made from chert and shale.” Site 130768 is also graded IIIA for its palaeontological research potential and is described by Almond (2020) as

"Good riverbed and bank exposures of tabular, greyish wackes with undulose or wave-rippled tops. Thin, fissile, medium-grained, laminated, greyish sandy interbeds, locally ferruginised, towards base of package of medium- to thick-bedded wackes (horizontally to current ripple cross-laminated) containing dense hash of transported plant debris – mainly stems, including probable sphenophytes - preserved as moulds where weathered and carbonaceous compressions in fresher material. Some possible axes up to 10 cm across". Site 130772 is graded IIIC by Almond (2020) and is described as an exposure of the Waterford Formation. It includes "Hillslope exposure of grey-green mudrocks with large ferruginous carbonate diagenetic concretions and package of tabular, thin-bedded wackes. Small float block of silicified wood."

RECOMMENDATION
Based on the available information, it is likely that the proposed development will negatively impact on significant archaeological and palaeontological heritage resources. As such, it is recommended that an HIA is required that assesses these impacts and proposes mitigation measures.

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APPENDIX 1

List of known heritage resources within proximity to the development area

Site ID	Site no	Full Site Name	Site Type	Grading
35526	GK078	Gamma Kappa 078	Artefacts	Grade IIIb
35648	GK125	Gamma Kappa 125	Artefacts	Grade IIIa
35653	GK128	Gamma Kappa 128	Artefacts	Grade IIIa
35654	GK127	Gamma Kappa 127	Artefacts	Grade IIIa
35656	GK129	Gamma Kappa 129	Artefacts	Grade IIIa
35657	GK130	Gamma Kappa 130	Artefacts	Grade IIIa
35658	GK131	Gamma Kappa 131	Artefacts	Grade IIIa
35659	GK132	Gamma Kappa 132	Artefacts	Grade IIIa
35661	GK126	Gamma Kappa 126	Artefacts	Grade IIIc
35665	GK133	Gamma Kappa 133	Artefacts	Grade IIIc
35666	GK134	Gamma Kappa 134	Artefacts	Grade IIIc
35667	GK135	Gamma Kappa 135	Artefacts	Grade IIIc
35668	GK136	Gamma Kappa 136	Artefacts	Grade IIIc
35669	GK137	Gamma Kappa 137	Artefacts	Grade IIIc
35670	GK138	Gamma Kappa 138	Artefacts	Grade IIIc
35671	GK139	Gamma Kappa 139	Artefacts	Grade IIIc
35672	GK140	Gamma Kappa 140	Artefacts	Grade IIIc

35673	GK141	Gamma Kappa 141	Artefacts	Grade IIIc
35650	GK124	Gamma Kappa 124	Burial Grounds & Graves	Grade IIIa
130719	OYPV-01	Matjiesfontein Oya Solar	Stone walling	Grade IIIc
130720	OYPV-02	Matjiesfontein Oya Solar	Stone walling	
130721	OYPV-03	Matjiesfontein Oya Solar	Stone walling, Structures, Building	Grade IIIc
130723	OYPV-04	Matjiesfontein Oya Solar	Stone walling	Grade IIIc
130725	OYPV-05	Matjiesfontein Oya Solar	Stone walling, Burial Grounds & Graves	Grade IIIa
130727	OYPV-06	Matjiesfontein Oya Solar	Artefacts	
130728	OYPV-07	Matjiesfontein Oya Solar	Stone walling	Grade IIIc
130729	OYPV-08	Matjiesfontein Oya Solar	Stone walling, Burial Grounds & Graves	Grade IIIa
130730	OYPV-09	Matjiesfontein Oya Solar	Artefacts, Burial Grounds & Graves	Grade IIIa
130731	OYPV-10	Matjiesfontein Oya Solar	Rock Art, Artefacts	Grade IIIa
130732	OYPV-11	Matjiesfontein Oya Solar	Artefacts	Grade IIIb
130733	OYPV-12	Matjiesfontein Oya Solar	Artefacts	Grade IIIc
130734	OYPV-13	Matjiesfontein Oya Solar	Artefacts	
130735	OYPV-14	Matjiesfontein Oya Solar	Artefacts	
130736	OYPV-15	Matjiesfontein Oya Solar	Artefacts	
130737	BKRN001	Baakens Rivier	Building	
130738	BKRN002	Baakens Rivier	Stone walling	
130739	BKRN003	Baakens Rivier	Stone walling	

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130740	BKRN004	Baakens Rivier	Structures	
130741	BKRN005	Baakens Rivier	Stone walling	
130284	KOLK08	Kolkies	Building	Grade IIIa
130742	BKRN006	Baakens Rivier	Burial Grounds & Graves	
130285	KOLK09	Kolkies	Building, Artefacts	Grade IIIc
130286	KOLK10	Kolkies	Stone walling	
130744	BKRN008	Baakens Rivier	Stone walling	
130287	KOLK11	Kolkies	Burial Grounds & Graves	Grade IIIa
130745	BKRN009	Baakens Rivier	Stone walling	
130288	KOLK12	Kolkies	Building	Grade IIIa
130746	BKRN010	Baakens Rivier	Rock Art	
130289	KOLK13	Kolkies	Burial Grounds & Graves	Grade IIIa
130747	BKRN011	Baakens Rivier	Stone walling	
130290	KOLK14	Kolkies	Artefacts	Grade IIIb
130748	BKRN012	Baakens Rivier	Structures	
130749	BKRN012	Baakens Rivier	Structures	
130750	BKRN013	Baakens Rivier	Stone walling	
130754	BKRN017	Baakens Rivier 155	Deposit	
130755	BKRN018	Baakens Rivier 155	Deposit	
130756	BKRN019	Baakens Rivier 155	Deposit	

130757	BKRN020		Rock Art, Artefacts	
130758	BKRN021	Baakens Rivier 155	Deposit	
130759	BKRN022	Baakens Rivier 155	Deposit	
130760	BKRN023	Baakens Rivier 155	Deposit	
130761	BKRN024	Baakens Rivier 155	Palaeontological	
130762	BKRN025	Baakens Rivier 155	Palaeontological	
130763	BKRN026	Baakens Rivier 155	Palaeontological	
130764	BKRN027	Baakens Rivier 155	Deposit	
130765	BKRN028	Baakens Rivier 155	Deposit	
130766	BKRN029	Baakens Rivier 155	Palaeontological	
130768	BKRN031	Baakens Rivier 155	Deposit	
130769	BKRN032	Baakens Rivier 155	Palaeontological	
130770	BKRN033	Baakens Rivier 155	Palaeontological	
130772	BKRN034	Baakens Rivier 155	Palaeontological	Grade IIIc
130773	BKRN035	Baakens Rivier 155	Artefacts	
130774	BKRN036	Baakens Rivier 155	Artefacts	
130775	BKRN037	Baakens Rivier 155	Palaeontological	
130529	PDK01	Perdekraal Farm	Burial Grounds & Graves	Grade IIIc
130530	PDK02	Perdekraal Farm	Burial Grounds & Graves	Grade IIIc
130531	PDK03	Perdekraal Farm	Burial Grounds & Graves	Grade IIIc

130532	PDK04	Perdekraal Farm	Stone walling	Grade IIIc
130533	PDK05	Perdekraal Farm	Burial Grounds & Graves	Grade IIIc
130534	PDK06	Perdekraal Farm	Burial Grounds & Graves	Grade IIIc
130535	PDK07	Perdekraal Farm	Stone walling	Grade IIIc
130536	PDK08	Perdekraal Farm	Stone walling	Grade IIIc
130537	PDK09	Perdekraal Farm	Stone walling	Grade IIIc
130538	PDK10	Perdekraal Farm	Building	Grade IIIc
130539	PDK11	Perdekraal Farm	Deposit	Grade IIIc
130540	PDK12	Perdekraal Farm	Stone walling	Grade IIIc
130541	PDK13	Perdekraal Farm	Structures	Grade IIIc
130542	PDK14	Perdekraal Farm	Burial Grounds & Graves	Grade IIIc
130543	PDK15	Perdekraal Farm	Burial Grounds & Graves	Grade IIIc
130544	PDK16	Perdekraal Farm	Burial Grounds & Graves	Grade IIIc
130545	PDK17	Perdekraal Farm	Burial Grounds & Graves	Grade IIIc
130546	PDK18	Perdekraal Farm	Artefacts	Grade IIIc
130547	PDK19	Perdekraal Farm	Burial Grounds & Graves	Grade IIIa
130548	PDK20	Perdekraal Farm	Artefacts	Grade IIIc
130549	PDK21	Perdekraal Farm	Artefacts	Grade IIIc
130550	PDK22	Perdekraal Farm	Artefacts	Grade IIIc
130551	PDK23	Perdekraal Farm	Burial Grounds & Graves	Grade IIIa

130552	PDK24	Perdekraal Farm	Stone walling	Grade IIIc
130553	PDK25	Perdekraal Farm	Stone walling	Grade IIIc
130554	PDK26	Perdekraal Farm	Burial Grounds & Graves	Grade IIIa
130555	PDK27	Perdekraal Farm	Artefacts	Grade IIIb
130556	PDK28	Perdekraal Farm	Artefacts	Grade IIIb
130557	PDK29	Perdekraal Farm	Burial Grounds & Graves	Grade IIIa
130558	PDK30	Perdekraal Farm	Structures	Grade IIIc
130559	PDK31	Perdekraal Farm	Structures	Grade IIIc
130560	PDK32	Perdekraal Farm	Artefacts	Grade IIIb
130561	PDK33	Perdekraal Farm	Stone walling	Grade IIIb
130562	PDK34	Perdekraal Farm	Structures, Burial Grounds & Graves	Grade IIIa
130563	PDK35	Perdekraal Farm	Burial Grounds & Graves	Grade IIIa
130565	PDK36	Perdekraal Farm	Burial Grounds & Graves	
130566	PDK37	Perdekraal Farm	Burial Grounds & Graves	
130567	PDK38	Perdekraal Farm	Burial Grounds & Graves	
130568	PDK39	Perdekraal Farm	Artefacts	Grade IIIb
130569	PDK40	Perdekraal Farm	Artefacts	Grade IIIb
130570	PDK41	Perdekraal Farm	Artefacts	Grade IIIc
130571	PDK42	Perdekraal Farm	Artefacts	Grade IIIc
130572	PDK43		Stone walling	Grade IIIc

References:

Hart, T. et al. (2016). **HERITAGE IMPACT ASSESSMENT (SCOPING) FOR THE PROPOSED KOLKIES WIND ENERGY FACILITY AND ASSOCIATED GRID CONNECTION TO BE SITUATED IN THE SOUTHERN TANKWA KAROO.** (Assessment conducted under Section 38 (8) of the National Heritage Resources Act (No. 25 of 1999) as part of an EIA). For Arcus Consulting. Unpublished and not submitted.

Hart, T. et al. (2016). **HERITAGE IMPACT ASSESSMENT (SCOPING) FOR THE PROPOSED KAREE WIND ENERGY FACILITY AND ASSOCIATED GRID CONNECTION TO BE SITUATED IN THE SOUTHERN TANKWA KAROO.** (Assessment conducted under Section 38 (8) of the National Heritage Resources Act (No. 25 of 1999) as part of an EIA). For Arcus Consulting. Unpublished and not submitted.

Fourie, W. (2020). **HIA for the Proposed Development of the 750MW Oya Energy Facility and Associated infrastructure near Matjiesfontein in the Western Cape.** (Assessment conducted under Section 38 (8) of the National Heritage Resources Act (No. 25 of 1999) as part of an EIA). For Arcus Consulting. Unpublished.

Fourie, W. (2020). **Archaeological Specialist Assessment for the Proposed Development of the 750MW Oya Energy Facility and Associated infrastructure near Matjiesfontein in the Western Cape.** (Assessment conducted under Section 38 (8) of the National Heritage Resources Act (No. 25 of 1999) as part of an EIA). For Arcus Consulting. Unpublished.

Bailey, E. (2020). **Cultural Landscape Specialist Assessment for the Proposed Development of the 750MW Oya Energy Facility and Associated infrastructure near Matjiesfontein in the Western Cape.** (Assessment conducted under Section 38 (8) of the National Heritage Resources Act (No. 25 of 1999) as part of an EIA). For Arcus Consulting. Unpublished.

Amond, J.. (2020). **Palaeontological Specialist Assessment for the Proposed Development of the 750MW Oya Energy Facility and Associated infrastructure near Matjiesfontein in the Western Cape.** (Assessment conducted under Section 38 (8) of the National Heritage Resources Act (No. 25 of 1999) as part of an EIA). For Arcus Consulting. Unpublished.

Shaw, Matthew & Ames, Christopher & Phillips, Natasha & Chambers, Sherrie & Dosseto, Anthony & Douglas, Matthew & Goble, Ron & Jacobs, Zenobia & Jones, Brian & Lin, Sam & Low, Marika & Mcneil, Jessica-Louise & Nasoordeen, Shezani & O'driscoll, Corey & Saktura, Rosaria & Sumner, T. & Watson, Sara & Will, Manual & Mackay, Alex. (2020). **The Doring River Archaeology Project: Approaching the Evolution of Human Land Use Patterns in the Western Cape, South Africa.**

Smith, Andrew B., and Michael R. Ripp. “**An Archaeological Reconnaissance of the Doorn/Tanqua Karoo.**” The South African Archaeological Bulletin, vol. 33, no. 128, 1978, pp. 118–133

Lavin and Wiltshire (2020). **HIA for the Proposed Development of the Pienaarspoort Wind Energy Facility 1 on Rem Farm Bruwelsfontein 249 near Touws River, Western Cape.** (Assessment conducted under Section 38 (8) of the National Heritage Resources Act (No. 25 of 1999) as part of an EIA). For Arcus Consulting. Unpublished.

Lavin and Wiltshire (2020). **Archaeological Specialist Assessment for the Proposed Development of the Pienaarspoort Wind Energy Facility 1 on Rem Farm Bruwelsfontein 249 near Touws River, Western Cape.** (Assessment conducted under Section 38 (8) of the National Heritage Resources Act (No. 25 of 1999) as part of an EIA). For Arcus Consulting. Unpublished.

Lavin and Wiltshire (2020). **HIA for the Proposed Development of the Pienaarspoort Wind Energy Facility 2 on Farms Drinkwaterskloof 251 (RE) and Melkbosch Kraal 250 portion 1 near Touwsrivier, Western Cape.** (Assessment conducted under Section 38 (8) of the National Heritage Resources Act (No. 25 of 1999) as part of an EIA). For Arcus Consulting. Unpublished.

Lavin and Wiltshire (2020). **Archaeological Specialist Assessment for the Proposed Development of the Pienaarspoort Wind Energy Facility 2 on Farms Drinkwaterskloof 251 (RE) and Melkbosch Kraal 250 portion 1 near Touwsrivier, Western Cape.** (Assessment conducted under Section 38 (8) of the National Heritage Resources Act (No. 25 of 1999) as part of an EIA). For Arcus Consulting. Unpublished.

Jansen, L. (2020). **Cultural Landscape Assessment for the Proposed Development of the Pienaarspoort Wind Energy Facility 1 and 2 near Touws River, Western Cape.** (Assessment conducted under Section 38 (8) of the National Heritage Resources Act (No. 25 of 1999) as part of an EIA). For Arcus Consulting. Unpublished.

Almond, J. (2020). **Palaeontological Specialist Assessment for the Proposed Development of the Pienaarspoort Wind Energy Facility 1 and 2 Touws River, Western Cape.** (Assessment conducted under Section 38 (8) of the National Heritage Resources Act (No. 25 of 1999) as part of an EIA). For Arcus Consulting. Unpublished.

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APPENDIX 2

Reference List with relevant AIAs and PIAs from SAHRIS

Heritage Impact Assessments				
Nid	**Report Type**	**Author/s**	**Date**	**Title**
359488	Heritage Screener	Mariagrazia Galimberti, Kyla Bluff, Nicholas Wiltshire	09/03/2016	Brandvalley Wind Energy Facility
53187	HIA Phase 1	Timothy Hart, Lita Webley	01/03/2011	HERITAGE IMPACT ASSESSMENT PROPOSED WIND ENERGY FACILITY
337370	PIA Phase 1	Duncan Miller	01/03/2011	Palaeontological Impact Assessment Proposed Roggeveld Wind Energy Facility
356316	Heritage Screener	Mariagrazia Galimberti, Kyla Bluff, Nicholas Wiltshire	02/02/2016	Heritage Screener CTS15_015b EOH Brandvalley Wind Energy Facility
356318	Heritage Screener	Mariagrazia Galimberti, Kyla Bluff, Nicholas Wiltshire	01/02/2016	Heritage Screener CTS15_015a EOH Rietkloof Wind Energy Facility
364162	PIA Phase 1	John E Almond	01/04/2016	PALAEONTOLOGICAL HERITAGE ASSESSMENT: COMBINED DESKTOP & FIELD-BASED STUDY - PROPOSED BRANDVALLEY WIND ENERGY FACILITY LAINGSBURG, WESTERN & NORTHERN CAPE PROVINCES
364163	AIA Phase 1	Celeste Booth	01/04/2016	A PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT (AIA) FOR THE PROPOSED BRANDVALLEY WIND ENERGY FACILITY (WEF) SITUATED IN THE KAROO HOOGLAND LOCAL MUNICIPALITY (NAMAKWA DISTRICT MUNICIPALITY), THE WITZENBURG LOCAL MUNICIPALITY (CAPE WINELANDS DISTRICT MUNICIPALITY) AND LAINGSBURG LOCAL MUNICIPALITY (CENTRAL KAROO DISTRICT MUNICIPALITY).
4843	AIA Phase 1	Hilary Deacon	28/03/2008	Archaeological Impact Assessment: Proposed Breede Valley De Doorns Housing Project
514990	HIA Phase 1	Katie Smuts, Emmylou Bailey, Madelon Tusenius, John Almond	29/10/2018	HERITAGE IMPACT ASSESSMENT Basic Assessment for the Proposed Development of the 325MW Kudusberg Wind Energy Facility and associated infrastructure, between Matjiesfontein and Sutherland in the Western and Northern Cape Provinces: BA REPORT
375379	AIA Phase 1	Hugo Pinto, Katie Smuts	24/10/2011	Preliminary Archaeological Survey of Karoopoort Farm

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APPENDIX 3 - Keys/Guides

Key/Guide to Acronyms

AIA	Archaeological Impact Assessment
DARD	Department of Agriculture and Rural Development (KwaZulu-Natal)
DEFF	Department of Environmental, Forestry and Fisheries (National)
DEADP	Department of Environmental Affairs and Development Planning (Western Cape)
DEDEAT	Department of Economic Development, Environmental Affairs and Tourism (Eastern Cape)
DEDECT	Department of Economic Development, Environment, Conservation and Tourism (North West)
DEDT	Department of Economic Development and Tourism (Mpumalanga)
DEDTEA	Department of economic Development, Tourism and Environmental Affairs (Free State)
DENC	Department of Environment and Nature Conservation (Northern Cape)
DMR	Department of Mineral Resources (National)
GDARD	Gauteng Department of Agriculture and Rural Development (Gauteng)
HIA	Heritage Impact Assessment
LEDET	Department of Economic Development, Environment and Tourism (Limpopo)
MPRDA	Mineral and Petroleum Resources Development Act, no 28 of 2002
NEMA	National Environmental Management Act, no 107 of 1998
NHRA	National Heritage Resources Act, no 25 of 1999
PIA	Palaeontological Impact Assessment
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
VIA	Visual Impact Assessment

Full guide to Palaeosensitivity Map legend

	RED:	VERY HIGH - field assessment and protocol for finds is required
	ORANGE/YELLOW:	HIGH - desktop study is required and based on the outcome of the desktop study, a field assessment is likely
	GREEN:	MODERATE - desktop study is required
	BLUE/PURPLE:	LOW - no palaeontological studies are required however a protocol for chance finds is required
	GREY:	INSIGNIFICANT/ZERO - no palaeontological studies are required
	WHITE/CLEAR:	UNKNOWN - these areas will require a minimum of a desktop study.

APPENDIX 4 - Methodology

The Heritage Screener summarises the heritage impact assessments and studies previously undertaken within the area of the proposed development and its surroundings. Heritage resources identified in these reports are assessed by our team during the screening process.

The heritage resources will be described both in terms of **type**:

- Group 1: Archaeological, Underwater, Palaeontological and Geological sites, Meteorites, and Battlefields
- Group 2: Structures, Monuments and Memorials
- Group 3: Burial Grounds and Graves, Living Heritage, Sacred and Natural sites
- Group 4: Cultural Landscapes, Conservation Areas and Scenic routes

and **significance** (Grade I, II, IIIa, b or c, ungraded), as determined by the author of the original heritage impact assessment report or by formal grading and/or protection by the heritage authorities.

Sites identified and mapped during research projects will also be considered.

DETERMINATION OF THE EXTENT OF THE INCLUSION ZONE TO BE TAKEN INTO CONSIDERATION

The extent of the inclusion zone to be considered for the Heritage Screener will be determined by CTS based on:

- the size of the development,
- the number and outcome of previous surveys existing in the area
- the potential cumulative impact of the application.

The inclusion zone will be considered as the region within a maximum distance of 50 km from the boundary of the proposed development.

DETERMINATION OF THE PALAEONTOLOGICAL SENSITIVITY

The possible impact of the proposed development on palaeontological resources is gauged by:

- reviewing the fossil sensitivity maps available on the South African Heritage Resources Information System (SAHRIS)
- considering the nature of the proposed development
- when available, taking information provided by the applicant related to the geological background of the area into account

DETERMINATION OF THE COVERAGE RATING ASCRIBED TO A REPORT POLYGON

Each report assessed for the compilation of the Heritage Screener is colour-coded according to the level of coverage accomplished. The extent of the surveyed coverage is labeled in three categories, namely low, medium and high. In most instances the extent of the map corresponds to the extent of the development for which the specific report was undertaken.

Low coverage will be used for:

- desktop studies where no field assessment of the area was undertaken;
- reports where the sites are listed and described but no GPS coordinates were provided.
- older reports with GPS coordinates with low accuracy ratings;
- reports where the entire property was mapped, but only a small/limited area was surveyed.
- uploads on the National Inventory which are not properly mapped.

Medium coverage will be used for

- reports for which a field survey was undertaken but the area was not extensively covered. This may apply to instances where some impediments did not allow for full coverage such as thick vegetation, etc.
- reports for which the entire property was mapped, but only a specific area was surveyed thoroughly. This is differentiated from low ratings listed above when these surveys cover up to around 50% of the property.

High coverage will be used for

- reports where the area highlighted in the map was extensively surveyed as shown by the GPS track coordinates. This category will also apply to permit reports.

RECOMMENDATION GUIDE

The Heritage Screener includes a set of recommendations to the applicant based on whether an impact on heritage resources is anticipated. One of three possible recommendations is formulated:

(1) The heritage resources in the area proposed for development are sufficiently recorded - The surveys undertaken in the area adequately captured the heritage resources. There are no known sites which require mitigation or management plans. No further heritage work is recommended for the proposed development.

This recommendation is made when:

- enough work has been undertaken in the area
- it is the professional opinion of CTS that the area has already been assessed adequately from a heritage perspective for the type of development proposed

(2) The heritage resources and the area proposed for development are only partially recorded - The surveys undertaken in the area have not adequately captured the heritage resources and/or there are sites which require mitigation or management plans. Further specific heritage work is recommended for the proposed development.

This recommendation is made in instances in which there are already some studies undertaken in the area and/or in the adjacent area for the proposed development. Further studies in a limited HIA may include:

- improvement on some components of the heritage assessments already undertaken, for instance with a renewed field survey and/or with a specific specialist for the type of heritage resources expected in the area
- compilation of a report for a component of a heritage impact assessment not already undertaken in the area

- undertaking mitigation measures requested in previous assessments/records of decision.

(3) The heritage resources within the area proposed for the development have not been adequately surveyed yet - Few or no surveys have been undertaken in the area proposed for development. A full Heritage Impact Assessment with a detailed field component is recommended for the proposed development.

Note:
The responsibility for generating a response detailing the requirements for the development lies with the heritage authority. However, since the methodology utilised for the compilation of the Heritage Screeners is thorough and consistent, contradictory outcomes to the recommendations made by CTS should rarely occur. Should a discrepancy arise, CTS will immediately take up the matter with the heritage authority to clarify the dispute.

APPENDIX 5 -Summary of Specialist Expertise

Jenna Lavin, an archaeologist with an MSc in Archaeology and Palaeoenvironments, and currently completing an MPhil in Conservation Management , heads up the heritage division of the organisation, and has a wealth of experience in the heritage management sector. Jenna's previous position as the Assistant Director for Policy, Research and Planning at Heritage Western Cape has provided her with an in-depth understanding of national and international heritage legislation. Her 8 years of experience at various heritage authorities in South Africa means that she has dealt extensively with permitting, policy formulation, compliance and heritage management at national and provincial level and has also been heavily involved in rolling out training on SAHRIS to the Provincial Heritage Resources Authorities and local authorities.

Jenna is on the Executive Committee of the Association of Professional Heritage Practitioners (APHP), and is also an active member of the International Committee on Monuments and Sites (ICOMOS) as well as the International Committee on Archaeological Heritage Management (ICAHM). In addition, Jenna has been a member of the Association of Southern African Professional Archaeologists (ASAPA) since 2009. Recently, Jenna has been responsible for conducting training in how to write Wikipedia articles for the Africa Centre's WikiAfrica project.

Since 2016, Jenna has drafted over 50 Heritage Impact Assessments throughout South Africa.

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APPENDIX 5: HWC NID Form and Response

iLifa leMveli leNtshona Koloni
Erfenis Wes-Kaap
Heritage Western Cape

APPLICATION FORM
NOTIFICATION OF INTENT TO
SECTION 38 (1) AND SECTION 38 (8)

Heritage Western Cape Reference No:
To be completed by applicant

20103006

Completion of this form is required by Heritage Western Cape for the initiation of all impact assessment processes under Section 38 (1) & (8) of the National Heritage Resources Act (NHRA).

Whilst it is not a requirement, it may expedite processes and in particular avoid calls for additional information if certain of the information required in this form is provided by a heritage specialist/s with the necessary qualifications, skills and experience.

A. APPLICABILITY OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT (NEMA)

DEADP/ DMR Reference Number:	
X	This application is made in terms of Section 38(8) of the NHRA and an application under NEMA has been made to the following authority: **DEFF**
☐	This development will not require a NEMA application.
NOTE:	Making an incorrect statement or providing incorrect information in this part of the form may result in all or part of the application having to be reconsidered by HWC in the future, or submission of a new application.

B. BASIC DETAILS

PROPERTY DETAILS:

Name of property: **The 132kV Oya power line near Maitjiesfontein, Western and Northern Cape**
Street address or location (eg: off R44): **South of the R356**

Erf or farm number/s: **See attached screening assessment**	Coordinates: **-33.0218 S 20.1050 E** (A logical centre point. Format based on WGS84.)
Town or District: **Cape Winelands District Municipality and Namakwa District Multiplicity**	Municipality: **Witzenberg Local Municipality and Karoo Hooglands Local Municipality**
Extent of property: **Maximum 35km x 300m assessment corridor**	Current use: **The properties are currently zoned for agricultural land use and due to the low agricultural potential of the land, it was previously used for low intensity grazing however the properties are no longer actively used for agricultural activities**
Predominant land use/s of surrounding properties: **Agricultural**	

REGISTERED OWNER OF PROPERTY:

Name and Surname:		
Address		
Telephone	Cell	E-mail

APPLICANT/ AUTHORISED AGENT:

Name and Surname: **Jenna Lavin**		
Address: **34 Harries Street, Plumstead**		
Telephone **083 619 0854**	Cell **083 619 0854**	E-mail **jenna.lavin@ctsheritage.com**

By the submission of this form and all material submitted in support of this notification (ie: 'the material'), all applicant parties acknowledge that they are aware that the material and/or parts thereof will be put to the following uses and consent to such use being made: filing as a public record; presentations to committees, etc; inclusion in databases; inclusion on and downloading from websites; distribution to committee members and other stakeholders and any other use required in terms of powers, functions, duties and responsibilities allocated to Heritage Western Cape under the terms of the National Heritage Resources Act. Should restrictions on such use apply or if it is not possible to copy or lift information from any part of the digital version of the material, the material will be returned unprocessed.

I confirm that I enclose with this form two hardcopies of all material submitted together with a CD/ USB containing digital versions of all of the same.

Signature of Owner: ______________________________ Date:

Signature of Applicant/ Authorised Agent: ________________ Date: 30 Oct 2020
(Applicants/ agents must attach a copy of power of attorney to this

form.)

C. DEVELOPMENT DETAILS:

<table>
<tr><td colspan="4">Please indicate below which of the following Sections of the National Heritage Resources Act, or other legislation has triggered the need for notification of intent to develop.</td></tr>
<tr><td>X</td><td>S38(1)(a) Construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier over 300m in length.</td><td colspan="2">S38(1)(c) Any development or activity that will change the character of a site -</td></tr>
<tr><td>☐</td><td>S38(1)(b) Construction of a bridge or similar structure exceeding 50m in length.</td><td>☐</td><td>(i) exceeding 5 000m^2 in extent;</td></tr>
<tr><td>☐</td><td>S38(1)(d) Rezoning of a site exceeding 10 000m^2 in extent.</td><td>☐</td><td>(ii) involving three or more existing erven or subdivisions thereof;</td></tr>
<tr><td rowspan="2">X</td><td rowspan="2">Other triggers, eg: in terms of other legislation, (ie: National Environment Management Act, etc.) Please set out details:

Procedures laid out in GN No. 1131, namely the Central Corridor. The proposed overhead power line project will therefore be subject to a BA process in terms of the NEMA (as amended) and Appendix 1 of the EIA Regulations, 2014 promulgated in Government Gazette 40772 and GN R326, R327, R325 and R324 on 7 April 2017. The competent authority for this BA is the DEFF.</td><td>☐</td><td>(iii) involving three or more erven or divisions thereof which have been consolidated within the past five years.</td></tr>
<tr><td colspan="2">If you have checked any of the three boxes above, describe how the proposed development will change the character of the site:</td></tr>
</table>

If an impact assessment process has also been / will be initiated in terms of other legislation please provide the following information: Authority / government department (ie: consenting authority) to which information has been /will be submitted for final decision: **DEFF** Present phase at which the process with that authority stands: **Notice of Intent to Submit**
Provide a <u>full</u> description of the nature and extent of the proposed development or activity including its potential impacts: **Oya Energy (Pty) Ltd (hereafter referred to as "Oya Energy") is proposing to construct a 132kV overhead power line near Matjiesfontein in the Western and Northern Cape Provinces (hereafter referred to as the "proposed development"). The overall objective of the proposed development is to feed the electricity generated by the proposed 750MW Oya Energy Facility (part of separate on-going EIA process with DEFF Ref No.: 14/12/16/3/3/2/2009) as well as potentially the nearby developments into the national grid. The grid connection and substation (this application) will requires a separate EA, in order to allow the EA to be handed over to Eskom. The proposed power line is located in the Witzenberg and Karoo Hoogland Local Municipalities respectively, which fall within the Cape Winelands and Namakwa District Municipalities.** **The entire extent of the proposed overhead power line is located within one (1) of the Strategic Transmission Corridors as defined and in terms of the procedures laid out in GN No. 1131, namely the Central Corridor. The proposed overhead power line project will therefore be subject to a BA process in terms of the NEMA (as amended) and Appendix 1 of the EIA Regulations, 2014 promulgated in Government Gazette 40772 and GN R326, R327, R325 and R324 on 7 April 2017. The competent authority for this BA is the DEFF.** **At this stage, it is anticipated that the proposed development will include a 132kV power line and a 33/132kV substation to feed electricity generated by the renewable energy facilities owned by the applicant into the national gird at the Kappa substation.** **The type of power line towers being considered at this stage include both lattice and monopole towers and it is assumed that these towers will be located approximately 200m to 250m apart. The towers will be up to 45m in height, depending on the terrain, but will ensure minimum overhead line clearances from buildings and surrounding infrastructure. The exact location of the towers will be determined during the final design stages of the power line design process and will be submitted along with the Final Basic Assessment report.** **300m wide power line corridors (i.e. 150m on either side) are being assessed to allow flexibility when determining the final route alignment. The proposed power line however only requires a 31m wide servitude and as such, this servitude would be positioned within the assessed corridor.** **The size of the proposed Oya and Kudusberg on-site Eskom substation and O&M building site will be approximately 200m x 200m [i.e. 2 hectare (ha)] each. It should be noted that only one (1) route is possible for the section of the proposed power line which connects the Kudusberg WEF on-site substation (authorised under 14/12/16/3/3/1/1976/AM1) to the Oya Energy Facility on-site substation. No alternatives can therefore be provided for this section of the power line. The Kudusberg to Oya power line corridor route is approximately 16.6km in length and runs from the Kudusberg on-site substation along the RE/194, 1/158, RE/159, RE/156, 1/156 and RE/155**

properties to the Oya on-site substation. This power line corridor route is to be assessed with each alternative mentioned below (i.e. Alternative 1-5) as these cannot be developed without this power line corridor (i.e. cannot have alternatives mentioned below without this power line corridor).

Five (5) power line corridor route alternatives have however been provided for the section of the proposed overhead power line which connects the Oya Energy Facility on-site substation to the Kappa substation. The power line corridor route alternatives provide different route alignments contained within an assessment corridor of up to approximately 300m wide. This is to allow for flexibility to route the power line within the authorised corridor. The above-mentioned alternatives are described below:

- **Power Line Corridor Alternative 1 (Oya to Kappa): Approximately 34.14km in length and runs along the RE/155, RE/152, 2/152, RE/169, RE/243, 241, 240 and RE/244 properties to the Kappa substation**
- **Power Line Corridor Alternative 2 (Oya to Kappa): Approximately 32.43km in length and runs along the RE/155, 3/155, RE/152, 2/152, RE/169, 13/168, 5/168, 1/243, RE/243, 241 and 240 properties to the Kappa substation**
- **Power Line Corridor Alternative 3 (Oya to Kappa): Approximately 30.56km in length and runs along the RE/155, 4/168, 13/168, 5/168, 1/243, 240 and RE/244 properties to the Kappa substation**
- **Power Line Corridor Alternative 4 (Oya to Kappa): Approximately 32.94km in length and runs along the RE/155, 4/168, 13/168, RE/169, RE/243, 241 and 240 properties to the Kappa substation**
- **Power Line Corridor Alternative 5 (Oya to Kappa): Approximately 32.26km in length and runs along the RE/155, RE/152, 2/152, RE/169, 5/168, 1/243 and 240 properties to the Kappa substation**
- **'No-go' alternative: The 'no-go' alternative is the option of not fulfilling the proposed project as well as prevent the connection of the energy development in the area to feed electricity into the national grid. This alternative would result in no environmental impacts from the proposed project on the site or surrounding local area. It provides the baseline against which other alternatives are compared and will be considered throughout the report. Implementing the 'no-go' option would entail no development. The affected properties are currently not used for agricultural activities, although they are suitable for very low-level grazing.**

The 'no-go' option is a feasible option, however, this would prevent the proposed development from contributing to the environmental, social and economic benefits associated with the development of the renewables sector.

D. ANTICIPATED IMPACTS ON HERITAGE RESOURCES

Section 3 of the National Heritage Resources Act sets out the following categories of heritage resource as forming part of the national estate. Please indicate the known presence of any of these by checking the box alongside and then providing a description of each occurrence, including nature, location, size, type

Failure to provide sufficient detail or to anticipate the likely presence of heritage resources on the site may lead to a request for more detailed specialist information.

(The assistance of relevant heritage professionals is particularly relevant in completing this section.)

Provide a short history of the site and its environs (Include sources where available): **See attached Heritage Screening Assessment**	
Please indicate which heritage resources exist on the site and in its environs, describe them and indicate the nature of any impact upon them: **See attached Heritage Screening Assessment**	
☐	**Places, buildings, structures and equipment of cultural significance** Description of resource: Description of impact on heritage resource:
☐	**Places to which oral traditions are attached or which are associated with living heritage** Description of resource: Description of impact on heritage resource:
☐	**Historical settlements and townscapes** Description of resource: **see attached screening assessment** Description of impact on heritage resource:
X	**Landscapes and natural features of cultural significance** Description of resource: **see attached screening assessment** Description of impact on heritage resource:
☐	**Geological resources of scientific or cultural importance** Description of resource: Description of impact on heritage resource:
X	**Archaeological resources** (Including archaeological sites and material, rock art, battlefields & wrecks): Description of resource: **see attached screening assessment** Description of impact on heritage resource:
X	**Palaeontological resources** (ie: fossils): Description of resource: **see attached screening assessment** Description of impact on heritage resource:
☐	**Graves and burial grounds** (eg: ancestral graves, graves of victims of conflict, historical graves & cemeteries): Description of Resource: Description of Impact on Heritage Resource:
☐	**Other human remains:** Description of resource: Description of impact on heritage resource:

☐	**Sites of significance relating to the history of slavery in South Africa:** Description of resource: Description of impact on heritage resource:
☐	**Other heritage resources:** Description of resource: Description of impact on heritage resource:

Describe elements in the environs of the site that could be deemed to be heritage resources:

Background

Oya Energy (Pty) Ltd (hereafter referred to as "Oya Energy") is proposing to construct a 132kV overhead power line near Matjiesfontein in the Western and Northern Cape Provinces (hereafter referred to as the "proposed development"). The overall objective of the proposed development is to feed the electricity generated by the proposed 750MW Oya Energy Facility (part of separate on-going EIA process with DEFF Ref No.: 14/12/16/3/3/2/2009) as well as potentially the nearby developments into the national grid. The grid connection and substation (this application) will requires a separate EA, in order to allow the EA to be handed over to Eskom.

Cultural Landscape

The proposed power line is located in the Witzenberg and Karoo Hoogland Local Municipalities respectively, which fall within the Cape Winelands and Namakwa District Municipalities. The area proposed for development is located within a REDZ area and is firmly located within the Tanqua and Ceres Karoo. This part of the Karoo is prized for its wide-open spaces and expansive vistas. Hart et al. (2016) note that the cultural landscape of this area is agricultural in nature, and consists of mostly stock farming with very occasional agriculture. The area is isolated with natural qualities and semi-desert landscapes. Many of the farm werfs in the broader area include historic structures. These are usually a modest size farm dwelling made from local rocks, and painted white with an outbuilding. Some of these structures are no longer in use, or are converted into farm sheds, housing animals, or any other use that supports farming activities.Other infrastructure typically found in the karoo is a round concrete dam, with a wind pump. The broader cultural landscape associated with the Baakens River Cultural Landscape has been previously thoroughly assessed by Bailey (2020) for the Oya PV HIA.

The interaction between the topography, geology, flora and historical remnants of human occupation of the area form a unique cultural landscape that may be negatively impacted by the proposed development. However, it must be noted that there are a number of approved Renewable Energy Facilities in the area, furthermore, the proposed OHL alignment falls within a Strategic Transmission Corridor which already contains existing powerline infrastructure (Figure 6). As noted in the Cultural Landscape Assessment for Oya PV (Bailey 2020), the negative impact of the development of such infrastructure on the Cultural Landscape is unavoidably high and are inevitable. The only mitigation option available is to develop this infrastructure in clusters, such as within the Komsberg REDZ (as with this project). As the cultural landscape for this area has already been assessed by Bailey 2020 as well as Jansen 2020, it is recommended that no additional Cultural Landscape assessment is necessary for this project.

Archaeology and the Built Environment

Heritage Impact Assessments have been completed within 20km of the area proposed for development and are recorded on SAHRIS, the South African Heritage Resources Information System, or have been sourced for this desktop screening assessment. It is noted that wherever

an assessment has been completed, heritage resources of significance have been identified. According to Deacon (2008, SAHRIS ID 4843), this area "is well known for its rock art. However this is restricted to the kloofs and higher lying areas. There is the possibility that stone artefacts of different ages may occur in well-watered lowlands and valley margins." In addition, according to Pinto and Smuts (2011, SAHRIS ID 375379), "Agriculture since colonial times has been, to a large extent, marginal and has had a low impact on the archaeological evidence for these early communities. Prehistoric sites in the area, consisting predominantly of surface and sub-surface stone artefact scatters in the open landscape together with overhangs and recesses in the sandstone hills used as shelters, are likely to be well preserved with little disturbance from later historic periods." According to Smuts et al. (2018, SAHRIS NID 514990), studies completed in the broader area identified surprisingly little pre-colonial or stone age archaeology, and distinct spatial patterning to the little that was found. Almost all archaeological material, predominantly in the form of scatters, has been identified on the flat floodplains up to the foothills of the mountains, and within river valleys along watercourses… The area is known to have been inhabited since the Early Stone Age (ESA) and throughout the Middle Stone Age (MSA). Later Stone Age (LSA) scatters have also been documented throughout the region, although at remarkably low density, although excavations at cave sites near Sutherland yielded significant LSA cultural material" Furthermore, Smuts et al (2018) notes that rock art and archaeological resources associated with the trek boers and historical occupation of the area are known from the region. In addition, it has been noted that there is often a more dense accumulation of archaeological artefactual material along an exposure of the Collingwood Formation (Pc) as this formation provides an excellent raw material source. Part of the proposed OHL lies along this formation (Figure 5b).

In 2016 a Draft HIA (Hart et al.) for the proposed Kolkies and Karee WEFs on neighbouring properties was not completed as the project was cancelled. Hart et al. (2016) note that in terms of impacts to archaeology, sites tend to be found on the banks of river beds. Discrete scatters of Middle Stone Age artefacts are often identified in sheet washed locations at several farms in the area but they are not considered to be of high significance. In general, Hart et al. (2016) found that Late and Early Stone Age Archaeology is sparse. Hart et al. (2016) also found that the built environment is sparse. Hart et al. (2016) note that previous heritage work has shown there are numerous stone cairns along the dry river beds which may represent graves. Similarly, in the archaeological assessment completed for the Oya PV facility by Fourie (2020), burial grounds and graves, some old farmsteads and kraals. Lavin and Wiltshire (2020) identified diffuse scatters of Middle and Later Stone Age artefacts in the neighbouring Pienaarspoort REF area.

As such, it is likely that the proposed OHL development will impact on significant archaeological and other heritage resources and as such, an assessment that identifies this impact is recommended. However, much of the OHL alternative alignments have been covered by existing completed heritage assessments (Figure 2). It is therefore recommended that only the portions of the alternatives that have not yet been assessed are surveyed for impacts to archaeological heritage.

Palaeontology

According to the SAHRIS Palaeosensitivity Map, the area proposed for development is underlain by sediments that are of low, moderate, high and very high palaeontological sensitivity (Figure 4a). According to the extract from the Council for GeoScience Map 3220 for Sutherland (Figure 5a) and Map 3320 for Ladismith (Figure 5b), the area proposed for development is underlain by sediments of the Karoo Supergroup assigned to the Dwyka, Ecca and Witteberg Groups in addition to Quaternary Sands. The Dwyka Group is known to preserve trace fossils, organic-walled microfossils, rare marine invertebrates (*eg* molluscs), fish, vascular plants, predominantly interglacial and post-glacial trace fossil assemblages, possibility of body fossils (*eg* molluscs, fish, plants). The Ecca Group is known to conserve non-marine trace fossils,

vascular plants (including petrified wood) and palynomorphs of *Glossopteris* flora, mesosaurid reptiles, fish (including microvertebrate remains, coprolites), crustaceans, sparse marine shelly invertebrates (molluscs, brachiopods), microfossils (radiolarians *etc*) and insects. The Witteberg Group is very palaeontologically sensitive and is known to conserve trace fossils, vascular plants, sparse shelly invertebrates and fish (brachiopods, bivalves *etc*). In the palaeontological assessment completed for the Oya PV facility, Almond (2020) concluded that the Oya PV project area has low paleontological sensitivity overall, but with small unpredictable areas of high to very high sensitivity. It is therefore likely that the proposed development will impact on significant palaeontological heritage and as such, an assessment of impacts to palaeontological resources is recommended for the portions of the proposed OHL alternatives that have not been previously assessed.

Known Resources

Four known heritage resources fall within the 300m buffer area proposed for the Oya OHL. These are SAHRIS Site ID 130730, 130734, 130768 and 130772. Site 130730 is graded IIIA and is described by Fourie (2020) as "Three grave features including a medium-density scatter of MSA and LSA stone tools... The site is located on the eastern bank of a river and has evidence of flooding. Three possible stone grave features were identified. The first grave (OYPV-10a) consists of packed stones in a semi-rectangular shape. The second grave (OYPV- 10b) has two sharp rectangular stones placed in one corner, most likely forming part of a grave marker that has been washed away or covered by sand from the river. The third grave feature (OYPV-10c) contains two stones placed on the eastern and western end, marking the feature as a grave. A medium-density scatter of MSA and LSA tools were found around the site. The stone tools mostly consist of cores, flakes, blades and chunks, and formal tools such as scrapers. The tools were made from chert, shale, and hornfels. Burial grounds and graves are protected under Section 36 of the NHRA 25 of 1999. Thus, the site is provisionally rated as having a high heritage significance with a heritage rating of IIIA. All graves have high levels of emotional, religious and in some cases historical significance. It is also important to understand that the identified graves could have significant heritage value to the relevant families."

Site 130734 is not graded as significant and is described by Fourie (2020) as consisting of "Several LSA stone tools were found scattered over an area of 107,23m 2 near the river on the farm Gats Rivier 156. The flakes were made from chert and shale." Site 130768 is also graded IIIA for its palaeontological research potential and is described by Almond (2020) as "Good riverbed and bank exposures of tabular, greyish wackes with undulose or wave-rippled tops. Thin, fissile, medium-grained, laminated, greyish sandy interbeds, locally ferruginised, towards base of package of medium- to thick-bedded wackes (horizontally to current ripple cross-laminated) containing dense hash of transported plant debris – mainly stems, including probable sphenophytes - preserved as moulds where weathered and carbonaceous compressions in fresher material. Some possible axes up to 10 cm across". Site 130772 is graded IIIC by Almond (2020) and is described as an exposure of the Waterford Formation. It includes "Hillslope exposure of grey-green mudrocks with large ferruginous carbonate diagenetic concretions and package of tabular, thin-bedded wackes. Small float block of silicified wood."

Description of impacts on heritage resources in the environs of the site:

The heritage resources within the area proposed for the development have not been adequately surveyed yet

A full Heritage Impact Assessment with a detailed field component is recommended for the proposed development. Before the alignment has been finalised, it is recommended that an archaeological and palaeontological field assessment be undertaken to ensure that significant heritage

resources are not impacted by the proposed development. It is recommended that these field assessments be integrated into a Heritage Impact Assessment that satisfies section 38(3) of the NHRA.
Summary of anticipated impacts on heritage resources: **The heritage resources within the area proposed for the development have not been adequately surveyed yet** **A full Heritage Impact Assessment with a detailed field component is recommended for the proposed development.** Before the alignment has been finalised, it is recommended that an archaeological and palaeontological field assessment be undertaken to ensure that significant heritage resources are not impacted by the proposed development. It is recommended that these field assessments be integrated into a Heritage Impact Assessment that satisfies section 38(3) of the NHRA.

E. ILLUSTRATIVE MATERIAL (This form will not be processed unless the following are included):

Attach to this form a minimum A4 sized locality plan showing the boundaries of the area affected by the proposed development, its environs, property boundaries and a scale. The plan must be of a scale and size that is appropriate to creating a clear understanding of the development.
Attach also other relevant graphic material such as maps, site plans, satellite photographs and photographs of the site and the heritage resources on it and in its environs. These are essential to the processing of this notification.
Please provide all graphic material on paper of appropriate size and on CD/ USB in JPEG format. It is essential that graphic material be annotated via titles on the photographs, map names and numbers, names of files and/or provision of a numbered list describing what is visible in each image.

F. RECOMMENDATION
In your opinion do you believe that a heritage impact assessment is required? **X** Yes ☐ No
Recommendation made by: **Jenna Lavin** Name **Jenna Lavin** Capacity **Heritage Practitioner**
PLEASE NOTE: No Heritage Impact Assessment should be submitted with this form or conducted until Heritage Western Cape has expressed its opinion on the need for such and the nature thereof.

G. INFORMATION TO BE PROVIDED AND STUDIES TO BE CONDUCTED AS PART OF THE HERITAGE IMPACT ASSESSMENT (HIA)

If it is recommended that an HIA is required, please complete this section of the form.

DETAILS OF STUDIES TO BE CONDUCTED IN THE INTENDED HIA

In addition to the requirements set out in Section 38(3) of the NHRA, indicate envisaged studies:	
☐	Heritage resource-related guidelines and policies.
☐	Local authority planning and other laws and policies.
☐	Details of parties, communities, etc. to be consulted.
X	Specialist studies, eg: archaeology, palaeontology, architecture, townscape, visual impact, etc. Provide details: **See attached screening assessment**
☐	Other. Provide details:
PLEASE NOTE: Any further studies which Heritage Western Cape may resolve should be submitted must be in the form of a single, consolidated report with a single set of recommendations. Specialist studies must be incorporated in full, either as chapters of the report, or as annexures thereto.	