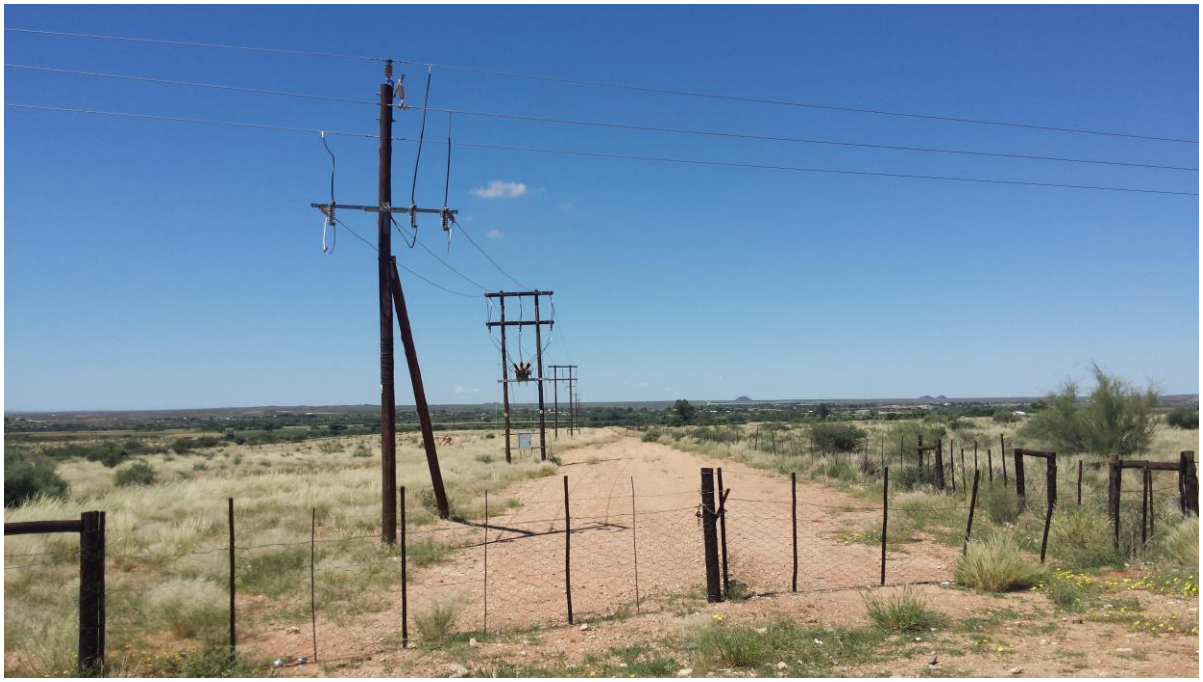

SOLAR RESERVE SA (PTY) LTD

Proposed Construction of up to a 132kV Power Line and Associated Infrastructure for the SolarReserve Rooipunt Solar Thermal Power Park Project near Upington, Northern Cape Province

Draft Basic Assessment Report

DEA Reference No.: 14/12/16/3/3/1/1578
Issue Date: 22nd June 2016
Version No.: 1
Project Number: 13621 – Rooipunt Power Line

Date:	22nd June 2016
Document Title:	Proposed Construction of up to a 132kV Power Line and Associated Infrastructure for the SolarReserve Rooipunt Solar Thermal Power Park Project near Upington, Northern Cape Province: Draft Basic Assessment Report
Author:	Shaun Taylor
Version Number:	1
Checked by:	Rebecca Thomas
Approved:	Kelly Tucker
Signature:	
For:	SiVEST Environmental Division

environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

(For official use only)

File Reference Number:	
Application Number:	
Date Received:	

Basic assessment report in terms of the Environmental Impact Assessment Regulations, 2014, promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended.

Kindly note that:

1. This **basic assessment report** is a standard report that may be required by a competent authority in terms of the EIA Regulations, 2014 and is meant to streamline applications. Please make sure that it is the report used by the particular competent authority for the activity that is being applied for.
2. This report format is current as of **08 December 2014**. It is the responsibility of the applicant to ascertain whether subsequent versions of the form have been published or produced by the competent authority
3. The report must be typed within the spaces provided in the form. The size of the spaces provided is not necessarily indicative of the amount of information to be provided. The report is in the form of a table that can extend itself as each space is filled with typing.
4. Where applicable **tick** the boxes that are applicable in the report.
5. An incomplete report may be returned to the applicant for revision.
6. The use of "not applicable" in the report must be done with circumspection because if it is used in respect of material information that is required by the competent authority for assessing the application, it may result in the rejection of the application as provided for in the regulations.
7. This report must be handed in at offices of the relevant competent authority as determined by each authority.
8. No faxed or e-mailed reports will be accepted.
9. The signature of the EAP on the report must be an original signature.
10. The report must be compiled by an independent environmental assessment practitioner.
11. Unless protected by law, all information in the report will become public information on receipt by the competent authority. Any interested and affected party should be provided with the information contained in this report on request, during any stage of the application process.
12. A competent authority may require that for specified types of activities in defined situations only parts of this report need to be completed.
13. Should a specialist report or report on a specialised process be submitted at any stage for any part of this application, the terms of reference for such report must also be submitted.
14. Two (2) colour hard copies and one (1) electronic copy of the report must be submitted to the competent authority.

15. Shape files (.shp) for maps must be included in the electronic copy of the report submitted to the competent authority.

SOLARRESERVE SOUTH AFRICA (PTY) LTD

PROPOSED CONSTRUCTION OF UP TO A 132KV POWER LINE AND ASSOCIATED INFRASTRUCTURE FOR THE SOLAR RESERVE ROOIPUNT SOLAR THERMAL POWER PARK PROJECT NEAR UPINGTON, NORTHERN CAPE PROVINCE

DRAFT BASIC ASSESSMENT REPORT

Executive Summary

On the 30th September 2015, SolarReserve South Africa (Pty) Ltd (hereafter referred to as, "SolarReserve") received environmental authorization (EA – DEA Ref: 12/12/20/248804; NEAS Ref: DEA/EIA/0000894/2012) for the proposed 200MW Concentrated Solar Power (CSP) Plant on the Farm Rooipunt 617 near Upington in the Northern Cape Province (the "SolarReserve Rooipunt CSP Project"). SolarReserve are also in the process of applying for environmental authorisation for the Proposed Rooipunt Photovoltaic (PV) Solar Power Park Phase 1 on Portion 0 of the Farm Rooipunt 617 (DEA Ref: 12/12/20/2488/01), as well as for the Proposed Rooipunt Photovoltaic (PV) Solar Power Park Phase 2 on Portion 0 of the Farm Rooipunt 617, near Upington in the Northern Cape Province (DEA Ref: 12/12/20/2488/02). These three components will form the greater Rooipunt Solar Thermal Power Park on the Farm Rooipunt 617 near Upington, Northern Cape Province (hereafter referred to as the "Rooipunt Solar Thermal Power Park Project").

In order to evacuate the electricity generated by the SolarReserve Rooipunt Solar Thermal Power Park Project, a grid connection solution will be assessed. SolarReserve appointed SiVEST, as the independent Environmental Assessment Practitioner (EAP), to undertake the required Basic Assessment (BA) processes for the proposed 132kV power line and associated infrastructure in the Northern Cape Province ("the proposed project").

The proposed project will comprise of the following:

- Construction of one Tern power line of up to 132kV from the proposed Rooipunt Solar Thermal Power Park Project. The grid connections that will be assessed include the following:
- Corridor Option 1 (Blue) = approximately 17km in length;
- Corridor Option 2 (Orange) = approximately 22km in length; and
- Corridor Option 3 (Green) = approximately 24km in length.
- Install 48 core optical ground wire (OPGW) on the line
- Build 2 bay substations next to approved substations on the Rooipunt CSP Project site. Proposed substations will be approximately 100m x 100m
- Inclusive of all cable trenches
- Install 3 x 25m lighting/lightning masts
- Building of an access road to the substation

- Building of a standard control room (5.5m x 12m) with top entry and cable racks. This will include a sewage system, air-conditioning and energy efficient lighting
- Installation of a security fence with entrance gates
- 1 x 132kV line bay and 1 x 132kV metering bay
- Installation of a required Control Plant, AC/DC, Metering, SCADA and Telecoms
- V drain extension of substation for drainage purposes
- And or all extensions required (132kV yard, fencing etc.) of the connecting Eskom Assets i.e. Solar MTS

The location of the proposed substations will be adjacent to the on-site substations of the approved layout of the SolarReserve Rooipunt CSP Project, authorized under the EA (DEA Ref: 12/12/20/248804). The footprint of the proposed substations would be approximately 10 000m².

Three power line alternative corridors have been identified which will be assessed as part of the BA process. The three corridors are up to 4km (2km either side of the centre line) wide originating from the SolarReserve Rooipunt CSP Project site and routed to the Proposed Eskom Upington Transmission Substation. These three corridors will serve as alternatives to each other for comparative assessment. The registered servitude width will be 31 metres (15.5 metres either side of the centre line), positioned within the 2km assessment corridor. The three power line corridors include the following:

- Corridor Option 1 (Blue) = approximately 17km in length;
- Corridor Option 2 (Orange) = approximately 22km in length; and
- Corridor Option 3 (Green) = approximately 24km in length.

The proposed power line will also include the establishment of all associated infrastructure as required (including but not limited to access roads, control rooms, security systems, network integration infrastructure etc.).

A Site Locality Map for the proposed project has been provided in Figure i below.

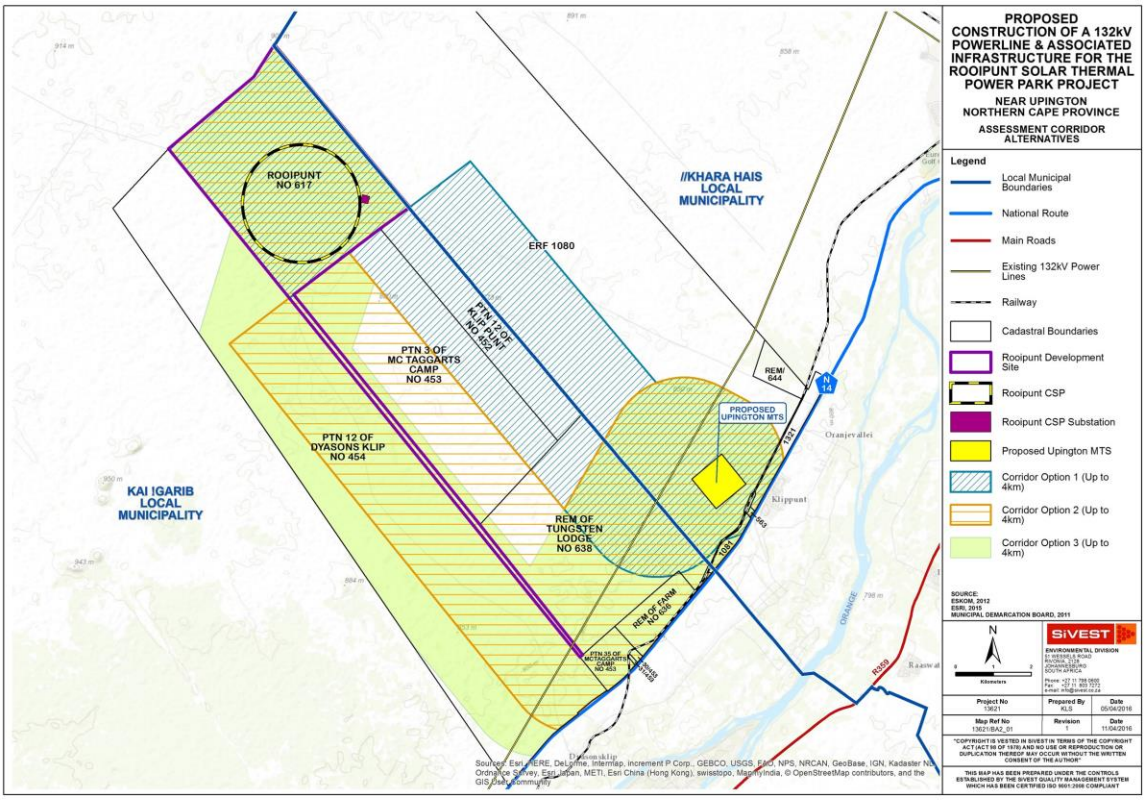

Figure i: Site Locality Map

The study area is located within the Northern Cape Province within the ZF Mgcawu District Municipality. The proposed project traverses two local municipalities, the Kai !Garib Municipality and the Khara Hais Local Municipality within the greater district. Land uses for the proposed project encompass mainly vacant land, industrial (renewable), agricultural farming activities and residential areas.

Several specialist studies were conducted during the BA process to identify issues or legislative implications associated with the proposed development. These include the following:

- Biodiversity Assessment (fauna and flora);
- Avi-fauna Assessment;
- Freshwater Assessment;
- Soils and Agricultural Potential Assessment;
- Heritage and Palaeontology Assessment;
- Visual Assessment; and
- Socio-Economic Assessment.

Table i: Specialist Findings Summary Table

Environmental Parameter	Summary of Major Findings	Recommendations
Biodiversity	In terms of flora, within the area affected by the proposed development, vegetation types that are affected include Kalahari Karroid Shrubland and Bushmanland Arid Grassland. Within these vegetation types however, a the specific habitat that are actually occurring within the proposed corridor alternatives include the following: ▪ Bushmaland Arid Grassland – Protected and listed species include *Hoodia gordonii*, *Adenium oleifolium*, *Avonia albissima* and *Euphorbia rudis* ▪ Kalahari Karroid Shrubland – Species of conservation concern are occasional *Hoodia gordonii* plants. Protected species include occasional individuals of *Boscia foetida*, *Boscia albitrunca* and *Acacia erioloba* ▪ Plains Wash – Aside from *Boscia foetida* which is fairly common in these areas, there are few listed or protected species ▪ Drainage Lines – Due to the ecological role that drainage lines play as well as their vulnerability to disturbance, these areas are considered sensitive and should be avoided as much as possible. Protected tree species are concentrated along the drainage lines with species such as *Boscia foetida*, *Boscia albitrunca* and *Acacia erioloba* being found largely within this habitat type ▪ Quartz Outcrops – This is a localised and specialised habitat that frequently contains associated species that are not found elsewhere. As such this is considered a sensitive habitat that should be avoided as much as possible. Species of concern associated with this habitat include *Dinteranthus wilmotianus*, *Lithops bromfieldii*, *Aloe claviflora, Larryleachia marlothii* and *Adenium oleifolium* In terms of fauna: ▪ The site falls within the distribution range of 46 terrestrial mammals, indicating that the mammalian	▪ Preconstruction walk-through of powerline route to identify and locate species of conservation concern that should be avoided or translocated. ▪ Affected individuals of protected species which cannot be avoided should be translocated to a safe area on the site prior to construction as far as practically possible. ▪ There are also additional species present which are either protected under the National Forests Act such as *Boscia albitrunca* and *Acacia erioloba* or protected under the Northern Cape Nature Conservation Act of 2009, which includes *Boscia foetida*, all *Mesembryanthemaceae*, all species within the *Euphorbiaceae*, *Oxalidaceae*, *Iridaceae*, all species within the genera *Nemesia* and *Jamesbrittenia*. ▪ Relevant permits (i.e. plant removal permit from NCPG DENC) should be obtained before translocation/destruction/removal of listed and protected plant or tree species takes place and before construction commences. ▪ Where the power line runs adjacent to existing power lines or access roads, the existing roads should be used and no additional permanent roads should be constructed for the power line.

	diversity in the area is of moderate potential. ▪ Three listed terrestrial mammals may occur at the site, the Honey Badger *Mellivora capensis* (Endangered), Brown Hyaena *Hyaena brunnea* (Near Threatened) and Black-footed cat *Felis nigripes* (Vulnerable). ▪ The site lies within the distribution range of 6 bat species, indicating that the richness of bats at the site is probably quite low. Within the affected area, only the vicinity of major drainage lines such as the Helbrandkloofspruit are likely to be frequently used by bats. ▪ According to the SARCA database, 40 reptile species are known from the area suggesting that the reptile diversity within the site is likely to be moderate to low. ▪ The site lies within the distribution range of 10 amphibian species. The only listed species which may occur in the area is the Giant Bullfrog *Pyxicephalus adspersus* which is listed as Near Threatened. The major impacts ecologically associated with the construction phase include impacts on vegetation and protected plant species as well as direct impacts on faunal species. Typical impacts can include vegetation clearing which may result in loss or removal of protected species where the power line cannot avoid these habitats/species locations. In terms of fauna, increased noise levels, pollution, disturbance and human presence may cause displacement, illegal collection (mammals or reptiles) or even death. For the operation phase, the main concern is during maintenance activities such as vegetation cleating which will create disturbance as well as making the affected areas susceptible to alien plant invasion. Finally, during the decommissioning and closure phase, the same impacts as identified for the construction phase are likely in addition to further impacts such as soil erosion for removal of structures. Overall, potential impacts on vegetation and faunal species are rated as medium to low in both the construction and operation phases, with the decommissioning and	

	closure phase being rated as low. After mitigation, all potential impacts can be reduced to low impacts. In terms of preference, the different options have large sections in common and ultimately, Alternative 2 and Alternative 3 are considered ecologically similar and not sufficiently different from one another to be considered significantly different in terms of their potential impacts. Alternative 1 is considered to be the preferred alternative due to its shorter length and fewer drainage lines that would need to be crossed and hence lower potential impact on vegetation within these more sensitive areas.	
Avi-fauna	An estimated 196 bird species could potentially occur in the study area of which 13 are classified as Red Data species. Red data species include the following: ▪ Martial Eagle (Polymoetus bellicosus) ▪ Secretary Bird (Sagittorius serpentarius) ▪ Kori Bustard (Ardeotis kori) ▪ Curlew Sandpiper (Colidris ferruginea) ▪ Lanner Falcon (Falco biomicus) ▪ Karoo Korhaan (Eupodotis vigorsii) ▪ Abdim's Stork (Ciconia abdimii) ▪ Black Stork (Ciconia nigra) ▪ Yellow-billed Stork (Mycteria ibis) ▪ Ludwig's Bustard (Meotis ludwigii) ▪ Greater Flamingo (Phoenicopterus roseus) ▪ Lesser Flamingos (Phoenicopterus minor) Potential impacts during the construction and decommissioning phase include the displacement of priority species and habitat transformation. Impacts are mainly negative but low. With mitigation, these impacts can be reduced further. For the operation phase, electrocutions and collissions of red data species is the primary potential impact. Potential impacts are rated as medium-low for all three alternative corridors. With mitigation, these potential impacts can be reduced to low levels, with the exception of Corridor Alternative 2 which will remain medium due to the potential waterbird movement between the evaporation ponds at the Khi Solar One CSP facility located in the corridor, which may put Flamingo (Greater and Lesser Flamingos), Black Stork,	▪ Construction and de-commissioning activities should be restricted to the immediate footprint of the infrastructure. ▪ Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of Red Data species. ▪ Measures to control noise and dust should be applied according to current best practice in the industry. ▪ Maximum used should be made of existing access roads and the construction of new roads should be kept to a minimum. ▪ The 132kV grid connection should be inspected at least once a quarter for a minimum of three years by the avifaunal specialist to establish if there is any significant collision mortality. Thereafter the frequency of inspections will be informed by the results of the first three years. ▪ The detailed protocol to be followed for the inspections will be compiled by the avifaunal specialist prior to the first inspection. ▪ The line should be marked with Bird Flight Diverters (BFDs) for its entire length on the earth wire of the line, 5m apart, alternating black

	Yellow-billed Stork, Abdim's Stork and Curlew Sandpiper at greater risk of collisions.	and white. ▪ All the steel monopoles should be fitted with bird perches.
Freshwater	Three primary hydrogeomorphic types were identified including well developed riparian systems (namely the Helbrandleegte and Helbrandkloofspruit Rivers), ephemeral drainage lines with riparian habitat and smaller, poorly defined episodic drainage lines without riparian vegetation. Summary of assessments undertaken applied to riparian resources include the following: ▪ Helbrandleegte: PES-C; EI & ES-B; REC-C; Intermediate Ecological Function and Service Provision; ▪ Helbrandkloofspruit: PES-C; EI & ES-B; REC-C; Intermediate Ecological Function and Service Provision; and ▪ Ephemeral drainage lines: PES-B; EI & ES-C; REC-B; Moderately Low Ecological Function and Service Provision. Types of impacts to the riparian systems included: ▪ Loss of riparian habitat and ecological structure; and ▪ Changes to riparian ecological and sociocultural service provision; ▪ Impacts on riparian hydrology and sediment balance. Overall significance after mitigation is a low negative impact after management and mitigation measure implementation. Based on the findings of the freshwater ecological assessment, it is clear that the proposed linear development is perceived to be a low-impact activity, posing limited risk to the ecological integrity of the identified riparian resources. Although the freshwater resources to be traversed by the proposed linear development are deemed to be in relatively natural to moderately modified condition, it is the opinion of the ecologists that with the implementation of good mitigation measures, the perceived impact of the proposed linear development on the freshwater resources can be effectively reduced. Therefore, from a riparian habitat resource conservation perspective, it is the opinion of the ecologists that the proposed linear development be considered favourably.	▪ Ensuring that during the design phase, cognisance is taken of the locality of identified riparian resources and their associated buffers, and as far as is practicable, to avoid the placement of infrastructure within those zones unnecessarily, and ensuring that the method of installation is as low impact as possible should crossings be absolutely unavoidable; ▪ Planning of temporary roads and access routes should avoid natural areas and be restricted to existing roads where possible. If it is not possible to avoid crossing the rivers and/or drainage lines, it must be ensured that the construction of such access roads are carried out in a responsible manner, i.e. by implementing mitigations to manage erosion, prevent impeding the flow of water along the system, and prevent sedimentation of the system as a result of the construction of such access roads; ▪ Should it be absolutely essential at certain crossings to place infrastructure within the riparian habitat, access to such riparian zones must be limited to essential personnel (and construction vehicles) and the boundaries thereof are to be clearly demarcated on site. No contract laydown areas are to be permitted within the riparian habitat or associated buffer zone; ▪ Due to the natural susceptibility of the soils in the area to erosion, care must be taken to ensure that as little vegetation as

	Following the assessment of perceived impacts, consideration was given as to the preferred corridor option from a riparian/watercourse conservation perspective. Corridor Option 1 is considered to be the preferred option, since this route will most likely impact on the least number of watercourses, and most importantly, will only traverse one riverine system, namely the Helbrandleegte River. Whilst Options 2 and 3 are favourable, both of these options will traverse both rivers, and therefore in order to minimise the cumulative impacts on the riparian ecology of the area, it would be preferable to avoid traversing both rivers.	possible is removed, and that all exposed soils as a consequence of construction activities must be suitably protected with a geotextile to prevent erosion and sedimentation of riparian resources; and ▪ Any riparian habitat directly impacted upon during construction activities must be immediately rehabilitated in accordance with the EMPr following the completion of such activities at that specific site.
Soils and Agricultural Potential	The proposed development is on land zoned and used for agriculture. Soils on the site are shallow to moderately deep, red, sandy soils overlying rock or hard pan carbonate (Hutton, Mispah and Coega soil forms). They also include smaller areas of deep, very sandy soils and an area with a high proportion of rock outcrop. The major limitation to agriculture is the limited climatic moisture availability. The low water holding capacity and limited depth of the soils are further limitations. As a result, the site is predominantly unsuitable for cultivation and agricultural land use is limited to grazing. The land capability is classified as predominantly Class 7 - non-arable, low potential grazing land. The site has a low grazing capacity predominantly of 31-40 hectares per large stock unit. Cultivated table grapes along the south eastern boundary of the site is considered an area of high agricultural sensitivity. Any infrastructure on the ground must avoid this area, although the overhead power lines can cross it without impact. There are three factors that limit the significance of all potential agricultural impacts. The first is that the actual footprint of disturbance of the proposed powerline is very small in relation to available, surrounding land. The second is that the impact of a pipeline on the kind of agricultural activity (predominantly grazing)	▪ Recommended mitigation measures include implementation of an effective system of storm water run-off control to mitigate erosion; and topsoil stripping and re-spreading to mitigate loss of topsoil.

	along the proposed development is very minimal. The third factor is that the site has very low agricultural potential, limited by severe climatic moisture availability constraints and soils that include shallow ones. Four potential negative impacts of the development on agricultural resources and productivity were identified as: ▪ Loss of agricultural land use caused by direct occupation of land by the footprint of the powerline infrastructure. ▪ Soil Erosion caused by alteration of the surface characteristics. ▪ Loss of topsoil in disturbed areas, causing a decline in soil fertility. ▪ Degradation of veld vegetation beyond the direct footprint due to constructional disturbance, dust and vehicle trampling. All impacts were assessed as having low significance. Recommended mitigation measures include implementation of an effective system of storm water run-off control to mitigate erosion; and topsoil stripping and re-spreading to mitigate loss of topsoil. Because of the low agricultural potential of the site and resultant low agricultural impacts, the development should, from an agricultural impact perspective, be authorised. Because of the low impacts and the uniformly low potential of the site, there is no preference between the three corridor alternatives.	
Heritage and Palaeontology	Heritage Findings: An archival and historical desktop study was undertaken which was used to compile a historical layering of the study area within its regional context. This component indicated that the landscape within which the project area is located has a rich and diverse history. The desktop assessment identified numerous heritage studies conducted within the assessment area, however none of the heritage resources identified outside of the original SolarRserve Rooipunt Solar Thermal Power Park Project study area is of high heritage significance and no further mitigation will be required on these.	Heritage recommendations ▪ Mitigation would be required if the development came closer than 50 m to the abandoned mine. ▪ In this case the heritage resource should be photographed and drawn to record the details of its construction before destruction. ▪ The documentation should be archived on SAHRIS and with the MacGregor Museum, Kimberley.

	The mitigation measures as identified for the heritage resources inside the SolarRserve Rooipunt CSP Project study area are still valid and must be applied as per the EMPr for the development. These desktop studies were followed by a fieldwork component that comprised driving and walking through the study area. Only one heritage resource (DYK001) of significance was identified in the assessment area. Mitigation is as follows: ▪ Mitigation would be required if the development came closer than 50 m to the abandoned mine. ▪ In this case the heritage resource should be photographed and drawn to record the details of its construction before destruction. ▪ The documentation should be archived on SAHRIS and with the MacGregor Museum, Kimberley. Palaeontological Findings: Should outcrop areas of potentially fossiliferous ancient Orange River alluvial gravels be identified (e.g. during geotechnical investigations) within the development footprint, however, these should be assessed by a professional palaeontologist before construction commences. The purposes of the field assessment study would be (a) to identify the rock units actually present, (b) to carry out judicious sampling of any fossil heritage currently exposed, together with pertinent geological and palaeontological data, (c) to determine the likely impact of the proposed development on local fossil heritage based on the new field-based information, and finally (d) to make recommendations for any no-go areas, buffer zones or further palaeontological mitigation deemed necessary for this project (e.g. comprehensive pre-construction sampling of near-surface surface fossil material, palaeontological monitoring of excavations). Note that further mitigation may be most useful during the construction phase of the development while fresh, potentially fossiliferous bedrock is still exposed. Overall Impact Statement: The overall impact evaluation has shown that the pre-mitigation impact on heritage resources is rated as High negative.	▪ The mitigation measures as identified for the heritage resources inside the SolarRserve Rooipunt CSP Project area are still valid and must be applied as per the EMPr for the development. Palaeontology recommendations ▪ Should outcrop areas of potentially fossiliferous ancient Orange River alluvial gravels be identified (e.g. during geotechnical investigations) within the development footprint, these should be assessed by a professional palaeontologist before construction commences. The purposes of the field assessment study would be: (a) to identify the rock units actually present, (b) to carry out judicious sampling of any fossil heritage currently exposed, together with pertinent geological and palaeontological data, (c) to determine the likely impact of the proposed development on local fossil heritage based on the new field-based information, and finally (d) to make recommendations for any no-go areas, buffer zones or further palaeontological mitigation deemed necessary for this project (e.g. comprehensive pre-construction sampling of near-surface surface fossil material, palaeontological monitoring of excavations). ▪ The ECO responsible for the development should be aware of the possibility of important fossils being present or unearthed on site and should monitor all substantial excavations into fresh (i.e. unweathered) sedimentary bedrock for fossil remains;

	However, with the implementation of the recommended mitigation measures, this will reduce the potential impact to a low negative impact. There is no preference between all three alternative corridors provided for assessment.	▪ In the case of any significant fossil finds (e.g. vertebrate teeth, bones, burrows, petrified wood, calcretised termitaria) during construction, these should be safeguarded - preferably in situ - and reported by the ECO as soon as possible to the relevant heritage management authority (South African Heritage Resources Agency. Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Phone: +27 (0)21 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that any appropriate mitigation by a palaeontological specialist can be considered and implemented, at the developer's expense; ▪ The palaeontologist concerned with mitigation work will need a valid collection permit from SAHRA. All work would have to conform to international best practice for palaeontological fieldwork and the study (e.g. data recording fossil collection and curation, final report) should adhere to the minimum standards for Phase 2 palaeontological studies recently published by SAHRA.
Visual	The Visual Impact Assessment (VIA) conducted for the proposed 132kV power line and associated infrastructure has demonstrated that majority of the study area has a natural visual character, typical of a rural environment. It should be noted that the southern, south-eastern and eastern parts of the study area found along the N14 are characterised by a more visually degraded landscape, which is mostly attributed to the presence of large-scale commercial cultivation as well as informal/semi-formal settlements and residential areas/communities. Certain parts of the study area in this area are however still largely characterised by a	▪ Recommended mitigation measures to be implemented.

	pastoral environmental where commercial cultivation prevails and will be less visually degraded than the peri-urban developed areas found along the N14. The visual character in these areas is thus typical of a rural or pastoral environment. The study area forms part of the Kokerboom Food & Wine Route and is therefore valued or utilised for its natural scenic or tourism potential. Despite this, relatively few tourism, historical or culturally significant sensitive receptors were identified during the fieldwork. A desktop investigation revealed that several farmsteads are also present within the study area which may perceive the proposed power line and associated infrastructure to be an unwelcome intrusion, depending on the perception of the viewer The assessment revealed that a negligible or low visual impact would typically be experienced from most areas beyond 1km of the proposed development and within 1km of the proposed development a moderate visual impact would typically be experienced. The impact assessment revealed that the significance of the visual impacts resulting from the proposed power line and associated infrastructure would be low during the construction phase and medium during the operational phase. These potential impacts can be mitigated to acceptable levels provided the recommended mitigation measures are implemented. Based on the alternatives comparative assessment, Corridor Option 1 (Blue) is considered to be the preferred alignment for the proposed power line while Corridor Option 2 (Purple) and Corridor Option 3 (Green) are considered to be favourable alignments.	
Socio-Economic	The review of the relevant policy documents concluded that there is no conflict between the establishment of the proposed project and spatial plans of the province or local municipalities. On the contrary, the project will contribute to the national objective of diversifying electricity-generating capacity through the development of renewable sources of energy, including concentrated solar energy. The Northern Cape sees the	▪ The potentially directly affected and interested parties interviewed have not expressed objections to the project. However, it is important that these parties be properly consulted before choosing the final powerline route and servitudes before construction commences in order to not affect any

	promotion of renewable energy projects as a means to unlock the economic potential of the province, and the municipalities concerned have identified solar energy projects among the driving forces of their respective economies. This is further highlighted in the baseline analysis, which shed light on the notable growth of contribution of the utilities and construction sectors towards the economic development and job creation in both municipalities in the past few years. The impact analysis stresses some positive impacts that could be derived during the construction phase of the project. These include positive impacts on the economy, employment and household incomes. The proposed development will also have a positive impact on the reduction of electricity transmission losses through the connection of the CSP plant to the grid and subsequently, dispersing electricity generation capacitates throughout the country. While the affected and interested parties that were interviewed have not expressed major concerns nor objection to the project, it is important that these parties be properly consulted before choosing the power line route in order to not affect any commercial farming activities or future industrial projects happening on those properties. Overall, all of the Corridor Alternatives received the same average scores for positive impacts for both before and after mitigations measures. Corridor Alternative 1 however received a slightly lower average score for negative impacts for both before and after mitigations. Corridor Alternative 1 appears to be slightly more preferred from a socio-economic perspective than the other two alternatives.	commercial farming activities or future industrial projects happening on those properties. ▪ This will be undertaken by SolarReserve as part of the commnercial and contractual process when obtaining servitudes from the affected landowners.

An impact assessment was conducted to ascertain the level of each identified impact, as well as mitigation measures which may be required. The potential positive and negative impacts associated within these studies have been evaluated and rated accordingly. The results of the specialist studies have indicated that no fatal flaws exist as a result of the proposed development.

In terms of the environmentally preferred alternative power line corridors, the following was selected after a comparative assessment was undertaken:

Corridor Alternative 1 (Blue – Preferred)

There is not much difference in terms of preference with regards to soils and agricultural potential as well as heritage and palaeonotology. However, there are similarities in the selection of preferred alternatives (Corridor Alternative 1) with regards to biodiversity, wetlands, socio-economic and visual studies. All of the aforementioned studies do however note little difference in preference for the remaining corridor alternatives. However, avi-fauna identifies an alternative as not preferred, that being Corridor Alternative 2. As such, the selection of Corridor Alternative 1 as the preferred option was made taking into account the following:

- Less sensitive habitat to be physically affected;
- Lower risk of avi-fauna collision mortality;
- Least number of watercourses (ephemeral and episodic drainage systems) to be affected and will only traverse one river system (Helbrandleegte River);
- Only one heritage resources of high significance was identified along the proposed corridor. The width of the corridor makes it possible to design the final alignment to avoid the identified heritage resource.
- More direct and shorter route and thus less physical impact (reduced footprint);
- Reduced potential negative socio-economic impacts;
- Farthest from closest visual sensitive receptor location (Bezalel Wine and Brandy Estate); and
- More economically viable being the shorter more direct route.

A thorough Public Participation Process (PPP) is underway as part of the BA. During this process on-going consultation is taking place with various key stakeholders and organs of state, which include provincial, district and local authorities, relevant government departments, parastatals and Non-Governmental Organisations (NGO's).

Through the findings of the BA process and report, it is the opinion of the Environmental Assessment Practitioner (EAP) that the proposed project should be allowed to proceed provided that the recommended mitigation measures are implemented, and provided the following conditions are adhered to:

- All mitigation measures recommended by the various specialists should be strictly implemented.
- Final Environmental Management Programme (EMPr) should be approved by the DEA prior to construction.

SOLARRESERVE SOUTH AFRICA (PTY) LTD

PROPOSED CONSTRUCTION OF UP TO A 132KV POWER LINE AND ASSOCIATED INFRASTRUCTURE FOR THE SOLAR RESERVE ROOIPUNT SOLAR THERMAL POWER PARK PROJECT NEAR UPINGTON, NORTHERN CAPE PROVINCE

DRAFT BASIC ASSESSMENT REPORT

Contents

List of Appendices

List of Abbreviations

ASAPA	Association of South African Professional Archaeologists
BA	Basic Assessment
BAR	Basic Assessment Report
BFD	Bird Flight Diverter
C&RR	Comments and Response Report
DAFF	Department of Agriculture, Forestry and Fisheries
DEA	Department of Environmental Affairs
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
EMPr	Environmental Management Programme
GIS	Geographic Information System
GN	Government Notice
HIA	Heritage Impact Assessment
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
NEMA	National Environmental Management Act, 1998 (Act No.107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
NFA	National Forests Act, 1998 (Act No. 84 of 1998)
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NWA	National Water Act, 1998 (Act No. 36 of 1998)
PPP	Public Participation Process
PV	Photovoltaic
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SANRAL	South African National Roads Agency SOC Limited
SDF	Spatial Development Framework
SG	Surveyor General
SHEQ	Safety, Health, Environment and Quality

SOLARRESERVE SOUTH AFRICA (PTY) LTD

PROPOSED CONSTRUCTION OF UP TO A 132KV POWER LINE AND ASSOCIATED INFRASTRUCTURE FOR THE SOLAR RESERVE ROOIPUNT SOLAR THERMAL POWER PARK PROJECT NEAR UPINGTON, NORTHERN CAPE PROVINCE

DRAFT BASIC ASSESSMENT REPORT

INTRODUCTION

On the 30th September 2015, SolarReserve South Africa (Pty) Ltd (hereafter referred to as, "SolarReserve") received environmental authorization (EA – DEA Ref: 12/12/20/248804; NEAS Ref: DEA/EIA/0000894/2012) for the proposed 200MW Concentrated Solar Power (CSP) Plant on the Farm Rooipunt 617 near Upington in the Northern Cape Province (the "SolarReserve Rooipunt CSP Project"). SolarReserve are also in the process of applying for environmental authorisation for the Proposed Rooipunt Photovoltaic (PV) Solar Power Park Phase 1 on Portion 0 of the Farm Rooipunt 617 (DEA Ref: 12/12/20/2488/01), as well as for the Proposed Rooipunt Photovoltaic (PV) Solar Power Park Phase 2 on Portion 0 of the Farm Rooipunt 617, near Upington in the Northern Cape Province (DEA Ref: 12/12/20/2488/02). These three components will form the greater Rooipunt Solar Thermal Power Park on the Farm Rooipunt 617 near Upington, Northern Cape Province (hereafter referred to as the "Rooipunt Solar Thermal Power Park Project").

In order to evacuate the electricity generated by the SolarReserve Rooipunt Solar Thermal Power Park Project, a grid connection solution will be assessed. SolarReserve appointed SiVEST, as the independent Environmental Assessment Practitioner (EAP), to undertake the required Basic Assessment (BA) processes for the proposed 132kV power line and associated infrastructure in the Northern Cape Province ("the proposed project").

1. PROJECT DESCRIPTION

The proposed project will comprise of the following:

- Construction of one Tern power line of up to 132kV from the proposed Rooipunt Solar Thermal Power Park Project. The grid connections that will be assessed include the following:
  - Corridor Option 1 (Blue) = approximately 17km in length;
  - Corridor Option 2 (Orange) = approximately 22km in length; and
  - Corridor Option 3 (Green) = approximately 24km in length.
- Install 48 core optical ground wire (OPGW) on the line
- Build 2 bay substations next to approved substations on the Rooipunt CSP Project site. Proposed substations will be approximately 100m x 100m

- Inclusive of all cable trenches
- Install 3 x 25m lighting/lightning masts
- Building of an access road to the substation
- Building of a standard control room (5.5m x 12m) with top entry and cable racks. This will include a sewage system, air-conditioning and energy efficient lighting
- Installation of a security fence with entrance gates
- 1 x 132kV line bay and 1 x 132kV metering bay
- Installation of a required Control Plant, AC/DC, Metering, SCADA and Telecoms
- V drain extension of substation for drainage purposes
- And or all extensions required (132kV yard, fencing etc.) of the connecting Eskom Assets i.e. Solar MTS

The location of the proposed substations will be adjacent to the on-site substations of the approved layout of the SolarReserve Rooipunt CSP Project, authorized under the EA (DEA Ref: 12/12/20/248804). The footprint of the proposed substations would be approximately 10 000m².

Three power line alternative corridors have been identified which will be assessed as part of the BA process. The three corridors are up to 4km (2km either side of the centre line) wide originating from the SolarReserve Rooipunt CSP Project site and routed to the Proposed Eskom Upington Transmission Substation. These three corridors will serve as alternatives to each other for comparative assessment. The registered servitude width will be 31 metres (15.5 metres either side of the centre line), positioned within the 2km assessment corridor. The three power line corridors include the following:

- Corridor Option 1 (Blue) = approximately 17km in length;
- Corridor Option 2 (Orange) = approximately 22km in length; and
- Corridor Option 3 (Green) = approximately 24km in length.

The proposed power line will also include the establishment of all associated infrastructure as required (including but not limited to access roads, control rooms, security systems, network integration infrastructure etc.).

A Site Locality Map for the proposed project has been provided in Figure 1 below.

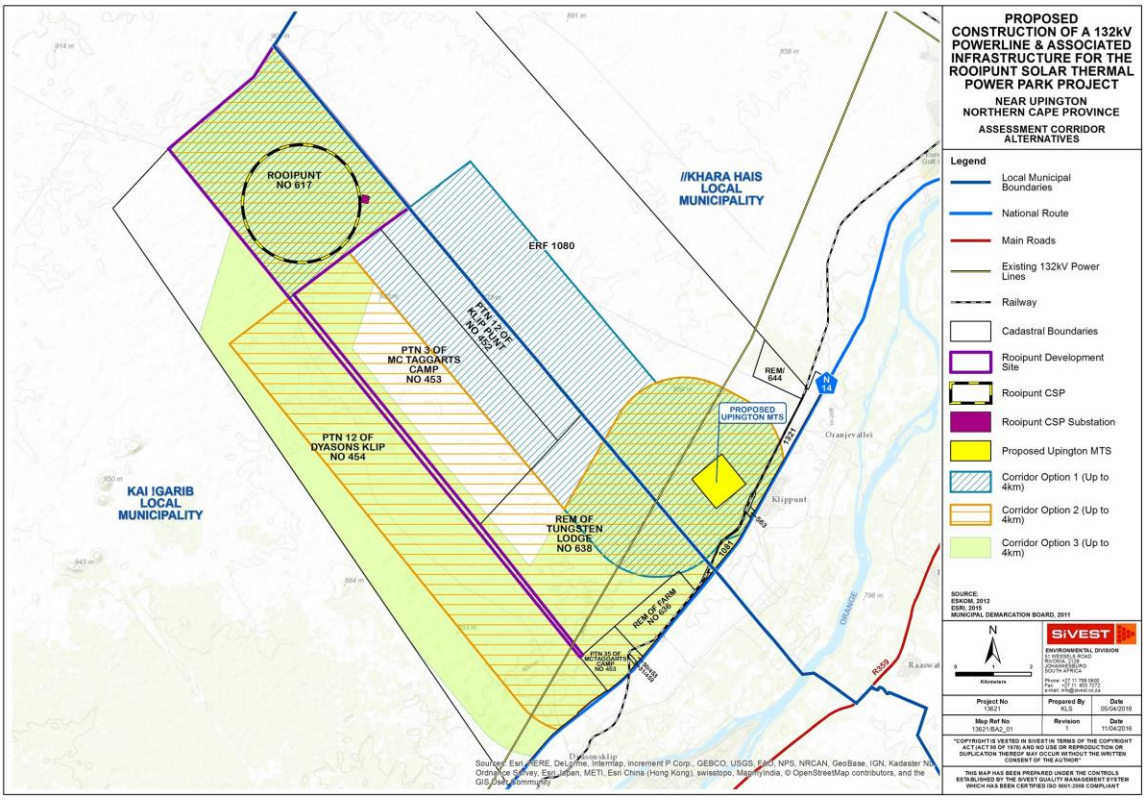

Figure 1: Site Locality Map

2. BRIEF DESCRIPTION OF THE RECEIVING ENVIRONMENT

The study area is located within the Northern Cape Province within the ZF Mgcawu District Municipality. The proposed project traverses two local municipalities, the Kai !Garib Municipality and the Khara Hais Local Municipality within the greater district.

Accessibility is mainly form the N14 highway to the south west of Upington (Figure 2). The Orange River can be found to the south east of the proposed water pipeline alternative corridors. In general, many small ephemeral watercourses can be found in the local area.

Land uses (Figure 3) for the proposed project encompass mainly vacant land, industrial (renewable), agricultural farming activities and residential areas.

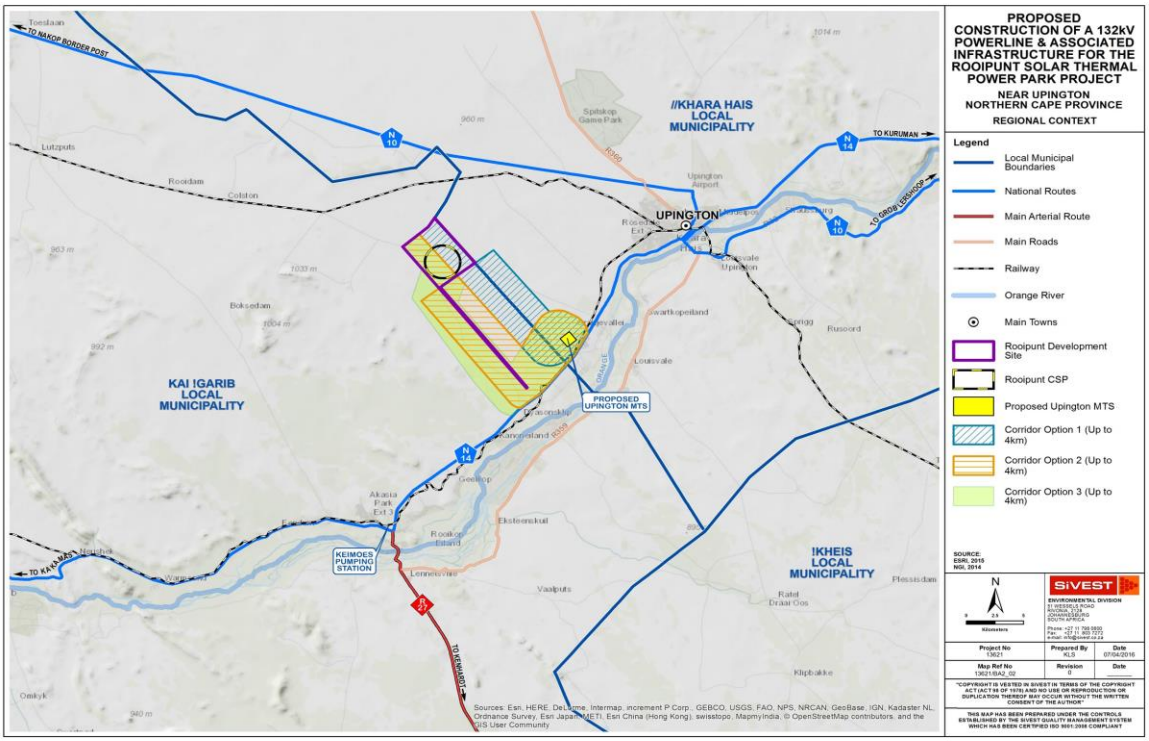

Figure 2: Regional Locality Map

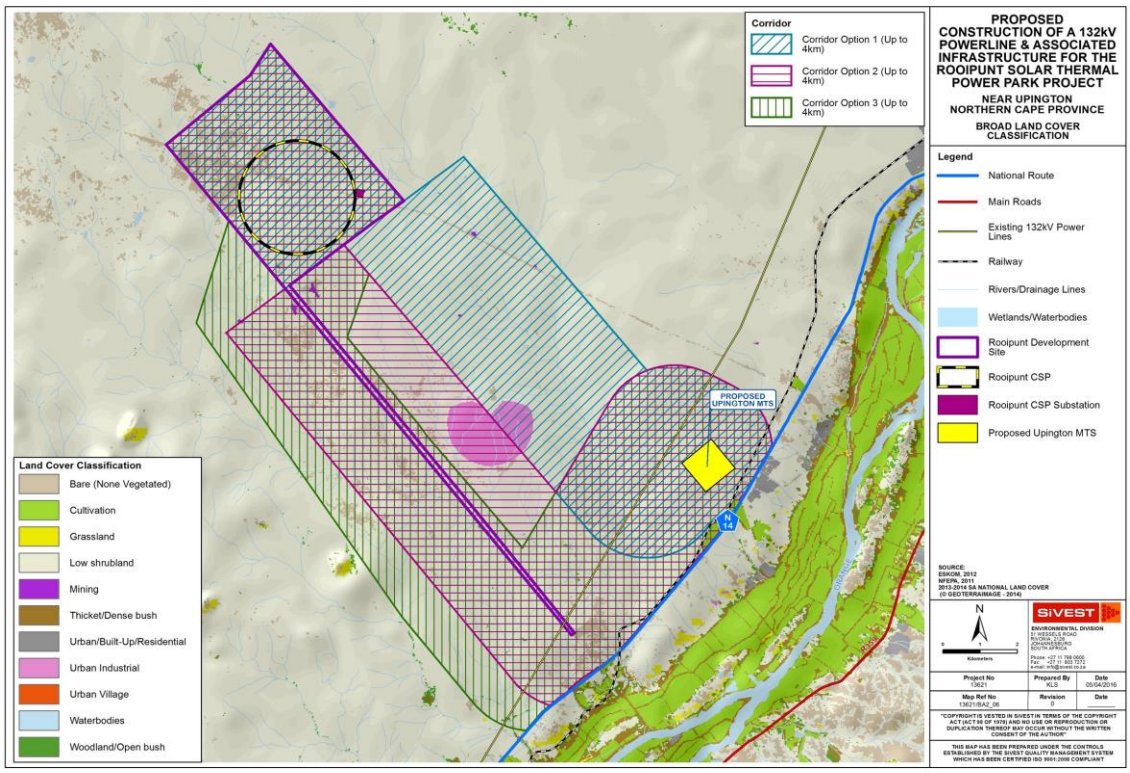

Figure 3: Land Use Map

3. EXPERTISE OF ENVIRONMENTAL ASSESSMENT PRACTITIONER

The proposed project requires Environmental Authorisation (EA) from the Department of Environmental Affairs (DEA). However, the provincial authority will also be consulted (i.e. the Northern Cape Provincial Government Department of Environment and Nature Conservation). The EIA for the proposed development will be conducted in terms of the EIA Regulations promulgated in terms of Chapter 5 NEMA (National Environmental Management Act), which came into effect on the 8th of December 2014 as amended. In terms of these regulations, a Basic Assessment (BA) is required for the proposed project. All relevant legislations and guidelines (including Equator Principles) will be consulted during the BA process and will be complied with at all times.

SiVEST has considerable experience in the undertaking of BAs. Staff and specialists who have worked on this project and contributed to the compilation of this draft Basic Assessment Report (DBAR) are detailed in Table 1 below.

Table 1**:** Project Team

Name and Organisation	Role
Kelly Tucker – SiVEST	Project Director
Shaun Taylor – SiVEST	Environmental Assessment Practitioner (EAP) Public Participation Practitioner
Kerry Schwartz – SiVEST	GIS and Mapping and Visual
Simon Todd – Simon Todd Consulting cc	Biodiversity
Scientific Aquatic Services (SAS) – Stephen Van Staden	Surface Water
Johann Lanz – Independent consultant	Agricultural Potential
Wouter Fourie – Professional Grave Solutions (Pty) Ltd	Heritage and Palaeontology
Elena Broughton, Helene Debbari – Urban-Econ Development Economists	Socio-economic
Riaan Barnard – Continuum	Public Participation Practitioner

As per the requirements of the NEMA (2014), the details and level of expertise of the persons who prepared the DBAR are provided in Table 2 below.

Table 2: Expertise of the EAP

Environmental Project Manager	SiVEST (Pty) Ltd – Kelly Tucker
Contact Details	kellyt@sivest.co.za
Qualifications	B.Sc. Earth Sciences, B.Sc. Hons Geography and Environmental Management, M. Sc. Environmental Management, Diploma in Advanced Project Management
Expertise to carry out the BA & EMPr	Kelly is an Environmental Scientist with 10 years' experience across various sectors. She specialises in the overall management and compilation of

	Environmental Impact Assessments (EIAs) and Environmental Management Programmes (EMPs) primarily related to mining, energy generation and electrical transmission projects. She furthermore has been involved in undertaking and managing Public Participation Processes, Consultation, Environmental Scans and Fatal Flaw / Feasibility Studies and independent review of environmental projects. She has been involved in numerous projects to which these skills have been applied. **Environmental Impact Assessments and Environmental Management Programmes:** ▪ Colenso Power EIA and Mining Application for new Coal fired power station and Coal mine in Coleso near Ladysmith in KwaZulu Natal (2013 – current). ▪ Basic Assessment and Waste License Application for the proposed new Iveco manufacturing plant, Rosslyn, South Africa (2013 – current). Environmental Advisory Services for the Moloto Development Corridor (MDC) Project which is located between the City of Tshwane Local municipality in Gauteng Province and Groblersdal, Limpopo Province, traversing Mpumalanga Province. Project Leader, SMEC/VelaVKE, 2012 - Current ▪ Environmental Advisory Services for the Moloto Development Corridor (MDC) Project which is located between the City of Tshwane Local municipality in Gauteng Province and Groblersdal, Limpopo Province, traversing Mpumalanga Province. Project Leader, SMEC/VelaVKE, 2012 - Current ▪ 3 Year Appointment: Environmental Management Compliance for the Integrated Rapid Transit project for Polokwane Municipality. Project Leader, City of Polokwane, 2013 - Current ▪ EIA and EMPr for the proposed 150 MW Renosterberg Wind Energy Company (RWEC) Wind Farm and 75 MW Solar Photovoltaic (PV) Plant, Northern Cape Province. The EIA includes the scoping process and detailed environmental impact assessment. The project includes detailed specialist studies such as social, visual, noise, heritage and biophysical as well as a full public participation process. RWEC, 2012 - Current ▪ EIA and EMP for the new proposed Nsoko Integrated Sugar Mill and Ethanol Plant for Nsoko Msele, in Swaziland (2013). ▪ BA and EMP for the Proposed Bulk Storage Fuel Oil Tank installation at the Grootvlei Power Station, Mpumalanga Province (2011) ▪ BA for the Proposed development of a 19MW Photovoltaic Solar Power Plant near Kimberley, Northern Cape Province (2012); ▪ BA for the Proposed development of a 19MW Photovoltaic Solar Power Plant near Danielskuil, Northern Cape Province (2012); ▪ EIA for the proposed Wind Energy and PV Facilities for Mainstream

	Renewable Power near Loeriesfontein, Northern Cape (2011 – 2012). ▪ EIA for the proposed Wind Energy and PV Facilities for Mainstream Renewable Power near Prieska, Northern Cape (2011 – 2012). ▪ EIA for the proposed Wind Energy and PV Facilities for Mainstream Renewable Power near Noupoort, Northern Cape (2011 – 2012). ▪ EIA for the proposed CSP and PV Facilities for Mainstream Renewable Power near Kimberley, Northern Cape (2011).
Environmental Assessment Practitioner	SiVEST (Pty) Ltd – Shaun Taylor
Contact Details	shaunt@sivest.co.za
Qualifications	BA Geography and Environmental Science, B. Sc. Hons Geography and Environmental Studies, M. Sc.
Expertise to carry out the BA and EMPr	Shaun has 8 years' work experience and specialises in undertaking and managing Environmental Impact Assessments (EIAs), Basic Assessments (BAs) and Environmental Management Programmes (EMPrs), primarily related to energy generation (renewable) and linear electrical distribution projects. He also specialises in undertaking wetland and riparian assessments, by making use of field based methodologies/surveys and ArcGIS technology. He has experience in overseeing public participation and stakeholder engagement processes, and has been involved in environmental baseline assessments, fatal flaw / feasibility assessments and environmental negative mapping / sensitivity analyses. From a business and administrative side, Shaun is actively involved in maintaining good client relationships, mentoring junior staff and maintaining financial performance of the projects he leads. **Environmental Impact Assessments and Basic Assessments:** ▪ BA for the Proposed Installation of a 500m³ Bulk Storage Fuel Oil Tank at Grootvlei Power Station, Mpumalanga Province; ▪ BA for the Proposed development of a 19MW Photovoltaic Solar Power Plant near Kimberley, Northern Cape Province; ▪ BA for the Proposed development of a 19MW Photovoltaic Solar Power Plant near Danielskuil, Northern Cape Province; ▪ BA for the Frankfort Strengthening Project: 88kV Power Line from Heilbron (via Frankfort) to Villiers, Free State Province; ▪ BA for the Wilger 132kV Overhead Distribution Power Line, Northern Cape Province; ▪ BA for the Limestone 1 – 132kV Overhead Distribution Power Line, Northern Cape Province; ▪ BA for the Limestone 2 – 132kV Overhead Distribution Power Line, Northern Cape Province; ▪ BA for the Proposed Tweespruit to Welroux Power Line and Substations, Free State Province;

	▪ BA for the Sir Lowry's Pass River Flood Alleviation Project, Western Cape Province; ▪ EIA for the Loeriesfontein 70MW Photovoltaic and 132kV Power Line, Northern Cape Province; ▪ EIA for the Mookodi Integration Project Environmental Impact Assessment; ▪ EIA for the Noupoort Wind Farm, Northern Cape Province; ▪ EIA for the Loeriesfontein Wind Farm and PV Plant, Northern Cape Province; ▪ EIA for the Renosterberg Wind Farm and PV Plant near De Aar, Northern Cape Province.

4. BASIC ASSESSMENT REPORT STRUCTURE

- **Section A** describes the activity and technical project components, including the proposed alternatives, location and physical size of the activity. This section also provides an activity motivation by describing the need and desirability for the proposed project. Section A expands on the legal ramifications applicable to the project and describes relevant development strategies and guidelines. Finally the section explains the infrastructural requirements of the proposed project such as waste, effluent, emission water use and energy efficiency.
- **Section B** provides a description of the site and region in which the proposed development is intended to be located. Although the chapter provides a broad overview of the region, it is also specific to the application.
- **Section C** describes the Public Participation Process (PPP) undertaken during the Basic Assessment and tables issues and concerns raised by Interested and Affected Parties (I&APs).
- **Section D** identifies potential issues associated with the proposed project by outlining the impacts that may result from the planning, design, construction, operational, decommissioning and closure phases. Section D also provides a description of the mitigation and management measures for each potential impact. The section concludes with an Environmental Impact Statement which summarises the impacts that the proposed development may have on the environment.
- **Section E** outlines the recommendations of the Environmental Assessment Practitioner (EAP).

5. ASSUMPTIONS AND LIMITATIONS

The following assumptions and limitations have been taken into account when compiling this DBAR:

- It is assumed that all technical information provided by SolarReserve is technically acceptable and accurate;
- The proposed development is still in the planning stages and therefore some of the specific technical details are not available;
- The following assumptions, uncertainties and gaps in knowledge were encountered by various specialists:
    - **Biodiversity**
        - Ideally, a site should be visited several times during different seasons to ensure that the full complement of plant and animal species present are captured. However, this is rarely possible due to time and cost constraints and therefore, the representivity of the species sampled at the time of the site visit should be critically evaluated. Although not all parts of the affected area had been sampled in the past, large sections of the pipeline corridors fall within areas that have been sampled multiple times, with the result that good temporal distribution of sampling effort on these sections has been achieved and the large amount of work done in the areas means that the ecological patterns of the area are well known to the consultant and the uncertainty associated with the field study is considered very low. As a result, the timing and duration of the site visit is not seen to pose a constraint on the results of the study and it is unlikely that any significant features or species would be revealed by additional site visits.
        - The lists of amphibians, reptiles and mammals for the site are based on those observed at the site and on adjacent properties as well as those likely to occur in the area based on their distribution and habitat preferences. In order to counter the likelihood that the area has not been well sampled in the past and in order ensure a conservative approach, the species lists derived for the site were obtained from an area significantly larger than the study area and are likely to include a much wider array of species than actually occur at the site. This is a cautious and conservative approach which takes the study limitations into account.
    - **Avi-fauna**
        - A total of 35 SABAP2 data cards have been completed to date for the area indicated in Figure 2, which should provide a reasonably accurate snapshot of the avifauna in the study area.
        - The author has worked extensively on avifaunal impact assessments in the Northern Cape area in the past 20 years. Personal observations and past experience have therefore also been used to supplement the data that is available from SABAP2, and has been used extensively in identifying likely bird/habitat associations.
        - Predictions in this study are based on experience of these and similar species in different parts of South Africa. Bird behaviour can never be entirely reduced to formulas that will hold true under all circumstances; therefore, professional judgment played an important role in this assessment. It should also be noted that the impact of power lines on birds has been well researched with a robust body of published research stretching over thirty years.
        - The focus of the study is on the potential impact on Red Data avifauna.

- **Wetlands**
  - The freshwater assessment is confined to the linear development and does not include the neighbouring and adjacent properties, which were only considered as part of the desktop assessment;
  - The freshwater resource delineations as presented in this report are regarded as a best estimate of the freshwater resource boundaries based on the site conditions present at the time of assessment. Global Positioning System (GPS) technology is inherently inaccurate and some inaccuracies due to the use of handheld GPS instrumentation may occur. If more accurate assessments are required the freshwater resource zones will need to be surveyed and pegged according to surveying principles;
  - Limitations in the accuracy of the delineation in some areas due to anthropogenic disturbances such as the presence of roads and agricultural activities are deemed possible and therefore the delineations presented in this report are regarded as a best estimate of the riparian habitat boundaries based on site conditions present at the time of the assessment. The presented delineations are however considered to be accurate;
  - Due to the landscape in some areas being rugged and very undeveloped and with many freshwater resources occurring on extensive private properties with limited access, some freshwater resources were inaccessible. Therefore, verification points for freshwater resources were located at points as close to the freshwater resource to be verified as possible and where necessary the conditions at the exact point required were inferred or extrapolated;
  - Riparian and terrestrial zones create transitional areas where an ecotone is formed as vegetation species change from terrestrial to wetland species. Within this transition zone some variation of opinion on the freshwater resource boundary may occur however if the DWAF 2008 method is followed, all assessors should get largely similar results; and
  - With ecology being dynamic and complex, certain aspects (some of which may be important) may have been overlooked. It is, however, expected that the proposed development activities have been accurately assessed and considered, based on the field observations undertaken and the consideration of existing studies and monitoring data in terms of freshwater ecology.
- **Soils and Agricultural Potential**
  - The land type data used for this assessment is considered more than adequate for the purposes of this study and is therefore not seen as a limitation. A more detailed soil investigation is not considered likely to have added anything significant to the assessment of agricultural soil suitability for the purposes of determining the impact of the facility on agricultural resources and productivity.
  - The assessment rating of impacts is not an absolute measure. It is based on the subjective considerations and experience of the specialist, but is done with due regard and as accurately as possible within these constraints.
  - There are no other specific constraints, uncertainties and gaps in knowledge for this study.
- **Heritage and Palaeontology**

- Not detracting in any way from the comprehensiveness of the fieldwork undertaken, it is necessary to realise that the heritage resources located during the fieldwork do not necessarily represent all the possible heritage resources present within the area. Various factors account for this, including the subterranean nature of some archaeological sites. As such, should any heritage features and/or objects not included in the present inventory be located or observed, a heritage specialist must immediately be contacted.
- Such observed or located heritage features and/or objects may not be disturbed or removed in any way, until such time that the heritage specialist has been able to make an assessment as to the significance of the site (or material) in question. This applies to graves and cemeteries as well. In the event that any graves or burial places are located during the development, the procedures and requirements pertaining to graves and burials will apply.

o **Visual**

- The identification of visual receptors has been based on a combination of desktop assessment as well as field-based observation. Due to the extensive area covered by the proposed power line and the limited access to properties within the study area, not all receptor locations were visited during the fieldwork. As such, a number of broad assumptions have been made in terms of the visual intrusion of the proposed power line from each receptor location and the sensitivity of the receptor 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 type of facility and standard use, which could not be established at a desktop level. Visual perception may also depend on several factors including the age, gender, activity preferences and traditions of the viewer (Barthwal, 2002). Homesteads / farmsteads in a largely natural setting were assumed to be more sensitive from a visual perspective than those in a more urbanised / industrial settings and were therefore included as potentially sensitive visual receptor locations that may be visually exposed to the proposed development.
- A matrix has been developed to assist with the assessment of the potential visual impact at each sensitive receptor location. The limitations of quantitatively assessing a largely subjective or qualitative type of impact should be noted. The matrix is relatively simplistic in considering five main parameters relating to visual impact, but provides a reasonably accurate indicative assessment of the degree of visual impact likely to be exerted on each sensitive receptor location by the proposed power line. The matrix should therefore be seen as a representation of the likely visual impact at each sensitive receptor location. An assessment of the visual impact from each potentially sensitive location is beyond the scope of this Visual Impact Assessment that is being undertaken as part of the Basic Assessment study.
- Although, most human habitation occurs in areas surrounding the urban node of Upington and there is a high concentration of potential receptors within this area, Upington falls outside the visual assessment zone and is also not regarded as sensitive to the visual impact of the proposed development due to the existing

visual degradation within the area. The introduction of a new power line in this setting would therefore be less intrusive considering the presence of existing infrastructure.

- Roads that are primarily used by local farmers are not regarded as visually sensitive receptor locations as they do not form part of any scenic tourist routes, and are unlikely to be valued or utilised specifically for their scenic or tourism potential.
- The assessment of receptor-based impacts has been based on the power line corridors approved by the proponent. It is recognised however that the exact route of the power line within the corridor has not been determined, and depending on this the proposed power line may result in greater or lesser visual impacts on receptor locations.
- Given the nature of the receiving environment and the height of the proposed power line towers, the study area is assumed to encompass a zone of 5km from the outer boundary of the power line corridor alternatives. This area was assigned as distance is a critical factor when assessing visual impacts and beyond 5km the visual impact associated with the proposed development would be significantly diminished and thus the need to assess the impact on potential receptors beyond this distance would not be warranted (refer to **Error! Reference source not found.** in VIA Report).
- Viewsheds have not been generated for the proposed power line due to the complexity associated with generating viewsheds off multiple points within the context of a corridor. In addition, detailed digital data was not available and the topography within the study area is relatively flat. Generating viewsheds from coarse-grained DTMs would only take the large scale topographical variations into account and not minor topographical features, vegetative screening, or man-made structures which are important factors influencing the severity of visual impacts in this context. Distance banding from each potentially sensitive receptor location has been used to gain an understanding of the level of visual exposure associated with the proposed power line alignment.
- Visualisation modelling or three dimensional simulations of the proposed development were not undertaken for the proposed development due to budget limitations. Should the need for visualisation modelling be proven by stakeholder / I&AP feedback, then this will be able to be incorporated into this assessment.
- No feedback regarding the visual environment has been received from the public participation process to date, however any feedback from the public received during the review period of the Draft Basic Assessment Report (DBAR) will be incorporated into further drafts of this report. In addition, undertaking a perception survey falls outside of the scope of this VIA.
- Operational and security lighting will most likely be required for the proposed control room and two (2) bay substation at night. 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 the control room and substation lighting at night has not been assessed. General measures to mitigate

the impact of additional light sources on the ambiance of the nightscape have been provided in Section **Error! Reference source not found.** of the VIA Report.

- Most rainfall within the area occurs from November to April during the summer months. The fieldwork was undertaken in March 2016 during the summer season. As such, the surrounding vegetation can be expected to provide the maximum potential screening. During winter months the visual impact of the proposed development may therefore be greater, particularly from farmhouses surrounded by tall deciduous trees.
- At the time of undertaking the visual study no specific information was available regarding the design and location of the associated infrastructure (other than the location proposed substation). This report therefore focusses on the impact of the proposed 132kV power line. Therefore, the potential visual impact of the associated infrastructure which would include, the two (2) bay substation, cable trenches, access roads, lighting/lightning masts and a control room, has not been assessed in detail in this VIA. General impacts and measures to mitigate the impact of this infrastructure has been provided.

o **Socio-Economic**

- Project-related information supplied by the environmental practitioner and the client for the purpose of the analysis is assumed to be reasonably accurate.
- The secondary data sources used to compile the socio-economic baseline (demographics, dynamics of the economy) although not exhaustive, can be viewed as being indicative of broad trends within the study area.
- Possible impacts as well as stakeholder responses to these impacts cannot be predicted with complete accuracy, even when circumstances are similar and these predictions are based on research and years of experience, taking the specific set of circumstance into account.
- Limited timeframes were allocated for the study. However, it is believed that the data gathered from various I&APs is sufficient to confidently predict the potential socio-economic impacts of the proposed project and objectively evaluate their significance. This is under assumption that:
- Questions asked during the interviews were answered accurately and truthfully by respondents and to the best of their abilities and knowledge.
- That the attitudes of the respondents towards the project will remain reasonably stable over the short- to medium-term.
- As indicated earlier, it was not possible to engage with all potentially affected parties during the course of the study. The focus on the primary data collection was on those parties that were perceived to be most sensitive to the proposed project (i.e. parties that use land for commercial agricultural production and tourism). As such, it is believed that the study was able to identify the most significant impacts and assess the most pertinent issues.
- Where information was not possible to gather and the party was perceived to be sensitive, a conservative approach was applied and the highest rating was applied to the impact.

SECTION A: ACTIVITY INFORMATION

Has a specialist been consulted to assist with the completion of this section? **YES√**
If YES, please complete the form entitled "Details of specialist and declaration of interest" for the specialist appointed and attach in Appendix I.

1. PROJECT DESCRIPTION

a) Describe the project associated with the listed activities applied for

On the 30th September 2015, SolarReserve South Africa (Pty) Ltd (hereafter referred to as, "SolarReserve") received environmental authorization (EA – DEA Ref: 12/12/20/248804; NEAS Ref: DEA/EIA/0000894/2012) for the proposed 200MW Concentrated Solar Power (CSP) Plant on the Farm Rooipunt 617 near Upington in the Northern Cape Province (the "SolarReserve Rooipunt CSP Project"). SolarReserve are also in the process of applying for environmental authorisation for the Proposed Rooipunt Photovoltaic (PV) Solar Power Park Phase 1 on Portion 0 of the Farm Rooipunt 617 (DEA Ref: 12/12/20/2488/01), as well as for the Proposed Rooipunt Photovoltaic (PV) Solar Power Park Phase 2 on Portion 0 of the Farm Rooipunt 617, near Upington in the Northern Cape Province (DEA Ref: 12/12/20/2488/02). These three components will form the greater Rooipunt Solar Thermal Power Park on the Farm Rooipunt 617 near Upington, Northern Cape Province (hereafter referred to as the "Rooipunt Solar Thermal Power Park Project").

In order to evacuate the electricity generated by the SolarReserve Rooipunt Solar Thermal Power Park Project, a grid connection solution will be assessed. SolarReserve appointed SiVEST, as the independent Environmental Assessment Practitioner (EAP), to undertake the required Basic Assessment (BA) processes for the proposed 132kV power line and associated infrastructure in the Northern Cape Province ("the proposed project").

The proposed project will comprise of the following:

- Construction of one Tern power line of up to 132kV from the proposed Rooipunt Solar Thermal Power Park Project. The grid connections that will be assessed include the following:
- Corridor Option 1 = approximately 17km in length;
- Corridor Option 2 = approximately 22km in length; and
- Corridor Option 3 = approximately 24km in length.
- Install 48 core optical ground wire (OPGW) on the line
- Build 2 bay substations next to approved substations on the Rooipunt CSP Project site.

Proposed substations will be approximately 100m x 100m

- Inclusive of all cable trenches
- Install 3 x 25m lighting/lightning masts
- Building of an access road to the substation
- Building of a standard control room (5.5m x 12m) with top entry and cable racks. This will include a sewage system, air-conditioning and energy efficient lighting
- Installation of a security fence with entrance gates
- 1 x 132kV line bay and 1 x 132kV metering bay
- Installation of a required Control Plant, AC/DC, Metering, SCADA and Telecoms
- V drain extension of substation for drainage purposes
- And or all extensions required (132kV yard, fencing etc.) of the connecting Eskom Assets i.e. Solar MTS

The location of the proposed substations will be adjacent to the on-site substations of the approved layout of the SolarReserve Rooipunt CSP Project, authorized under the EA (DEA Ref: 12/12/20/248804). The footprint of the proposed substations would be approximately 10 000m².

Three power line alternative corridors have been identified which will be assessed as part of the BA process. The three corridors are up to 4km (2km either side of the centre line) wide originating from the SolarReserve Rooipunt CSP Project site and routed to the Proposed Eskom Upington Transmission Substation. These three corridors will serve as alternatives to each other for comparative assessment. The registered servitude width will be 31 metres (15.5 metres either side of the centre line), positioned within the 2km assessment corridor. The three power line corridors include the following:

- Corridor Option 1 (Blue) = approximately 17km in length;
- Corridor Option 2 (Orange) = approximately 22km in length; and
- Corridor Option 3 (Green) = approximately 24km in length.

The proposed power line will also include the establishment of all associated infrastructure as required (including but not limited to access roads, control rooms, security systems, network integration infrastructure etc.).

b) Provide a detailed description of the listed activities associated with the project as applied for

Listed activity as described in GN 983, 984 and 985	Description of project activity

GN 983, Activity 11 Item (i) The development of facilities or infrastructure for the transmission and distribution of electricity – (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts;	The proposed power line will be up to 132kV in capacity and will be located outside an urban area.
GN 983, Activity 12 Item (xii); (a) and (c) The development of: (xii) infrastructures or structures with a physical footprint of 100 square metres or more; where such development occurs- (a) within a watercourse; (c) if no development setback exists, within 32m of a watercourse, measured from the edge of a watercourse	Due to the number and width of the watercourses (including drainage lines, wetlands and riparian zones), the powerline structures and associated infrastructure will need to be placed within watercourses as well as within 32 meters of the edge of the watercourses.
GN 983, Activity 19 Item (i) The development of infilling or depositing of any material of more than 5m³ into, or the dredging, excavation, removal or moving of soil, sand, shells, grit, pebbles or rock of more than 5m³ from - : (i) a watercourse;	The proposed powerline will need to be constructed through a number of watercourses which will involve the removal and infill of material that will be more than 5m³ from the respective affected watercourses.
GN 985 Activity 4 Item (ii) (cc) The development of a road wider than 4 metres with a reserve less than 13,5 metres In Northern Cape: (ii) Outside urban areas, in (cc) Sensitive areas as identified in an environmental management framework as contemplated in Chapter 5 of the Act and as adopted by the competent authority.	Access roads will be in excess of 4 metres wide with a reserve less than 13,5 metres within sensitive areas identified in the District Municipal EMF.
GN 985 Activity 14 Item (xii) (a) (c) The development of – (xii) infrastructure or structures with a physical footprint of 10 square metres or more; Where such development occurs – (a) within a watercourse; (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse. (a) In Northern Cape: ii. Outside urban areas, in:	The proposed construction of the powerline and associated infrastructure footprint will exceed 10 square metres or more within 32 metres of the identified watercourses.

(dd) Sensitive areas as identified in an environmental management framework as contemplated in Chapter 5 of the Act and as adopted by the competent authority.	

2. FEASIBLE AND REASONABLE ALTERNATIVES

"alternatives", in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to—

(a) the property on which or location where it is proposed to undertake the activity;
(b) the type of activity to be undertaken;
(c) the design or layout of the activity;
(d) the technology to be used in the activity;
(e) the operational aspects of the activity; and
(f) the option of not implementing the activity.

Describe alternatives that are considered in this application as required by Appendix 1 (3)(h), Regulation 2014. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity (NOT PROJECT) could be accomplished in the specific instance taking account of the interest of the applicant in the activity. The no-go alternative must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed.

The determination of whether site or activity (including different processes, etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment. After receipt of this report the, competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

The identification of alternatives should be in line with the Integrated Environmental Assessment Guideline Series 11, published by the DEA in 2004. Should the alternatives include different locations and lay-outs, the co-ordinates of the different alternatives must be provided. The co-ordinates should be in degrees, minutes and seconds. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.

a) Site alternatives

Alternative 1 (preferred alternative)		
Description	Lat (DDMMSS)	Long (DDMMSS)
N/a	N/a	N/a
Alternative 2		
Description	Lat (DDMMSS)	Long (DDMMSS)
N/a	N/a	N/a
Alternative 3		
Description	Lat (DDMMSS)	Long (DDMMSS)
N/a	N/a	N/a

In the case of linear activities:

Alternative:	Latitude (S):	Longitude (E):
Corridor Alternative 1 (Blue - Preferred)		
• Starting point of the activity	S28° 27' 26.725"	E21° 0' 14.949"
• Middle/Additional point of the activity	S28° 30' 4.758"	E21° 4' 21.287"
• End point of the activity	S28° 32' 37.005"	E21° 8' 5.201"
Corridor Alternative 2 (Orange)		
• Starting point of the activity	S28° 27' 26.725"	E21° 0' 14.949"
• Middle/Additional point of the activity	S28° 32' 32.762"	E21° 3' 26.842"
• End point of the activity	S28° 32' 37.005"	E21° 8' 5.201"
Corridor Alternative 3 (Green)		
• Starting point of the activity	S28° 27' 26.725"	E21° 0' 14.949"
• Middle/Additional point of the activity	S28° 32' 55.464"	E21° 2' 55.482"
• End point of the activity	S28° 32' 37.005"	E21° 8' 5.201"

For route alternatives that are longer than 500m, please provide an addendum with co-ordinates taken every 250 meters along the route for each alternative alignment.

In the case of an area being under application, please provide the co-ordinates of the corners of the site as indicated on the lay-out map provided in Appendix A of this form.

Full coordinate spreadsheets, including coordinates every 250m and at bend points, are included in Appendix J2.

b) Lay-out alternatives

Alternative 1 (preferred alternative)		
Description	Lat (DDMMSS)	Long (DDMMSS)
Alternative 2		
Description	Lat (DDMMSS)	Long (DDMMSS)
Alternative 3		
Description	Lat (DDMMSS)	Long (DDMMSS)

c) Technology alternatives

Alternative 1 (preferred alternative)
Alternative 2
Alternative 3

d) Other alternatives (e.g. scheduling, demand, input, scale and design alternatives)

Alternative 1 (preferred alternative)		
Alternative 2		
Alternative 3		

e) No-go alternative

The "no-go" alternative assumes that the proposed activity does not go-ahead, implying a continuation of the current situation or the status quo. In the case of this project, the no-go alternative would result in no power line being constructed, and it would therefore not be possible to export the electricity generated at the SolarReserve Rooipunt Solar Thermal Power Park Project to the national grid. South Africa is under immense pressure to provide electricity generating capacity in order to reduce the current electricity demand in the country. With the global focus on climate change, the government is under severe pressure to explore alternative energy sources in addition to coal-fired power stations. Not establishing the proposed solar development would be detrimental to the mandate that the government has set to promote the implementation of renewable energy.

In general, the South African economy has shown a trend in significant and rapid growth over the past few years, placing tremendous strain on existing infrastructure and service delivery, as these are not capable of complying or supporting this growth trend. In order for the National Government to create an economic climate which is suitable to their growth targets, and will accommodate the existing economic growth and social development, it was found essential that basic services such as electricity provision be enhanced as a matter of urgency.

Power demand in South Africa is growing at a rate whereby power cuts due to shortages are anticipated within the next three years. Demand for electricity rose by 5.4% 2010 in comparison to 2009 with an annual forecast growth of 1.3%. In order to meet these demanding requirements, which is a clear indication of the country's future growth prospects, South Africa must facilitate the rapid build out of capacity in order not to limit the countries potential. The Proposed Project will help facilitate this increase in supply capacity to the national grid.

The current infrastructure and generation capacity of South Africa's power utility, Eskom, is unable to accommodate a rapid growing economy in which reliable electricity provision is essential. South Africa has experienced electricity blackouts during 2008 and 2009 which dampened investor confidence in South Africa as an investor destination and also hampered industrial development. Ageing power plants and the prevalence of unplanned maintenance to these plants were major contributors to the problem, which caused erratic and unreliable electricity provision to major industries as well as households throughout South Africa.

In order to manage this supply versus demand gap, South Africa has embarked on an infrastructure growth program supported by various government initiatives, including but not limited to, the National Development Plan (NDP), the Presidential Infrastructure Coordinating Commission (PICC), the Department of Energy's Integrated Resource Plan and National Strategy for Sustainable

Development, the National Climate Change Response White Paper, the Presidency of the Republic of South Africa Medium-Term Framework and National Treasury's Carbon Tax Policy Paper. These efforts are in support of, among other sectors, the ever increasing, growing demand for energy, to find solutions for the current electricity shortages, as well as the need to find more sustainable and environmentally friendly energy resources in support of Governments programs.

This being said it needs to be remembered that the bulk of South Africa's power is generated by coal fired power stations and a number of coal fired power stations are being planned to meet the ever increasing demand for power. This makes coal South Africa's primary energy resource. Beyond the fact that coal is not a renewable resource the burning of coal for the generation of electricity also has a very negative impact on the environment from the point of view that vast amounts of CO2 is being released into the atmosphere and contributing to the ever growing concern of the greenhouse effect and global warming.

The Generation Facility was designed to meet the increasing demand for clean, renewable electrical power in South Africa. The multiple benefits associated with developing renewable energy infrastructure have been recognized by both local regional and National policy-makers. Development of solar resources reduces reliance on foreign sources of fuel, promotes national energy security, diversifies energy portfolios and contributes to the reduction of greenhouse gas emissions at the same time creating a large number of jobs within a new industry at the same time raising the core knowledge bases of the country.

In addition, the Kyoto Protocol, as a result of concern about climate change, establishes the obligation of reducing green-house effect gas emissions by industrialised countries including South Africa. Energy efficiency and the use of renewable energy sources are presented as sustainable solutions leading to a reduction in CO2 emissions into the atmosphere. In the Integrated Resource Plan for Electricity 2010-2030, South Africa has committed to a target of 17.8 GW of primary energy consumption should come from renewable sources by 2030. In addition to these environmental and legislative reasons, the fact is that renewable energy sources mean a reduction in the country's energy dependence on carbon fuels, increasing the safety and quality of the energy supply and providing a valuable source of employment.

South Africa as a signatory to the United Nations Framework Convention on Climate Change committed to the stabilization of atmospheric greenhouse gas concentrations at a level that would prevent dangerous anthropogenic interference with the climate system. With this commitment in place and the ever growing need for power, South Africa is urged to expand its generation capacity but through the development and utilisation of alternative resources, which are renewable and more environmentally sustainable.
South Africa's climate is ideal with regards to solar resources, with a broad time band of sunlight and a high level of energy delivered by area of land. Utilising this solar resource in combination with molten salt storage technology makes it an ideal system in the generation of renewable energy. As the additional demand for power continues to grow in other regions as older technology fossil fuel plants reach the end of their shelf lives, the project will contribute much needed on-peak power to the electrical grid serving the region.

Over and above the aforementioned, the South African Government adopted the National Infrastructure Plan in 2012 which is aimed at transforming the South African economic landscape as well as to provide the necessary aid regarding employment creation and delivery of basic services.

The Plan is designed to integrate and coordinate the long term infrastructure build which is done via the Presidential Infrastructure Coordination Commission (PICC). A need assessment undertaken on behalf of this plan has led to the identification of 18 Strategic Integrated Project (SIP) – SIP 8 – 10 relates to energy generation, green energy generation and the transmission and distribution of electricity to all. With respect to SIP 10, the National Government aims to expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development. Align the 10-year transmission plan, the services backlog, the national broadband roll-out and the freight rail line development to leverage off regulatory approvals, supply chain and project development capacity. The project forms part of the National Government's endeavours to provide infrastructure readily for services deliver.

The Infrastructure Development Act, Number 23 of 2014 was promulgated on 2 June 2014 in order to "provide for the facilitation and co-ordination of public infrastructure development which is of significant economic or social importance to the Republic; to ensure that infrastructure development in the Republic is given priority in planning, approval and implementation; to ensure that the development goals of the state are promoted through infrastructure development; to improve the management of such infrastructure during all life-cycle phases, including planning, approval, implementation and operations; and to provide for matters incidental thereto". Electricity generation and provision is regarded under strategic integrated projects and conspired a national priority in terms of Annexure 1 of the Act.

The Project has been designed to assist Government in meeting the increasing demand for clean, renewable energy in South Africa by providing the necessary interconnection infrastructure to transmit the power from the point of supply to point of demand.

As such, the SolarReserve Rooipunt Solar Thermal Power Park Project forms part of the country's strategies to meet future energy consumption requirements through the use of renewable energy, as the power generated by the facility will be evacuated to the national grid.

Should the proposed development not proceed, the multiple benefits associated with developing renewable energy infrastructure as well as infrastructure to strengthen the national grid that have been recognized by both local regional and National policy-makers, will not be realised.

The proposed power line will be an Eskom owned asset, and only constructed by the Applicant under a self-build agreement with Eskom. Should the proposed development not proceed, this infrastructure will not be constructed and Eskom will not own this infrastructure. Moreover, future developments requiring water infrastructure will not be able to take advantage of the proposed power line as a possible connection point.

Paragraphs 3 – 13 below should be completed for each alternative.

3. PHYSICAL SIZE OF THE ACTIVITY

a) Indicate the physical size of the preferred activity/technology as well as alternative activities/technologies (footprints):

Alternative:	**Size of the activity:**
Alternative 1[1]	N/a – Linear activity
Alternative 2	N/a – Linear activity

or, for linear activities:

Alternative:	**Length of the activity:**
Corridor Alternative 1 (Blue – Preferred)	Approx. 18km
Corridor Alternative 2 (Orange)	Approx. 23km
Corridor Alternative 3 (Green)	Approx. 25km

b) Indicate the size of the alternative sites or servitudes (within which the above footprints will occur):

Alternative:	**Size of the site/servitude:**
Corridor Alternative 1 (Blue – Preferred)	32m servitude
Corridor Alternative 2 (Orange)	32m servitude
Corridor Alternative 3 (Green)	32m servitude

4. SITE ACCESS

Does ready access to the site exist?	YES√ Existing roads to be used.
If NO, what is the distance over which a new access road will be built	N/A

Describe the type of access road planned:

Include the position of the access road on the site plan and required map, as well as an indication of the road in relation to the site.

5. LOCALITY MAP

An A3 locality map must be attached to the back of this document, as Appendix A. The scale of the locality map must be relevant to the size of the development (at least 1:50 000. For linear activities of

more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map.). The map must indicate the following:

- an accurate indication of the project site position as well as the positions of the alternative sites, if any;
- indication of all the alternatives identified;
- closest town(s;)
- road access from all major roads in the area;
- road names or numbers of all major roads as well as the roads that provide access to the site(s);
- all roads within a 1km radius of the site or alternative sites; and
- a north arrow;
- a legend; and
- locality GPS co-ordinates (Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees and decimal minutes. The minutes should have at least three decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection).

An A3 locality map is included in Appendix A.

6. LAYOUT/ROUTE PLAN

A detailed site or route plan(s) must be prepared for each alternative site or alternative activity. It must be attached as Appendix A to this document.

The site or route plans must indicate the following:

- the property boundaries and numbers of all the properties within 50 metres of the site;
- the current land use as well as the land use zoning of the site;
- the current land use as well as the land use zoning each of the properties adjoining the site or sites;
- the exact position of each listed activity applied for (including alternatives);
- servitude(s) indicating the purpose of the servitude;
- a legend; and
- a north arrow.

An A3 layout/route plan map is included in Appendix A.

7. SENSITIVITY MAP

The layout/route plan as indicated above must be overlain with a sensitivity map that indicates all the sensitive areas associated with the site, including, but not limited to:

- watercourses;
- the 1:100 year flood line (where available or where it is required by DWS);
- ridges;
- cultural and historical features;

- areas with indigenous vegetation (even if it is degraded or infested with alien species); and
- critical biodiversity areas.

The sensitivity map must also cover areas within 100m of the site and must be attached in Appendix A.

An A3 sensitivity map is included in Appendix A.

8. SITE PHOTOGRAPHS

Colour photographs from the centre of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached under Appendix B to this report. It must be supplemented with additional photographs of relevant features on the site, if applicable.

Site photographs are included in Appendix B.

9. FACILITY ILLUSTRATION

A detailed illustration of the activity must be provided at a scale of at least 1:200 as Appendix C for activities that include structures. The illustrations must be to scale and must represent a realistic image of the planned activity. The illustration must give a representative view of the activity.

Facility Illustrations are included in Appendix C.

10. ACTIVITY MOTIVATION

Motivate and explain the need and desirability of the activity (including demand for the activity):

1. Is the activity permitted in terms of the property's existing land use rights?	**YES√**		Please explain
The project in question is for the proposed construction of up to a 132kV power line and associated infrastructure, which will consist of servitude within the properties it will be traversing. A change in land use will not be required and the servitude will be considered as special use within the existing land use.			
2. Will the activity be in line with the following?			
(a) Provincial Spatial Development Framework (PSDF)	**YES√**		Please explain
The Provincial Spatial Development Framework (PSDF) of 2012 recognises the potential of renewable energy sources in not only securing electricity and addressing the climate change issues, but also in unlocking the economic potential of the Province. The area, where the power line corridor alternatives are to be located has been demarcated as industrial area in the PSDF with numerous high voltage and medium voltage power lines envisaged to traverse the locality in question. Therefore, from the provincial spatial perspective, the project does not conflict with the spatial vision and is in direct alignment with the infrastructure envisaged to be developed in the area.			
(b) Urban edge / Edge of Built environment for the area		**No√**	Please explain
The proposed development is not located in an urban area.			

(c) Integrated Development Plan (IDP) and Spatial Development Framework (SDF) of the Local Municipality (e.g. would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF?).	**YES✓**		Please explain
The vision of the Khara Hais IDP (2015) is to provide affordable quality service to Khara Hais and its visitors to execute the policies and programmes of the council. That being said, through implementation of the Spatial Development Framework (SDF) it foresees industry as a viable sector which builds on the comparative economic advantages of Khara Hais and operates in accordance with the highest standards for environmental management. With this in mind, through the SDF, it will ensure the sustainable use of natural resources, including renewable energy whereby the municipality is currently involved in the national program for the development of solar power installations in the Upington area (of which includes this project). The IDP (2015) identifies energy and electricity with regards to making provision to all and for the upgrading of electricity infrastructure as a priority issue. As a critical component of the greater SolarReserve Rooipunt Thermal Power Park Project, the proposed power line will contribute towards the greater objective of generating and distributing electricity to the region as a whole. More specifically, according to the Khara Hais SDF (2012), the provision for renewable energy developments is made within the spatial planning category (SPC) F for surface infrastructure and buildings. The sub-category is contained therein under F.i for renewable energy structures. In this way, the proposed project is in line with the Khara Hais IDP and SDF. The Kai! Garib LM IDP (2015) vision is towards creating an economically viable and fully developed municipality, which enhances the standard of living of all the inhabitants / community of Kai! Garib through good governance, excellent service delivery and sustainable development. Bearing this in mind, it is identified that there is a need for bulk electricity services which currently poses a challenge to areas such as Kakamas, Keimoes and to a lesser extent Kenhardt. It is however stated that the municipality is very optimistic about the future due to the rise of Solar Energy Developments in the municipal area of which this proposed project forms a part of and will contribute towards alleviating the electrical disparities of the local area. No version of the Kai! Garib SDF was unfortunately available for evaluation. It is presumed that a future version will be available in due course. Findings will be integrated into this report as and when it becomes available.			
(d) Approved Structure Plan of the Municipality			Please explain
The proposed development is for service infrastructure and therefore will not have any bearing on the Municipalities' Structure Plans.			
(e) An Environmental Management Framework (EMF) adopted by the Department (e.g. Would the approval of this application compromise the integrity of the existing environmental management priorities for the area and if so, can it be justified in terms of sustainability considerations?)	**YES✓**		Please explain
The Siyanda District Municipality Environmental Management Framework (2008) is the only available EMF document for which covers the now known as ZF Mgcawu District Municipality (as from 1 July			

2013). This document identifies that there is opportunity to harness the huge potential to utilise solar energy in the district. The proposed project will therefore contribute towards the generation of electricity which can then be distributed as required to areas that are in demand. The proposed project also aligns with the desired state in utilising the excellent potential for alternative energy sources to provide electricity to the district. In this way, the proposed project will assist with reaching broader sustainability objectives for communities within the district.			
(f) Any other Plans (e.g. Guide Plan)	**YES✓**		Please explain
The proposed project falls within the Northern Cape Province. The Spatial Development Framework (SDF) for the Northern Cape Province has as one of the energy objectives, to promote the development of renewable energy supply schemes as large scale renewable energy supply schemes are strategically important for increasing the diversity of domestic energy supplies and avoiding imports while minimizing detrimental environmental impacts. In this way, the greater project for the SolarReserve Rooipunt Thermal Power Park Project will contribute towards this objective.			
3. Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved SDF agreed to by the relevant environmental authority (i.e. is the proposed development in line with the projects and programmes identified as priorities within the credible IDP)?	**YES✓**		Please explain
The Khara Hais IDP (2015) identifies energy and electricity with regards to making provision to all and for the upgrading of electricity infrastructure as a priority issue. As a critical component of the greater SolarRserve Rooipunt CSP Project, the proposed power line will contribute towards the greater objective of generating and distributing electricity to the region as a whole and meeting this priority. For the Kai! Garib LM IDP (2015), the need for bulk electricity services which this proposed project forms a part of, will contribute towards alleviating the electrical demands of the local area.			
4. Does the community/area need the activity and the associated land use concerned (is it a societal priority)? (This refers to the strategic as well as local level (e.g. development is a national priority, but within a specific local context it could be inappropriate.)	**YES✓**		Please explain
The local communities of Upington and Keimoes are in need of electrical bulk services. The proposed project will contribute towards generating electricity and establishing the infrastructure necessary for future bulk services to be distributed from. The local community and area is therefore in need of the proposed activity which will contribute towards electricity infrastructure as well as generation and distribution.			
5. Are the necessary services with adequate capacity currently available (at the time of application), or must additional capacity be created to cater for the development? (Confirmation by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)	**YES✓**		Please explain
Eskom cost estimate letter (Page 23 – Appendix J1) states that there is capacity for 150MW to be connected to the proposed Rooipunt substation on the SolarReserve Rooipunt Thermal Power Park Project. However, it is stated that the Rooipunt CSP component can only be connected after the			

commissioning of the Eskom Upington MTS as well as the second 500MVA 400/132Kv transformer.			
6. Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services and opportunity costs)? (Comment by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)	**YES√**		Please explain
No, however the proposed project will benefit the respective municipalities in that existing infrastructure will be provided by the applicant to Eskom as infrastructure which can be expanded in the future.			
7. Is this project part of a national programme to address an issue of national concern or importance?	**YES√**		Please explain

South Africa has embarked on an infrastructure growth programme supported by various government initiatives, including but not limited to, the National Development Plan (NDP), the Presidential Infrastructure Coordinating Commission (PICC), the Department of Energy's Integrated Resource Plan and National Strategy for Sustainable Development, the National Climate Change Response White Paper, the Presidency of the Republic of South Africa Medium-Term Framework and National Treasury's Carbon Tax Policy Paper.

The South African Government adopted the National Infrastructure Plan in 2012 which is aimed at transforming the South African economic landscape as well as to provide the necessary aid regarding employment creation and delivery of basic services. The Plan is designed to integrate and coordinate the long term infrastructure build which is done via the Presidential Infrastructure Coordination Commission (PICC). A need assessment undertaken on behalf of this plan has led to the identification of 18 Strategic Integrated Project (SIP) – SIP 8 – 10 relates to energy generation, green energy generation and the transmission and distribution of electricity to all. With respect to SIP 10, the National Government aims to expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development. Align the 10-year transmission plan, the services backlog, the national broadband roll-out and the freight rail line development to leverage off regulatory approvals, supply chain and project development capacity.

Over and above the aforementioned, the Infrastructure Development Act, Number 23 of 2014 was promulgated on 2 June 2014 in order to "provide for the facilitation and co-ordination of public infrastructure development which is of significant economic or social importance to the Republic; to ensure that infrastructure development in the Republic is given priority in planning, approval and implementation; to ensure that the development goals of the state are promoted through infrastructure development; to improve the management of such infrastructure during all life-cycle phases, including planning, approval, implementation and operations; and to provide for matters incidental thereto". Electricity generation and provision is regarded under strategic integrated projects and conspired a national priority in terms of Annexure 1 of the Act.

In consideration of the above, yes, the proposed project is intrinsically linked to the construction of the SolarReserve Rooipunt Thermal Power Park Project, which is an issue of national concern or importance with regards to renewable energy (RE) development.

8. Do location factors favour this land use (associated with the activity applied for) at this place? (This relates to the contextualisation of the proposed land use on this site within its broader context.)	**YES√**		Please explain
Much of the study area is characterised by rural areas with low densities of human settlement. Agriculture in the form of maize and grape cultivation is the prominent land use, which has transformed the natural vegetation in some areas. However, a large portion of the study area has retained a natural appearance due to the presence of the low shrubs and grasslands. The most prominent anthropogenic elements in these areas include the N14 national highway, 132kV power lines and other linear elements, such as telephone poles, communication poles and farm boundary fences. The presence of this infrastructure will have a very limited impact visually on the land use since there are existing power lines present in the area.			
9. Is the development the best practicable environmental option for this land/site?	**YES√**		Please explain
The power lines and associated infrastructure are intrinsically linked to the SolarReserve Rooipunt Thermal Power Park Project, which is a National development priority. The project site already includes the N14 main road, 132kV power lines and other linear elements, such as telephone poles, communication poles and farm boundary fences. As such, the proposed development is a suitable development within this context considering that the presence of this infrastructure will have a very limited impact visually as as there is existing infrastructure present.			
10. Will the benefits of the proposed land use/development outweigh the negative impacts of it?	**YES√**		Please explain
The absence of the proposed power lines would mean that the SolarReserve Rooipunt Thermal Power Park Project would not be connected to the grid which would have negative consequences for the renewable energy targets in the country. The positive impacts relating to job creation would also not be realised.			
11. Will the proposed land use/development set a precedent for similar activities in the area (local municipality)?		**NO√**	Please explain
Currently there is already a CSP facility in the vicinity which has already set a precedent for the proposed land use for renewable energy developments. Additionally, Eskom have also set a precedent for additional land uses of the same nature by the proposed establishment of the Upington Main Transmission Substation specifically for the purposes of accommodating and connecting renewable energy developments in this region.			
12. Will any person's rights be negatively affected by the proposed activity/ies?		**NO√**	Please explain
The proposed development will impact on individuals where the power lines are to be constructed on the land on which they are residing or using for various activities. Establishment of a servitude will be required where the power line route is to be constructed. The visual impact associated with the proposed development will be limited due to the presence of existing power lines in the area.			
13. Will the proposed activity/ies compromise the "urban edge" as defined by the local municipality?		**NO√**	Please explain
The proposed power line would not impact the urban edge as it is a linear infrastructure development.			

14. Will the proposed activity/ies contribute to any of the 17 Strategic Integrated Projects (SIPS)?	**YES√**		Please explain

The Strategic Integrated Projects (SIPs) have been identified based on a spatial analysis of the South Africa's needs. The proposed development would contribute to SIP 8 – 10 relating to energy generation, green energy generation and the transmission and distribution of electricity to all. With respect to SIP 10, the National Government aims to expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development.

15. What will the benefits be to society in general and to the local communities?	Please explain

The proposed construction of the power line infrastructure will assist by providing the infrastructure for distribution of electricity to local communities as to be determined by Eskom.

At a national level, the proposed project as a critical part of the SolarReserve Rooipunt Thermal Power Park Project also has the potential to stimulate the national economy through an increase in production to the value of R68 million for the power line and associated infrastructure.

16. Any other need and desirability considerations related to the proposed activity?	Please explain

As mentioned above, the proposed project is needed in order connect the SolarReserve Rooipunt Thermal Power Park Project to the national grid. The SolarReserve Rooipunt Thermal Power Park Project is needed in order to produce renewable energy to feed into the national grid and contribute to fulfilling South Africa's renewable energy goals.`

17. How does the project fit into the National Development Plan for 2030?	Please explain

The National Development Plan 2010 – 2030 (NDP 2030) aims to eliminate poverty and reduce inequality by 2030. At the same time it is geared towards achieving economic growth by expanding opportunities, building capabilities, reducing poverty, and involving communities in their own development, all leading to an increase in living standards of these communities. The NDP 2030 recognises nine key challenges that need to be addressed. Although all challenges are seen to be important, the priority areas can be identified as job creation and improvement of the quality of national education. Managing the transition towards a low carbon economy is also one of the nine key national challenges; in line with this, the expansion and acceleration of a commercial RE sector is seen as a key intervention strategy. The NDP 2030 seeks to ensure that half of all electricity generation capacity is provided by renewable resources (National Planning Commission, 2011). The SolarReserve Rooipunt Thermal Power Park Project is dependent on the proposed project and is therefore in line with the goals of the NDP.

18. Please describe how the general objectives of Integrated Environmental Management as set out in section 23 of NEMA have been taken into account.

In terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) the required BA and public participation process (PPP) is being undertaken for the proposed power line in order to investigate and assess any potential environmental impacts associated with the proposed development prior to implementation. As part of the BA process several specialist studies were conducted to evaluate the actual and potential impact that the proposed development could have on the biophysical environment, socio-economic conditions and cultural heritage within the study area. In line with the general objectives of Integrated Environmental Management, the risks and consequences of the various alternatives were assessed and mitigation measures were

recommended by each specialists in order to minimise the negative impacts and maximise the benefits of the proposed project. In addition, a thorough PPP is being undertaken as part of the BA, which will involve consultation with various key stakeholders and organs of state, including provincial, district and local authorities, relevant government departments, parastatals and NGO's.
19. Please describe how the principles of environmental management as set out in section 2 of NEMA have been taken into account.
The principles of environmental management as set out in section 2 of the NEMA require that environmental management must place people and their needs at the forefront of development and that development must be socially, environmentally and economically sustainable. As described above; these principles will be taken into account by undertaking a thorough PPP in order to ensure that all Interested and Affected Parties (I&APs) are given the opportunity to be involved in the BA process and ultimately that their comments are taken into consideration by the DEA when reviewing the application. Several specialist studies were also undertaken to ensure that the development is sustainable and that disturbance to the environment is avoided were possible, minimised through appropriate mitigation measures and remedied via appropriate measures.

11. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

List all legislation, policies and/or guidelines of any sphere of government that are applicable to the application as contemplated in the EIA regulations, if applicable:

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA)	In terms of the NEMA the proposed development must be considered, investigated and assessed prior to implementation.	Department of Environmental Affairs (DEA)	1998
National Heritage Resources Act, 1999 (Act No. 25 of 1999)	In terms of section 38 of the NHRA, the responsible heritage resources authority can call for a Heritage Impact Assessment (HIA) where a power line is being proposed.	South African Heritage Resources Authority (SAHRA)	1999
National Water Act, 1998 (Act 36 of 1998)	If the development may need to take place within a water resource or within 500m radius of a delineated wetland a water use license is likely to be required with regards to water uses (c) and (i) of the NWA.	Department of Water Affairs (DWA)	1998
National Environmental Management: Biodiversity Act, 2004 (Act No. of 2004)	Under the NEMBA the project proponent is required to take appropriate reasonable measures to limit the impacts	Department of Environmental Affairs (DEA) and South African National	2004

	on biodiversity, to obtain permits if required and to invite SANBI to provide commentary on any documentation resulting from the proposed development.	Biodiversity Institute (SANBI)	
National Forests Act, 1998 (Act 84 of 1998) (NFA)	The proposed project may result in the disturbance or damage to a tree protected under the NFA.	Department of Agriculture, Forestry and Fisheries (DAFF)	1998
Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) as amended in 2001 (CARA)	The construction of power lines may impact on agricultural resources and vegetation on the site. The CARA prohibits the spreading of weeds and prescribes control measures that need to be complied with in order to achieve this.	Department of Agriculture, Forestry and Fisheries (DAFF)	1983
National Road Traffic Act, 1996 (No. 93 0f 1996)	All the requirements stipulated in the NRTA regarding traffic matters will need to be complied with during the construction and operational phases of the proposed power line.	South African National Roads Agency Limited (SANRAL)	1996
Regulations			
NEMA EIA 2014 Regulations	In terms of the EIA 2014 Regulations, a basic assessment process is required for this proposed project.	Department of Environmental Affairs (DEA)	2014
Guidelines			
Northern Cape Provincial Spatial Development Framework	The SDF is one of the fundamental implementation instruments, which provides the spatial dimensions for achieving the strategies for the province. The proposed development should be aligned with the provincial SDF.	Northern Cape Provincial Government	2012
ZF Mgcawu District Municipality Integrated Development Plan	The vision of the ZF Mgcawu District Municipality Integrated Development Plan is to enhance economic development for the benefit of the community of the ZF	ZF Mgcawu District Municipality	2015

	Mgcawu District area by creating and maintaining an effective administration and a safe environment to attract tourists and investors. The proposed project and by implication the SolarRserve Rooipunt CSP Project will contribute to achieving this vision through investing and economic development for the benefit of the community for the district.		
Kai! Garib Local Municipality Integrated Development Plan (Draft)	For the Kai! Garib LM IDP (2015), the need for bulk electricity services, which this proposed project forms a part of, will contribute towards alleviating the electrical demands of the local area.	Kai! Garib Local Municipality	2016
Khara Hais Local Municipality Integrated Development Plan (IDP)	The IDP identifies energy and electricity with regards to making provision to all and for the upgrading of electricity infrastructure as a priority issue. As a critical component of the greater Rooipunt solar project, the proposed water pipeline will contribute towards the greater objective of generating and distributing electricity to the region as a whole and meeting this priority.	Khara Hais Local Municipality	2015
Khara Hais Local Municipality Spatial Development Framework	According to the Khara Hais SDF, the provision for renewable energy developments is made within the spatial planning category (SPC) F for surface infrastructure and buildings. The sub-category is contained therein under F.i for renewable energy structures. In this way, the proposed project is in line with the Khara Hais SDF.	Khara Hais Local Municipality	2012

12. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

a) Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?	**YES√**
If YES, what estimated quantity will be produced per month?	Unknown

How will the construction solid waste be disposed of (describe)?

All solid waste collected shall be disposed of at registered/licensed landfill site. Skip waste containers and waste collection bins will be maintained on site and the contractor will arrange for them to be collected regularly and transported to the landfill site.

Under no circumstances will waste be burned or buried on site.

Hazardous materials and contaminants will be stored carefully to prevent contamination until being disposed of at a licensed landfill site.

Where will the construction solid waste be disposed of (describe)?

All solid waste will be disposed of at the nearest registered landfill site.

Will the activity produce solid waste during its operational phase?	**YES√**
If YES, what estimated quantity will be produced per month?	Unknown

How will the solid waste be disposed of (describe)?

All solid waste will be collected and disposed of. Waste separation and recycling will take place where possible.

If the solid waste will be disposed of into a municipal waste stream, indicate which registered landfill site will be used.

All solid waste will be disposed of at the nearest registered landfill site.

Where will the solid waste be disposed of if it does not feed into a municipal waste stream (describe)?

The waste will be disposed of at the next nearby registered landfill sites.

If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Can any part of the solid waste be classified as hazardous in terms of the NEM:WA? **NO√**

If YES, inform the competent authority and request a change to an application for scoping and EIA. An application for a waste permit in terms of the NEM:WA must also be submitted with this application.

Is the activity that is being applied for a solid waste handling or treatment facility? **NO√**

If YES, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA. An application for a waste permit in terms of the NEM:WA must also be submitted with this application.

b) Liquid effluent

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?		NO✓
If YES, what estimated quantity will be produced per month?		m^3
Will the activity produce any effluent that will be treated and/or disposed of on site?		NO✓

If YES, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Will the activity produce effluent that will be treated and/or disposed of at another facility?		NO✓

If YES, provide the particulars of the facility:

Facility name:			
Contact person:			
Postal address:			
Postal code:			
Telephone:		**Cell:**	
E-mail:		**Fax:**	

Describe the measures that will be taken to ensure the optimal reuse or recycling of waste water, if any:

The proposed activity will only require a small amount of water for the proposed project which will be trucked in. There will be no generation of waste water for the construction of the power lines and associated infrastructure.

c) Emissions into the atmosphere

Will the activity release emissions into the atmosphere other that exhaust emissions and dust associated with construction phase activities?		NO✓
If YES, is it controlled by any legislation of any sphere of government?	YES	NO

If YES, the applicant must consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

If NO, describe the emissions in terms of type and concentration:

Other that exhaust emissions and dust associated with construction phase activities, the activity will not release emissions into the atmosphere.

d) Waste permit

Will any aspect of the activity produce waste that will require a waste permit in terms of the NEM:WA?		NO✓

If YES, please submit evidence that an application for a waste permit has been submitted to the competent authority

e) Generation of noise

Will the activity generate noise? If YES, is it controlled by any legislation of any sphere of government?	YES√	
		NO√

Describe the noise in terms of type and level:

Noise will be generated during the construction phase. This impact is transient and is unlikely to be heard by many noise receptors due to the limited human habitation in the area. The impact of the project on noise does therefore not warrant a specialist noise impact assessment.

13. WATER USE

Please indicate the source(s) of water that will be used for the activity by ticking the appropriate box(es):

Municipal	Water board	Groundwater	River, stream, dam or lake	Other	The activity will not use water

If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate the volume that will be extracted per month:	N/a
Does the activity require a water use authorisation (general authorisation or water use license) from the Department of Water Affairs?	YES√

If YES, please provide proof that the application has been submitted to the Department of Water Affairs.

An application for water use can only be submitted once environmental authorisation has been granted. Pre-application meeting with the Department of Water Affairs has already been undertaken and this process will be undertaken in due course should environmental authorisation be granted. See Appendix E3.

14. ENERGY EFFICIENCY

Describe the design measures, if any, which have been taken to ensure that the activity is energy efficient:

The proposed development will use the electricity generated by the SolarReserve Rooipunt Thermal Power Park Project during operation. Where electricity is to be used for the operation of machinery and equipment during construction, this will be generated using conventional fuel generators.

Describe how alternative energy sources have been taken into account or been built into the design of the activity, if any:

The proposed development will primarily use the electricity supplied from Eskom during the construction, commissioning and operation phase. The SolarReserve Rooipunt Thermal Power Park Project will however indirectly provide it's own electricity by augmenting the national electricity supply through the proposed power lines.

SECTION B: SITE/AREA/PROPERTY DESCRIPTION

Important notes:

1. For linear activities (pipelines, etc) as well as activities that cover very large sites, it may be necessary to complete this section for each part of the site that has a significantly different environment. In such cases please complete copies of Section B and indicate the area, which is covered by each copy No. on the Site Plan.

Section B Copy No. (e.g. A):

2. Paragraphs 1 - 6 below must be completed for each alternative.

3. Has a specialist been consulted to assist with the completion of this section? **YES√**

If YES, please complete the form entitled "Details of specialist and declaration of interest" for each specialist thus appointed and attach it in Appendix I. All specialist reports must be contained in Appendix D.

A 'specialist declaration of interest" for each specialist is included in Appendix I and all specialist reports are contained in Appendix D.

Property description/physical address:

Province	Northern Cape Province
District Municipality	ZF Mgcawu District Municipality
Local Municipalities	Khara Hais Local Municipality & Kai! Garib Local Municipality
Ward Number(s)	1, 2, 3, 7, 8, 9 & 11
Farm name and number	Linear Activity – Please see Appendix J2
Portion number	Linear Activity – Please see Appendix J2
SG Code	Linear Activity – Please see Appendix J2

Where a large number of properties are involved (e.g. linear activities), please attach a full list to this application including the same information as indicated above.

Current land-use zoning as per local municipality IDP/records:

Linear Activity – Please see Appendix J2

In instances where there is more than one current land-use zoning, please attach a list of current land use zonings that also indicate which portions each use pertains to, to this application.

Is a change of land-use or a consent use application required? **YES√**

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Corridor Alternative 1 (Blue):

Flat✓	**1:50 – 1:20**	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

Corridor Alternative 2 (Orange – Preferred):

Flat✓	**1:50 – 1:20**	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

Corridor Alternative 3 (Green):

Flat✓	**1:50 – 1:20**	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

Most of the terrain in the study area is flat to gently undulating. An A3 Slope Classification Map and Topography Map are included in Appendix A.

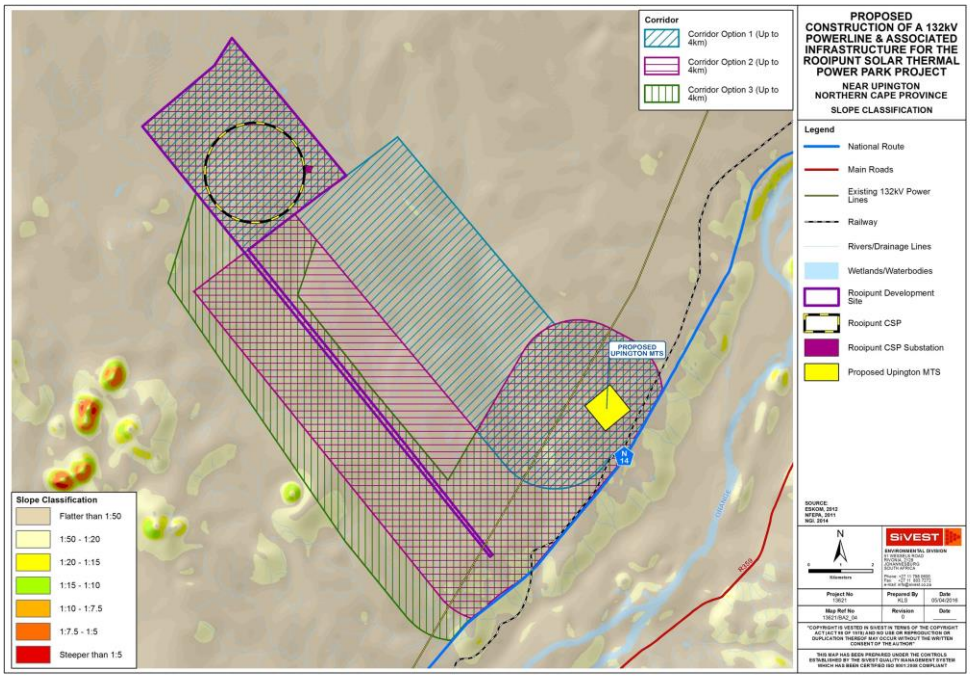

Figure 4: Slope Classification Map

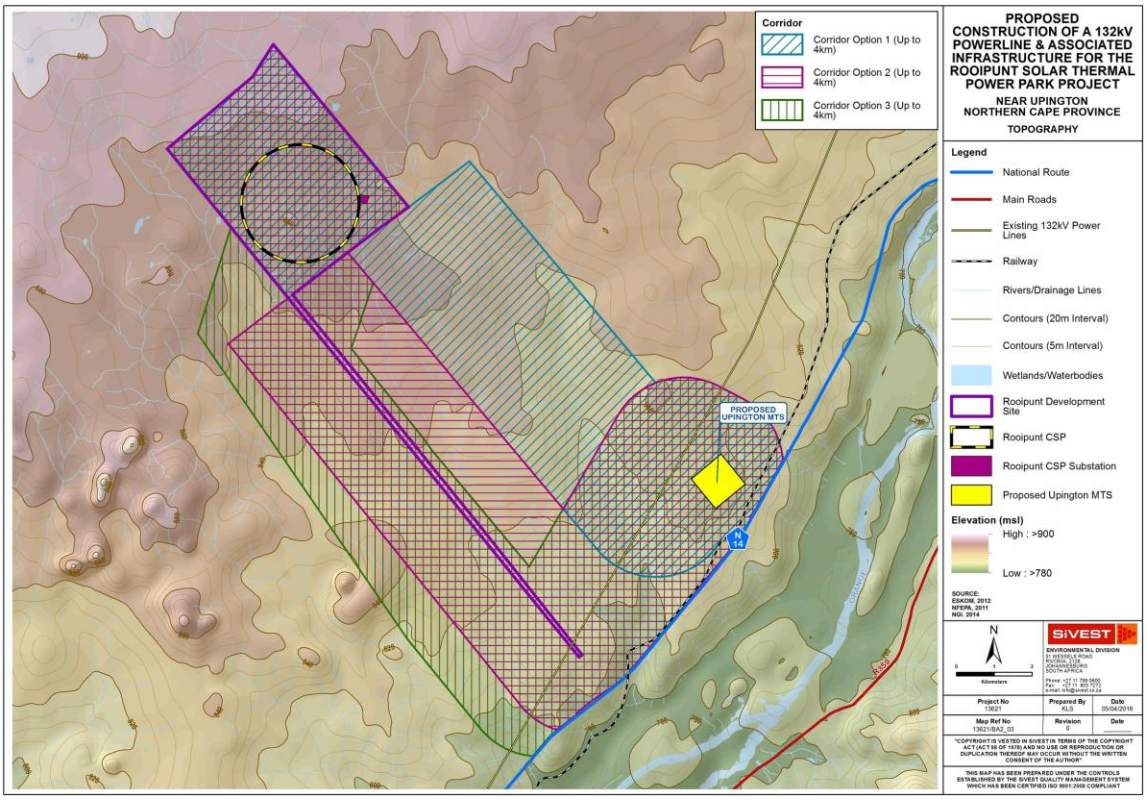

Figure 5: Topography Map

2. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site:

2.1 Ridgeline		2.4 Closed valley		2.7 Undulating plain / low hills	✓
2.2 Plateau		2.5 Open valley		2.8 Dune	
2.3 Side slope of hill/mountain		2.6 Plain	✓	2.9 Seafront	
2.10 At sea					

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

Is the site(s) located on any of the following?

	Corridor Alternative 1 (Blue – Preferred)		Corridor Alternative 2 (Orange)		Corridor Alternative 3 (Green)	
Shallow water table (less than 1.5m deep)		NO✓		NO✓		NO✓
Dolomite, sinkhole or doline areas		NO✓		NO✓		NO✓
Seasonally wet soils (often close to water bodies)		NO✓		NO✓		NO✓
Unstable rocky slopes or steep slopes with loose soil	YES✓		YES✓		YES✓	
Dispersive soils (soils that dissolve in water)		NO✓		NO✓		NO✓
Soils with high clay content (clay fraction more than 40%)		NO✓		NO✓		NO✓
Any other unstable soil or geological feature		NO✓		NO✓		NO✓
An area sensitive to erosion	YES✓		YES✓		YES✓	

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted.

A specialist wetland study was undertaken by Stephen Van Staden, and a soils and agricultural potential study was undertaken by Johann Lanz. These are included in Appendix D.

4. GROUNDCOVER

Indicate the types of groundcover present on the site. The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

Natural veld - good condition[E]	**Natural veld with scattered aliens[E]**	Natural veld with heavy alien infestation[E]	Veld dominated by alien species[E]	Gardens
Sport field	**Cultivated land**	Paved surface	Building or other structure	**Bare soil**

If any of the boxes marked with an "[E] "is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn't have the necessary expertise.

A specialist biodiversity study was undertaken by Simon Todd and is included in Appendix D.

5. SURFACE WATER

Indicate the surface water present on and or adjacent to the site and alternative sites?

Perennial River	YES	**NO**	UNSURE
Non-Perennial River	**YES – Helbrandleegte, Helbrandkloofspruit and numerous smaller ephemeral drainage lines**	NO	UNSURE
Permanent Wetland	YES	**NO**	UNSURE
Seasonal Wetland	YES	**NO**	UNSURE
Artificial Wetland	YES	**NO**	UNSURE
Estuarine / Lagoonal wetland	YES	**NO**	UNSURE

If any of the boxes marked YES or UNSURE is ticked, please provide a description of the relevant watercourse.

A specialist surface water study was undertaken by Stephen Van Staden from Scientific Aquatic Services and is included in Appendix D.

6. LAND USE CHARACTER OF SURROUNDING AREA

Indicate land uses and/or prominent features that currently occur within a 500m radius of the site and give description of how this influences the application or may be impacted upon by the application:

Natural area	**Dam or reservoir**	Polo fields

Low density residential	Hospital/medical centre	Filling station [H]
Medium density residential	School	Landfill or waste treatment site
High density residential	Tertiary education facility	**Plantation**
Informal residential[A]	Church	**Agriculture**
Retail commercial & warehousing	Old age home	**River, stream or wetland**
Light industrial	Sewage treatment plant[A]	Nature conservation area
Medium industrial [AN]	Train station or shunting yard [N]	**Mountain, koppie or ridge**
Heavy industrial [AN]	**Railway line [N]**	Museum
Power station	Major road (4 lanes or more) [N]	Historical building
Office/consulting room	Airport [N]	Protected Area
Military or police base/station/compound	Harbour	Graveyard
Spoil heap or slimes dam[A]	Sport facilities	**Archaeological site**
Quarry, sand or borrow pit	Golf course	Other land uses (describe)

If any of the boxes marked with an "[N] "are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

Railway line – The proposed power line will need to cross the existing railway line. This will however be done by overhead crossing (as required per wayleave agreement with TRANSNET Freight Rail). As a result, the railway line will only be temporarily affected during the construction phase for the proposed power line crossing point.

If any of the boxes marked with an "[An]" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

Not applicable

If any of the boxes marked with an "[H]" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

Not applicable

An A3 Land Use Map is included in Appendix A.

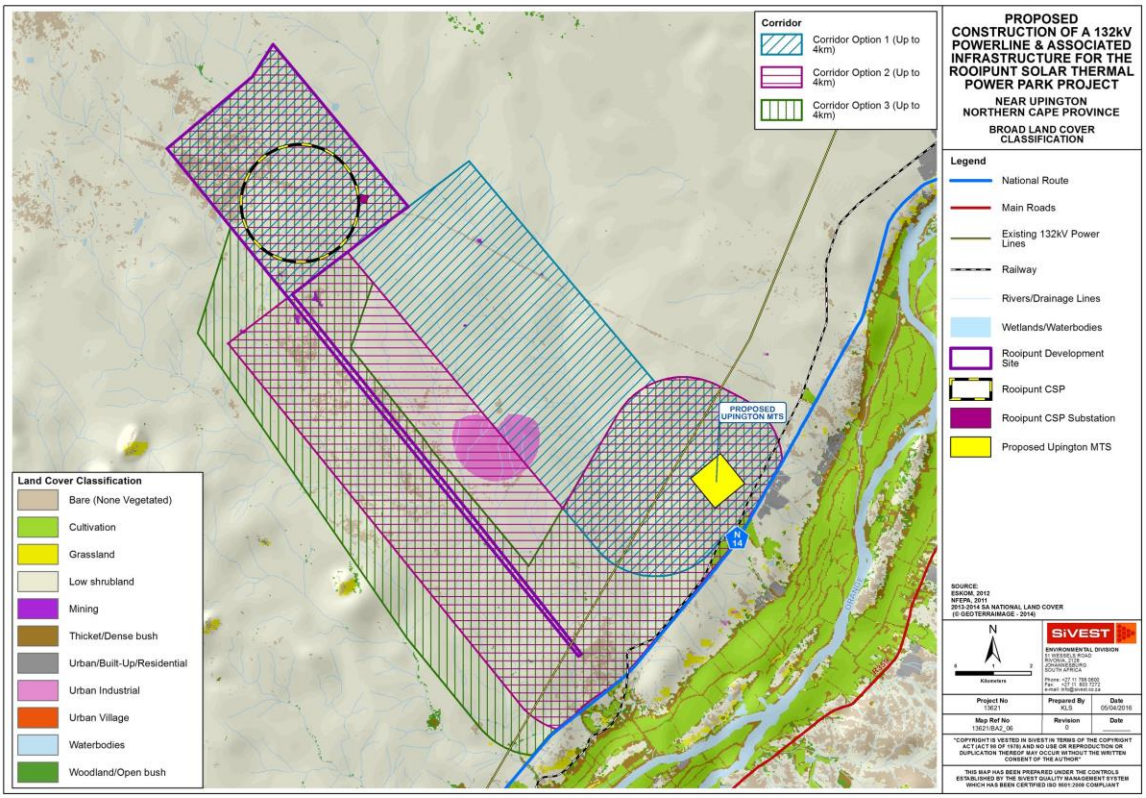

Figure 6: Land Use Map

Does the proposed site (including any alternative sites) fall within any of the following:

Critical Biodiversity Area (as per provincial conservation plan)	YES	**NO√**
Core area of a protected area?	YES	**NO√**
Buffer area of a protected area?	YES	**NO√**
Planned expansion area of an existing protected area?	YES	**NO√**
Existing offset area associated with a previous Environmental Authorisation?	YES	**NO√**
Buffer area of the SKA?	YES	**NO√**

If the answer to any of these questions was YES, a map indicating the affected area must be included in Appendix A.

N/a

7. CULTURAL/HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in [redacted]

section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including Archaeological or paleontological sites, on or close (within 20m) to the site? If YES, explain:	**Uncertain✓**
A heritage study was conducted by Wouter Fourie which included findings from a previously undertaken palaeontological study conducted by John Almond. Both findings are included in the heritage report compiled by PGS Heritage. The report is included in Appendix D.	

If uncertain, conduct a specialist investigation by a recognised specialist in the field (archaeology or palaeontology) to establish whether there is such a feature(s) present on or close to the site. Briefly explain the findings of the specialist:

The heritage study shows that there is only one heritage resourse (DYK001) of significance was identified in the assessment area that would require mitigation as follows:

- Mitigation would be required if the development came closer than 50 m to the abandoned mine.
- In this case the heritage resource should be photographed and drawn to record the details of its construction before destruction.
- The documentation should be archived on SAHRIS and with the MacGregor Museum, Kimberley.

No other heritage resources were identified within the power line corridors.

The Palaeontological study has shown that should outcrop areas of potentially fossiliferous ancient Orange River alluvial gravels be identified (e.g. during geotechnical investigations) within the development footprint, these should be assessed by a professional palaeontologist before construction commences. The purposes of the field assessment study would be (a) to identify the rock units actually present, (b) to carry out judicious sampling of any fossil heritage currently exposed, together with pertinent geological and palaeontological data, (c) to determine the likely impact of the proposed development on local fossil heritage based on the new field-based information, and finally (d) to make recommendations for any no-go areas, buffer zones or further palaeontological mitigation deemed necessary for this project (e.g. comprehensive pre-construction sampling of near-surface surface fossil material, palaeontological monitoring of excavations). Note that further mitigation may be most useful during the construction phase of the development while fresh, potentially fossiliferous bedrock is still exposed.

Will any building or structure older than 60 years be affected in any way?		**Possibly✓ Should the proposed development come within 50m of the old mine shaft**

Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?		**Possibly✓ Should outcrop areas of potentially ancient Orange River alluvial gravels be identified during the geotechnical investigations.**

If YES, please provide proof that this permit application has been submitted to SAHRA or the relevant provincial authority.

8. SOCIO-ECONOMIC CHARACTER

a) Local Municipality

Please provide details on the socio-economic character of the local municipality in which the proposed site(s) are situated.

Level of unemployment:

70.5% of the population of the Kai !Garib LM was of working age in 2011 (Stats SA, 2015). It is estimated that 66.8% of these people make up the economically active population, including 89.8% of employed people. This rate is considerably higher than that of the Province (72.6% of employed people). The Khara Hais LM also has a better employment rate (78.3%) than that of the Province, but this is significantly lower than the employment rate of its neighbouring municipality (Stats SA, 2015).

Seven out of ten working people in the Kai !Garib LM work in the agriculture sector, while the rest of the workforce is scattered across different economic sectors. The electricity, gas and water sector still absorbs only 0.2% of the workforce, despite the highest growth rate experienced by this sector over a ten-year period (2003 - 2013). This, though, is indicative of the high capital intensity of the utility sector, that offers a significantly lower number of employment opportunities for every R1 million of output generated compared to sectors such as agriculture or retail.

The sector that employs the majority of the Khara Hais LM's workforce is trade (26.4%), followed by general government (18.3%) and agriculture (16.3%).

The representative of the Kai !Garib LM interviewed during the site visit stressed that the majority of workers in the municipality have low skills and no formal education. There is an outflow of educated people who leave the municipality to find employment in the mining sector or in large cities (i.e. Kimberley and Johannesburg).

Economic profile of local municipality:

The economy of the Kai !Garib LM was valued at R923.3 million in Gross Domestic Product (GDP) in 2013, and that of Khara Hais was over three times larger with a GDP of R3 158.7 million (Quantec,

2016). The Kai !Garib LM largely depends on agriculture, with this sector accounting for close to half of the economy's production. The situation is different in the Khara Hais LM, where the tertiary sector contributes 75.9% to the local economy, with "wholesale and retail trade, catering and accommodation" and "general government" as the main contributors.

Based on constant 2005 prices and using a Compounded Annual Growth Rate (CAGR), it is interesting to note that the Kai !Garib LM has a flat growth rate over the ten-year period 2003-2013. This is explained by the recession experienced in the majority of the economic sectors, with the notable exceptions of agriculture (CAGR of 2%), manufacturing (7%), construction (7%) and electricity, gas and water (10%). During the same period, the Khara Hais municipality grew at a CAGR of 3%, and here again the sectors of agriculture (9%), construction (7%) and electricity, gas and water (10%) showed exceptional performance over the years. The growth of the utility sector is of particular interest, as it was propelled by the development of solar energy projects as a result of the RE IPPPP roll out. The importance of the agriculture and construction sectors for the Kai !Garib LM's economy was also highlighted by the people interviewed at the municipality during the site visit.

Level of education:

The representative of the Kai !Garib LM interviewed during the site visit stressed that the majority of workers in the municipality have low skills and no formal education. There is an outflow of educated people who leave the municipality to find employment in the mining sector or in large cities (i.e. Kimberley and Johannesburg).

b) Socio-economic value of the activity

What is the expected capital value of the activity on completion?	Approx. R 68 million	
What is the expected yearly income that will be generated by or as a result of the activity?	Unknown – Eskom owned asset.	
Will the activity contribute to service infrastructure?	YES	
Is the activity a public amenity?		NO
How many new employment opportunities will be created in the development and construction phase of the activity/ies?	Approx. 15-30	
What is the expected value of the employment opportunities during the development and construction phase?	Unknown – Eskom owned asset.	
What percentage of this will accrue to previously disadvantaged individuals?	Approx. 45%	
How many permanent new employment opportunities will be created during the operational phase of the activity?	Approx. 45%	
What is the expected current value of the employment opportunities during the first 10 years?	Unknown – Eskom owned asset.	
What percentage of this will accrue to previously disadvantaged individuals?	Unknown – Eskom owned asset.	

9. BIODIVERSITY

Please note: The Department may request specialist input/studies depending on the nature of the biodiversity occurring on the site and potential impact(s) of the proposed activity/ies. To assist with the

identification of the biodiversity occurring on site and the ecosystem status consult http://bgis.sanbi.org or BGIShelp@sanbi.org. Information is also available on compact disc (cd) from the Biodiversity-GIS Unit, Ph (021) 799 8698. This information may be updated from time to time and it is the applicant/ EAP's responsibility to ensure that the latest version is used. A map of the relevant biodiversity information (including an indication of the habitat conditions as per (b) below) and must be provided as an overlay map to the property/site plan as Appendix D to this report.

a) Indicate the applicable biodiversity planning categories of all areas on site and indicate the reason(s) provided in the biodiversity plan for the selection of the specific area as part of the specific category)

Systematic Biodiversity Planning Category				**If CBA or ESA, indicate the reason(s) for its selection in biodiversity plan**
Critical Biodiversity Area (CBA)	Ecological Support Area (ESA)	Other Natural Area (ONA)	No Natural Area Remaining (NNR)	N/A
				N/A
				N/A

b) Indicate and describe the habitat condition on site

Habitat Condition	**Percentage of habitat condition class (adding up to 100%)**	**Description and additional Comments and Observations (including additional insight into condition, e.g. poor land management practises, presence of quarries, grazing, harvesting regimes etc).**
Natural	Approx. 30%	Drainage Lines There are a number of drainage lines of variable size which occur in the affected area, the most significant of which are the Helbrandkloofspruit and the Helbrandleegte. These represent the largest obstacles which would need to be traversed by the pipeline and several of the options would need to traverse at least one of these dry rivers. The drainage lines carry water only for brief periods following heavy rainfall events and usually consist of a narrow sandy bed flanked by tall shrubs and scattered trees. Larger drainage lines are dominated by species such as *Acacia erioloba*, *Boscia albitrunca*, *Zizyphus mucronata* and *Searsia lancea*, while the smaller drainage lines are typically dominated species such as *Acacia mellifera*, *Boscia foetida* and *Phaeoptilum spinosum*. Due to the ecological role that drainage lines play as well as their vulnerability to disturbance, these areas are considered sensitive and should be avoided as much as possible. Protected tree species are concentrated along the drainage lines with species such as *Boscia foetida*, *Boscia albitrunca* and *Acacia erioloba* being found largely

		within this habitat type. The Rooipunt-Keimoes Alternative 2, both the Alternatives to the Orange River and the Rooipunt – Upington WWTW Alternative 2 would all need to cross fairly large drainage lines and specific mitigation measures to reduce impacts on the drainage lines would be required. Quartz Outcrops There are occasional quartz outcrops within the study area, usually associated with higher-lying ground or ridges in the area. This is a localised and specialised habitat that frequently contains associated species that are not found elsewhere. As such this is considered a sensitive habitat that should be avoided as much as possible. Species of concern associated with this habitat include *Dinteranthus wilmotianus*, *Lithops bromfieldii*, *Aloe claviflora, Larryleachia marlothii* and *Adenium oleifolium*. Quatrz patches occur scattered throughout the area at a low density and may be conspicuous ridges or take the form of flat areas of weathered quartz pebbles on the open plains that are less visible. They are however generally of small extent and it should be possible to avoid direct impact to these habitats where they are found to occur. As not all of them are conspicuous, there may b additional patches present in the area that have not yet been observed, but if present, these can be located and avoided during the preconstruction walk through of the final development footprint. This habitat is potentially present along the Alternatives to the Keimoes pumping station and is not likely to be present along the other options.
Near Natural (includes areas with low to moderate level of alien invasive plants)	65%	Kalahari Karroid Shrubland Areas of shallow soils with exposed or underlying gravel or calcrete often occur on crests of hills or on valley bottoms along drainage lines. These areas are usually shrub-dominated and correspond loosely with the Kalahari Karroid Shrubland vegetation type. Typical species include *Leucosphaera bainesii*, *Hermannia spinosa*, *Monoechma genistifoilium*, *Salsola rabieana*, *Aptosimum albomarginatum*, *A.spinecens*, *Kleinia longiflora*, *Limeum argute-carinatum*, *Phyllanthus maderaspatensis*, *Zygophyllum dregeanum* and grasses such as *Stipagrostis anomala*, *S.ciliata*, *S.uniplumis*, *S.hochstetteriana*, *S.uniplumis* and *Schmidtia kalariensis*. Protected and listed species that occur in these areas include *Hoodia gordonii*, *Adenium oleifolium*, *Avonia albissima* and *Euphorbia rudis*. The habitat is present along a significant proportion of all of the options, but represents the largest

		proportion of the two options to the Orange River. Bushmanland Arid Grassland Although this vegetation unit is mapped as being largely restricted to the areas towards the Orange River, it is more widespread than the Vegmap suggests and most areas on deeper soils are dominated by various *Stipagrostis* species with a variable shrub layer. Common and dominant species include *Stipagrostis ciliata*, *S.obtusa*, *S.uniplumis* and *S.amabilis*. Species of conservation concern are not abundant in this habitat and the only species of concern that is commonly observed within this habitat type are occasional *Hoodia gordonii* plants. Protected species which occur in this habitat type include occasional individuals of *Boscia foetida*, *Boscia albitrunca* and *Acacia erioloba*. The unit is present along all of the options to a greater or lesser degree, but is most prominent along the Rooipunt-Keimoes Alternative 2. Plains Wash It is common in the area for wash areas to develop on the open plains. These are areas where runoff may collect and flow during extreme rainfall events, but not to the extent that that well-defined drainage lines develop. This is typical of arid areas and these areas are not considered to be drainage lines and usually disappear or dissipate as soon as the soils get deeper or the slope declines. As such these areas are not categorized as drainage lines but are nevertheless considered more sensitive than the surrounding plains as these areas are more vulnerable to disturbance and erosion. These areas are usually dominated by perennial grasses such as *Stipagrostis anomala*, *S.ciliata*, *S.uniplumis*, *S.hochstetteriana*, *S.uniplumis* and *Schmidtia kalariensis*. A scattered variable-density taller woody layer is usually present, consisting of species such as *Phaeoptilum spinosum*, *Boscia foetida* subsp. *foetida*, *Rhigozum trichotomum* and *Lycium oxycarpum*, but there is often little overall differentiation between the grass and low shrub layer of these areas and the surrounding vegetation. Aside from *Boscia foetida* which is fairly common in these areas, there are few listed or protected species which were observed in this habitat type. There are areas of plains wash along all of the different routes and the risk of erosion following disturbance in these areas would be high but it would not be possible to avoid all of these areas.
Degraded (includes areas	0%	None

heavily invaded by alien plants)		
Transformed (includes cultivation, dams, urban, plantation, roads, etc)	Approx. 5%	Roads and power line infrastructure as well as areas of cultivation.

c) Complete the table to indicate:

(i) the type of vegetation, including its ecosystem status, present on the site; and

(ii) whether an aquatic ecosystem is present on site.

Terrestrial Ecosystems		**Aquatic Ecosystems**				
Ecosystem threat status as per the National Environmental Management: Biodiversity Act (Act No. 10 of 2004)	Critical	Wetland (including rivers, depressions, channelled and unchanneled wetlands, flats, seeps pans, and artificial wetlands)		Estuary		Coastline
	Endangered					
	Vulnerable					
	Least Threatened✓	**YES✓**			**NO✓**	**NO✓**

d) Please provide a description of the vegetation type and/or aquatic ecosystem present on site, including any important biodiversity features/information identified on site (e.g. threatened species and special habitats)

Within the area affected by the proposed development, vegetation types that are affected include Lower Gariep Broken Veld, Lower Gariep Alluvial Vegetation, Kalahari Karroid Shrubland and Bushmanland Arid Grassland. The vegetation habitats actually observed within the proposed power line corridors however include those stipulated below.

Bushmanland Arid Grassland

Although this vegetation unit is mapped as being largely restricted to the areas towards the Orange River, it is more widespread than the Vegmap suggests and most areas on deeper soils are dominated by various Stipagrostis species with a variable shrub layer. Common and dominant species include *Stipagrostis ciliata*, *S.obtusa*, *S.uniplumis* and *S.amabilis*. Species of conservation concern are not abundant in this habitat and the only species of concern that is commonly observed within this habitat type are occasional *Hoodia gordonii* plants. Protected species which occur in this habitat type include occasional individuals of *Boscia foetida*, *Boscia albitrunca* and *Acacia erioloba*. The unit is present along all of the options to a greater or lesser degree, but is most prominent along the Rooipunt-Keimoes Alternative 2.

Kalahari Karroid Shrubland

Areas of shallow soils with exposed or underlying gravel or calcrete often occur on crests of hills or on valley bottoms along drainage lines. These areas are usually shrub-dominated and correspond loosely with the Kalahari Karroid Shrubland vegetation type. Typical species include *Leucosphaera bainesii*, *Hermannia spinosa*, *Monoechma genistifoilium*, *Salsola rabieana*, *Aptosimum albomarginatum*, *A.spinecens*, *Kleinia longiflora*, *Limeum argute-carinatum*, *Phyllanthus maderaspatensis*, *Zygophyllum dregeanum* and grasses such as *Stipagrostis anomala*, *S.ciliata*, *S.uniplumis*, *S.hochstetteriana*, *S.uniplumis* and *Schmidtia kalariensis*. Protected and listed species

that occur in these areas include *Hoodia gordonii*, *Adenium oleifolium*, *Avonia albissima* and *Euphorbia rudis*. The habitat is present along a significant proportion of all of the options, but represents the largest proportion of the two options to the Orange River.

Plains Wash

It is common in the area for wash areas to develop on the open plains. These are areas where runoff may collect and flow during extreme rainfall events, but not to the extent that that well-defined drainage lines develop. This is typical of arid areas and these areas are not considered to be drainage lines and usually disappear or dissipate as soon as the soils get deeper or the slope declines. As such these areas are not categorized as drainage lines but are nevertheless considered more sensitive than the surrounding plains as these areas are more vulnerable to disturbance and erosion. These areas are usually dominated by perennial grasses such as *Stipagrostis anomala*, *S.ciliata*, *S.uniplumis*, *S.hochstetteriana*, *S.uniplumis* and *Schmidtia kalariensis*. A scattered variable-density taller woody layer is usually present, consisting of species such as Phaeoptilum spinosum, *Boscia foetida* subsp. *foetida*, *Rhigozum trichotomum* and *Lycium oxycarpum*, but there is often little overall differentiation between the grass and low shrub layer of these areas and the surrounding vegetation. Aside from *Boscia foetida* which is fairly common in these areas, there are few listed or protected species which were observed in this habitat type. There are areas of plains wash along all of the different routes and the risk of erosion following disturbance in these areas would be high but it would not be possible to avoid all of these areas.

Drainage Lines

There are a number of drainage lines of variable size which occur in the affected area, the most significant of which are the Helbrandkloofspruit and the Helbrandleegte. These represent the largest obstacles which would need to be traversed by the pipeline and several of the options would need to traverse at least one of these dry rivers. The drainage lines carry water only for brief periods following heavy rainfall events and usually consist of a narrow sandy bed flanked by tall shrubs and scattered trees. Larger drainage lines are dominated by species such as *Acacia erioloba*, *Boscia albitrunca*, *Zizyphus mucronata* and *Searsia lancea*, while the smaller drainage lines are typically dominated species such as *Acacia mellifera*, *Boscia foetida* and *Phaeoptilum spinosum*. Due to the ecological role that drainage lines play as well as their vulnerability to disturbance, these areas are considered sensitive and should be avoided as much as possible. Protected tree species are concentrated along the drainage lines with species such as *Boscia foetida*, *Boscia albitrunca* and *Acacia erioloba* being found largely within this habitat type. The Rooipunt-Keimoes Alternative 2, both the Alternatives to the Orange River and the Rooipunt – Upington WWTW Alternative 2 would all need to cross fairly large drainage lines and specific mitigation measures to reduce impacts on the drainage lines would be required.

Quartz Outcrops

There are occasional quartz outcrops within the study area, usually associated with higher-lying ground or ridges in the area. This is a localised and specialised habitat that frequently contains associated species that are not found elsewhere. As such this is considered a sensitive habitat that should be avoided as much as possible. Species of concern associated with this habitat include *Dinteranthus wilmotianus*, *Lithops bromfieldii*, *Aloe claviflora*, *Larryleachia marlothii* and *Adenium oleifolium*. Quatrz patches occur scattered throughout the area at a low density and may be conspicuous ridges or take the form of flat areas of weathered quartz pebbles on the open plains that are less visible. They are however generally of small extent and it should be possible to avoid direct

impact to these habitats where they are found to occur. As not all of them are conspicuous, there may b additional patches present in the area that have not yet been observed, but if present, these can be located and avoided during the preconstruction walk through of the final development footprint. This habitat is potentially present along the Alternatives to the Keimoes pumping station and is not likely to be present along the other options.

SECTION C: PUBLIC PARTICIPATION

Details of the Public Participation process is included in Appendix E.

1. ADVERTISEMENT AND NOTICE

Publication name	Details to be included in Final Basic Assessment Report	
Date published	Details to be included in Final Basic Assessment Report	
Site notice position	**Latitude**	**Longitude**
	Details to be included in Final Basic Assessment Report	Details to be included in Final Basic Assessment Report
Date placed	Details to be included in Final Basic Assessment Report	

Include proof of the placement of the relevant advertisements and notices in Appendix E1.

Proof of the Advertisements and Site notices to be included in Final Basic Assessment Report in Appendix E1

2. DETERMINATION OF APPROPRIATE MEASURES

Provide details of the measures taken to include all potential I&APs as required by Regulation 41(2)(e) and 41(6) of GN 733.

Refer to Appendix E for further details of the measures taken to notify all potential I&APs of the proposed project

Key stakeholders (other than organs of state) identified in terms of Regulation 41(2)(b) of GN 733

Title, Name and Surname	Affiliation/ key stakeholder status	Contact details (tel number or e-mail address)
Please refer to Appendix E5	Please refer to Appendix E5	To be requested directly from SiVEST (Pty) Ltd

Include proof that the key stakeholder received written notification of the proposed activities as Appendix E2. This proof may include any of the following:

- e-mail delivery reports;
- registered mail receipts;
- courier waybills;
- signed acknowledgements of receipt; and/or
- or any other proof as agreed upon by the competent authority.

Proof that the key stakeholder received written notification of the proposed activities is included in Appendix E2.

3. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

Summary of main issues raised by I&APs	Summary of response from EAP
Avoidance of project infrastructure for the adjacent Solek PV components on Portion 12 of the Farm Dyasons Klip No. 454. Provision for the power line is to be made as follows: ▪ Proposed Powerline Option 3 cannot be accommodated due to planned development on Portion 12 of the Farm Dyasons Klip No. 454, as this will interfere with multiple of our project sites. Please further note that it would neither suffice on the boundaries of Dyason's klip 454 as there are unfortunately already constraints on the service corridors. ▪ Proposed powerline option 2 should be routed to run as far as possible east within the Rooipunt pan handle (portion of Rooipunt servitude to the south and west of portion 3 of MC Taggarts 453 and remainder of Tungsten 638) and should not cross the Dyasonsklip farm 454. Therefore, the proposed powerline option 2 is not supported when planned to run on the eastern boundary of Dyasonsklip farm 454 (the constraint is due to limited space availability and the already occupied service corridors for our other projects on the property).	These provisions will be accommodated should the proposed development receive environmental authorisation and proceed to construction.
Further details to be included in Final Basic Assessment Report	Further details to be included in Final Basic Assessment Report
Further details to be included in Final Basic Assessment Report	Further details to be included in Final Basic Assessment Report
Further details to be included in Final Basic Assessment Report	Further details to be included in Final Basic Assessment Report
Further details to be included in Final Basic Assessment Report	Further details to be included in Final Basic Assessment Report
Further details to be included in Final Basic Assessment Report	Further details to be included in Final Basic Assessment Report
Further details to be included in Final Basic Assessment Report	Further details to be included in Final Basic Assessment Report
Further details to be included in Final Basic Assessment Report	Further details to be included in Final Basic Assessment Report

4. COMMENTS AND RESPONSE REPORT

The practitioner must record all comments received from I&APs and respond to each comment before the Draft BAR is submitted. The comments and responses must be captured in a comments and response report as prescribed in the EIA regulations and be attached to the Final BAR as Appendix E3.

The Comments and Response Report (C&RR) is included in Appendix E3.

5. AUTHORITY PARTICIPATION

Authorities and organs of state identified as key stakeholders:

Authority/Organ of State	Contact person (Title, Name and Surname)	Tel No	Fax No	e-mail	Postal address
Please refer to Appendix E5, full contact details can be requested directly from SiVEST (Pty) Ltd					

Include proof that the Authorities and Organs of State received written notification of the proposed activities as appendix E4.

In the case of renewable energy projects, Eskom and the SKA Project Office must be included in the list of Organs of State.

Proof that the Authorities and Organs of State received written notification of the proposed activities are included in Appendix E4.

6. CONSULTATION WITH OTHER STAKEHOLDERS

Note that, for any activities (linear or other) where deviation from the public participation requirements may be appropriate, the person conducting the public participation process may deviate from the requirements of that sub-regulation to the extent and in the manner as may be agreed to by the competent authority.

Proof of any such agreement must be provided, where applicable. Application for any deviation from the regulations relating to the public participation process must be submitted prior to the commencement of the public participation process.

A list of registered I&APs must be included as appendix E5.

Copies of any correspondence and minutes of any meetings held must be included in Appendix E6.

A list of registered I&APs is included in Appendix E5. Full detail of the correspondence and minutes of meetings are to be included in Final Basic Assessment Report in Appendix E6.

SECTION D: IMPACT ASSESSMENT

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations, 2014 and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts.

1. IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN, CONSTRUCTION, OPERATIONAL, DECOMMISSIONING AND CLOSURE PHASES AS WELL AS PROPOSED MANAGEMENT OF IDENTIFIED IMPACTS AND PROPOSED MITIGATION MEASURES

Provide a summary and anticipated significance of the potential direct, indirect and cumulative impacts that are likely to occur as a result of the planning and design phase, construction phase, operational phase, decommissioning and closure phase, including impacts relating to the choice of site/activity/technology alternatives as well as the mitigation measures that may eliminate or reduce the potential impacts listed. This impact assessment must be applied to all the identified alternatives to the activities identified in Section A(2) of this report.

Corridor Alternative 1 (Blue – Preferred)

Activity	Impact summary	Significance	Proposed mitigation
Biodiversity	***Direct impacts:***		
	Loss of Vegetation during construction	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts, but will not affect the extent, probability, reversibility, irreplaceable loss of resources, duration, cumulative effect or intensity: ▪ There should be a preconstruction walk-through of the pipeline route to identify species of conservation concern that should be avoided or translocated. ▪ It should not be necessary to clear the whole servitude and the existing lines in the area have generally not been cleared. ▪ The footprint should be restricted to a temporary access road for construction and the pylon foundations.

Activity	Impact summary	Significance	Proposed mitigation
	Faunal Impacts during construction	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts, but will not affect the extent, probability, reversibility, irreplaceable loss of resources, duration, cumulative effect or intensity: ▪ The footprint of the power line should be kept as low as possible and construction staff should undergo environmental induction to ensure that they are aware of fauna-related issues and that no fauna are harmed during construction.
	Ecological degradation during operation	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Regular erosion and alien plant control along the powerline servitude. During operation and maintenance of the powerline servitude, alien species especially large woody species such as *Propsopis glandulosa* should be cleared from the pipeline servitude, but indigenous species such as *Boscia albitunca* and *Boscia foetida*, should not be cleared as they do not pose a fire risk. If any indigenous trees are too tall to comply with safety standards they can be trimmed to an acceptable height and it is not necessary to cut down the trees.
	Decommissioning Impacts on Fauna	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Disturbance during decommissioning should be kept as low as possible. Staff should undergo environmental induction to ensure that they are aware of fauna-related issues and that no fauna are harmed during decommissioning activities.
	Ecological Degradation due to Decommissioning	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ As the pylons are steel structures with concrete foundations, they are not easily removed and so it is

Activity	Impact summary	Significance	Proposed mitigation
			likely that decommissioning would result in some disturbance along the power line route, which should be reduced as far as possible. The use various tools to dismantle the pylons may also pose a fire risk if these generate sparks or have open flames.
	Indirect impacts:		
	None identified.	None identified	None identified.
	Cumulative impacts:		
	Although the density of renewable energy development in the area is high, with numerous approved projects currently being built or nearing construction, the main source of cumulative impact in the area is from the facilities themselves and the contribution of power lines is minimal in comparison. As a result, the contribution of the Rooipunt to Eskom MTS 132kV line to cumulative impact is not considered highly significant in the context of the surrounding landscape and large-scale impacts on habitat loss resulting from the facilities or transformation for vineyards.		
Avifauna	***Direct impacts:***		
	Displacement of Red Data species due to disturbance and habitat transformation associated with construction of the 132kV power line	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Construction activity should be restricted to the immediate footprint of the infrastructure. ▪ Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of Red Data species. ▪ Measures to control noise and dust should be applied according to current best practice in the industry. ▪ Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum.
	Collisions of Red Data species with the proposed 132kV line (operation phase)	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ The 132kV grid connection should be inspected at least once a quarter for a minimum of three years by the avifaunal specialist to establish if there is any significant collision mortality. Thereafter the frequency of inspections will be informed by the results of the first three years.

Activity	Impact summary	Significance	Proposed mitigation
			▪ The detailed protocol to be followed for the inspections will be compiled by the avifaunal specialist prior to the first inspection. ▪ The line should be marked with Bird Flight Diverters (BFDs) for its entire length on the earth wire of the line, 5m apart, alternating black and white..
	Electrocutions of Red Data species on the proposed 132kV line (operation phase)	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ The 132kV grid connection should be inspected at least once a quarter for a minimum of three years by the avifaunal specialist to establish if there is any significant electrocution mortality. Thereafter the frequency of inspections will be informed by the results of the first three years. ▪ The detailed protocol to be followed for the inspections will be compiled by the avifaunal specialist prior to the first inspection. ▪ All the steel monopoles should be fitted with bird perches. See Appendix 3 for the recommended bird perch.
	Displacement of Red Data species due to disturbance and habitat transformation associated with de-commissioning of the 132kV power line.	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ De-commissioning activity should be restricted to the immediate footprint of the infrastructure. ▪ Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of Red Data species. ▪ Measures to control noise and dust should be applied according to current best practice in the industry. ▪ Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum.

Activity	Impact summary	Significance	Proposed mitigation
	Indirect impacts:		
	None identified.		
	Cumulative impacts:		
	The cumulative impact of displacement due to disturbance and habitat transformation as a result of the building of the 132kV Rooipunt power line, is likely to be MINOR for Red Data species. The risks that power lines pose, is well researched (Shaw 2013). This sub-transmission line will further increase the already high collision risk to Ludwig's Bustards, Greater Flamingo, Lesser Flamingo, Karoo Korhaan and Kori Bustard that power lines pose throughout their range. The key question therefore is to what extent the proposed sub-transmission line will contribute to this existing and potentially significant mortality factor in the area around Upington. All in all, it is envisaged that collisions of Red Data species with the proposed line will have a MINOR - MODERATE cumulative impact, due to the short length of the line. It is envisaged that the risk of electrocution posed by the proposed powerline is MINOR, especially if the monopole is fitted with a bird perch.		
Wetlands	***Direct impacts:***		
	Helbrandleegte and Helbrandkloofspruit Rivers – Loss of riparian habitat and ecological structure (construction phase)	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Careful planning of the placement of towers, taking into consideration the locality of riparian habitats and as much as possible, avoid placement of towers within riparian habitat, and powerlines are preferably to span the relevant resource. If at all possible, all towers should be developed above the 1:100 year floodline. ▪ Where it is impossible to avoid placing infrastructure within riparian habitat, flow connectivity must be retained by preventing fragmentation of the riparian habitat, and it must be ensured that no canalization or incision of the riparian resource takes place as a result of the construction activities. ▪ Vegetation clearing prior to construction must be minimized and the area re-seeded following construction with indigenous/endemic species to aid in the natural recovery of

Activity	Impact summary	Significance	Proposed mitigation
			vegetation. ▪ Clearing/felling of woody vegetation should be limited to trees/shrubs above the maximum permitted clearance height, and the understory should not be cleared. Where possible, crossing points should be chosen to avoid large riparian trees. ▪ An alien vegetation control programme should form part of the Environmental Management Programme (EMPr). ▪ Exposed soils to be protected with suitable geotextile coverings, such as hessian sheets at all times during the construction phase, and no stockpiling of soils is to take place within the riparian zone or associated buffer zone. ▪ All riparian zones should be treated as highly sensitive areas, and be strictly maintained as such, except in the case of essential construction activities such stringing of lines and clearing of vegetation, should riparian crossings be unavoidable. The footprint areas of any crossing points must be minimised in order to reduce the cumulative impacts thereof. ▪ Lay down areas should be placed outside the delineated riparian corridors/buffer zones, and construction right of ways may only be created through or across watercourses if proposed for use during operations and no existing right of way exist. However it is recommended that where existing roads / accesses cross watercourses exist these be used as a primary right of way. ▪ Reinforce banks and drainage features where necessary with gabions, reno mattresses and

Activity	Impact summary	Significance	Proposed mitigation
			geotextiles but as far as possible soft rehabilitation techniques should be employed. ▪ Planning of temporary roads and access routes should avoid natural areas and be restricted to existing roads where possible. If it is not possible to avoid crossing the rivers and/or drainage lines, it must be ensured that the construction of such access roads are carried out in a responsible manner, i.e. by implementing mitigations to manage erosion, prevent impeding the flow of water along the system, and prevent sedimentation of the system as a result of the construction of such access roads.
	Helbrandleegte and Helbrandkloofspruit Rivers – Changes to riparian ecological and sociocultural service provision (construction phase)	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Careful Careful planning of the placement of towers, taking into consideration the locality of riparian habitats and as much as possible, avoid placement of towers within riparian habitat, and powerlines are preferably to span the relevant resource. If at all possible, all towers should be developed above the 1:100 year floodline ▪ Where it is impossible to avoid placing infrastructure within riparian habitat, flow connectivity must be retained by preventing fragmentation of the riparian habitat, and it must be ensured that no canalization or incision of the riparian resource takes place as a result of the construction activities. ▪ Vegetation clearing prior to construction must be minimized and the area re-seeded following construction with indigenous/endemic species to aid in the natural recovery of

Activity	Impact summary	Significance	Proposed mitigation
			vegetation. ▪ Clearing/felling of woody vegetation should be limited to trees/shrubs above the maximum permitted clearance height, and the understory should not be cleared. Where possible, crossing points should be chosen to avoid large riparian trees. ▪ An alien vegetation control programme should form part of the Environmental Management Programme (EMPr). ▪ Exposed soils to be protected with suitable geotextile coverings, such as hessian sheets, at all times during the construction phase, and no stockpiling of soils is to take place within the riparian zone or associated buffer zone. ▪ All riparian zones should be treated as highly sensitive areas, and be strictly maintained as such, except in the case of essential construction activities such stringing of lines and clearing of vegetation, should riparian crossings be unavoidable. The footprint areas of any crossing points must be minimised in order to reduce the cumulative impacts thereof. ▪ Lay down areas should be placed outside the delineated riparian corridors/buffer zones, and construction right of ways may only be created through or across watercourses if proposed for use during operations and no existing right of way exist. However it is recommended that where existing roads / accesses cross watercourses exist these be used as a primary right of way. Reinforce banks and drainage features where necessary with gabions, reno mattresses and

Activity	Impact summary	Significance	Proposed mitigation
			geotextiles but as far as possible soft rehabilitation techniques should be employed. ▪ Planning of temporary roads and access routes should avoid natural areas and be restricted to existing roads where possible. If it is not possible to avoid crossing the rivers and/or drainage lines, it must be ensured that the construction of such access roads are carried out in a responsible manner, i.e. by implementing mitigations to manage erosion, prevent impeding the flow of water along the system, and prevent sedimentation of the system as a result of the construction of such access roads.
	Helbrandleegte and Helbrandkloofspruit Rivers – Impacts on riparian hydrology and sediment balance (construction phase)	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Careful planning of the placement of towers, taking into consideration the locality of riparian habitats and as much as possible, avoid placement of towers within riparian habitat, and powerlines are preferably to span the relevant resource. If at all possible, all towers should be developed above the 1:100 year floodline. ▪ Where it is impossible to avoid placing infrastructure within riparian habitat, flow connectivity must be retained by preventing fragmentation of the riparian habitat, and it must be ensured that no canalization or incision of the riparian resource takes place as a result of the construction activities. ▪ Vegetation clearing prior to construction must be minimized and the area re-seeded following construction with indigenous/endemic species to aid in the natural recovery of vegetation.

Activity	Impact summary	Significance	Proposed mitigation
			▪ Clearing/felling of woody vegetation should be limited to trees/shrubs above the maximum permitted clearance height, and the understory should not be cleared. Where possible, crossing points should be chosen to avoid large riparian trees. ▪ An alien vegetation control programme should form part of the Environmental Management Programme (EMPr). ▪ Exposed soils to be protected with suitable geotextile coverings at all times, such as hessian sheets, during the construction phase, and no stockpiling of soils is to take place within the riparian zone or associated buffer zone. ▪ All riparian zones should be treated as highly sensitive areas, and be strictly maintained as such, except in the case of essential construction activities such stringing of lines and clearing of vegetation, should riparian crossings be unavoidable. The footprint areas of any crossing points must be minimised in order to reduce the cumulative impacts thereof. ▪ Lay down areas should be placed outside the delineated riparian corridors/buffer zones, and construction right of ways may only be created through or across watercourses if proposed for use during operations and no existing right of way exist. However it is recommended that where existing roads / accesses cross watercourses exist these be used as a primary right of way. Reinforce banks and drainage features where necessary with gabions, reno mattresses and geotextiles but as far as possible

Activity	Impact summary	Significance	Proposed mitigation
			soft rehabilitation techniques should be employed. ▪ Planning of temporary roads and access routes should avoid natural areas and be restricted to existing roads where possible. If it is not possible to avoid crossing the rivers and/or drainage lines, it must be ensured that the construction of such access roads are carried out in a responsible manner, i.e. by implementing mitigations to manage erosion, prevent impeding the flow of water along the system, and prevent sedimentation of the system as a result of the construction of such access roads.
	Ephemeral Drainage Lines – Loss of riparian habitat and ecological structure (construction phase)	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Careful planning of the placement of towers, taking into consideration the locality of riparian habitats and as much as possible, avoid placement of towers within riparian habitat, and powerlines are preferably to span the relevant resource. If at all possible, all towers should be developed above the 1:100 year floodline ▪ Where it is impossible to avoid placing infrastructure within riparian habitat, flow connectivity must be retained by preventing fragmentation of the riparian habitat, and it must be ensured that no canalization or incision of the riparian resource takes place as a result of the construction activities. ▪ Vegetation clearing prior to construction must be minimized and the area re-seeded following construction with indigenous/endemic species to aid in the natural recovery of vegetation. ▪ Clearing/felling of woody

Activity	Impact summary	Significance	Proposed mitigation
			vegetation should be limited to trees/shrubs above the maximum permitted clearance height, and the understory should not be cleared. Where possible, crossing points should be chosen to avoid large riparian trees. ▪ An alien vegetation control programme should form part of the Environmental Management Programme (EMPr). ▪ Exposed soils to be protected with suitable geotextile coverings, such as hessian sheets, at all times during the construction phase, and no stockpiling of soils is to take place within the riparian zone or associated buffer zone. ▪ All riparian zones should be treated as highly sensitive areas, and be strictly maintained as such, except in the case of essential construction activities such stringing of lines and clearing of vegetation, should riparian crossings be unavoidable. The footprint areas of any crossing points must be minimised in order to reduce the cumulative impacts thereof. ▪ Lay down areas should be placed outside the delineated riparian corridors/buffer zones, and construction right of ways may only be created through or across watercourses if proposed for use during operations and no existing right of way exist. However it is recommended that where existing roads / accesses cross watercourses exist these be used as a primary right of way. Reinforce banks and drainage features where necessary with gabions, reno mattresses and geotextiles but as far as possible soft rehabilitation techniques

Activity	Impact summary	Significance	Proposed mitigation
			should be employed. ▪ Planning of temporary roads and access routes should avoid natural areas and be restricted to existing roads where possible. If it is not possible to avoid crossing the rivers and/or drainage lines, it must be ensured that the construction of such access roads are carried out in a responsible manner, i.e. by implementing mitigations to manage erosion, prevent impeding the flow of water along the system, and prevent sedimentation of the system as a result of the construction of such access roads.
	Ephemeral Drainage Lines – Changes to riparian ecological and sociocultural service provision (construction phase)	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Careful planning of the placement of towers, taking into consideration the locality of riparian habitats and as much as possible, avoid placement of towers within riparian habitat, and powerlines are preferably to span the relevant resource. If at all possible, all towers should be developed above the 1:100 year floodline. ▪ Where it is impossible to avoid placing infrastructure within riparian habitat, flow connectivity must be retained by preventing fragmentation of the riparian habitat, and it must be ensured that no canalization or incision of the riparian resource takes place as a result of the construction activities. ▪ Vegetation clearing prior to construction must be minimized and the area re-seeded following construction with indigenous/endemic species to aid in the natural recovery of vegetation. ▪ Clearing/felling of woody vegetation should be limited to

Activity	Impact summary	Significance	Proposed mitigation
			trees/shrubs above the maximum permitted clearance height, and the understory should not be cleared. Where possible, crossing points should be chosen to avoid large riparian trees. ▪ An alien vegetation control programme should form part of the Environmental Management Programme (EMPr). ▪ Exposed soils to be protected with suitable geotextile coverings, such as hessian sheets, at all times during the construction phase, and no stockpiling of soils is to take place within the riparian zone or associated buffer zone. ▪ All riparian zones should be treated as highly sensitive areas, and be strictly maintained as such, except in the case of essential construction activities such stringing of lines and clearing of vegetation, should riparian crossings be unavoidable. The footprint areas of any crossing points must be minimised in order to reduce the cumulative impacts thereof. ▪ Lay down areas should be placed outside the delineated riparian corridors/buffer zones, and construction right of ways may only be created through or across watercourses if proposed for use during operations and no existing right of way exist. However it is recommended that where existing roads / accesses cross watercourses exist these be used as a primary right of way. ▪ Reinforce banks and drainage features where necessary with gabions, reno mattresses and geotextiles but as far as possible soft rehabilitation techniques should be employed.

Activity	Impact summary	Significance	Proposed mitigation
			▪ Planning of temporary roads and access routes should avoid natural areas and be restricted to existing roads where possible. If it is not possible to avoid crossing the rivers and/or drainage lines, it must be ensured that the construction of such access roads are carried out in a responsible manner, i.e. by implementing mitigations to manage erosion, prevent impeding the flow of water along the system, and prevent sedimentation of the system as a result of the construction of such access roads.
	Ephemeral Drainage Lines – Impacts on riparian hydrology and sediment balance (construction phase)	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Careful planning of the placement of towers, taking into consideration the locality of riparian habitats and as much as possible, avoid placement of towers within riparian habitat, and powerlines are preferably to span the relevant resource. If at all possible, all towers should be developed above the 1:100 year floodline ▪ Where it is impossible to avoid placing infrastructure within riparian habitat, flow connectivity must be retained by preventing fragmentation of the riparian habitat, and it must be ensured that no canalization or incision of the riparian resource takes place as a result of the construction activities. ▪ Vegetation clearing prior to construction must be minimized and the area re-seeded following construction with indigenous/endemic species to aid in the natural recovery of vegetation. ▪ Clearing/felling of woody vegetation should be limited to trees/shrubs above the maximum

Activity	Impact summary	Significance	Proposed mitigation
			permitted clearance height, and the understory should not be cleared. Where possible, crossing points should be chosen to avoid large riparian trees. ▪ An alien vegetation control programme should form part of the Environmental Management Programme (EMPr). ▪ Exposed soils to be protected with suitable geotextile coverings, such as hessian sheets, at all times during the construction phase, and no stockpiling of soils is to take place within the riparian zone or associated buffer zone. ▪ All riparian zones should be treated as highly sensitive areas, and be strictly maintained as such, except in the case of essential construction activities such stringing of lines and clearing of vegetation, should riparian crossings be unavoidable. The footprint areas of any crossing points must be minimised in order to reduce the cumulative impacts thereof. ▪ Lay down areas should be placed outside the delineated riparian corridors/buffer zones, and construction right of ways may only be created through or across watercourses if proposed for use during operations and no existing right of way exist. However it is recommended that where existing roads / accesses cross watercourses exist these be used as a primary right of way. Reinforce banks and drainage features where necessary with gabions, reno mattresses and geotextiles but as far as possible soft rehabilitation techniques should be employed. ▪ Planning of temporary roads and

Activity	Impact summary	Significance	Proposed mitigation
			access routes should avoid natural areas and be restricted to existing roads where possible. If it is not possible to avoid crossing the rivers and/or drainage lines, it must be ensured that the construction of such access roads are carried out in a responsible manner, i.e. by implementing mitigations to manage erosion, prevent impeding the flow of water along the system, and prevent sedimentation of the system as a result of the construction of such access roads.
	Indirect impacts:		
	None identified	None identified	None identified
	Cumulative impacts:		
	With several current and historical activities occurring within the vicinity of the proposed development, the potential cumulative impacts of such activities in conjunction with the potential impacts of the proposed linear development, were taken into consideration. Historical and existing activities taking place within the zone of influence of the proposed linear development, which may have impacts on the riparian systems, include, but are not limited to: ▪ Peri-urban development (including the development of infrastructure such as the Upington WWTW, road and bridge crossings); ▪ Small scale open-cast tungsten mining activities (WCS, 2013) ▪ Agricultural activities (livestock and game farming, and crop cultivation, particularly in the floodplains of the Orange River); and ▪ Solar Renewable Energy Projects in the vicinity of the Rooipunt Solar Thermal Power Park (e.g. the existing Khi Solar One facility (located between the Rooipunt-Keimoes Alternative 01 and Rooipunt-Orange Alternative 02 proposed routes). These activities have already resulted in the transformation and loss of riparian habitat within the Kalahari Duneveld and Nama Karoo Bushmanland WetVeg Groups. Whilst both of these WetVeg groups are classified as "Least Threatened" (SANBI, 2013), they receive poor levels of protection, and therefore, further alterations and/or losses should be minimised as much as possible. Natural freshwater systems have been artificially impounded, and the vegetation communities of the Helbrandeegte and Helbrandkloofspruit Rivers, as well as many of the smaller, ephemeral drainage lines with riparian vegetation, have been transformed as a result of grazing and trampling by livestock. Due to the presence of fences throughout the entire area, some of which traverse the riparian systems, it is considered likely that the capacity of the riparian systems to function as migration corridors for fauna is reduced, although it was apparent during the site visit that such functionality still remains to a degree. Whilst not directly observed during this study,		

Activity	Impact summary	Significance	Proposed mitigation
	the perceived impacts of activities such as open-case tungsten mining (as discussed in WCS, 2013) may include altered sediment budgets, runoff into the riparian systems and vegetation clearing. The overall impact on the connectivity of the landscape and the further disruption of ecosystem processes associated with freshwater features by the proposed linear development would thus be reduced by the proximity to these existing developments and activities. Considering the above, the cumulative impacts on the freshwater ecology by the proposed linear development in the region, should adequate mitigation measures be implemented, is considered to be low. However, it is imperative that adequate mitigation be implemented throughout the life of the development in order to minimise the potential impacts of the proposed linear development on the receiving environment, and thus minimise the cumulative impacts.		
Soils and Agricultural Potential	***Direct impacts:***		
	Loss of agricultural land use caused by direct occupation of land by the footprint of the power line infrastructure (construction and operation phase)	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Implement an effective system of run-off control, where it is required, that collects and safely disseminates all potential accumulations of run-off water and thereby prevents potential down slope erosion. This should be in place and maintained during all phases of the development. ▪ Maintain where possible all vegetation cover and facilitate re-vegetation of denuded areas throughout the site to stabilize the soil against erosion.
	Soil erosion caused by alteration of the surface characteristics (construction and operation phase)	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Minimize road footprint and control vehicle access on roads only. ▪ Control dust as per standard construction site practice.
	Loss of topsoil caused by poor topsoil management (burial, erosion, etc) during construction related soil profile disturbance (levelling, excavations,	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Strip and stockpile topsoil from all areas where soil will be disturbed below surface. ▪ After cessation of disturbance, re-spread topsoil over the surface. ▪ Dispose of any sub-surface spoils from excavations where they will not impact on agricultural land (for

Activity	Impact summary	Significance	Proposed mitigation
	disposal of spoils from excavations etc.) and having the effect of loss of soil fertility on disturbed areas after rehabilitation (construction phase)		example use as road surfacing), or where they can be effectively covered with topsoil.
	Degradation of grazing beyond the direct development footprint caused by trampling due to vehicle passage, and deposition of dust.	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Minimize road footprint and control vehicle access on roads only. ▪ Control dust as per standard construction site practice.
	Indirect impacts:		
	None identified	None identified	None identified
	Cumulative impacts:		
	There are other proposed developments that will also occupy agricultural land in the area, and because the area is suitable for solar energy developments, there are likely to be more in the future. The potential for cumulative impacts therefore exists. However, because of the low agricultural impact of this development and the low agricultural sensitivity of the area, the cumulative impact is assessed as negligible.		
Heritage and Palaeontology	***Direct impacts:***		
	The possibility of encountering previously unidentified heritage resources. As well as the impact on the identified archaeological sites (Construction phase)	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Monitoring during construction by an archaeologist is recommended. ▪ Mitigation through archaeological excavations and collection should heritage resources be identified during the construction phase. ▪ Walk-down of final powerline route before construction commences is recommended.
	Indirect impacts:		
	None identified.		
	Cumulative impacts:		
	An evaluation of the possible cumulative impacts from the combined solar projects in the area on heritage resources has shown that the biggest envisaged impact could be on the graves of this proposed development. Through implementation of buffer zones, this impact can be avoided.		
Visual	***Direct impacts:***		
	Alteration of the natural character of	Low negative impact expected	The following mitigation measures would help to limit impacts:

Activity	Impact summary	Significance	Proposed mitigation
	the study area and exposure to visual receptors to visual impacts associated with the construction phase	after mitigation	▪ Carefully plan in order to reduce the construction period where possible. ▪ 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 proposed site as far as possible. ▪ Ensure that dust suppression techniques are implemented on all gravel access roads. ▪ Ensure that dust suppression is implemented in all areas where vegetation clearing has taken place, relevant to the project site. ▪ Ensure that dust suppression techniques are implemented on all soil stockpiles.
	Alteration of the natural character of the study area and exposure to visual receptors to visual impacts associated with the operation phase	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Light fittings for security at night should reflect the light toward the ground and prevent light spill. ▪ As far as possible, limit the amount of security and operational lighting present at the two (2) bay substations. ▪ If possible, the control room should not be illuminated at night. ▪ As far as possible, limit the number of maintenance vehicles which are allowed to access the substation site and power line access roads. ▪ The control room should be painted with natural tones that fit with the surrounding environment. ▪ Ensure that dust suppression techniques are implemented on all

Activity	Impact summary	Significance	Proposed mitigation
			gravel access roads. ▪ Align power lines to run parallel to existing power lines and other linear elements, where possible. ▪ Avoid crossing areas of high elevation, especially ridges, koppies or hills, where possible. ▪ Non-reflective surfaces should be utilised where possible.
	Indirect impacts:		
	None identified.		
	Cumulative impacts:		
	Renewable energy developments and their potential for large scale visual impacts could significantly alter the sense of place and visual character within the study area, once constructed. The cumulative visual impact experienced from each potentially sensitive visual receptor location will depend on the number of proposed renewable energy developments within viewing distance. As mentioned above, the height of the development in combination with distance are critical factors when assessing visual impacts. As such, the proposed solar energy facilities are unlikely to be visible from beyond 5km, and from beyond this distance the degree of visual impact would be considered to be insignificant. As such, all of the above mentioned proposed renewable energy developments, except for Upington Solar PV, will be in viewing distance from most of the the potentially sensitive receptor locations identified within the study area. However, it is envisaged that the biggest cumulative impact would be the change in the visual character within the the study area due to the presence of these large scale industrial developments. These facilities will therefore significantly alter the visual baseline within the study area and thereby reduce the visual impact of the proposed power line on the surrounding potentially sensitive receptor locations. The impact of the proposed power line would therefore be dwarfed in comparison the impact of the renewable energy developments.		
Socio-economic	***Direct impacts:***		
	Stimulation of the economy during construction	Medium positive impact after mitigation is expected	The following mitigation measures would help to enhance positive impacts: ▪ An impact on local economy may be increased if certain services are procured from local businesses as far as practically possible in line with Eskom procurement policies and standards.
	Impact on employment and household income during construction	Low positive impact after mitigation is expected	The following mitigation measures would help to enhance positive impacts: ▪ All jobs that will be an outcome of the proposed project are to be locally sourced as far as practically possible and in line with Eskom procurement standards and policies. It can be advocated that

Activity	Impact summary	Significance	Proposed mitigation
			as many as possible of these jobs are filled by people from the local communities.
	Impact on increased generation capacity	Low positive impact	No mitigation measures could be identified for the proposed project to enhance the positive impact.
	Impact on current business activities	Low negative impact after mitigation is expected	It is proposed that the final alignment and tower positions chosen for the power line should environmental authorisation be received for a preferred power line corridor, it is to be established in consultation with the affected land owners before construction commences during servitude negotiations, and specifically: ▪ The owners of Portion 12 of Daysons Klip 454 and Farm 35 Mc Taggarts Camp 453 with respect to the location of the power line relative to the grapevines on the property ▪ The owner of the Remainder of Tungsten Lodge 636 to avoid the area where 12 chalets and a bar restaurant are located.
	Impact on future developments	Low negative impact after mitigation is expected	The following mitigation measures would help to reduce negative impacts: ▪ It will be imperative to ensure that the selection of the Corridor Option and the design of the final power line route takes into account the layout of solar energy facilitates planned on the surrounding properties. The developers/owners of these projects will also need to be consulted prior the selection of the final power line route and tower positions before construction commences. ▪
	Indirect impacts:		
	None identified.		
	Cumulative impacts:		
	The area west, south and south-east of the project site is to become concentrated with solar energy facilities with five projects (i.e. two CSP and three PV) already being approved and either developed or to be developed in the near future. All of these projects will need to have access to the sub-station and will require access to a sustainable water source. Therefore, the area is likely already to be traversed by the		

Activity	Impact summary	Significance	Proposed mitigation
	required infrastructure, and an additional infrastructure is to be built.		
No-go option			
	Direct impacts:		
	The job creation and local investment expected for the local area would not occur. The expected capital injection into the LM would be prevented. The electricity generated at the SolarReserve Rooipunt Solar Thermal Power Park Project would not be connected to the grid and greater electricity security would not be achieved, South Africa would not have the benefit of the SolarReserve Rooipunt Solar Thermal Power Park contributing to the country's renewable energy targets.		
	Indirect impacts:		
	None identified.		
	Cumulative impacts:		
	None identified.		

Corridor Alternative 2 (Orange)

Activity	Impact summary	Significance	Proposed mitigation
Biodiversity	***Direct impacts:***		
	Loss of Vegetation during construction	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts, but will not affect the extent, probability, reversibility, irreplaceable loss of resources, duration, cumulative effect or intensity: ▪ There should be a preconstruction walk-through of the powerline route to identify species of conservation concern that should be avoided or translocated. ▪ It should not be necessary to clear the whole servitude and the existing lines in the area have generally not been cleared. ▪ The footprint should be restricted to a temporary access road for construction and the pylon foundations.
	Faunal Impacts during construction	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts, but will not affect the extent, probability, reversibility, irreplaceable loss of resources, duration, cumulative effect or intensity: ▪ The footprint of the power line should be kept as low as possible and construction staff should undergo environmental induction to ensure that they are aware of fauna-related issues and that no fauna are harmed during

Activity	Impact summary	Significance	Proposed mitigation
			construction.
	Ecological degradation during operation	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Regular erosion and alien plant control along the powerline servitude. During operation and maintenance of the powerline servitude, alien species especially large woody species such as *Propsopis glandulosa* should be cleared from the pipeline servitude, but indigenous species such as *Boscia albitunca* and *Boscia foetida*, should not be cleared as they do not pose a fire risk. If any indigenous trees are too tall to comply with safety standards they can be trimmed to an acceptable height and it is not necessary to cut down the trees.
	Decommissioning Impacts on Fauna	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Disturbance during decommissioning should be kept as low as possible. Staff should undergo environmental induction to ensure that they are aware of fauna-related issues and that no fauna are harmed during decommissioning activities.
	Ecological Degradation due to Decommissioning	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ As the pylons are steel structures with concrete foundations, they are not easily removed and so it is likely that decommissioning would result in some disturbance along the power line route, which should be reduced as far as possible.

Activity	Impact summary	Significance	Proposed mitigation
			The use various tools to dismantle the pylons may also pose a fire risk if these generate sparks or have open flames.
	Indirect impacts:		
	None identified.	None identified	None identified.
	Cumulative impacts:		
	Although the density of renewable energy development in the area is high, with numerous approved projects currently being built or nearing construction, the main source of cumulative impact in the area is from the facilities themselves and the contribution of power lines is minimal in comparison. As a result, the contribution of the Rooipunt to Eskom MTS 132kV line to cumulative impact is not considered highly significant in the context of the surrounding landscape and large-scale impacts on habitat loss resulting from the facilities or transformation for vineyards.		
Avifauna	***Direct impacts:***		
	Displacement of Red Data species due to disturbance and habitat transformation associated with construction of the 132kV power line	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Construction activity should be restricted to the immediate footprint of the infrastructure. ▪ Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of Red Data species. ▪ Measures to control noise and dust should be applied according to current best practice in the industry. ▪ Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum.
	Collisions of Red Data species with the proposed 132kV line (operation phase)	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ The 132kV grid connection should be inspected at least once a quarter for a minimum of three years by the avifaunal specialist to establish if there is any significant collision mortality. Thereafter the frequency of inspections will be informed by the results of the first three years. ▪ The detailed protocol to be followed for the inspections will be compiled by the avifaunal specialist prior to the first

Activity	Impact summary	Significance	Proposed mitigation
			inspection. ▪ The line should be marked with Bird Flight Diverters (BFDs) for its entire length on the earth wire of the line, 5m apart, alternating black and white.
	Electrocutions of Red Data species on the proposed 132kV line (operation phase)	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ The 132kV grid connection should be inspected at least once a quarter for a minimum of three years by the avifaunal specialist to establish if there is any significant electrocution mortality. Thereafter the frequency of inspections will be informed by the results of the first three years. ▪ The detailed protocol to be followed for the inspections will be compiled by the avifaunal specialist prior to the first inspection. ▪ All the steel monopoles should be fitted with bird perches.
	Displacement of Red Data species due to disturbance and habitat transformation associated with de-commissioning of the 132kV power line.	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ De-commissioning activity should be restricted to the immediate footprint of the infrastructure. ▪ Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of Red Data species. ▪ Measures to control noise and dust should be applied according to current best practice in the industry. ▪ Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum.
	Indirect impacts:		
	None identified.		
	Cumulative impacts:		
	The cumulative impact of displacement due to disturbance and habitat transformation as a result of the building of the 132kV Rooipunt sub-transmission line, is likely to be MINOR for Red Data species.		

Activity	Impact summary	Significance	Proposed mitigation
	The risks that power lines pose, is well researched (Shaw 2013). This sub-transmission line will further increase the already high collision risk to Ludwig's Bustards, Greater Flamingo, Lesser Flamingo, Karoo Korhaan and Kori Bustard that power lines pose throughout their range. The key question therefore is to what extent the proposed sub-transmission line will contribute to this existing and potentially significant mortality factor in the area around Upington. All in all, it is envisaged that collisions of Red Data species with the proposed line will have a MINOR - MODERATE cumulative impact, due to the short length of the line. It is envisaged that the risk of electrocution posed by the proposed powerline is MINOR, especially if the monopole is fitted with a bird perch.		
Wetlands	***Direct impacts:***		
	Helbrandleegte and Helbrandkloofspruit Rivers – Loss of riparian habitat and ecological structure (construction phase)	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Careful planning of the placement of towers, taking into consideration the locality of riparian habitats and as much as possible, avoid placement of towers within riparian habitat, and powerlines are preferably to span the relevant resource. If at all possible, all towers should be developed above the 1:100 year floodline. ▪ Where it is impossible to avoid placing infrastructure within riparian habitat, flow connectivity must be retained by preventing fragmentation of the riparian habitat, and it must be ensured that no canalization or incision of the riparian resource takes place as a result of the construction activities. ▪ Vegetation clearing prior to construction must be minimized and the area re-seeded following construction with indigenous/endemic species to aid in the natural recovery of vegetation. ▪ Clearing/felling of woody vegetation should be limited to trees/shrubs above the maximum permitted clearance height, and the understory should not be

Activity	Impact summary	Significance	Proposed mitigation
			cleared. Where possible, crossing points should be chosen to avoid large riparian trees. ▪ An alien vegetation control programme should form part of the Environmental Management Programme (EMPr). ▪ Exposed soils to be protected with suitable geotextile coverings, such as hessian sheets at all times during the construction phase, and no stockpiling of soils is to take place within the riparian zone or associated buffer zone. ▪ All riparian zones should be treated as highly sensitive areas, and be strictly maintained as such, except in the case of essential construction activities such clearing of vegetation, should riparian crossings be unavoidable. The footprint areas of any crossing points must be minimised in order to reduce the cumulative impacts thereof. ▪ Lay down areas should be placed outside the delineated riparian corridors/buffer zones, and construction right of ways may only be created through or across watercourses if proposed for use during operations and no existing right of way exist. However it is recommended that where existing roads / accesses cross watercourses exist these be used as a primary right of way. ▪ Reinforce banks and drainage features where necessary with gabions, reno mattresses and geotextiles but as far as possible soft rehabilitation techniques should be employed. ▪ Planning of temporary roads and access routes should avoid natural areas and be restricted to existing roads where possible. If it is not

Activity	Impact summary	Significance	Proposed mitigation
			possible to avoid crossing the rivers and/or drainage lines, it must be ensured that the construction of such access roads are carried out in a responsible manner, i.e. by implementing mitigations to manage erosion, prevent impeding the flow of water along the system, and prevent sedimentation of the system as a result of the construction of such access roads.
	Helbrandleegte and Helbrandkloofspruit Rivers – Changes to riparian ecological and sociocultural service provision (construction phase)	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Careful planning of the placement of towers, taking into consideration the locality of riparian habitats and as much as possible, avoid placement of towers within riparian habitat, and powerlines are preferably to span the relevant resource. If at all possible, all towers should be developed above the 1:100 year floodline ▪ Where it is impossible to avoid placing infrastructure within riparian habitat, flow connectivity must be retained by preventing fragmentation of the riparian habitat, and it must be ensured that no canalization or incision of the riparian resource takes place as a result of the construction activities. ▪ Vegetation clearing prior to construction must be minimized and the area re-seeded following construction with indigenous/endemic species to aid in the natural recovery of vegetation. ▪ Clearing/felling of woody vegetation should be limited to trees/shrubs above the maximum permitted clearance height, and the understory should not be cleared. Where possible, crossing

Activity	Impact summary	Significance	Proposed mitigation
			points should be chosen to avoid large riparian trees. ▪ An alien vegetation control programme should form part of the Environmental Management Programme (EMPr). ▪ Exposed soils to be protected with suitable geotextile coverings, such as hessian sheets, at all times during the construction phase, and no stockpiling of soils is to take place within the riparian zone or associated buffer zone. ▪ All riparian zones should be treated as highly sensitive areas, and be strictly maintained as such, except in the case of essential construction activities such clearing of vegetation, should riparian crossings be unavoidable. The footprint areas of any crossing points must be minimised in order to reduce the cumulative impacts thereof. ▪ Lay down areas should be placed outside the delineated riparian corridors/buffer zones, and construction right of ways may only be created through or across watercourses if proposed for use during operations and no existing right of way exist. However it is recommended that where existing roads / accesses cross watercourses exist these be used as a primary right of way. ▪ Reinforce banks and drainage features where necessary with gabions, reno mattresses and geotextiles but as far as possible soft rehabilitation techniques should be employed. ▪ Planning of temporary roads and access routes should avoid natural areas and be restricted to existing roads where possible. If it is not possible to avoid crossing the

Activity	Impact summary	Significance	Proposed mitigation
			rivers and/or drainage lines, it must be ensured that the construction of such access roads are carried out in a responsible manner, i.e. by implementing mitigations to manage erosion, prevent impeding the flow of water along the system, and prevent sedimentation of the system as a result of the construction of such access roads.
	Helbrandleegte and Helbrandkloofspruit Rivers – Impacts on riparian hydrology and sediment balance (construction phase)	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Careful planning of the placement of towers, taking into consideration the locality of riparian habitats and as much as possible, avoid placement of towers within riparian habitat, and powerlines are preferably to span the relevant resource. If at all possible, all towers should be developed above the 1:100 year floodline. ▪ Where it is impossible to avoid placing infrastructure within riparian habitat, flow connectivity must be retained by preventing fragmentation of the riparian habitat, and it must be ensured that no canalization or incision of the riparian resource takes place as a result of the construction activities. ▪ Vegetation clearing prior to construction must be minimized and the area re-seeded following construction with indigenous/endemic species to aid in the natural recovery of vegetation. ▪ Clearing/felling of woody vegetation should be limited to trees/shrubs above the maximum permitted clearance height, and the understory should not be cleared. Where possible, crossing points should be chosen to avoid

Activity	Impact summary	Significance	Proposed mitigation
			large riparian trees. ▪ An alien vegetation control programme should form part of the Environmental Management Programme (EMPr). ▪ Exposed soils to be protected with suitable geotextile coverings at all times, such as hessian sheets, during the construction phase, and no stockpiling of soils is to take place within the riparian zone or associated buffer zone. ▪ All riparian zones should be treated as highly sensitive areas, and be strictly maintained as such, except in the case of essential construction activities such clearing of vegetation, should riparian crossings be unavoidable. The footprint areas of any crossing points must be minimised in order to reduce the cumulative impacts thereof. ▪ Lay down areas should be placed outside the delineated riparian corridors/buffer zones, and construction right of ways may only be created through or across watercourses if proposed for use during operations and no existing right of way exist. However it is recommended that where existing roads / accesses cross watercourses exist these be used as a primary right of way. ▪ Reinforce banks and drainage features where necessary with gabions, reno mattresses and geotextiles but as far as possible soft rehabilitation techniques should be employed. ▪ Planning of temporary roads and access routes should avoid natural areas and be restricted to existing roads where possible. If it is not possible to avoid crossing the rivers and/or drainage lines, it

Activity	Impact summary	Significance	Proposed mitigation
			must be ensured that the construction of such access roads are carried out in a responsible manner, i.e. by implementing mitigations to manage erosion, prevent impeding the flow of water along the system, and prevent sedimentation of the system as a result of the construction of such access roads.
	Ephemeral Drainage Lines – Loss of riparian habitat and ecological structure (construction phase)	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Careful planning of the placement of towers, taking into consideration the locality of riparian habitats and as much as possible, avoid placement of towers within riparian habitat, and powerlines are preferably to span the relevant resource. If at all possible, all towers should be developed above the 1:100 year floodline ▪ Where it is impossible to avoid placing infrastructure within riparian habitat, flow connectivity must be retained by preventing fragmentation of the riparian habitat, and it must be ensured that no canalization or incision of the riparian resource takes place as a result of the construction activities. ▪ Vegetation clearing prior to construction must be minimized and the area re-seeded following construction with indigenous/endemic species to aid in the natural recovery of vegetation. ▪ Clearing/felling of woody vegetation should be limited to trees/shrubs above the maximum permitted clearance height, and the understory should not be cleared. Where possible, crossing points should be chosen to avoid large riparian trees.

Activity	Impact summary	Significance	Proposed mitigation
			▪ An alien vegetation control programme should form part of the Environmental Management Programme (EMPr). ▪ Exposed soils to be protected with suitable geotextile coverings, such as hessian sheets, at all times during the construction phase, and no stockpiling of soils is to take place within the riparian zone or associated buffer zone. ▪ All riparian zones should be treated as highly sensitive areas, and be strictly maintained as such, except in the case of essential construction activities such clearing of vegetation, should riparian crossings be unavoidable. The footprint areas of any crossing points must be minimised in order to reduce the cumulative impacts thereof. ▪ Lay down areas should be placed outside the delineated riparian corridors/buffer zones, and construction right of ways may only be created through or across watercourses if proposed for use during operations and no existing right of way exist. However it is recommended that where existing roads / accesses cross watercourses exist these be used as a primary right of way. ▪ Reinforce banks and drainage features where necessary with gabions, reno mattresses and geotextiles but as far as possible soft rehabilitation techniques should be employed. ▪ Planning of temporary roads and access routes should avoid natural areas and be restricted to existing roads where possible. If it is not possible to avoid crossing the rivers and/or drainage lines, it must be ensured that the

Activity	Impact summary	Significance	Proposed mitigation
			construction of such access roads are carried out in a responsible manner, i.e. by implementing mitigations to manage erosion, prevent impeding the flow of water along the system, and prevent sedimentation of the system as a result of the construction of such access roads.
	Ephemeral Drainage Lines – Changes to riparian ecological and sociocultural service provision (construction phase)	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Careful planning of the placement of towers, taking into consideration the locality of riparian habitats and as much as possible, avoid placement of towers within riparian habitat, and powerlines are preferably to span the relevant resource. If at all possible, all towers should be developed above the 1:100 year floodline. ▪ Where it is impossible to avoid placing infrastructure within riparian habitat, flow connectivity must be retained by preventing fragmentation of the riparian habitat, and it must be ensured that no canalization or incision of the riparian resource takes place as a result of the construction activities. ▪ Vegetation clearing prior to construction must be minimized and the area re-seeded following construction with indigenous/endemic species to aid in the natural recovery of vegetation. ▪ Clearing/felling of woody vegetation should be limited to trees/shrubs above the maximum permitted clearance height, and the understory should not be cleared. Where possible, crossing points should be chosen to avoid large riparian trees. ▪ An alien vegetation control

Activity	Impact summary	Significance	Proposed mitigation
			programme should form part of the Environmental Management Programme (EMPr). ▪ Exposed soils to be protected with suitable geotextile coverings, such as hessian sheets, at all times during the construction phase, and no stockpiling of soils is to take place within the riparian zone or associated buffer zone. ▪ All riparian zones should be treated as highly sensitive areas, and be strictly maintained as such, except in the case of essential construction activities such clearing of vegetation, should riparian crossings be unavoidable. The footprint areas of any crossing points must be minimised in order to reduce the cumulative impacts thereof. ▪ Lay down areas should be placed outside the delineated riparian corridors/buffer zones, and construction right of ways may only be created through or across watercourses if proposed for use during operations and no existing right of way exist. However it is recommended that where existing roads / accesses cross watercourses exist these be used as a primary right of way. ▪ Reinforce banks and drainage features where necessary with gabions, reno mattresses and geotextiles but as far as possible soft rehabilitation techniques should be employed. ▪ Planning of temporary roads and access routes should avoid natural areas and be restricted to existing roads where possible. If it is not possible to avoid crossing the rivers and/or drainage lines, it must be ensured that the construction of such access roads

Activity	Impact summary	Significance	Proposed mitigation
			are carried out in a responsible manner, i.e. by implementing mitigations to manage erosion, prevent impeding the flow of water along the system, and prevent sedimentation of the system as a result of the construction of such access roads.
	Ephemeral Drainage Lines – Impacts on riparian hydrology and sediment balance (construction phase)	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Careful planning of the placement of towers, taking into consideration the locality of riparian habitats and as much as possible, avoid placement of towers within riparian habitat, and powerlines are preferably to span the relevant resource. If at all possible, all towers should be developed above the 1:100 year floodline ▪ Where it is impossible to avoid placing infrastructure within riparian habitat, flow connectivity must be retained by preventing fragmentation of the riparian habitat, and it must be ensured that no canalization or incision of the riparian resource takes place as a result of the construction activities. ▪ Vegetation clearing prior to construction must be minimized and the area re-seeded following construction with indigenous/endemic species to aid in the natural recovery of vegetation. ▪ Clearing/felling of woody vegetation should be limited to trees/shrubs above the maximum permitted clearance height, and the understory should not be cleared. Where possible, crossing points should be chosen to avoid large riparian trees. ▪ An alien vegetation control programme should form part of the

Activity	Impact summary	Significance	Proposed mitigation
			Environmental Management Programme (EMPr). ▪ Exposed soils to be protected with suitable geotextile coverings, such as hessian sheets, at all times during the construction phase, and no stockpiling of soils is to take place within the riparian zone or associated buffer zone. ▪ All riparian zones should be treated as highly sensitive areas, and be strictly maintained as such, except in the case of essential construction activities such clearing of vegetation, should riparian crossings be unavoidable. The footprint areas of any crossing points must be minimised in order to reduce the cumulative impacts thereof. ▪ Lay down areas should be placed outside the delineated riparian corridors/buffer zones, and construction right of ways may only be created through or across watercourses if proposed for use during operations and no existing right of way exist. However it is recommended that where existing roads / accesses cross watercourses exist these be used as a primary right of way. ▪ Reinforce banks and drainage features where necessary with gabions, reno mattresses and geotextiles but as far as possible soft rehabilitation techniques should be employed. ▪ Planning of temporary roads and access routes should avoid natural areas and be restricted to existing roads where possible. If it is not possible to avoid crossing the rivers and/or drainage lines, it must be ensured that the construction of such access roads are carried out in a responsible

Activity	Impact summary	Significance	Proposed mitigation
			manner, i.e. by implementing mitigations to manage erosion, prevent impeding the flow of water along the system, and prevent sedimentation of the system as a result of the construction of such access roads.
	Indirect impacts:		
	None identified	None identified	None identified
	Cumulative impacts:		
	With several current and historical activities occurring within the vicinity of the proposed development, the potential cumulative impacts of such activities in conjunction with the potential impacts of the proposed linear development, were taken into consideration. Historical and existing activities taking place within the zone of influence of the proposed linear development, which may have impacts on the riparian systems, include, but are not limited to: ▪ Peri-urban development (including the development of infrastructure such as the Upington WWTW, road and bridge crossings); ▪ Small scale open-cast tungsten mining activities (WCS, 2013) ▪ Agricultural activities (livestock and game farming, and crop cultivation, particularly in the floodplains of the Orange River); and ▪ Solar Renewable Energy Projects in the vicinity of the Rooipunt Solar Thermal Power Park (e.g. the existing Khi Solar One facility (located between the Rooipunt-Keimoes Alternative 01 and Rooipunt-Orange Alternative 02 proposed routes). These activities have already resulted in the transformation and loss of riparian habitat within the Kalahari Duneveld and Nama Karoo Bushmanland WetVeg Groups. Whilst both of these WetVeg groups are classified as "Least Threatened" (SANBI, 2013), they receive poor levels of protection, and therefore, further alterations and/or losses should be minimised as much as possible. Natural freshwater systems have been artificially impounded, and the vegetation communities of the Helbrandeegte and Helbrandkloofspruit Rivers, as well as many of the smaller, ephemeral drainage lines with riparian vegetation, have been transformed as a result of grazing and trampling by livestock. Due to the presence of fences throughout the entire area, some of which traverse the riparian systems, it is considered likely that the capacity of the riparian systems to function as migration corridors for fauna is reduced, although it was apparent during the site visit that such functionality still remains to a degree. Whilst not directly observed during this study, the perceived impacts of activities such as open-case tungsten mining (as discussed in WCS, 2013) may include altered sediment budgets, runoff into the riparian systems and vegetation clearing. The overall impact on the connectivity of the landscape and the further disruption of ecosystem processes associated with freshwater features by the proposed linear development would thus be reduced by the proximity to these existing developments		

Activity	Impact summary	Significance	Proposed mitigation
	and activities. Considering the above, the cumulative impacts on the freshwater ecology by the proposed linear development in the region, should adequate mitigation measures be implemented, is considered to be low. However, it is imperative that adequate mitigation be implemented throughout the life of the development in order to minimise the potential impacts of the proposed linear development on the receiving environment, and thus minimise the cumulative impacts.		
Soils and Agricultural Potential	***Direct impacts:***		
	Loss of agricultural land use caused by direct occupation of land by the footprint of the power line infrastructure (construction and operation phase)	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Implement an effective system of run-off control, where it is required, that collects and safely disseminates all potential accumulations of run-off water and thereby prevents potential down slope erosion. This should be in place and maintained during all phases of the development. ▪ Maintain where possible all vegetation cover and facilitate re-vegetation of denuded areas throughout the site to stabilize the soil against erosion.
	Soil erosion caused by alteration of the surface characteristics (construction and operation phase)	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Minimize road footprint and control vehicle access on roads only. ▪ Control dust as per standard construction site practice.
	Loss of topsoil caused by poor topsoil management (burial, erosion, etc) during construction related soil profile disturbance (levelling, excavations, disposal of spoils from excavations etc.) and having the effect of loss of soil fertility on disturbed areas after	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Strip and stockpile topsoil from all areas where soil will be disturbed below surface. ▪ After cessation of disturbance, re-spread topsoil over the surface. ▪ Dispose of any sub-surface spoils from excavations where they will not impact on agricultural land (for example use as road surfacing), or where they can be effectively covered with topsoil.

Activity	Impact summary	Significance	Proposed mitigation
	rehabilitation (construction phase)		
	Degradation of grazing beyond the direct development footprint caused by trampling due to vehicle passage, and deposition of dust.	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Minimize road footprint and control vehicle access on roads only. ▪ Control dust as per standard construction site practice.
	Indirect impacts:		
	None identified	None identified	None identified
	Cumulative impacts:		
	There are other proposed developments that will also occupy agricultural land in the area, and because the area is suitable for solar energy developments, there are likely to be more in the future. The potential for cumulative impacts therefore exists. However, because of the low agricultural impact of this development and the low agricultural sensitivity of the area, the cumulative impact is assessed as negligible.		
Heritage and Palaeontology	***Direct impacts:***		
	The possibility of encountering previously unidentified heritage resources. As well as the impact on the identified archaeological sites (Construction phase)	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Monitoring during construction by an archaeologist is recommended. ▪ Mitigation through archaeological excavations and collection should heritage resources be identified during the construction phase. ▪ Walk-down of final powerline route before construction commences is recommended.
	Indirect impacts:		
	None identified.		
	Cumulative impacts:		
	An evaluation of the possible cumulative impacts from the combined solar projects in the area on heritage resources has shown that the biggest envisaged impact could be on the graves of this proposed development. Through implementation of buffer zones, this impact can be avoided.		
Visual	***Direct impacts:***		
	Alteration of the natural character of the study area and exposure to visual receptors to visual impacts associated with the construction phase	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Carefully plan in order to reduce the construction period. ▪ Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. ▪ Vegetation clearing should take

Activity	Impact summary	Significance	Proposed mitigation
			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 proposed site. ▪ Ensure that dust suppression techniques are implemented on all gravel access roads as far as possible. ▪ Ensure that dust suppression is implemented in all areas where vegetation clearing has taken place, relevant to the project site. ▪ Ensure that dust suppression techniques are implemented on all soil stockpiles. ▪
	Alteration of the natural character of the study area and exposure to visual receptors to visual impacts associated with the operation phase	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Light fittings for security at night should reflect the light toward the ground and prevent light spill. ▪ Las far as possible, limit the amount of security and operational lighting present at the two (2) bay substations. ▪ If possible, the control room should not be illuminated at night. ▪ As far as possible, limit the number of maintenance vehicles which are allowed to access the substation site and power line access roads. ▪ The control room should be painted with natural tones that fit with the surrounding environment. ▪ Ensure that dust suppression techniques are implemented on all gravel access roads. ▪ Align power lines to run parallel to existing power lines and other linear elements, where possible. ▪ Avoid crossing areas of high

Activity	Impact summary	Significance	Proposed mitigation
			elevation, especially ridges, koppies or hills, where possible. ▪ Non-reflective surfaces should be utilised where possible.
	Indirect impacts:		
	None identified.		
	Cumulative impacts:		
	Renewable energy developments and their potential for large scale visual impacts could significantly alter the sense of place and visual character within the study area, once constructed. The cumulative visual impact experienced from each potentially sensitive visual receptor location will depend on the number of proposed renewable energy developments within viewing distance. As mentioned above, the height of the development in combination with distance are critical factors when assessing visual impacts. As such, the proposed solar energy facilities are unlikely to be visible from beyond 5km, and from beyond this distance the degree of visual impact would be considered to be insignificant. As such, all of the above mentioned proposed renewable energy developments, except for Upington Solar PV, will be in viewing distance from most of the the potentially sensitive receptor locations identified within the study area. However, it is envisaged that the biggest cumulative impact would be the change in the visual character within the the study area due to the presence of these large scale industrial developments. These facilities will therefore significantly alter the visual baseline within the study area and thereby reduce the visual impact of the proposed power line on the surrounding potentially sensitive receptor locations. The impact of the proposed power line would therefore be dwarfed in comparison the impact of the renewable energy developments.		
Socio-economic	***Direct impacts:***		
	Stimulation of the economy during construction	Medium positive impact after mitigation is expected	The following mitigation measures would help to enhance positive impacts: ▪ An impact on local economy may be increased if certain services are procured from local businesses as far as practically possible in line with Eskom procurement policies and standards.
	Impact on employment and household income during construction	Low positive impact after mitigation is expected	The following mitigation measures would help to enhance positive impacts: ▪ All jobs that will be an outcome of the proposed project are to be locally sourced as far as practically possible and in line with Eskom procurement standards and policies. It can be advocated that as many as possible of these jobs are filled by people from the local communities.
	Impact on increased	Low positive impact	No mitigation measures could be identified for the proposed project to enhance the

Activity	Impact summary	Significance	Proposed mitigation
	generation capacity		positive impact.
	Impact on current business activities	Low negative impact after mitigation is expected	It is proposed that the final alignment and tower positions chosen for the power line should environmental authorisation be received for a preferred power line corridor, it is to be established in consultation with the affected land owners before construction commences during servitude negotiations, and specifically: ▪ The owners of Portion 12 of Daysons Klip 454 and Farm 35 Mc Taggarts Camp 453 with respect to the location of the power line relative to the grapevines on the property ▪ The owner of the Remainder of Tungsten Lodge 636 to avoid the area where 12 chalets and a bar restaurant are located.
	Impact on future developments	Low negative impact after mitigation is expected	The following mitigation measures would help to reduce negative impacts: ▪ It will be imperative to ensure that the selection of the Corridor Option and the design of the final power line route takes into account the layout of solar energy facilitates planned on the surrounding properties. The developers/owners of these projects will also need to be consulted prior the selection of the final power line route and tower positions before construction commences. ▪
	Indirect impacts:		
	None identified.		
	Cumulative impacts:		
	The area west, south and south-east of the project site is to become concentrated with solar energy facilities with five projects (i.e. two CSP and three PV) already being approved and either developed or to be developed in the near future. All of these projects will need to have access to the sub-station and will require access to a sustainable water source. Therefore, the area is likely already to be traversed by the required infrastructure, and an additional infrastructure is to be built.		
No-go option			
	Direct impacts:		
	The job creation and local investment expected for the local area would not occur.		

Activity	Impact summary	Significance	Proposed mitigation
	The expected capital injection into the LM would be prevented. The electricity generated at the SolarReserve Rooipunt Solar Thermal Power Park Project would not be connected to the grid and greater electricity security would not be achieved, South Africa would not have the benefit of the SolarReserve Rooipunt Solar Thermal Power Park contributing to the country's renewable energy targets.		
	Indirect impacts:		
	None identified.		
	Cumulative impacts:		
	None identified.		

Corridor Alternative 3 (Green)

Activity	Impact summary	Significance	Proposed mitigation
Biodiversity	***Direct impacts:***		
	Loss of Vegetation during construction	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts, but will not affect the extent, probability, reversibility, irreplaceable loss of resources, duration, cumulative effect or intensity: ▪ There should be a preconstruction walk-through of the power line route to identify species of conservation concern that should be avoided or translocated. ▪ It should not be necessary to clear the whole servitude and the existing lines in the area have generally not been cleared. ▪ The footprint should be restricted to a temporary access road for construction and the pylon foundations.
	Faunal Impacts during construction	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts, but will not affect the extent, probability, reversibility, irreplaceable loss of resources, duration, cumulative effect or intensity: ▪ The footprint of the power line should be kept as low as possible and construction staff should undergo environmental induction to ensure that they are aware of fauna-related issues and that no fauna are harmed during construction.

Activity	Impact summary	Significance	Proposed mitigation
	Ecological degradation during operation	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Regular erosion and alien plant control along the powerline servitude. During operation and maintenance of the powerline servitude, alien species especially large woody species such as *Propsopis glandulosa* should be cleared from the pipeline servitude, but indigenous species such as *Boscia albitunca* and *Boscia foetida*, should not be cleared as they do not pose a fire risk. If any indigenous trees are too tall to comply with safety standards they can be trimmed to an acceptable height and it is not necessary to cut down the trees.
	Decommissioning Impacts on Fauna	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Disturbance during decommissioning should be kept as low as possible. Staff should undergo environmental induction to ensure that they are aware of fauna-related issues and that no fauna are harmed during decommissioning activities.
	Ecological Degradation due to Decommissioning	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ As the pylons are steel structures with concrete foundations, they are not easily removed and so it is likely that decommissioning would result in some disturbance along the power line route, which should be reduced as far as possible. The use various tools to dismantle the pylons may also pose a fire risk if these generate sparks or have open flames.
	Indirect impacts:		
	None identified.	None identified	None identified.
	Cumulative impacts:		
	Although the density of renewable energy development in the area is high, with numerous approved projects currently being built or nearing construction, the main		

Activity	Impact summary	Significance	Proposed mitigation
	source of cumulative impact in the area is from the facilities themselves and the contribution of power lines is minimal in comparison. As a result, the contribution of the Rooipunt to Eskom MTS 132kV line to cumulative impact is not considered highly significant in the context of the surrounding landscape and large-scale impacts on habitat loss resulting from the facilities or transformation for vineyards.		
Avifauna	***Direct impacts:***		
	Displacement of Red Data species due to disturbance and habitat transformation associated with construction of the 132kV power line	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Construction activity should be restricted to the immediate footprint of the infrastructure. ▪ Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of Red Data species. ▪ Measures to control noise and dust should be applied according to current best practice in the industry. ▪ Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum.
	Collisions of Red Data species with the proposed 132kV line (operation phase)	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ The 132kV grid connection should be inspected at least once a quarter for a minimum of three years by the avifaunal specialist to establish if there is any significant collision mortality. Thereafter the frequency of inspections will be informed by the results of the first three years. ▪ The detailed protocol to be followed for the inspections will be compiled by the avifaunal specialist prior to the first inspection. ▪ The line should be marked with Bird Flight Diverters (BFDs) for its entire length on the earth wire of the line, 5m apart, alternating black and white.
	Electrocutions of Red Data species on the proposed	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ The 132kV grid connection should

Activity	Impact summary	Significance	Proposed mitigation
	132kV line (operation phase)		be inspected at least once a quarter for a minimum of three years by the avifaunal specialist to establish if there is any significant electrocution mortality. Thereafter the frequency of inspections will be informed by the results of the first three years. ▪ The detailed protocol to be followed for the inspections will be compiled by the avifaunal specialist prior to the first inspection. ▪ All the steel monopoles should be fitted with bird perches.
	Displacement of Red Data species due to disturbance and habitat transformation associated with de-commissioning of the 132kV power line.	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ De-commissioning activity should be restricted to the immediate footprint of the infrastructure. ▪ Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of Red Data species. ▪ Measures to control noise and dust should be applied according to current best practice in the industry. ▪ Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum.
	Indirect impacts:		
	None identified.		
	Cumulative impacts:		
	The cumulative impact of displacement due to disturbance and habitat transformation as a result of the building of the 132kV Rooipunt sub-transmission line, is likely to be MINOR for Red Data species. The risks that power lines pose, is well researched (Shaw 2013). This sub-transmission line will further increase the already high collision risk to Ludwig's Bustards, Greater Flamingo, Lesser Flamingo, Karoo Korhaan and Kori Bustard that power lines pose throughout their range. The key question therefore is to what extent the proposed sub-transmission line will contribute to this existing and potentially significant mortality factor in the area around Upington. All in all, it is envisaged that collisions of Red Data species with the proposed line will have a MINOR - MODERATE cumulative impact, due to the short length of the line.		

Activity	Impact summary	Significance	Proposed mitigation
	It is envisaged that the risk of electrocution posed by the proposed powerline is MINOR, especially if the monopole is fitted with a bird perch.		
Wetlands	***Direct impacts:***		
	Helbrandleegte and Helbrandkloofspruit Rivers – Loss of riparian habitat and ecological structure (construction phase)	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Careful planning of the placement of towers, taking into consideration the locality of riparian habitats and as much as possible, avoid placement of towers within riparian habitat, and powerlines are preferably to span the relevant resource. If at all possible, all towers should be developed above the 1:100 year floodline. ▪ Where it is impossible to avoid placing infrastructure within riparian habitat, flow connectivity must be retained by preventing fragmentation of the riparian habitat, and it must be ensured that no canalization or incision of the riparian resource takes place as a result of the construction activities. ▪ Vegetation clearing prior to construction must be minimized and the area re-seeded following construction with indigenous/endemic species to aid in the natural recovery of vegetation. ▪ Clearing/felling of woody vegetation should be limited to trees/shrubs above the maximum permitted clearance height, and the understory should not be cleared. Where possible, crossing points should be chosen to avoid large riparian trees. ▪ An alien vegetation control programme should form part of the Environmental Management Programme (EMPr). ▪ Exposed soils to be protected with suitable geotextile coverings, such

Activity	Impact summary	Significance	Proposed mitigation
			as hessian sheets at all times during the construction phase, and no stockpiling of soils is to take place within the riparian zone or associated buffer zone. ▪ All riparian zones should be treated as highly sensitive areas, and be strictly maintained as such, except in the case of essential construction activities such clearing of vegetation, should riparian crossings be unavoidable. The footprint areas of any crossing points must be minimised in order to reduce the cumulative impacts thereof. ▪ Lay down areas should be placed outside the delineated riparian corridors/buffer zones, and construction right of ways may only be created through or across watercourses if proposed for use during operations and no existing right of way exist. However it is recommended that where existing roads / accesses cross watercourses exist these be used as a primary right of way. ▪ Reinforce banks and drainage features where necessary with gabions, reno mattresses and geotextiles but as far as possible soft rehabilitation techniques should be employed. ▪ Planning of temporary roads and access routes should avoid natural areas and be restricted to existing roads where possible. If it is not possible to avoid crossing the rivers and/or drainage lines, it must be ensured that the construction of such access roads are carried out in a responsible manner, i.e. by implementing mitigations to manage erosion, prevent impeding the flow of water along the system, and prevent sedimentation of the

Activity	Impact summary	Significance	Proposed mitigation
			system as a result of the construction of such access roads.
	Helbrandleegte and Helbrandkloofspruit Rivers – Changes to riparian ecological and sociocultural service provision (construction phase)	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Careful Careful planning of the placement of towers, taking into consideration the locality of riparian habitats and as much as possible, avoid placement of towers within riparian habitat, and powerlines are preferably to span the relevant resource. If at all possible, all towers should be developed above the 1:100 year floodline ▪ Where it is impossible to avoid placing infrastructure within riparian habitat, flow connectivity must be retained by preventing fragmentation of the riparian habitat, and it must be ensured that no canalization or incision of the riparian resource takes place as a result of the construction activities. ▪ Vegetation clearing prior to construction must be minimized and the area re-seeded following construction with indigenous/endemic species to aid in the natural recovery of vegetation. ▪ Clearing/felling of woody vegetation should be limited to trees/shrubs above the maximum permitted clearance height, and the understory should not be cleared. Where possible, crossing points should be chosen to avoid large riparian trees. ▪ An alien vegetation control programme should form part of the Environmental Management Programme (EMPr). ▪ Exposed soils to be protected with suitable geotextile coverings, such as hessian sheets, at all times

Activity	Impact summary	Significance	Proposed mitigation
			during the construction phase, and no stockpiling of soils is to take place within the riparian zone or associated buffer zone. ▪ All riparian zones should be treated as highly sensitive areas, and be strictly maintained as such, except in the case of essential construction activities such clearing of vegetation, should riparian crossings be unavoidable. The footprint areas of any crossing points must be minimised in order to reduce the cumulative impacts thereof. ▪ Lay down areas should be placed outside the delineated riparian corridors/buffer zones, and construction right of ways may only be created through or across watercourses if proposed for use during operations and no existing right of way exist. However it is recommended that where existing roads / accesses cross watercourses exist these be used as a primary right of way. ▪ Reinforce banks and drainage features where necessary with gabions, reno mattresses and geotextiles but as far as possible soft rehabilitation techniques should be employed. ▪ Planning of temporary roads and access routes should avoid natural areas and be restricted to existing roads where possible. If it is not possible to avoid crossing the rivers and/or drainage lines, it must be ensured that the construction of such access roads are carried out in a responsible manner, i.e. by implementing mitigations to manage erosion, prevent impeding the flow of water along the system, and prevent sedimentation of the system as a result of the

Activity	Impact summary	Significance	Proposed mitigation
			construction of such access roads.
	Helbrandleegte and Helbrandkloofspruit Rivers – Impacts on riparian hydrology and sediment balance (construction phase)	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Careful planning of the placement of towers, taking into consideration the locality of riparian habitats and as much as possible, avoid placement of towers within riparian habitat, and powerlines are preferably to span the relevant resource. If at all possible, all towers should be developed above the 1:100 year floodline. ▪ Where it is impossible to avoid placing infrastructure within riparian habitat, flow connectivity must be retained by preventing fragmentation of the riparian habitat, and it must be ensured that no canalization or incision of the riparian resource takes place as a result of the construction activities. ▪ Vegetation clearing prior to construction must be minimized and the area re-seeded following construction with indigenous/endemic species to aid in the natural recovery of vegetation. ▪ Clearing/felling of woody vegetation should be limited to trees/shrubs above the maximum permitted clearance height, and the understory should not be cleared. Where possible, crossing points should be chosen to avoid large riparian trees. ▪ An alien vegetation control programme should form part of the Environmental Management Programme (EMPr). ▪ Exposed soils to be protected with suitable geotextile coverings at all times, such as hessian sheets, during the construction phase, and no stockpiling of soils is to take

Activity	Impact summary	Significance	Proposed mitigation
			place within the riparian zone or associated buffer zone. ▪ All riparian zones should be treated as highly sensitive areas, and be strictly maintained as such, except in the case of essential construction activities such clearing of vegetation, should riparian crossings be unavoidable. The footprint areas of any crossing points must be minimised in order to reduce the cumulative impacts thereof. ▪ Lay down areas should be placed outside the delineated riparian corridors/buffer zones, and construction right of ways may only be created through or across watercourses if proposed for use during operations and no existing right of way exist. However it is recommended that where existing roads / accesses cross watercourses exist these be used as a primary right of way. ▪ Reinforce banks and drainage features where necessary with gabions, reno mattresses and geotextiles but as far as possible soft rehabilitation techniques should be employed. ▪ Planning of temporary roads and access routes should avoid natural areas and be restricted to existing roads where possible. If it is not possible to avoid crossing the rivers and/or drainage lines, it must be ensured that the construction of such access roads are carried out in a responsible manner, i.e. by implementing mitigations to manage erosion, prevent impeding the flow of water along the system, and prevent sedimentation of the system as a result of the construction of such access roads.
	Ephemeral	Low negative	The following mitigation measures would

Activity	Impact summary	Significance	Proposed mitigation
	Drainage Lines – Loss of riparian habitat and ecological structure (construction phase)	impact expected after mitigation	help to limit impacts: ▪ Careful planning of the placement of towers, taking into consideration the locality of riparian habitats and as much as possible, avoid placement of towers within riparian habitat, and powerlines are preferably to span the relevant resource. If at all possible, all towers should be developed above the 1:100 year floodline ▪ Where it is impossible to avoid placing infrastructure within riparian habitat, flow connectivity must be retained by preventing fragmentation of the riparian habitat, and it must be ensured that no canalization or incision of the riparian resource takes place as a result of the construction activities. ▪ Vegetation clearing prior to construction must be minimized and the area re-seeded following construction with indigenous/endemic species to aid in the natural recovery of vegetation. ▪ Clearing/felling of woody vegetation should be limited to trees/shrubs above the maximum permitted clearance height, and the understory should not be cleared. Where possible, crossing points should be chosen to avoid large riparian trees. ▪ An alien vegetation control programme should form part of the Environmental Management Programme (EMPr). ▪ Exposed soils to be protected with suitable geotextile coverings, such as hessian sheets, at all times during the construction phase, and no stockpiling of soils is to take place within the riparian zone or associated buffer zone.

Activity	Impact summary	Significance	Proposed mitigation
			▪ All riparian zones should be treated as highly sensitive areas, and be strictly maintained as such, except in the case of essential construction activities such clearing of vegetation, should riparian crossings be unavoidable. The footprint areas of any crossing points must be minimised in order to reduce the cumulative impacts thereof. ▪ Lay down areas should be placed outside the delineated riparian corridors/buffer zones, and construction right of ways may only be created through or across watercourses if proposed for use during operations and no existing right of way exist. However it is recommended that where existing roads / accesses cross watercourses exist these be used as a primary right of way. ▪ Reinforce banks and drainage features where necessary with gabions, reno mattresses and geotextiles but as far as possible soft rehabilitation techniques should be employed. ▪ Planning of temporary roads and access routes should avoid natural areas and be restricted to existing roads where possible. If it is not possible to avoid crossing the rivers and/or drainage lines, it must be ensured that the construction of such access roads are carried out in a responsible manner, i.e. by implementing mitigations to manage erosion, prevent impeding the flow of water along the system, and prevent sedimentation of the system as a result of the construction of such access roads.
	Ephemeral Drainage Lines – Changes to riparian	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Careful planning of the placement

Activity	Impact summary	Significance	Proposed mitigation
	ecological and sociocultural service provision (construction phase)		of towers, taking into consideration the locality of riparian habitats and as much as possible, avoid placement of towers within riparian habitat, and powerlines are preferably to span the relevant resource. If at all possible, all towers should be developed above the 1:100 year floodline. ▪ Where it is impossible to avoid placing infrastructure within riparian habitat, flow connectivity must be retained by preventing fragmentation of the riparian habitat, and it must be ensured that no canalization or incision of the riparian resource takes place as a result of the construction activities. ▪ Vegetation clearing prior to construction must be minimized and the area re-seeded following construction with indigenous/endemic species to aid in the natural recovery of vegetation. ▪ Clearing/felling of woody vegetation should be limited to trees/shrubs above the maximum permitted clearance height, and the understory should not be cleared. Where possible, crossing points should be chosen to avoid large riparian trees. ▪ An alien vegetation control programme should form part of the Environmental Management Programme (EMPr). ▪ Exposed soils to be protected with suitable geotextile coverings, such as hessian sheets, at all times during the construction phase, and no stockpiling of soils is to take place within the riparian zone or associated buffer zone. ▪ All riparian zones should be treated as highly sensitive areas,

Activity	Impact summary	Significance	Proposed mitigation
			and be strictly maintained as such, except in the case of essential construction activities such clearing of vegetation, should riparian crossings be unavoidable. The footprint areas of any crossing points must be minimised in order to reduce the cumulative impacts thereof. ▪ Lay down areas should be placed outside the delineated riparian corridors/buffer zones, and construction right of ways may only be created through or across watercourses if proposed for use during operations and no existing right of way exist. However it is recommended that where existing roads / accesses cross watercourses exist these be used as a primary right of way. ▪ Reinforce banks and drainage features where necessary with gabions, reno mattresses and geotextiles but as far as possible soft rehabilitation techniques should be employed. ▪ Planning of temporary roads and access routes should avoid natural areas and be restricted to existing roads where possible. If it is not possible to avoid crossing the rivers and/or drainage lines, it must be ensured that the construction of such access roads are carried out in a responsible manner, i.e. by implementing mitigations to manage erosion, prevent impeding the flow of water along the system, and prevent sedimentation of the system as a result of the construction of such access roads.
	Ephemeral Drainage Lines – Impacts on riparian hydrology and sediment balance	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Careful planning of the placement of towers, taking into consideration the locality of riparian habitats and

Activity	Impact summary	Significance	Proposed mitigation
	(construction phase)		as much as possible, avoid placement of towers within riparian habitat, and powerlines are preferably to span the relevant resource. If at all possible, all towers should be developed above the 1:100 year floodline ▪ Where it is impossible to avoid placing infrastructure within riparian habitat, flow connectivity must be retained by preventing fragmentation of the riparian habitat, and it must be ensured that no canalization or incision of the riparian resource takes place as a result of the construction activities. ▪ Vegetation clearing prior to construction must be minimized and the area re-seeded following construction with indigenous/endemic species to aid in the natural recovery of vegetation. ▪ Clearing/felling of woody vegetation should be limited to trees/shrubs above the maximum permitted clearance height, and the understory should not be cleared. Where possible, crossing points should be chosen to avoid large riparian trees. ▪ An alien vegetation control programme should form part of the Environmental Management Programme (EMPr). ▪ Exposed soils to be protected with suitable geotextile coverings, such as hessian sheets, at all times during the construction phase, and no stockpiling of soils is to take place within the riparian zone or associated buffer zone. ▪ All riparian zones should be treated as highly sensitive areas, and be strictly maintained as such, except in the case of essential

Activity	Impact summary	Significance	Proposed mitigation
			construction activities such clearing of vegetation, should riparian crossings be unavoidable. The footprint areas of any crossing points must be minimised in order to reduce the cumulative impacts thereof. ▪ Lay down areas should be placed outside the delineated riparian corridors/buffer zones, and construction right of ways may only be created through or across watercourses if proposed for use during operations and no existing right of way exist. However it is recommended that where existing roads / accesses cross watercourses exist these be used as a primary right of way. ▪ Reinforce banks and drainage features where necessary with gabions, reno mattresses and geotextiles but as far as possible soft rehabilitation techniques should be employed. ▪ Planning of temporary roads and access routes should avoid natural areas and be restricted to existing roads where possible. If it is not possible to avoid crossing the rivers and/or drainage lines, it must be ensured that the construction of such access roads are carried out in a responsible manner, i.e. by implementing mitigations to manage erosion, prevent impeding the flow of water along the system, and prevent sedimentation of the system as a result of the construction of such access roads.
	Indirect impacts:		
	None identified	None identified	None identified
	Cumulative impacts:		
	With several current and historical activities occurring within the vicinity of the proposed development, the potential cumulative impacts of such activities in conjunction with the potential impacts of the proposed linear development, were taken into consideration. Historical and existing activities taking place within the zone		

Activity	Impact summary	Significance	Proposed mitigation
	of influence of the proposed linear development, which may have impacts on the riparian systems, include, but are not limited to: ▪ Peri-urban development (including the development of infrastructure such as the Upington WWTW, road and bridge crossings); ▪ Small scale open-cast tungsten mining activities (WCS, 2013) ▪ Agricultural activities (livestock and game farming, and crop cultivation, particularly in the floodplains of the Orange River); and ▪ Solar Renewable Energy Projects in the vicinity of the Rooipunt Solar Thermal Power Park (e.g. the existing Khi Solar One facility (located between the Rooipunt-Keimoes Alternative 01 and Rooipunt-Orange Alternative 02 proposed routes). These activities have already resulted in the transformation and loss of riparian habitat within the Kalahari Duneveld and Nama Karoo Bushmanland WetVeg Groups. Whilst both of these WetVeg groups are classified as "Least Threatened" (SANBI, 2013), they receive poor levels of protection, and therefore, further alterations and/or losses should be minimised as much as possible. Natural freshwater systems have been artificially impounded, and the vegetation communities of the Helbrandeegte and Helbrandkloofspruit Rivers, as well as many of the smaller, ephemeral drainage lines with riparian vegetation, have been transformed as a result of grazing and trampling by livestock. Due to the presence of fences throughout the entire area, some of which traverse the riparian systems, it is considered likely that the capacity of the riparian systems to function as migration corridors for fauna is reduced, although it was apparent during the site visit that such functionality still remains to a degree. Whilst not directly observed during this study, the perceived impacts of activities such as open-case tungsten mining (as discussed in WCS, 2013) may include altered sediment budgets, runoff into the riparian systems and vegetation clearing. The overall impact on the connectivity of the landscape and the further disruption of ecosystem processes associated with freshwater features by the proposed linear development would thus be reduced by the proximity to these existing developments and activities. Considering the above, the cumulative impacts on the freshwater ecology by the proposed linear development in the region, should adequate mitigation measures be implemented, is considered to be low. However, it is imperative that adequate mitigation be implemented throughout the life of the development in order to minimise the potential impacts of the proposed linear development on the receiving environment, and thus minimise the cumulative impacts.		
Soils and Agricultural Potential	***Direct impacts:***		
	Loss of agricultural land use caused by direct occupation of land by the footprint of the power line infrastructure	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Implement an effective system of run-off control, where it is required, that collects and safely disseminates all potential

Activity	Impact summary	Significance	Proposed mitigation
	(construction and operation phase)		accumulations of run-off water and thereby prevents potential down slope erosion. This should be in place and maintained during all phases of the development. ▪ Maintain where possible all vegetation cover and facilitate re-vegetation of denuded areas throughout the site to stabilize the soil against erosion.
	Soil erosion caused by alteration of the surface characteristics (construction and operation phase)	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Minimize road footprint and control vehicle access on roads only. ▪ Control dust as per standard construction site practice.
	Loss of topsoil caused by poor topsoil management (burial, erosion, etc) during construction related soil profile disturbance (levelling, excavations, disposal of spoils from excavations etc.) and having the effect of loss of soil fertility on disturbed areas after rehabilitation (construction phase)	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Strip and stockpile topsoil from all areas where soil will be disturbed below surface. ▪ After cessation of disturbance, re-spread topsoil over the surface. ▪ Dispose of any sub-surface spoils from excavations where they will not impact on agricultural land (for example use as road surfacing), or where they can be effectively covered with topsoil.
	Degradation of grazing beyond the direct development footprint caused by trampling due to vehicle passage, and deposition of dust.	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Minimize road footprint and control vehicle access on roads only. ▪ Control dust as per standard construction site practice.
	Indirect impacts:		
	None identified	None identified	None identified
	Cumulative impacts:		
	There are other proposed developments that will also occupy agricultural land in the		

Activity	Impact summary	Significance	Proposed mitigation
	area, and because the area is suitable for solar energy developments, there are likely to be more in the future. The potential for cumulative impacts therefore exists. However, because of the low agricultural impact of this development and the low agricultural sensitivity of the area, the cumulative impact is assessed as negligible.		
Heritage and Palaeontology	***Direct impacts:***		
	The possibility of encountering previously unidentified heritage resources. As well as the impact on the identified archaeological sites (Construction phase)	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Monitoring during construction by an archaeologist is recommended. ▪ Mitigation through archaeological excavations and collection should heritage resources be identified during the construction phase. ▪ Walk-down of final powerline route before construction commences is recommended.
	Indirect impacts:		
	None identified.		
	Cumulative impacts:		
	An evaluation of the possible cumulative impacts from the combined solar projects in the area on heritage resources has shown that the biggest envisaged impact could be on the graves of this proposed development. Through implementation of buffer zones, this impact can be avoided.		
Visual	***Direct impacts:***		
	Alteration of the natural character of the study area and exposure to visual receptors to visual impacts associated with the construction phase	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Carefully plan in order to reduce the construction period where possible. ▪ 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 proposed site as far as possible. ▪ Ensure that dust suppression techniques are implemented on all gravel access roads. ▪ Ensure that dust suppression is implemented in all areas where

Activity	Impact summary	Significance	Proposed mitigation
			vegetation clearing has taken place, relevant to the project site. ▪ Ensure that dust suppression techniques are implemented on all soil stockpiles. ▪ Route / align the proposed power line to completely avoid any structures such as farmsteads / homesteads / dwellings.
	Alteration of the natural character of the study area and exposure to visual receptors to visual impacts associated with the operation phase	Low negative impact expected after mitigation	The following mitigation measures would help to limit impacts: ▪ Light fittings for security at night should reflect the light toward the ground and prevent light spill. ▪ Las far as possible, limit the amount of security and operational lighting present at the two (2) bay substations. ▪ If possible, the control room should not be illuminated at night. ▪ As far as possible, limit the number of maintenance vehicles which are allowed to access the substation site and power line access roads. ▪ The control room should be painted with natural tones that fit with the surrounding environment. ▪ Ensure that dust suppression techniques are implemented on all gravel access roads. ▪ Align power lines to run parallel to existing power lines and other linear elements, where possible. ▪ Avoid crossing areas of high elevation, especially ridges, koppies or hills, where possible. ▪ Non-reflective surfaces should be utilised where possible.
	Indirect impacts:		
	None identified.		
	Cumulative impacts:		
	Renewable energy developments and their potential for large scale visual impacts could significantly alter the sense of place and visual character within the study area, once constructed. The cumulative visual impact experienced from each potentially sensitive visual receptor location will depend on the number of proposed renewable energy developments within viewing distance. As mentioned above, the height of the development in combination with distance are critical factors when assessing visual		

Activity	Impact summary	Significance	Proposed mitigation
	impacts. As such, the proposed solar energy facilities are unlikely to be visible from beyond 5km, and from beyond this distance the degree of visual impact would be considered to be insignificant. As such, all of the above mentioned proposed renewable energy developments, except for Upington Solar PV, will be in viewing distance from most of the the potentially sensitive receptor locations identified within the study area. However, it is envisaged that the biggest cumulative impact would be the change in the visual character within the the study area due to the presence of these large scale industrial developments. These facilities will therefore significantly alter the visual baseline within the study area and thereby reduce the visual impact of the proposed power line on the surrounding potentially sensitive receptor locations. The impact of the proposed power line would therefore be dwarfed in comparison the impact of the renewable energy developments.		
Socio-economic	***Direct impacts:***		
	Stimulation of the economy during construction	Medium positive impact after mitigation is expected	The following mitigation measures would help to enhance positive impacts: ▪ An impact on local economy may be increased if certain services are procured from local businesses as far as practically possible in line with Eskom procurement policies and standards.
	Impact on employment and household income during construction	Low positive impact after mitigation is expected	The following mitigation measures would help to enhance positive impacts: ▪ All jobs that will be an outcome of the proposed project are to be locally sourced as far as practically possible and in line with Eskom procurement standards and policies. It can be advocated that as many as possible of these jobs are filled by people from the local communities.
	Impact on increased generation capacity	Low positive impact	No mitigation measures could be identified for the proposed project to enhance the positive impact.
	Impact on current business activities	Low negative impact after mitigation is expected	It is proposed that the final alignment and tower positions chosen for the power line should environmental authorisation be received for a preferred power line corridor, it is to be established in consultation with the affected land owners before construction commences during servitude negotiations, and specifically: ▪ The owners of Portion 12 of Daysons Klip 454 and Farm 35 Mc Taggarts Camp 453 with respect to the location of the power line

Activity	Impact summary	Significance	Proposed mitigation
			relative to the grapevines on the property ▪ The owner of the Remainder of Tungsten Lodge 636 to avoid the area where 12 chalets and a bar restaurant are located.
	Impact on future developments	Low negative impact after mitigation is expected	The following mitigation measures would help to reduce negative impacts: ▪ It will be imperative to ensure that the selection of the Corridor Option and the design of the final power line route takes into account the layout of solar energy facilitates planned on the surrounding properties. The developers/owners of these projects will also need to be consulted prior the selection of the final power line route and tower positions before construction commences. ▪
	Indirect impacts:		
	None identified.		
	Cumulative impacts:		
	The area west, south and south-east of the project site is to become concentrated with solar energy facilities with five projects (i.e. two CSP and three PV) already being approved and either developed or to be developed in the near future. All of these projects will need to have access to the sub-station and will require access to a sustainable water source. Therefore, the area is likely already to be traversed by the required infrastructure, and an additional infrastructure is to be built.		
No-go option			
	Direct impacts:		
	The job creation and local investment expected for the local area would not occur. The expected capital injection into the LM would be prevented. The electricity generated at the SolarReserve Rooipunt Solar Thermal Power Park Project would not be connected to the grid and greater electricity security would not be achieved, South Africa would not have the benefit of the SolarReserve Rooipunt Solar Thermal Power Park contributing to the country's renewable energy targets.		
	Indirect impacts:		
	None identified.		
	Cumulative impacts:		
	None identified.		

A complete impact assessment in terms of Regulation 19(3) of GN 733 must be included as Appendix F.

A complete impact assessment in terms of Regulation 19(3) of GN R.733 is included in Appendix F and

a comparison of the alternatives is included in section 2 below.

2. ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, please provide an environmental impact statement that summarises the impact that the proposed activity and its alternatives may have on the environment after the management and mitigation of impacts have been taken into account, with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

Corridor Alternative 1 (Blue - Preferred)

Biodiversity	In terms of flora, within the area affected by the proposed development, vegetation types that are affected include Kalahari Karroid Shrubland and Bushmanland Arid Grassland. Within these vegetation types however, a the specific habitat that are actually occurring within the proposed corridor alternatives include the following: ▪ Bushmaland Arid Grassland – Protected and listed species include *Hoodia gordonii*, *Adenium oleifolium*, *Avonia albissima* and *Euphorbia rudis* ▪ Kalahari Karroid Shrubland – Species of conservation concern are occasional *Hoodia gordonii* plants. Protected species include occasional individuals of *Boscia foetida*, *Boscia albitrunca* and *Acacia erioloba* ▪ Plains Wash – Aside from *Boscia foetida* which is fairly common in these areas, there are few listed or protected species ▪ Drainage Lines – Due to the ecological role that drainage lines play as well as their vulnerability to disturbance, these areas are considered sensitive and should be avoided as much as possible. Protected tree species are concentrated along the drainage lines with species such as *Boscia foetida*, *Boscia albitrunca* and *Acacia erioloba* being found largely within this habitat type ▪ Quartz Outcrops – This is a localised and specialised habitat that frequently contains associated species that are not found elsewhere. As such this is considered a sensitive habitat that should be avoided as much as possible. Species of concern associated with this habitat include *Dinteranthus wilmotianus*, *Lithops bromfieldii*, *Aloe claviflora, Larryleachia marlothii* and *Adenium oleifolium* In terms of fauna: ▪ The site falls within the distribution range of 46 terrestrial mammals, indicating that the mammalian diversity in the area is of moderate potential. ▪ Three listed terrestrial mammals may occur at the site, the Honey Badger *Mellivora capensis* (Endangered), Brown Hyaena *Hyaena brunnea* (Near Threatened) and Black-footed cat *Felis nigripes* (Vulnerable).

	▪ The site lies within the distribution range of 6 bat species, indicating that the richness of bats at the site is probably quite low. Within the affected area, only the vicinity of major drainage lines such as the Helbrandkloofspruit are likely to be frequently used by bats. ▪ According to the SARCA database, 40 reptile species are known from the area suggesting that the reptile diversity within the site is likely to be moderate to low. ▪ The site lies within the distribution range of 10 amphibian species. The only listed species which may occur in the area is the Giant Bullfrog *Pyxicephalus adspersus* which is listed as Near Threatened. The major impacts ecologically associated with the construction phase include impacts on vegetation and protected plant species as well as direct impacts on faunal species. Typical impacts can include vegetation clearing which may result in loss or removal of protected species where the power line cannot avoid these habitats/species locations. In terms of fauna, increased noise levels, pollution, disturbance and human presence may cause displacement, illegal collection (mammals or reptiles) or even death. For the operation phase, the main concern is during maintenance activities such as vegetation cleating which will create disturbance as well as making the affected areas susceptible to alien plant invasion. Finally, during the decommissioning and closure phase, the same impacts as identified for the construction phase are likely in addition to further impacts such as soil erosion for removal of structures. Overall, potential impacts on vegetation and faunal species are rated as **medium to low** in both the construction and operation phases, with the decommissioning and closure phase being rated as low. **After mitigation, all potential impacts can be reduced to low impacts**. In terms of preference, the different options have large sections in common and ultimately, Alternative 2 and Alternative 3 are considered ecologically similar and not sufficiently different from one another to be considered significantly different in terms of their potential impacts. **Alternative 1 is considered to be the preferred alternative** due to its shorter length and fewer drainage lines that would need to be crossed and hence lower potential impact on vegetation within these more sensitive areas.
Avi-fauna	An estimated 196 bird species could potentially occur in the study area of which 13 are classified as Red Data species. Red data species include the following: ▪ Martial Eagle (Polymoetus bellicosus) ▪ Secretary Bird (Sagittorius serpentarius) ▪ Kori Bustard (Ardeotis kori) ▪ Curlew Sandpiper (Colidris ferruginea)

	▪ Lanner Falcon (Falco biomicus) ▪ Karoo Korhaan (Eupodotis vigorsii) ▪ Abdim's Stork (Ciconia abdimii) ▪ Black Stork (Ciconia nigra) ▪ Yellow-billed Stork (Mycteria ibis) ▪ Ludwig's Bustard (Meotis ludwigii) ▪ Greater Flamingo (Phoenicopterus roseus) ▪ Lesser Flamingos (Phoenicopterus minor) Potential impacts during the construction and decommissioning phase include the displacement of priority species and habitat transformation. Impacts are mainly negative but low. With mitigation, these impacts can be reduced further. For the operation phase, electrocutions and collisions of red data species is the primary potential impact. Potential impacts are rated as medium-low for all three alternative corridors. With mitigation, these potential impacts can be reduced to low levels, with the exception of Corridor Alternative 2 which will remain medium due to the potential waterbird movement between the evaporation ponds at the Khi Solar One CSP facility located in the corridor, which may put Flamingo (Greater and Lesser Flamingos), Black Stork, Yellow-billed Stork, Abdim's Stork and Curlew Sandpiper at greater risk of collisions.
Wetlands	Three primary hydrogeomorphic types were identified including well developed riparian systems (namely the Helbrandleegte and Helbrandkloofspruit Rivers), ephemeral drainage lines with riparian habitat and smaller, poorly defined episodic drainage lines without riparian vegetation. Summary of assessments undertaken applied to riparian resources include the following: ▪ Helbrandleegte: PES-C; EI & ES-B; REC-C; Intermediate Ecological Function and Service Provision; ▪ Helbrandkloofspruit: PES-C; EI & ES-B; REC-C; Intermediate Ecological Function and Service Provision; and ▪ Ephemeral drainage lines: PES-B; EI & ES-C; REC-B; Moderately Low Ecological Function and Service Provision. Types of impacts to the riparian systems included: ▪ Loss of riparian habitat and ecological structure; and ▪ Changes to riparian ecological and sociocultural service provision; ▪ Impacts on riparian hydrology and sediment balance. Overall significance after mitigation is a low negative impact after management and mitigation measure implementation. Based on the findings of the freshwater ecological assessment, it is clear that the proposed linear development is perceived to be a low-impact activity, posing limited risk to the ecological integrity of the identified riparian resources. Although the freshwater resources to be traversed by the proposed linear development are deemed to be in relatively natural to

	moderately modified condition, it is the opinion of the ecologists that with the implementation of good mitigation measures, the perceived impact of the proposed linear development on the freshwater resources can be effectively reduced. Therefore, from a riparian habitat resource conservation perspective, it is the opinion of the ecologists that the proposed linear development be considered favourably. Following the assessment of perceived impacts, consideration was given as to the preferred corridor option from a riparian/watercourse conservation perspective. **Corridor Option 1 is considered to be the preferred option**, since this route will most likely impact on the least number of watercourses, and most importantly, will only traverse one riverine system, namely the Helbrandleegte River. Whilst Options 2 and 3 are favourable, both of these options will traverse both rivers, and therefore in order to minimise the cumulative impacts on the riparian ecology of the area, it would be preferable to avoid traversing both rivers.
Soils and Agricultural Potential	The proposed development is on land zoned and used for agriculture. Soils on the site are shallow to moderately deep, red, sandy soils overlying rock or hard pan carbonate (Hutton, Mispah and Coega soil forms). They also include smaller areas of deep, very sandy soils and an area with a high proportion of rock outcrop. The major limitation to agriculture is the limited climatic moisture availability. The low water holding capacity and limited depth of the soils are further limitations. As a result, the site is predominantly unsuitable for cultivation and agricultural land use is limited to grazing. The land capability is classified as predominantly Class 7 - non-arable, low potential grazing land. The site has a low grazing capacity predominantly of 31-40 hectares per large stock unit. Cultivated table grapes along the south eastern boundary of the site is considered an area of high agricultural sensitivity. Any infrastructure on the ground must avoid this area, although the overhead power lines can cross it without impact. There are three factors that limit the significance of all potential agricultural impacts. The first is that the actual footprint of disturbance of the proposed pipeline is very small in relation to available, surrounding land. The second is that the impact of a pipeline on the kind of agricultural activity (predominantly grazing) along the proposed development is very minimal. The third factor is that the site has very low agricultural potential, limited by severe climatic moisture availability constraints and soils that include shallow ones. Four potential negative impacts of the development on agricultural

	resources and productivity were identified as: ▪ Loss of agricultural land use caused by direct occupation of land by the footprint of the powerline infrastructure. ▪ Soil Erosion caused by alteration of the surface characteristics. ▪ Loss of topsoil in disturbed areas, causing a decline in soil fertility. ▪ Degradation of veld vegetation beyond the direct footprint due to constructional disturbance, dust and vehicle trampling. All impacts were assessed as having low significance. Recommended mitigation measures include implementation of an effective system of storm water run-off control to mitigate erosion; and topsoil stripping and re-spreading to mitigate loss of topsoil. Because of the low agricultural potential of the site and resultant low agricultural impacts, the development should, from an agricultural impact perspective, be authorised. Because of the low impacts and the uniformly low potential of the site, there is no preference between the three corridor alternatives.
Heritage and Palaeontology	Heritage Findings: An archival and historical desktop study was undertaken which was used to compile a historical layering of the study area within its regional context. This component indicated that the landscape within which the project area is located has a rich and diverse history. The desktop assessment identified numerous heritage studies conducted within the assessment area, however none of the heritage resources identified outside of the original SolarReserve Rooipunt Solar Thermal Power Park Project study area is of high heritage significance and no further mitigation will be required on these. The mitigation measures as identified for the heritage resources inside the SolarReserve Rooipunt CSP Project study area are still valid and must be applied as per the EMPr for the development. These desktop studies were followed by a fieldwork component that comprised driving and walking through the study area. No heritage resources were identified in this Alternative Corridor. Palaeontological Findings: Should outcrop areas of potentially fossiliferous ancient Orange River alluvial gravels be identified (e.g. during geotechnical investigations) within the development footprint, however, these should be assessed by a professional palaeontologist before construction commences. The purposes of the field assessment study would be (a) to identify the rock units actually present, (b) to carry out judicious sampling of any fossil heritage currently exposed, together with pertinent geological and

	palaeontological data, (c) to determine the likely impact of the proposed development on local fossil heritage based on the new field-based information, and finally (d) to make recommendations for any no-go areas, buffer zones or further palaeontological mitigation deemed necessary for this project (e.g. comprehensive pre-construction sampling of near-surface surface fossil material, palaeontological monitoring of excavations). Note that further mitigation may be most useful during the construction phase of the development while fresh, potentially fossiliferous bedrock is still exposed. Overall Impact Statement: The overall impact evaluation has shown that the pre-mitigation impact on heritage resources is rated as High negative. However, with the implementation of the recommended mitigation measures, this will reduce the potential impact to a low negative impact. There is no preference between all three alternative corridors provided for assessment.
Visual	The Visual Impact Assessment (VIA) conducted for the proposed 132kV power line and associated infrastructure has demonstrated that majority of the study area has a natural visual character, typical of a rural environment. It should be noted that the southern, south-eastern and eastern parts of the study area found along the N14 are characterised by a more visually degraded landscape, which is mostly attributed to the presence of large-scale commercial cultivation as well as informal/semi-formal settlements and residential areas/communities. Certain parts of the study area in this area are however still largely characterised by a pastoral environmental where commercial cultivation prevails and will be less visually degraded than the peri-urban developed areas found along the N14. The visual character in these areas is thus typical of a rural or pastoral environment. The study area forms part of the Kokerboom Food & Wine Route and is therefore valued or utilised for its natural scenic or tourism potential. Despite this, relatively few tourism, historical or culturally significant sensitive receptors were identified during the fieldwork. A desktop investigation revealed that several farmsteads are also present within the study area which may perceive the proposed power line and associated infrastructure to be an unwelcome intrusion, depending on the perception of the viewer The assessment revealed that a negligible or low visual impact would typically be experienced from most areas beyond 1km of the proposed development and within 1km of the proposed development a moderate visual impact would typically be experienced. The impact assessment revealed that the significance of the visual impacts resulting from the proposed power line and associated infrastructure would be low during the construction phase and medium during the operational phase. These potential impacts can be mitigated

	to acceptable levels provided the recommended mitigation measures are implemented. Based on the alternatives comparative assessment, Corridor Option 1 (Blue) is considered to be the preferred alignment for the proposed power line while Corridor Option 2 (Purple) and Corridor Option 3 (Green) are considered to be favourable alignments.
Socio-economic	The review of the relevant policy documents concluded that there is no conflict between the establishment of the proposed project and spatial plans of the province or local municipalities. On the contrary, the project will contribute to the national objective of diversifying electricity-generating capacity through the development of renewable sources of energy, including concentrated solar energy. The Northern Cape sees the promotion of renewable energy projects as a means to unlock the economic potential of the province, and the municipalities concerned have identified solar energy projects among the driving forces of their respective economies. This is further highlighted in the baseline analysis, which shed light on the notable growth of contribution of the utilities and construction sectors towards the economic development and job creation in both municipalities in the past few years. The impact analysis stresses some positive impacts that could be derived during the construction phase of the project. These include positive impacts on the economy, employment and household incomes. The proposed development will also have a positive impact on the reduction of electricity transmission losses through the connection of the CSP plant to the grid and subsequently, dispersing electricity generation capacitates throughout the country. While the affected and interested parties that were interviewed have not expressed major concerns nor objection to the project, it is important that these parties be properly consulted before choosing the power line route in order to not affect any commercial farming activities or future industrial projects happening on those properties. Overall, all of the Corridor Alternatives received the same average scores for positive impacts for both before and after mitigations measures. Corridor Alternative 1 however received a slightly lower average score for negative impacts for both before and after mitigations. Corridor Alternative 1 appears to be slightly more preferred from a socio-economic perspective than the other two alternatives.

Corridor Alternative 2 (Orange)

Biodiversity	In terms of flora, within the area affected by the proposed development, vegetation types that are affected include Kalahari Karroid Shrubland and Bushmanland Arid Grassland. Within these vegetation types however, a the specific habitat that are actually occurring within the proposed corridor alternatives include the following: ▪ Bushmaland Arid Grassland – Protected and listed species include *Hoodia gordonii*, *Adenium oleifolium*, *Avonia albissima* and *Euphorbia rudis* ▪ Kalahari Karroid Shrubland – Species of conservation concern are occasional *Hoodia gordonii* plants. Protected species include occasional individuals of *Boscia foetida*, *Boscia albitrunca* and *Acacia erioloba* ▪ Plains Wash – Aside from *Boscia foetida* which is fairly common in these areas, there are few listed or protected species ▪ Drainage Lines – Due to the ecological role that drainage lines play as well as their vulnerability to disturbance, these areas are considered sensitive and should be avoided as much as possible. Protected tree species are concentrated along the drainage lines with species such as *Boscia foetida*, *Boscia albitrunca* and *Acacia erioloba* being found largely within this habitat type ▪ Quartz Outcrops – This is a localised and specialised habitat that frequently contains associated species that are not found elsewhere. As such this is considered a sensitive habitat that should be avoided as much as possible. Species of concern associated with this habitat include *Dinteranthus wilmotianus*, *Lithops bromfieldii*, *Aloe claviflora, Larryleachia marlothii* and *Adenium oleifolium* In terms of fauna: ▪ The site falls within the distribution range of 46 terrestrial mammals, indicating that the mammalian diversity in the area is of moderate potential. ▪ Three listed terrestrial mammals may occur at the site, the Honey Badger *Mellivora capensis* (Endangered), Brown Hyaena *Hyaena brunnea* (Near Threatened) and Black-footed cat *Felis nigripes* (Vulnerable). ▪ The site lies within the distribution range of 6 bat species, indicating that the richness of bats at the site is probably quite low. Within the affected area, only the vicinity of major drainage lines such as the Helbrandkloofspruit are likely to be frequently used by bats. ▪ According to the SARCA database, 40 reptile species are known from the area suggesting that the reptile diversity within the site is likely to be moderate to low. ▪ The site lies within the distribution range of 10 amphibian species. The only listed species which may occur in the area is

	the Giant Bullfrog *Pyxicephalus adspersus* which is listed as Near Threatened. The major impacts ecologically associated with the construction phase include impacts on vegetation and protected plant species as well as direct impacts on faunal species. Typical impacts can include vegetation clearing which may result in loss or removal of protected species where the power line cannot avoid these habitats/species locations. In terms of fauna, increased noise levels, pollution, disturbance and human presence may cause displacement, illegal collection (mammals or reptiles) or even death. For the operation phase, the main concern is during maintenance activities such as vegetation cleating which will create disturbance as well as making the affected areas susceptible to alien plant invasion. Finally, during the decommissioning and closure phase, the same impacts as identified for the construction phase are likely in addition to further impacts such as soil erosion for removal of structures. Overall, potential impacts on vegetation and faunal species are rated as medium to low in both the construction and operation phases, with the decommissioning and closure phase being rated as low. After mitigation, all potential impacts can be reduced to low impacts. In terms of preference, the different options have large sections in common and ultimately, Alternative 2 and Alternative 3 are considered ecologically similar and not sufficiently different from one another to be considered significantly different in terms of their potential impacts. Alternative 1 is considered to be the preferred alternative due to its shorter length and fewer drainage lines that would need to be crossed and hence lower potential impact on vegetation within these more sensitive areas.
Avi-fauna	An estimated 196 bird species could potentially occur in the study area of which 13 are classified as Red Data species. Red data species include the following: ▪ Martial Eagle (Polymoetus bellicosus) ▪ Secretary Bird (Sagittorius serpentarius) ▪ Kori Bustard (Ardeotis kori) ▪ Curlew Sandpiper (Colidris ferruginea) ▪ Lanner Falcon (Falco biomicus) ▪ Karoo Korhaan (Eupodotis vigorsii) ▪ Abdim's Stork (Ciconia abdimii) ▪ Black Stork (Ciconia nigra) ▪ Yellow-billed Stork (Mycteria ibis) ▪ Ludwig's Bustard (Meotis ludwigii) ▪ Greater Flamingo (Phoenicopterus roseus) ▪ Lesser Flamingos (Phoenicopterus minor) Potential impacts during the construction and decommissioning phase

	include the displacement of priority species and habitat transformation. Impacts are mainly negative but low. With mitigation, these impacts can be reduced further. For the operation phase, electrocutions and collissions of red data species is the primary potential impact. Potential impacts are rated as medium-low for all three alternative corridors. With mitigation, these potential impacts can be reduced to low levels, with the exception of Corridor Alternative 2 which will remain medium due to the potential waterbird movement between the evaporation ponds at the Khi Solar One CSP facility located in the corridor, which may put Flamingo (Greater and Lesser Flamingos), Black Stork, Yellow-billed Stork, Abdim's Stork and Curlew Sandpiper at greater risk of collisions.
Wetlands	Three primary hydrogeomorphic types were identified including well developed riparian systems (namely the Helbrandleegte and Helbrandkloofspruit Rivers), ephemeral drainage lines with riparian habitat and smaller, poorly defined episodic drainage lines without riparian vegetation. Summary of assessments undertaken applied to riparian resources include the following: ▪ Helbrandleegte: PES-C; EI & ES-B; REC-C; Intermediate Ecological Function and Service Provision; ▪ Helbrandkloofspruit: PES-C; EI & ES-B; REC-C; Intermediate Ecological Function and Service Provision; and ▪ Ephemeral drainage lines: PES-B; EI & ES-C; REC-B; Moderately Low Ecological Function and Service Provision. Types of impacts to the riparian systems included: ▪ Loss of riparian habitat and ecological structure; and ▪ Changes to riparian ecological and sociocultural service provision; ▪ Impacts on riparian hydrology and sediment balance. Overall significance after mitigation is a low negative impact after management and mitigation measure implementation. Based on the findings of the freshwater ecological assessment, it is clear that the proposed linear development is perceived to be a low-impact activity, posing limited risk to the ecological integrity of the identified riparian resources. Although the freshwater resources to be traversed by the proposed linear development are deemed to be in relatively natural to moderately modified condition, it is the opinion of the ecologists that with the implementation of good mitigation measures, the perceived impact of the proposed linear development on the freshwater resources can be effectively reduced. Therefore, from a riparian habitat resource conservation perspective, it is the opinion of the ecologists that the proposed linear development be considered favourably. Following the assessment of perceived impacts, consideration was given as to the preferred corridor option from a riparian/watercourse conservation perspective. Corridor Option 1 is considered to be the

	preferred option, since this route will most likely impact on the least number of watercourses, and most importantly, will only traverse one riverine system, namely the Helbrandleegte River. Whilst Options 2 and 3 are favourable, both of these options will traverse both rivers, and therefore in order to minimise the cumulative impacts on the riparian ecology of the area, it would be preferable to avoid traversing both rivers.
Soils and Agricultural Potential	The proposed development is on land zoned and used for agriculture. Soils on the site are shallow to moderately deep, red, sandy soils overlying rock or hard pan carbonate (Hutton, Mispah and Coega soil forms). They also include smaller areas of deep, very sandy soils and an area with a high proportion of rock outcrop. The major limitation to agriculture is the limited climatic moisture availability. The low water holding capacity and limited depth of the soils are further limitations. As a result, the site is predominantly unsuitable for cultivation and agricultural land use is limited to grazing. The land capability is classified as predominantly Class 7 - non-arable, low potential grazing land. The site has a low grazing capacity predominantly of 31-40 hectares per large stock unit. Cultivated table grapes along the south eastern boundary of the site is considered an area of high agricultural sensitivity. Any infrastructure on the ground must avoid this area, although the overhead power lines can cross it without impact. There are three factors that limit the significance of all potential agricultural impacts. The first is that the actual footprint of disturbance of the proposed powerline is very small in relation to available, surrounding land. The second is that the impact of a powerline on the kind of agricultural activity (predominantly grazing) along the proposed development is very minimal. The third factor is that the site has very low agricultural potential, limited by severe climatic moisture availability constraints and soils that include shallow ones. Four potential negative impacts of the development on agricultural resources and productivity were identified as: ▪ Loss of agricultural land use caused by direct occupation of land by the footprint of the powerline infrastructure. ▪ Soil Erosion caused by alteration of the surface characteristics. ▪ Loss of topsoil in disturbed areas, causing a decline in soil fertility. ▪ Degradation of veld vegetation beyond the direct footprint due to constructional disturbance, dust and vehicle trampling. All impacts were assessed as having low significance.

	Recommended mitigation measures include implementation of an effective system of storm water run-off control to mitigate erosion; and topsoil stripping and re-spreading to mitigate loss of topsoil. Because of the low agricultural potential of the site and resultant low agricultural impacts, the development should, from an agricultural impact perspective, be authorised. Because of the low impacts and the uniformly low potential of the site, there is no preference between the three corridor alternatives.
Heritage and Palaeontology	Heritage Findings: An archival and historical desktop study was undertaken which was used to compile a historical layering of the study area within its regional context. This component indicated that the landscape within which the project area is located has a rich and diverse history. The desktop assessment identified numerous heritage studies conducted within the assessment area, however none of the heritage resources identified outside of the original SolarReserve Rooipunt Solar Thermal Power Park Project study area is of high heritage significance and no further mitigation will be required on these. The mitigation measures as identified for the heritage resources inside the SolarReserve Rooipunt Solar Thermal Power Park Project study area are still valid and must be applied as per the EMPr for the development. These desktop studies were followed by a fieldwork component that comprised driving and walking through the study area. Only one heritage resource (DYK001) of significance was identified in the assessment area (Alternative Corridors 2 and 3). Mitigation is as follows: ▪ Mitigation would be required if the development came closer than 50 m to the abandoned mine. ▪ In this case the heritage resource should be photographed and drawn to record the details of its construction before destruction. ▪ The documentation should be archived on SAHRIS and with the MacGregor Museum, Kimberley. Palaeontological Findings: Should outcrop areas of potentially fossiliferous ancient Orange River alluvial gravels be identified (e.g. during geotechnical investigations) within the development footprint, however, these should be assessed by a professional palaeontologist before construction commences. The purposes of the field assessment study would be (a) to identify the rock units actually present, (b) to carry out judicious sampling of any fossil heritage currently exposed, together with pertinent geological and palaeontological data, (c) to determine the likely impact of the proposed development on local fossil heritage based on the new field-based

		information, and finally (d) to make recommendations for any no-go areas, buffer zones or further palaeontological mitigation deemed necessary for this project (e.g. comprehensive pre-construction sampling of near-surface surface fossil material, palaeontological monitoring of excavations). Note that further mitigation may be most useful during the construction phase of the development while fresh, potentially fossiliferous bedrock is still exposed. Overall Impact Statement: The overall impact evaluation has shown that the pre-mitigation impact on heritage resources is rated as High negative. However, with the implementation of the recommended mitigation measures, this will reduce the potential impact to a low negative impact. There is no preference between all three alternative corridors provided for assessment.
	Visual	The Visual Impact Assessment (VIA) conducted for the proposed 132kV power line and associated infrastructure has demonstrated that majority of the study area has a natural visual character, typical of a rural environment. It should be noted that the southern, south-eastern and eastern parts of the study area found along the N14 are characterised by a more visually degraded landscape, which is mostly attributed to the presence of large-scale commercial cultivation as well as informal/semi-formal settlements and residential areas/communities. Certain parts of the study area in this area are however still largely characterised by a pastoral environmental where commercial cultivation prevails and will be less visually degraded than the peri-urban developed areas found along the N14. The visual character in these areas is thus typical of a rural or pastoral environment. The study area forms part of the Kokerboom Food & Wine Route and is therefore valued or utilised for its natural scenic or tourism potential. Despite this, relatively few tourism, historical or culturally significant sensitive receptors were identified during the fieldwork. A desktop investigation revealed that several farmsteads are also present within the study area which may perceive the proposed power line and associated infrastructure to be an unwelcome intrusion, depending on the perception of the viewer The assessment revealed that a negligible or low visual impact would typically be experienced from most areas beyond 1km of the proposed development and within 1km of the proposed development a moderate visual impact would typically be experienced. The impact assessment revealed that the significance of the visual impacts resulting from the proposed power line and associated infrastructure would be low during the construction phase and medium during the operational phase. These potential impacts can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.

	Based on the alternatives comparative assessment, Corridor Option 1 (Blue) is considered to be the preferred alignment for the proposed power line while Corridor Option 2 (Purple) and Corridor Option 3 (Green) are considered to be favourable alignments.
Socio-economic	The review of the relevant policy documents concluded that there is no conflict between the establishment of the proposed project and spatial plans of the province or local municipalities. On the contrary, the project will contribute to the national objective of diversifying electricity-generating capacity through the development of renewable sources of energy, including concentrated solar energy. The Northern Cape sees the promotion of renewable energy projects as a means to unlock the economic potential of the province, and the municipalities concerned have identified solar energy projects among the driving forces of their respective economies. This is further highlighted in the baseline analysis, which shed light on the notable growth of contribution of the utilities and construction sectors towards the economic development and job creation in both municipalities in the past few years. The impact analysis stresses some positive impacts that could be derived during the construction phase of the project. These include positive impacts on the economy, employment and household incomes. The proposed development will also have a positive impact on the reduction of electricity transmission losses through the connection of the SolarReserve Rooipunt Solar Thermal Power Park Project o the grid and subsequently, dispersing electricity generation capacitates throughout the country. While the affected and interested parties that were interviewed have not expressed major concerns nor objection to the project, it is important that these parties be properly consulted before choosing the power line route in order to not affect any commercial farming activities or future industrial projects happening on those properties. Overall, all of the Corridor Alternatives received the same average scores for positive impacts for both before and after mitigations measures. Corridor Alternative 1 however received a slightly lower average score for negative impacts for both before and after mitigations. Corridor Alternative 1 appears to be slightly more preferred from a socio-economic perspective than the other two alternatives.

Corridor Alternative 3 (Green)

Biodiversity	In terms of flora, within the area affected by the proposed development, vegetation types that are affected include Kalahari Karroid Shrubland and Bushmanland Arid Grassland. Within these vegetation types however, a the specific habitat that are actually occurring within the proposed corridor alternatives include the following: ▪ Bushmaland Arid Grassland – Protected and listed species include *Hoodia gordonii*, *Adenium oleifolium*, *Avonia albissima* and *Euphorbia rudis* ▪ Kalahari Karroid Shrubland – Species of conservation concern are occasional *Hoodia gordonii* plants. Protected species include occasional individuals of *Boscia foetida*, *Boscia albitrunca* and *Acacia erioloba* ▪ Plains Wash – Aside from *Boscia foetida* which is fairly common in these areas, there are few listed or protected species ▪ Drainage Lines – Due to the ecological role that drainage lines play as well as their vulnerability to disturbance, these areas are considered sensitive and should be avoided as much as possible. Protected tree species are concentrated along the drainage lines with species such as *Boscia foetida*, *Boscia albitrunca* and *Acacia erioloba* being found largely within this habitat type ▪ Quartz Outcrops – This is a localised and specialised habitat that frequently contains associated species that are not found elsewhere. As such this is considered a sensitive habitat that should be avoided as much as possible. Species of concern associated with this habitat include *Dinteranthus wilmotianus*, *Lithops bromfieldii*, *Aloe claviflora, Larryleachia marlothii* and *Adenium oleifolium* In terms of fauna: ▪ The site falls within the distribution range of 46 terrestrial mammals, indicating that the mammalian diversity in the area is of moderate potential. ▪ Three listed terrestrial mammals may occur at the site, the Honey Badger *Mellivora capensis* (Endangered), Brown Hyaena *Hyaena brunnea* (Near Threatened) and Black-footed cat *Felis nigripes* (Vulnerable). ▪ The site lies within the distribution range of 6 bat species, indicating that the richness of bats at the site is probably quite low. Within the affected area, only the vicinity of major drainage lines such as the Helbrandkloofspruit are likely to be frequently used by bats. ▪ According to the SARCA database, 40 reptile species are known from the area suggesting that the reptile diversity within the site is likely to be moderate to low. ▪ The site lies within the distribution range of 10 amphibian

	species. The only listed species which may occur in the area is the Giant Bullfrog *Pyxicephalus adspersus* which is listed as Near Threatened. The major impacts ecologically associated with the construction phase include impacts on vegetation and protected plant species as well as direct impacts on faunal species. Typical impacts can include vegetation clearing which may result in loss or removal of protected species where the power line cannot avoid these habitats/species locations. In terms of fauna, increased noise levels, pollution, disturbance and human presence may cause displacement, illegal collection (mammals or reptiles) or even death. For the operation phase, the main concern is during maintenance activities such as vegetation cleating which will create disturbance as well as making the affected areas susceptible to alien plant invasion. Finally, during the decommissioning and closure phase, the same impacts as identified for the construction phase are likely in addition to further impacts such as soil erosion for removal of structures. Overall, potential impacts on vegetation and faunal species are rated as medium to low in both the construction and operation phases, with the decommissioning and closure phase being rated as low. After mitigation, all potential impacts can be reduced to low impacts. In terms of preference, the different options have large sections in common and ultimately, Alternative 2 and Alternative 3 are considered ecologically similar and not sufficiently different from one another to be considered significantly different in terms of their potential impacts. Alternative 1 is considered to be the preferred alternative due to its shorter length and fewer drainage lines that would need to be crossed and hence lower potential impact on vegetation within these more sensitive areas.
Avi-fauna	An estimated 196 bird species could potentially occur in the study area of which 13 are classified as Red Data species. Red data species include the following: ▪ Martial Eagle (Polymoetus bellicosus) ▪ Secretary Bird (Sagittorius serpentarius) ▪ Kori Bustard (Ardeotis kori) ▪ Curlew Sandpiper (Colidris ferruginea) ▪ Lanner Falcon (Falco biomicus) ▪ Karoo Korhaan (Eupodotis vigorsii) ▪ Abdim's Stork (Ciconia abdimii) ▪ Black Stork (Ciconia nigra) ▪ Yellow-billed Stork (Mycteria ibis) ▪ Ludwig's Bustard (Meotis ludwigii) ▪ Greater Flamingo (Phoenicopterus roseus) ▪ Lesser Flamingos (Phoenicopterus minor)

	Potential impacts during the construction and decommissioning phase include the displacement of priority species and habitat transformation. Impacts are mainly negative but low. With mitigation, these impacts can be reduced further. For the operation phase, electrocutions and collisions of red data species is the primary potential impact. Potential impacts are rated as medium-low for all three alternative corridors. With mitigation, these potential impacts can be reduced to low levels, with the exception of Corridor Alternative 2 which will remain medium due to the potential waterbird movement between the evaporation ponds at the Khi Solar One CSP facility located in the corridor, which may put Flamingo (Greater and Lesser Flamingos), Black Stork, Yellow-billed Stork, Abdim's Stork and Curlew Sandpiper at greater risk of collisions.
Wetlands	Three primary hydrogeomorphic types were identified including well developed riparian systems (namely the Helbrandleegte and Helbrandkloofspruit Rivers), ephemeral drainage lines with riparian habitat and smaller, poorly defined episodic drainage lines without riparian vegetation. Summary of assessments undertaken applied to riparian resources include the following: ▪ Helbrandleegte: PES-C; EI & ES-B; REC-C; Intermediate Ecological Function and Service Provision; ▪ Helbrandkloofspruit: PES-C; EI & ES-B; REC-C; Intermediate Ecological Function and Service Provision; and ▪ Ephemeral drainage lines: PES-B; EI & ES-C; REC-B; Moderately Low Ecological Function and Service Provision. Types of impacts to the riparian systems included: ▪ Loss of riparian habitat and ecological structure; and ▪ Changes to riparian ecological and sociocultural service provision; ▪ Impacts on riparian hydrology and sediment balance. Overall significance after mitigation is a low negative impact after management and mitigation measure implementation. Based on the findings of the freshwater ecological assessment, it is clear that the proposed linear development is perceived to be a low-impact activity, posing limited risk to the ecological integrity of the identified riparian resources. Although the freshwater resources to be traversed by the proposed linear development are deemed to be in relatively natural to moderately modified condition, it is the opinion of the ecologists that with the implementation of good mitigation measures, the perceived impact of the proposed linear development on the freshwater resources can be effectively reduced. Therefore, from a riparian habitat resource conservation perspective, it is the opinion of the ecologists that the proposed linear development be considered favourably. Following the assessment of perceived impacts, consideration was

	given as to the preferred corridor option from a riparian/watercourse conservation perspective. Corridor Option 1 is considered to be the preferred option, since this route will most likely impact on the least number of watercourses, and most importantly, will only traverse one riverine system, namely the Helbrandleegte River. Whilst Options 2 and 3 are favourable, both of these options will traverse both rivers, and therefore in order to minimise the cumulative impacts on the riparian ecology of the area, it would be preferable to avoid traversing both rivers.
Soils and Agricultural Potential	The proposed development is on land zoned and used for agriculture. Soils on the site are shallow to moderately deep, red, sandy soils overlying rock or hard pan carbonate (Hutton, Mispah and Coega soil forms). They also include smaller areas of deep, very sandy soils and an area with a high proportion of rock outcrop. The major limitation to agriculture is the limited climatic moisture availability. The low water holding capacity and limited depth of the soils are further limitations. As a result, the site is predominantly unsuitable for cultivation and agricultural land use is limited to grazing. The land capability is classified as predominantly Class 7 - non-arable, low potential grazing land. The site has a low grazing capacity predominantly of 31-40 hectares per large stock unit. Cultivated table grapes along the south eastern boundary of the site is considered an area of high agricultural sensitivity. Any infrastructure on the ground must avoid this area, although the overhead power lines can cross it without impact. There are three factors that limit the significance of all potential agricultural impacts. The first is that the actual footprint of disturbance of the proposed powerline is very small in relation to available, surrounding land. The second is that the impact of a powerline on the kind of agricultural activity (predominantly grazing) along the proposed development is very minimal. The third factor is that the site has very low agricultural potential, limited by severe climatic moisture availability constraints and soils that include shallow ones. Four potential negative impacts of the development on agricultural resources and productivity were identified as: ▪ Loss of agricultural land use caused by direct occupation of land by the footprint of the powerline infrastructure. ▪ Soil Erosion caused by alteration of the surface characteristics. ▪ Loss of topsoil in disturbed areas, causing a decline in soil fertility. ▪ Degradation of veld vegetation beyond the direct footprint due to constructional disturbance, dust and vehicle trampling.

	All impacts were assessed as having low significance. Recommended mitigation measures include implementation of an effective system of storm water run-off control to mitigate erosion; and topsoil stripping and re-spreading to mitigate loss of topsoil. Because of the low agricultural potential of the site and resultant low agricultural impacts, the development should, from an agricultural impact perspective, be authorised. Because of the low impacts and the uniformly low potential of the site, there is no preference between the three corridor alternatives.
Heritage and Palaeontology	Heritage Findings: An archival and historical desktop study was undertaken which was used to compile a historical layering of the study area within its regional context. This component indicated that the landscape within which the project area is located has a rich and diverse history. The desktop assessment identified numerous heritage studies conducted within the assessment area, however none of the heritage resources identified outside of the original SolarReserve Rooipunt Solar Thermal Power Park Project study area is of high heritage significance and no further mitigation will be required on these. The mitigation measures as identified for the heritage resources inside the SolarReserve Rooipunt CSP Project study area are still valid and must be applied as per the EMPr for the development. These desktop studies were followed by a fieldwork component that comprised driving and walking through the study area. Only one heritage resource (DYK001) of significance was identified in the assessment area (Alternative Corridors 2 and 3). Mitigation is as follows: ▪ Mitigation would be required if the development came closer than 50 m to the abandoned mine. ▪ In this case the heritage resource should be photographed and drawn to record the details of its construction before destruction. ▪ The documentation should be archived on SAHRIS and with the MacGregor Museum, Kimberley. Palaeontological Findings: Should outcrop areas of potentially fossiliferous ancient Orange River alluvial gravels be identified (e.g. during geotechnical investigations) within the development footprint, however, these should be assessed by a professional palaeontologist before construction commences. The purposes of the field assessment study would be (a) to identify the rock units actually present, (b) to carry out judicious sampling of any fossil heritage currently exposed, together with pertinent geological and palaeontological data, (c) to determine the likely impact of the proposed

		development on local fossil heritage based on the new field-based information, and finally (d) to make recommendations for any no-go areas, buffer zones or further palaeontological mitigation deemed necessary for this project (e.g. comprehensive pre-construction sampling of near-surface surface fossil material, palaeontological monitoring of excavations). Note that further mitigation may be most useful during the construction phase of the development while fresh, potentially fossiliferous bedrock is still exposed. Overall Impact Statement: The overall impact evaluation has shown that the pre-mitigation impact on heritage resources is rated as High negative. However, with the implementation of the recommended mitigation measures, this will reduce the potential impact to a low negative impact. There is no preference between all three alternative corridors provided for assessment.
Visual		The Visual Impact Assessment (VIA) conducted for the proposed 132kV power line and associated infrastructure has demonstrated that majority of the study area has a natural visual character, typical of a rural environment. It should be noted that the southern, south-eastern and eastern parts of the study area found along the N14 are characterised by a more visually degraded landscape, which is mostly attributed to the presence of large-scale commercial cultivation as well as informal/semi-formal settlements and residential areas/communities. Certain parts of the study area in this area are however still largely characterised by a pastoral environmental where commercial cultivation prevails and will be less visually degraded than the peri-urban developed areas found along the N14. The visual character in these areas is thus typical of a rural or pastoral environment. The study area forms part of the Kokerboom Food & Wine Route and is therefore valued or utilised for its natural scenic or tourism potential. Despite this, relatively few tourism, historical or culturally significant sensitive receptors were identified during the fieldwork. A desktop investigation revealed that several farmsteads are also present within the study area which may perceive the proposed power line and associated infrastructure to be an unwelcome intrusion, depending on the perception of the viewer The assessment revealed that a negligible or low visual impact would typically be experienced from most areas beyond 1km of the proposed development and within 1km of the proposed development a moderate visual impact would typically be experienced. The impact assessment revealed that the significance of the visual impacts resulting from the proposed power line and associated infrastructure would be low during the construction phase and medium during the operational phase. These potential impacts can be mitigated to acceptable levels provided the recommended mitigation measures

	are implemented. Based on the alternatives comparative assessment, Corridor Option 1 (Blue) is considered to be the preferred alignment for the proposed power line while Corridor Option 2 (Purple) and Corridor Option 3 (Green) are considered to be favourable alignments.
Socio-economic	The review of the relevant policy documents concluded that there is no conflict between the establishment of the proposed project and spatial plans of the province or local municipalities. On the contrary, the project will contribute to the national objective of diversifying electricity-generating capacity through the development of renewable sources of energy, including concentrated solar energy. The Northern Cape sees the promotion of renewable energy projects as a means to unlock the economic potential of the province, and the municipalities concerned have identified solar energy projects among the driving forces of their respective economies. This is further highlighted in the baseline analysis, which shed light on the notable growth of contribution of the utilities and construction sectors towards the economic development and job creation in both municipalities in the past few years. The impact analysis stresses some positive impacts that could be derived during the construction phase of the project. These include positive impacts on the economy, employment and household incomes. The proposed development will also have a positive impact on the reduction of electricity transmission losses through the connection of the SolarReserve Rooipunt Solar Thermal Power Park Project to the grid and subsequently, dispersing electricity generation capacitates throughout the country. While the affected and interested parties that were interviewed have not expressed major concerns nor objection to the project, it is important that these parties be properly consulted before choosing the power line route in order to not affect any commercial farming activities or future industrial projects happening on those properties. Overall, all of the Corridor Alternatives received the same average scores for positive impacts for both before and after mitigations measures. Corridor Alternative 1 however received a slightly lower average score for negative impacts for both before and after mitigations. Corridor Alternative 1 appears to be slightly more preferred from a socio-economic perspective than the other two alternatives.

No-go alternative (compulsory)

The “no-go” alternative assumes that the proposed activity does not go-ahead, implying a continuation of the current situation or the status quo. The “no-go” or “no-action” alternative is regarded as a type of alternative that provides the means to compare the impacts of project alternatives with the scenario of

a project not going ahead. In evaluating the "no-go" alternative it is important to take into account the implications of foregoing the benefits of the proposed project.

In the case of this project, the no-go alternative would result in no power line and associated infrastructure being constructed, and it would therefore not be possible to export the electricity generated at the SolarReserve Rooipunt Solar Thermal Power Park Project to the national grid. South Africa is under immense pressure to provide electricity generating capacity in order to reduce the current electricity demand in the country. With the global focus on climate change, the government is under severe pressure to explore alternative energy sources in addition to coal-fired power stations. Although solar power is not the only solution to solving the energy crisis in South Africa, it is the best solution for the study area in question and not establishing the proposed power line for the operation of the SolarReserve Rooipunt Solar Thermal Power Park Project would be detrimental to the mandate that the government has set to promote the implementation of renewable energy.

Although the potential impacts identified (such as visual impacts) would not occur if the project did not go ahead, it must be noted that the socio economic benefit of the proposed project should equally not be overlooked. The No-Go alternative has thus been eliminated due to the fact that the identified environmental impacts can be suitably mitigated and that by not building the project, the socio-economic benefits would be lost.

Preferred Power Line Alternative Corridor Summary

	Preferred Rooipunt Powerline Corridor Alternative		
Environmental Aspect	**Corridor Option 1 (Preferred)**	**Corridor Option 2**	**Corridor Option 3**
Biodiversity	Preferred	No preference	No preference
Avi-fauna	No preference	Not preferred	No preference
Wetlands	Preferred	Favourable	Favourable
Agricultural Potential and Soils	No preference	No preference	No preference
Heritage and Palaeontology	No preference	No preference	No preference
Socio-economic	Preferred	Favourable	Favourable
Visual	Preferred	Favourable	Favourable

As per the summary of the preferred power line corridors shown above, the following reasons substantiate the final selection of the following preferred alternative (**Figure 7**):

Corridor Option 1 (Preferred)

There is not much difference in terms of preference with regards to soils and agricultural potential as well as heritage and palaeontology. However, there are similarities in the selection of preferred alternatives (Corridor Alternative 1) with regards to biodiversity, wetlands, socio-economic and visual studies. All of the aforementioned studies do however note little difference in preference for the remaining corridor alternatives. However, avi-fauna identifies an alternative as not preferred, that being Corridor Alternative 2. As such, the selection of Corridor Alternative 1 as the preferred option was made taking into account the following:

- Less sensitive habitat to be physically affected;
- Lower risk of avi-fauna collision mortality;
- Least number of watercourses (ephemeral and episodic drainage systems) to be affected and will only traverse one river system (Helbrandleegte River);
- Only one heritage resources of high significance was identified along the proposed corridor. The width of the corridor makes it possible to design the final alignment to avoid the identified heritage resource.
- More direct and shorter route and thus less physical impact (reduced footprint);
- Reduced potential negative socio-economic impacts;
- Farthest from closest visual sensitive receptor location (Bezalel Wine and Brandy Estate); and
- More economically viable being the shorter more direct route.

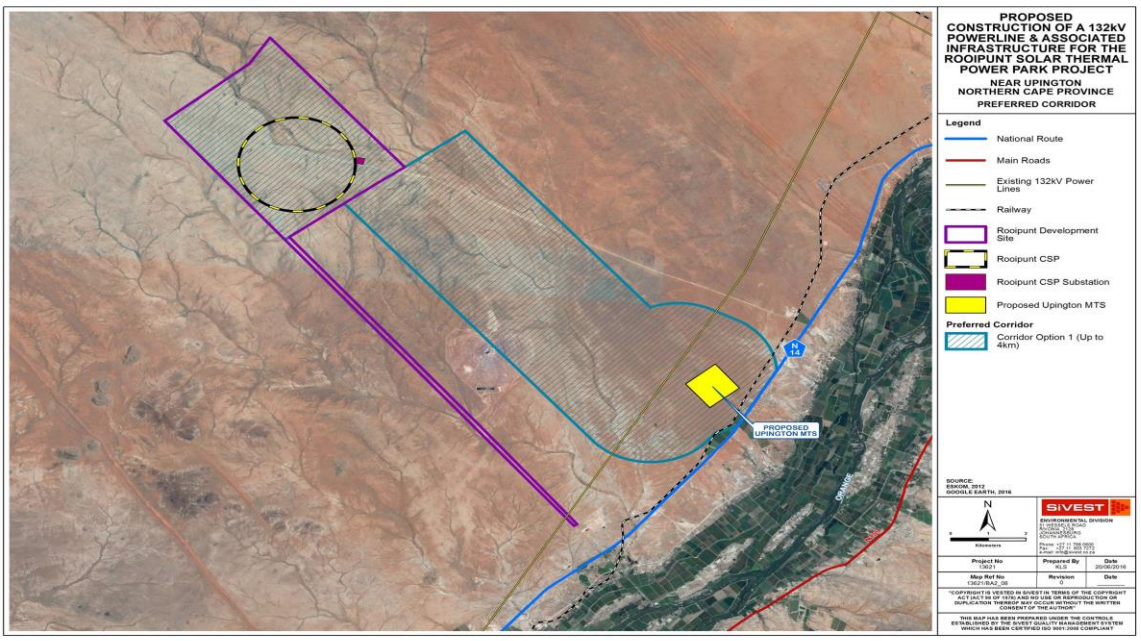

Figure 7. Preferred Powerline Corridor – Alternative Corridor 1

SECTION E: RECOMMENDATION OF PRACTITIONER

Is the information contained in this report and the documentation attached hereto sufficient to make a decision in respect of the activity applied for (in the view of the environmental assessment practitioner)?	**YES√**	

If "NO", indicate the aspects that should be assessed further as part of a Scoping and EIA process before a decision can be made (list the aspects that require further assessment).

If "YES", please list any recommended conditions, including mitigation measures that should be considered for inclusion in any authorisation that may be granted by the competent authority in respect of the application.

Recommendations of the Biodiversity Specialist

- Preconstruction walk-through of powerline route to identify and locate species of conservation concern that should be avoided or translocated.
- Affected individuals of protected species which cannot be avoided should be translocated to a safe area on the site prior to construction as far as practically possible.
- There are also additional species present which are either protected under the National Forests Act such as *Boscia albitrunca* and *Acacia erioloba* or protected under the Northern Cape Nature Conservation Act of 2009, which includes *Boscia foetida*, all *Mesembryanthemaceae*, all species within the *Euphorbiaceae*, *Oxalidaceae*, *Iridaceae*, all species within the genera *Nemesia* and *Jamesbrittenia*.
- Relevant permits (i.e. plant removal permit from NCPG DENC) should be obtained before translocation/destruction/removal of listed and protected plant or tree species takes place and before construction commences.
- Where the power line runs adjacent to existing power lines or access roads, the existing roads should be used and no additional permanent roads should be constructed for the power line.

Recommendations of the Avi-faunal Specialist

- Construction and de-commissioning activities should be restricted to the immediate footprint of the infrastructure.
- Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of Red Data species.
- Measures to control noise and dust should be applied according to current best practice in the industry.
- Maximum used should be made of existing access roads and the construction of new roads should be kept to a minimum.
- The 132kV grid connection should be inspected at least once a quarter for a minimum of three years by the avifaunal specialist to establish if there is any significant collision mortality. Thereafter the frequency of inspections will be informed by the results of the first three years.
- The detailed protocol to be followed for the inspections will be compiled by the avifaunal specialist prior to the first inspection.
- The line should be marked with Bird Flight Diverters (BFDs) for its entire length on the earth wire of the line, 5m apart, alternating black and white.

- All the steel monopoles should be fitted with bird perches.

Recommendations of the Wetlands Specialist

- Ensuring that during the design phase, cognisance is taken of the locality of identified riparian resources and their associated buffers, and as far as is practicable, to avoid the placement of infrastructure within those zones unnecessarily, and ensuring that the method of installation is as low impact as possible should crossings be absolutely unavoidable;
- Planning of temporary roads and access routes should avoid natural areas and be restricted to existing roads where possible. If it is not possible to avoid crossing the rivers and/or drainage lines, it must be ensured that the construction of such access roads are carried out in a responsible manner, i.e. by implementing mitigations to manage erosion, prevent impeding the flow of water along the system, and prevent sedimentation of the system as a result of the construction of such access roads;
- Should it be absolutely essential at certain crossings to place infrastructure within the riparian habitat, access to such riparian zones must be limited to essential personnel (and construction vehicles) and the boundaries thereof are to be clearly demarcated on site. No contract laydown areas are to be permitted within the riparian habitat or associated buffer zone;
- Due to the natural susceptibility of the soils in the area to erosion, care must be taken to ensure that as little vegetation as possible is removed, and that all exposed soils as a consequence of construction activities must be suitably protected with a geotextile to prevent erosion and sedimentation of riparian resources; and
- Any riparian habitat directly impacted upon during construction activities must be immediately rehabilitated in accordance with the EMPr following the completion of such activities at that specific site.

Recommendations of the Soils and Agriculture Specialist

- Recommended mitigation measures include implementation of an effective system of storm water run-off control to mitigate erosion; and topsoil stripping and re-spreading to mitigate loss of topsoil.

Recommendations of the Heritage and Palaeontology Specialist

Heritage recommendations

- Mitigation would be required if the development came closer than 50 m to the abandoned mine.
- In this case the heritage resource should be photographed and drawn to record the details of its construction before destruction.
- The documentation should be archived on SAHRIS and with the MacGregor Museum, Kimberley.
- The mitigation measures as identified for the heritage resources inside the SolarReserve Rooipunt CSP Project area are still valid and must be applied as per the EMPr for the development.

Palaeontology recommendations

- Should outcrop areas of potentially fossiliferous ancient Orange River alluvial gravels be identified (e.g. during geotechnical investigations) within the development footprint, these should be assessed by a professional palaeontologist before construction commences. The purposes of the field assessment study would be:

(a) to identify the rock units actually present,
(b) to carry out judicious sampling of any fossil heritage currently exposed, together with pertinent geological and palaeontological data,
(c) to determine the likely impact of the proposed development on local fossil heritage based on the new field-based information, and finally
(d) to make recommendations for any no-go areas, buffer zones or further palaeontological mitigation deemed necessary for this project (e.g. comprehensive pre-construction sampling of near-surface surface fossil material, palaeontological monitoring of excavations).

- The ECO responsible for the development should be aware of the possibility of important fossils being present or unearthed on site and should monitor all substantial excavations into fresh (i.e. unweathered) sedimentary bedrock for fossil remains;
- In the case of any significant fossil finds (e.g. vertebrate teeth, bones, burrows, petrified wood, calcretised termitaria) during construction, these should be safeguarded - preferably in situ - and reported by the ECO as soon as possible to the relevant heritage management authority (South African Heritage Resources Agency. Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Phone: +27 (0)21 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that any appropriate mitigation by a palaeontological specialist can be considered and implemented, at the developer's expense;
- The palaeontologist concerned with mitigation work will need a valid collection permit from SAHRA. All work would have to conform to international best practice for palaeontological fieldwork and the study (e.g. data recording fossil collection and curation, final report) should adhere to the minimum standards for Phase 2 palaeontological studies recently published by SAHRA.

Recommendations of the Visual Specialist

- Recommended mitigation measures to be implemented.

Recommendations of the Socio-Economic Specialist

- The potentially directly affected and interested parties interviewed have not expressed objections to the project. However, it is important that these parties be properly consulted before choosing the final powerline route and servitudes before construction commences in order to not affect any commercial farming activities or future industrial projects happening on those properties.
- This will be undertaken by SolarReserve as part of the commnercial and contractual process when obtaining servitudes from the affected landowners.

General Recommendations of the EAP

- All mitigation measures recommended by the various specialist should be strictly implemented.
- Final EMPr should be approved by DEA prior to construction.

Is an EMPr attached? **YES√**

The EMPr must be attached as Appendix G.

The details of the EAP who compiled the BAR and the expertise of the EAP to perform the Basic Assessment process must be included as Appendix H.

If any specialist reports were used during the compilation of this BAR, please attach the declaration of interest for each specialist in Appendix I.

Any other information relevant to this application and not previously included must be attached in Appendix J.

The EMPr is included in Appendix G.
Details of the EAP who compiled the BAR are included in Appendix H.
The declaration of interest for each specialist is included in Appendix I.
Any other information relevant to this application and not previously include is in Appendix J. This includes the following:

- Competent Authority Consultation (Appendix J1)
- A3 Maps (Appendix J2)
- Co-ordinate Spreadsheet (Appendix J3)
- EMF Report (Appendix J4)
- Property Descriptions (Appendix J5)
- Peer Review Letters (Appendix J6)
- Eskom Cost Estimate Letter (Appendix J7)

_____

NAME OF EAP

_____ _____

SIGNATURE OF EAP DATE

SECTION F: APPENDICES

The following appendices must be attached:

Appendix A: Maps

Appendix B: Photographs

Appendix C: Facility illustration(s)

Appendix D: Specialist reports (including terms of reference)

Appendix E: Public Participation

Appendix F: Impact Assessment

Appendix G: Environmental Management Programme (EMPr)

Appendix H: Details of EAP and expertise

Appendix I: Specialist's declaration of interest

Appendix J: Additional Information