APPENDIX F: IMPACT ASSESSMENT ON AUGRABIES SOLAR PV:

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INTRODUCTION

This section repeats certain key figures from the main Basic Assessment Report for ease of reference.

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

Approach to impact assessment in the specialist studies

The level of detail and methodology of assessment for each of the specialist studies was defined in accordance with the sensitivity of each issue on the site.

- *The Agricultural potential specialist study was undertaken as a desktop study based on soil mapping, aerial photography and site photographs. It included full impact assessment ratings.*
- *The Botanical specialist study included a site visit and full impact assessment ratings.*
- *The Ecological specialist study was a desktop study, making use of information provided by the Botanical specialist study site visit, aerial photography and site photographs to determine habitat type, which were then correlated with species known to be in the area. It included full impact assessment ratings.*
- *The Environmental Management Plan was based on a site visit and the information and recommendations provided by all other specialist studies.*
- *The Freshwater ecology study was a desktop study based on a review of the information provided in the Botanical and Ecological specialist studies to provide clarification on specific aquatic issues raised in these two studies. It did not include a site visit or impact ratings, but was supplementary to these two previous studies.*
- *The Heritage specialist study included a site visit and full impact ratings.*
- *The Paleontological (fossil) specialist study was a desktop study based on geological information on the area motivating for exemption from the need to do a full Paleontological impact assessment.*

The Visual specialist study was the most in-depth specialist study, given the location of the site within the viewshed protection area of the Augrabies National Park. It included a site visit and three dimensional computer modelling which generated videos showing the expected visual impacts from all locations on the roads in and outside the park in the vicinity of the site. The level of detail of this study went far beyond what is normally undertaken not only for a Basic Assessment report but also for a full Environmental Impact Assessment. The Visual Impact Assessment (VIA) was conducted in accordance with the Western Cape Department of Environmental Affairs and Development Planning Guidelines, which are the highest VIA quality standard guidelines in the South Africa. Accordingly, the rating system used included many more categories of rating than that used in the standard

NEMA rating table requirements. The Visual specialist maintains that to try to simplify the Visual Impact ratings to the regular NEMA rating categories would be unscientific.

Because of the different levels of detail and impact evaluation method used in each of the above study, the impact rating is not uniform. The Paleontological study and Freshwater ecology study do not have impact rating tables since the first is an exemption recommendation and the second a review. The Botanical, Ecological and Heritage studies made use of the NEMA regulations impact rating categories, while the Visual Impact Assessment made use of a number of additional impact rating categories.

It is possible that the applicant may decide to build a Photovoltaic plant smaller than the proposed 10 Mega Watt / 20 hectare plant. This would then have a smaller footprint and thus a lower impact than those stated below. The power line specification and thus impacts would however be the same.

Impacts that may result from the planning and design phase.

Alternative (preferred alternative)

Unrealistic employment expectations:

Description of impact: *Environmental Impact processes in rural areas can create unrealistic expectations of benefits such as the scale of employment opportunities and trade and the mis-perception that the environmental process was an opportunity for employment.*

Significance: *Medium*

Mitigation: *Care was taken during the public participation process to try to keep such expectations realistic, which included clarification in all public notices and correspondence, at the public meetings, and in numerous telephone conversations and SMS communications. Local political representatives were also asked to assist in dampening expectations.*

Nevertheless, despite all efforts dampen expectations, unrealistic perceptions and rumours of opportunities at the proposed PV project did spread in the Augrabies area and resulted in employment and trade enquiries which persisted for months afterward from the entire geographic region in which the process was advertised. This response nevertheless provided useful information to the impact assessment process on the employment needs in the area outside of grape harvest season and the desire to use local suppliers and labour where possible.

Significance after mitigation: *Low*

Impacts that may result from the construction phase

Construction Phase - Visual impacts

Given the location of the proposed PV facility within 2 kilometres of the Augrabies National Park, and within the defined Viewshed Protection Area of the National Park, visual impacts were given priority both in depth of evaluation and in weighting of impacts, in decision

making, in the recording of impacts in this Basic Assessment Report and in mitigation recommendations.

The findings of the Visual Impact Assessment are described in five different ways: firstly, by viewshed maps; secondly by description in words; thirdly, by rating tables (using those defined by the Western Cape Guidelines (see **Approach to impact assessment in the specialist studies***, p3); fourthly by a set of three dimensional computer generated videos showing the maximum possible visual impact of the proposed development from every point on the adjacent roads; fifthly by some still images generated in the same manner. Each of these assessment and representation methods needs to be interpreted correctly. This summary attempts to present the findings of the Visual Impact Assessment in simplified, less technical vocabulary. The figures in this section are taken from the Visual Impact Report (see Appendix E-7).*

Figure 1: Example of a PV plant in a relatively arid landscape

(20 MW Beneixama PV Plant, Spain: Source: http://technology4life.wordpress.com)

The above image shows a PV array in a relatively arid landscape, although the photograph shows an array approximately double the size of the 10 MW plant proposed at Augrabies. This, however, is an aerial photograph and given the relatively flat landscape in the vicinity of the site, the only views of the facility will be from the side (edge-on) and not from above. This edge-on view will be broken up by scattered bush and from a distance of many kilometres will feature as a line on the horizon.

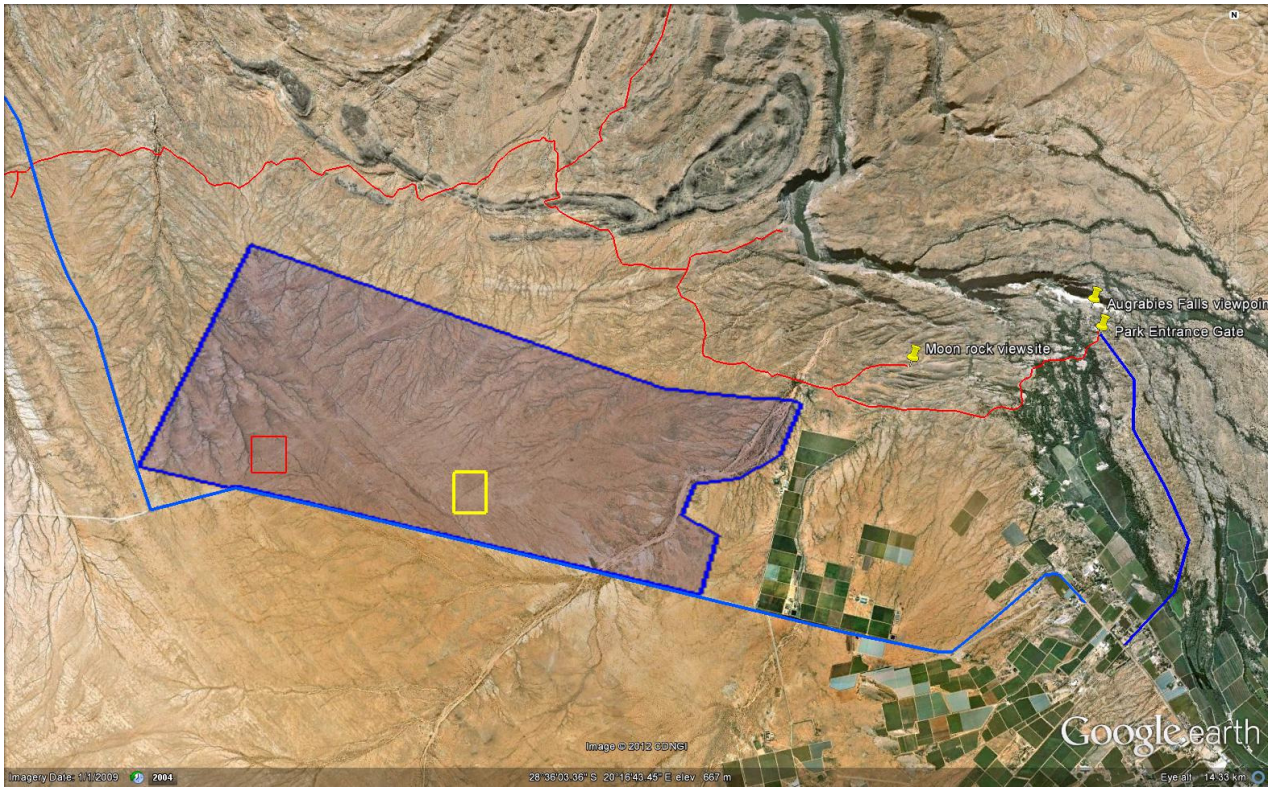

Figure 2: Key sensitive view sites in the Augrabies National Park

*The viewshed of the proposed development for Site 1 (before mitigation) (*Figure 3*, p7) constitutes what is called an 'indeterminate viewshed', meaning that the development may be visible from many points scattered across the landscape but there are also many points scattered across the same landscape from which the development will not be visible. In such locations, the vegetation and minor variation of the terrain will obscure the proposed development. Nothing however would be visible from outside of the viewshed (pink area). Other viewsheds were generated for each corner of the proposed development, but this is the most visible corner. The most visually sensitive areas of the park are to the north-east, far outside of the area where the proposed development may even possibly be visible.*

As can be seen by comparing the Figure 2*, p6 showing the key sensitive viewsites of the Augrabies Falls entrance, rest camp and viewsite and the Moon Rock viewsite with the viewshed of the preferred site 1* Figure 3*, p7 – the site is nowhere near visible from these locations. The site 1 would be visible from the R359 road, from the north-south road through the park.*

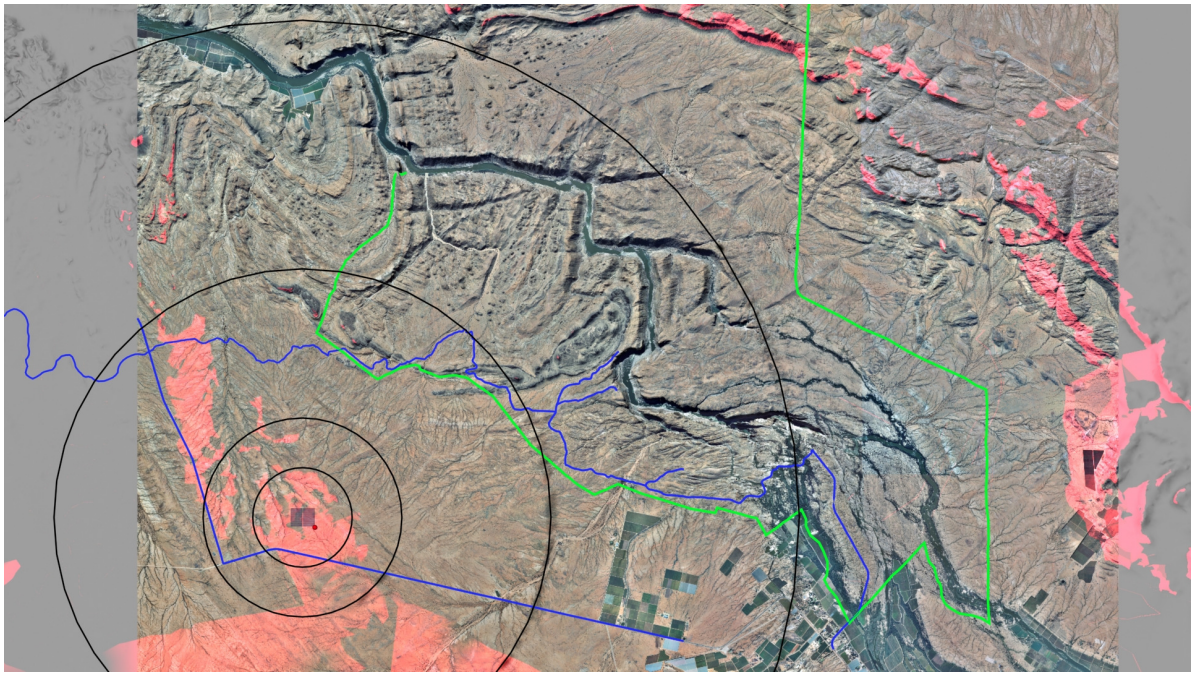

Figure 3: Viewshed of South-West corner of proposed development (Site 1 without mitigation) (from VIA)

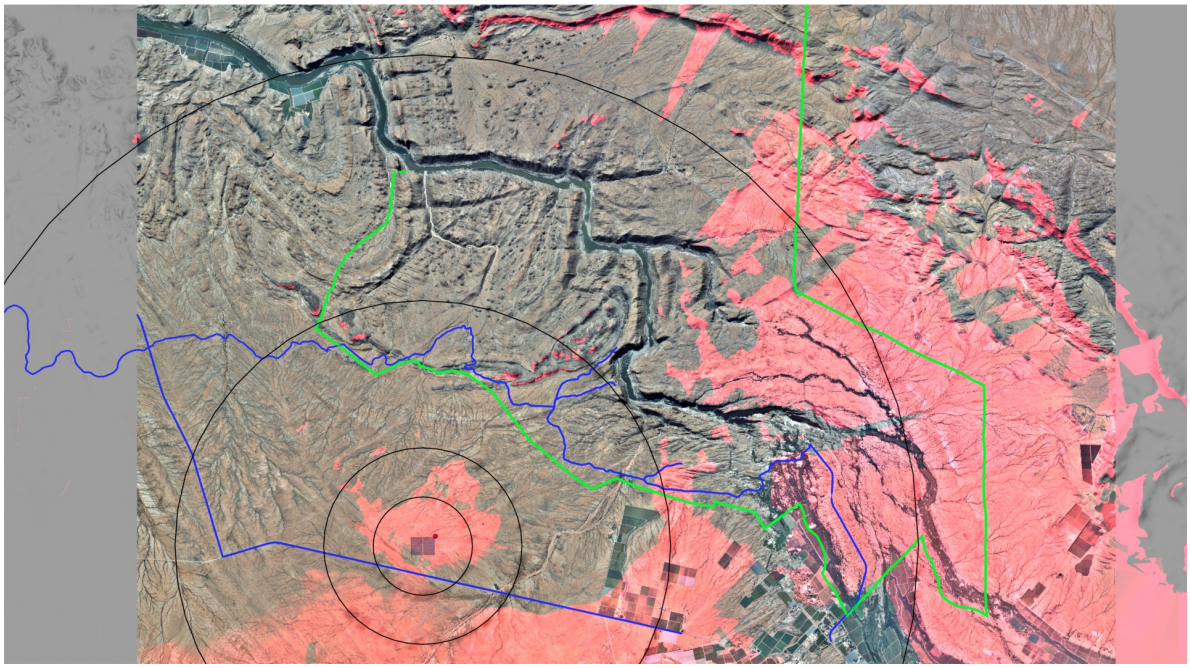

Figure 4: Viewshed of North-East Corner of Site 2 (from VIA)

The Visual Impact Assessment (VIA) states "It will be noted that the area of the viewshed is far less extensive for site 1 when compared with site 2, and the use of site 1 will have far less impact on the park. This includes not being visible from the Moon Rock lookout point and other main view sites including the falls.

The extent of the visual impact has been assessed at sub-regional as no significant views are expected beyond 10km from the site.

The visual influence on the following areas was analysed:

- *The visitor's facilities in the park and surrounding areas. Site 1 will not be visible from these areas but site 2 is potentially visible from some elevated areas close to the visitor's facilities however, the local vegetation should block most of these views.*
- *Site 1 is not visible from either the Moon Rock viewpoint or the viewpoint adjacent to the Ararat Road but the facility on Site 2 will be visible at a distance of 4.4km and further from these viewpoints.*
- *Site 1 will only be visible from a limited stretch of road in the west of the park close to where it crosses the R359 but will not be visible from all the roads close to the park's visitor's facilities.*
- *Both of the sites will be partially visible from some of the elevated viewpoints on the farms to the south and west of the site but these views are not expected to be significant.*
- *Site 2 may be visible from some of the more elevated areas in the Augrabies agricultural areas but site 1 will not be visible from these areas.*
- *Views of both sites will be possible from some of the ridgelines to the north of the Orange River but these views are not expected to be significant as they are 10km and further from the sites.*

The visual absorption capacity of the landscape for this type of development is relatively low and the contrast in land use between the farming and conservation activities and the industrial nature of the solar facility results in its compatibility with the surrounding landscape also being low.

The relatively low nature of the solar facility, the fact that from most significant viewpoints, other than the R359, the facility will only be visible edge on, and the distance between these viewpoints and the facility mean that the intensity of the visual impact will not rise above medium, and for most viewpoints it will be low.

The duration of the visual impact will be long-term; however, the visual impacts should be entirely reversible in the future.

Visitors to the park will have a high sensitivity to the visual environment which raises the significance of the visual impact.

The overall significance of the visual impact for the operational phase has been assessed at being medium for site 1 without mitigation and medium-low with mitigation. For site 2 this assessment rises to medium-high without mitigation and medium with mitigation.
The complexity of the visual environment, especially in southerly views from the park, makes it less likely that viewer will react entirely negatively when viewing the facility as there are other significant man-made visual elements within the vista including the covered vines which are of a similar height to the solar panels.

The limited views, especially of site 1 which does not affect any of the major viewpoints in the park, could be seen by many of the visitors as a positive step towards creating a more ecologically sound environment.

The visual study considered the small possibility that for limited periods of time a flash of reflected sunlight may be experienced from certain vantage points. Should the facility be constructed on site 1 this possibility will be eliminated from all the areas of the park that are commonly accessed by the visitors as this can only occur within the viewshed. The implementation of the single axis tracking form of solar panels, as opposed to fixed panels, will ensure that this does not occur at all. Even with fixed panels, glare would not affect any Park viewsite or road, but only the road between Blouputs substation and the Orange River just after sunrise at some times of year (See 'Appendix D-7: Supplementary Information: The potential for reflective flashes from the PV installation in the Augrabies Falls National Park).

The primary mitigation measure in terms of visual issues is the use of site 1 which will influence a smaller area than site 2, avoid any visual impact on the more frequented areas of the park, and require a shorter length of transmission line to the Blouputs Substation.
It is important that visual issues be central in all thinking concerning the facility, from design and construction to operation and decommissioning. Specific impacts that are identified at any stage should be sensitively dealt with in order to ensure the visual integrity of the environment. It is important therefore that management takes any visual issues seriously throughout the life of the project.

The use of tree lines to shield the facility from view is not indicated as these would incur a higher visual impact than the facility itself and their long-term maintenance could be problematic, however, the use of groups of indigenous thorn trees placed strategically in the surrounding landscape to mitigate specific visual impacts that are identified once the facility is constructed could be of some value.

Although the sense of place would be affected by the inclusion of an 'industrial' element within the local environment, the change, except for along the R359, would only affect a limited number of viewpoints and is therefore considered within acceptable limits."

Impact rating tables

The following set of impact tables and statements is shortened from the Visual Impact report. Please refer to Appendix D-7 for more detailed explanation of the meaning of the tables. This section includes the rating of the Construction as well as the Operational phases.

Table 1: Visual- Extent of Impact

	Construction	**Operational**	**Night***
No Development Alternative	-	-	-
Development Alternatives	sub-regional	sub-regional	sub-regional

Table 2: Zones of Visual Influence – The R359

Alternative	**Distance**	**Mitigation**	**Construction**	**Operational**	**Night**
No development	-	-	-	No visual	-

Alternative	Distance	Mitigation	Construction	Operational	Night
Alternative				influence	
Site 1	±300m	Without mitigation	Low to High*	Low to high	High
		With mitigation	Low to High	Low to Medium	Low
Site 2	±500m	Without mitigation	Low to High	Low to high	High
		With mitigation	Low to High	Low to Medium	Low

Table 3: Zones of Visual Influence – Visitor facilities in the park and surrounding areas

Alternative	Distance	Mitigation	Construction	Operational	Night
No development Alternative	±6km and further	-	-	No visual influence	-
Site 1		Without mitigation	Not visible	Not visible	Low
		With mitigation	Not visible	Not visible	Not visible
Site 2		Without mitigation	Low	Low	Low
		With mitigation	Low	Low	Not visible

Table 4: Zones of Visual Influence – The View sites within the park (Moon Rock and adjacent to Ararat)

Alternative	Distance	Mitigation	Construction	Operational	Night
No development Alternative	±4.4km and further	-	-	No visual influence	-
Site 1		Without mitigation	Not visible	Not visible	Low
		With mitigation	Not visible	Not visible	Not visible
Site 2		Without mitigation	Low	Low	Medium
		With mitigation	Low	Low	Low

Table 5: Zones of Visual Influence – Roads within the park

Alternative	Distance	Mitigation	Construction	Operational	Night
No development Alternative	±5km and further	-	-	No visual influence	-
Site 1		Without mitigation	Low	Low	Medium
		With mitigation	Low	Low	Low
Site 2		Without mitigation	Low	Low	Medium
		With mitigation	Low	Low	Low

Table 6: Zones of Visual Influence – Areas to the south and west of the site

Alternative	Distance	Mitigation	Construction	Operational	Night
No development Alternative	±500m and	-	-	No visual influence	-

Alternative	Distance	Mitigation	Construction	Operational	Night
Site 1	further	Without mitigation	Low	Low	Medium
		With mitigation	Low	Low	Low
Site 2		Without mitigation	Low	Low	Medium
		With mitigation	Low	Low	Low

Table 7: Zones of Visual Influence – Augrabies agricultural areas

Alternative	Distance	Mitigation	Construction	Operational	Night
No development Alternative	±4km and further	-	-	No visual influence	-
Site 1		Without mitigation	Not visible	Not visible	Not visible
		With mitigation	Not visible	Not visible	Not visible
Site 2		Without mitigation	Low	Low	Medium
		With mitigation	Low	Low	Low

Table 8: Zones of Visual Influence – Other areas

Alternative	Distance	Mitigation	Construction	Operational	Night
No development Alternative	±10km and further	-	-	No visual influence	-
Site 1		Without mitigation	Low	Low	Low
		With mitigation	Low	Low	Low
Site 2		Without mitigation	Low	Low	Low
		With mitigation	Low	Low	Low

Table 9: Visual Absorption Capacity

Alternative	Mitigation	Construction	Operational	Night
No development Alternative	-	-	High	-
Site 1	Without mitigation	Low	Low	Low
	With mitigation	Low	Medium-low	Low
Site 2	Without mitigation	Low	Low	Low
	With mitigation	Low	Low	Low

Table 10: Compatibility with the Surrounding Landscape

Alternative	Mitigation	Construction	Operational	Night
No Development Alternative	-	-	High	-
Development alternatives	Without mitigation	Low	Low	Low
	With mitigation	Low	Medium	High

Table 11: Intensity of Visual Impact – The R359

Alternative	Distance	Mitigation	Construction	Operational	Night
No development Alternative	-	-	-	No visual influence	-
Site 1	±300m	Without mitigation	Low to High*	Low to high	High
		With mitigation	Low to High	Low to Medium	Low
Site 2	±500m	Without mitigation	Low to High	Low to high	High
		With mitigation	Low to High	Low to Medium	Low

Table 12: Intensity of Visual Impact – Visitor facilities in the park and surrounding areas

Alternative	Distance	Mitigation	Construction	Operational	Night
No development Alternative	±6km and further	-	-	No visual influence	-
Site 1		Without mitigation	Not visible	Not visible	Low
		With mitigation	Not visible	Not visible	Not visible
Site 2		Without mitigation	Low	Low	Low
		With mitigation	Low	Low	Not visible

Table 13: Intensity of Visual Impact – The View sites within the park (Moon Rock and adjacent to Ararat)

Alternative	Distance	Mitigation	Construction	Operational	Night
No development Alternative	±4.4km and further	-	-	No visual influence	-
Site 1		Without mitigation	Not visible	Not visible	Low
		With mitigation	Not visible	Not visible	Not visible
Site 2		Without mitigation	Medium	Medium	Medium
		With mitigation	Low	Low	Low

Table 14: Intensity of Visual Impact – Roads within the park

Alternative	Distance	Mitigation	Construction	Operational	Night
No development Alternative	±5km and further	-	-	No visual influence	-
Site 1		Without mitigation	Medium	Medium	High
		With mitigation	Medium	Medium-low	Low
Site 2		Without mitigation	Medium	Medium	High
		With mitigation	Medium	Medium-low	Low

Table 15: Intensity of Visual Impact – Areas to the south and west of the site

Alternative	Distance	Mitigation	Construction	Operational	Night

Alternative	Distance	Mitigation	Construction	Operational	Night
No development Alternative	±500m and further	-	-	No visual influence	-
Site 1		Without mitigation	Low	Low	Medium
		With mitigation	Low	Low	Low
Site 2		Without mitigation	Low	Low	Medium
		With mitigation	Low	Low	Low

Table 16: Intensity of Visual Impact – Augrabies agricultural areas

Alternative	Distance	Mitigation	Construction	Operational	Night
No development Alternative	±4km and further	-	-	No visual influence	-
Site 1		Without mitigation	Not visible	Not visible	Not visible
		With mitigation	Not visible	Not visible	Not visible
Site 2		Without mitigation	Low	Low	Medium
		With mitigation	Low	Low	Low

Table 17: Intensity of Visual Impact – Other areas

Alternative	Distance	Mitigation	Construction	Operational	Night
No development Alternative	±10km and further	-	-	No visual influence	-
Site 1		Without mitigation	Low	Low	Low
		With mitigation	Low	Low	Low
Site 2		Without mitigation	Low	Low	Low
		With mitigation	Low	Low	Low

Duration

The duration of visual impacts associated with the construction phase will be short-term.

The duration of visual impacts associated with the operational phase will be long-term. It will not be permanent as it will be possible to reverse the visual impact should the facility be decommissioned.

Sensitivity of the viewers

The overall sensitivity of the viewers is assessed as low for the local inhabitants and high for the visitors to the park.

This assessment category, in terms of this particular development, plays an important role in increasing the overall significance of the visual impact.

Overall significance of the Visual Impact

The overall significance of the visual impact during the construction phase is assessed as being high for both alternatives as the unexpected nature of the construction activities will draw the attention of any viewers whereas during the operational phase the facility should eventually become an accepted part of the overall visual environment.

Table 18: Overall Significance of Visual Impact

Alternative	Mitigation	Construction	Operational	Night
No development Alternative	-	-	Low	-
Site 1	Without mitigation	High	Medium	High
	With mitigation	Medium-high	Medium-low	Low
Site 2	Without mitigation	High	Medium-high	High
	With mitigation	Medium-high	Medium	Low

Status of the Visual Impact

The usual reaction to the sight of any new development, especially by those who know an area well, is negative, and that is likely to be the initial reaction to the proposed development by the viewers who use the R359, however, it is believed that, with time, the facility will become part of the accepted landscape and achieve a neutral status for users of the road even though it is unlikely that it will be viewed as visually positive by any of them.

The sites are a long way from the viewpoints within the park and are set in a landscape that, in views towards the south, has evidence of significant human activity, including the power lines, the Blouputs substation and the covered vineyards. Views of the facility will therefore affect the sense of place but not be entirely unexpected. For most visitors to the park the view of the facility should therefore be neutral.

Reversibility

Provided that the basic landform is not altered by large scale earthworks the visual impacts will be entirely reversible and the land can be returned to its original visual status. This is of course dependant on the prevention of any future activities on site that could have long-term negative visual implications.

Probability of the impacts occurring

It is probable that the visual impacts described in this report will occur.

Confidence in the assessment

The confidence in the findings of this report is medium-high provided that the eventual development stays within the parameters described above. Any significant changes to the layout, number of structures, or their architectural character could invalidate the findings of this report." (VIA, 2012)

Cumulative visual impacts

At the time of the specialist studies (March- May 2012), the nearest other known proposed PV project was 40 kilometres away, closer to central Kakamas. This distance would mitigate cumulative effect even if both were constructed since a viewer would be unlikely to be able to see both from the same vantage point.

The Northern Cape Provincial Spatial Development Framework (PSDF)(2012), encourages the use of Solar PV alternative energy in the Northern Cape and in this region specifically. While more fine scale planning still needs to take place, such cumulative impacts need to be considered within the context of this policy.

On cumulative impacts, the VIA states: "The solar facility will represent an incremental increase in the 'industrial' elements in the overall landscape. These are represented at present by the Blouputs substation and the power lines that cross the area.
It is believed that the facility will not seriously affect the sense of place and change the balance in the visual environment in a way that is unacceptable, but the cumulative effect of any increase in the coverage of the facility, or the addition of other such installations in the area could have a seriously detrimental effect and change the sense of place in an unacceptable way.

It is therefore recommended that, should the project be authorized, it be done so on the condition that the facility not be expanded at a later stage."

Nevertheless, after completion of the specialist studies, the project became aware of another Solar PV proposal: See "Changes after completion of Specialist studies", page 30.

Swartrante Viewsite

During the course of the Basic Assessment process, after the completion of the Specialist Studies, the Augrabies National Park developed a new view site at Swartrante, which was raised as an issue during the public comment period. A supplementary Visual Impact Statement was requested on this which is provided in Appendix D-7. The conclusion is that the preferred Site 1 would not be visible from Swartrante view site, while the alternative Site 2 may be partly visible from Swartrante. A joint site visit was also held at Swartrante with the manager of the National Park and it was agreed based on empirical observations of the topography that the proposed Site 1 would not be visible.

Construction Phase – Botanical impacts

The Botanical Impact Assessment found Site alternative 2 to have marginally less impact than Site 1 because of the more common vegetation at Site 2. In terms of mitigation, the botanical specialist recommended avoiding larger drainage lines and not planting screening vegetation that would not naturally grow on site.

The report states:

"Botanical Direct Impact: Loss of vegetation type – Blouputs Karroid Thornveld and Bushmanland Arid Grassland

*The vegetation present at Rooipad 15/9, Blouputs Karroid Thornveld and Bushmanland Arid Grassland is classified as **Least Threatened**. No threatened species are known to occur in the study area and none are expected to be found. The solar array should be limited to the recommended area which avoids the more sensitive seasonal drainage lines. Mitigation is possible to a certain extent by relocating plant species such as Aloe claviflora and by avoiding hard-surfacing of roads.*

The significance of impacts on the flora and vegetation at Rooipad15/9 during the construction and operational phases is given in Table 3. In the case of the 'No Go' alternative not much would change and impacts would be Low Negative. At a local scale, if the proposed footprint in PV1 is used the impact would be Moderate

Negative due to impacts on the drainage lines. With mitigation as outlined and implementation of the 'variation alternative' (see Figure 19) the impact would be Low Negative (as defined in Appendix 1 of the Botanical Specialist Report).

The alternative area (PV2) has been rejected but by way of comparison, potential impacts of the PV facility would be Low Negative without and with mitigation.

Table 19: Botanical Impact: Loss of natural vegetation and habitat during construction and operational phases of the PV facility, roads and power-lines

Actions	Alternative	Impact	Extent	Duration	Intensity	Significance	Status	Probability of occurrence	Confidence
	"No Go"	Loss of natural vegetation	Local	Long-term	Low	Low	-ve	Probable	High
Without mitigation	Alt 1 (20 ha – preferred)	Loss of natural vegetation	Local	Long- term	Moderate	Moderate	-ve	Probable	High
With mitigation	Alt 1 (20 ha - preferred)	Loss of natural vegetation	Local	Long-term	Low	Low	-ve	Probable	High
Without mitigation	Alt 2 (20 ha)	Loss of natural vegetation	Local	Long- term	Low	Low	-ve	Probable	High
With mitigation	Alt 2 (20 ha)	Loss of natural vegetation	Local	Long-term	Low	Low	-ve	Probable	High

Indirect and cumulative impacts

No indirect impacts on the flora and vegetation of the study area were noted. As for cumulative impacts, the author is not aware of any other PV facilities implemented or planned for location within Blouputs Karroid Thornveld. Cumulative impacts on this vegetation type from development of solar energy facilities are therefore considered to be very low.

A number of PV facilities are planned in other parts of the Northern Cape Province, and specifically in Bushmanland Arid Grassland, in the Copperton area (Helme, 2010; McDonald 2012 a, b & c). However, the extensive range of Bushmanland Arid Grassland makes the cumulative impact of these facilities negligible.

It was found that of the two focus areas PV2 would be marginally more suitable from a botanical perspective but that from a visual and engineering viewpoint, PV1 would be preferable. Impacts of the proposed photovoltaic facility in the PV1 area would be locally 'high negative' since some vegetation would have to be removed in the area of the footprint of the facility. However, in the greater context, since the vegetation types are widespread the overall (cumulative) impact would be 'low negative'. Where required, 'on-site mitigation' such as relocation of plant species such as Aloe claviflora should be carried out.

The environment of the proposed PV facility is arid and the use of non-native trees (i.e. trees not found on the site) for screening purposes is not advocated but discouraged both on the site and along the R 359 road nearby. The blackthorn trees (Acacia mellifera subsp. detinens) trees on the site would provide adequate screening of the PV facility.

The preferred site of the proposed photovoltaic facility within the PV1 focus area is endorsed from a botanical perspective as long as the principal mitigation measure, to avoid the drainage lines, is taken into consideration.

The Botanical Specialist recommended the appointment of Ms Toni Belcher to provide supplementary comment to clarify uncertainties relating to aquatic ecology and the drainage lines in particular. The Basic Assessment did not adopt the exact modified Site 1 location recommended by the botanical specialist, but rather took a location with even lower impact on drainage lines.

Construction Phase – Ecological impacts

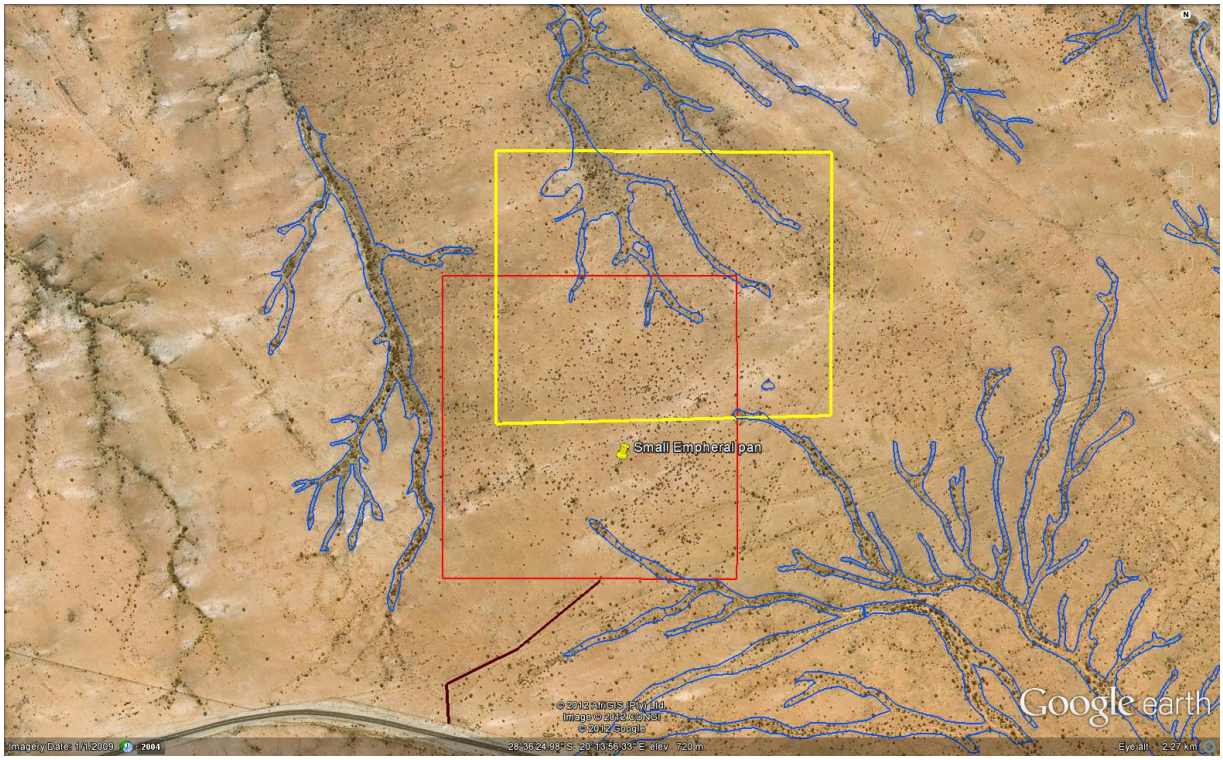

Figure 5: Drainage lines in the vicinity of site alternative 1 (initial proposal in yellow and with mitigation in red)

The ecological study was based on information from the botanical study and site visit and information from previous studies in the Kakamas area. Explanation of the numberings in the rating is found in the Ecological specialist report in Appendix E-4. Please refer to Figure 5: Drainage lines in the vicinity of site alternative 1 (initial proposal in yellow and with mitigation in red)*, page 17 above a drawing showing the drainage lines in relation to the original preferred site PV1 (without mitigation) and the final site PV1 (with mitigation). This figure uses the drainage line outlines provided by the ecological study combined with the additional information of the proposed new PV1 (with mitigation).*

The following impact rating is abridged form the Ecological Impact Study: "Checklists of species with a geographical distribution that includes the site includes 64 mammal species, 55 reptile species, 11 amphibian species and 215 bird species. The presence of any particular

species on site depends on the availability of suitable habitat. Invertebrates are not covered in this study. Nevertheless, specimens of the tadpole shrimp (Triops granarius) were found in a shallow, temporary pool on site and indicate this to be an ephemeral pan.

There are four mammal species of low conservation concern that could occur in available habitats in the study area, i.e. the Honey Badger, Littledale's Whistling Rat, the Dassies Rat and Dent's Horseshoe Bat, all listed as Near Threatened. Only Littledale's Whistling Rat and the Dassie Rat could potentially be affected by construction on site.

There are three bird species of potential conservation concern that may make use of habitats on site for foraging and possibly for breeding. These are the Kori Bustard (listed globally as Least Concern and nationally as Vulnerable), Ludwig's Bustard (listed globally as Endangered and nationally as Vulnerable) and Sclater's Lark (listed as Near Threatened).

Sensitive features identified on site are watercourses and a small pan. Other natural areas are potential habitat for a small number of animal/bird species of potential conservation concern.

Potential impacts were assessed. The potential impacts on natural vegetation and on watercourses by the solar arrays are the impacts with a significance of "medium" after mitigation. All other potential impacts are either "low" or can be reduced to "low" with mitigation. On this basis, this project is supported from an ecological point of view, on condition reasonable mitigation measures are implemented to manage impacts. The most important potential impact is on hydrological systems. If possible, the arrangement of infrastructure should be reconsidered to avoid directly impacting on these systems. Either site can be considered potentially suitable for the proposed development.

Impacts are assessed for each infrastructure component. These are grouped according to the expected impact on the receiving environment as follows:

1. Solar array, substation and on-site component of access road.
2. Overhead power line.

Solar arrays, substation and access road

Impact 1: Loss of habitat for threatened animals
There is a low likelihood of any threatened or near threatened animal species being affected by the proposed project. Birds and other animals that could potentially occur on site are relatively mobile and will move away during construction. The footprint of the solar array is small relative to the overall availability of habitat in the general area. The potential impact on them due to a loss of a small area of habitat is therefore not considered to be serious.

Table 20 Ecological Impact: Solar Arrays: Loss of habitat for threatened animals

	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	minor (2)	small (1)
Probability	Improbable (2)	Improbable (2)
Significance	**Low (16)**	**Low (14)**

	Without mitigation	**With mitigation**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible to some degree	Reversible to some degree
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	To a small degree only	
Mitigation: Ensure that construction impacts are contained within the footprint of the proposed infrastructure and do not spread into surrounding natural areas.		
Cumulative impacts: None		
Residual Impacts: None likely		

Impact 2: Bird collisions with power lines
This impact is not assessed for this infrastructure component.

Impact 3: Damage to watercourses/pans
There are a number of dry stream beds and drainage areas on site as well as one small ephemeral pan. According to the National Water Act, these are classified as water resources. Construction may lead to some direct or indirect loss of or damage to these affected areas or changes to the catchment of these areas.

Table 21 Ecological Impact: Solar arrays: Damage to wetland / watercourse areas resulting in hydrological impacts

	Without mitigation	**With mitigation**
Extent	local and surroundings (2)	local and surroundings (2)
Duration	Long-term (4)	Long-term (4)
Magnitude	Moderate (6)	Low (4)
Probability	definite (5)	Highly probable (4)
Significance	**medium (60)**	**medium (40)**
Status (positive or negative)	Negative	negative
Reversibility	Reversible with effective rehabilitation	Reversible
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	To some degree	
Mitigation: (1) If possible from a technical point of view, solar arrays should be positioned in such a way as to fall a minimum of 30 m outside defined watercourses and pans. (2) Ground surfaces within the solar array must be properly maintained to avoid erosion impacts. (3) A storm-water management plan must be compiled for the solar array. This must		

	Without mitigation	With mitigation
indicate how water velocities will be reduced before storm water is allowed to enter natural channels and how natural processes for water infiltration of the affected landscape will be accommodated. (4) There is a legal obligation to apply for a Water Use Licence (WUL) for any water resource that may be affected, as defined in the National Water Act. Any activity within 500 m of a watercourse or pan boundary may require a WUL, depending on the activity. (5) The exact extent and location of water resource, as defined in the National Water Act, must be determined. The map provided in this report (Figure 2) serves as a desktop approximation, but a specialist in this field should undertake a more comprehensive field study in order to confirm the location of boundaries of such features.		
Cumulative impacts: Soil erosion, alien invasions, may all lead to additional impacts on watercourse habitats that will exacerbate this impact.		
Residual Impacts: None.		

Overhead power line

Impact 1: Loss of habitat for threatened animals

The powerline will be a maximum of 2 km long for Site 1 and 4.3 km long for Site 2. The footprint of tower structures and service roads is very small compared to the overall extent of habitat that will be affected. The only threatened animals that will be affected are all bird species. The site constitutes a small area of potential foraging for any of the species. The power line tower structures will affect and even smaller component of this. Birds that could potentially occur on site are relatively mobile and will move away during construction. The potential impact on them due to a loss of a small area of habitat is therefore not considered to be serious.

Table 22 Ecological Impact: Power line: Loss of habitat for threatened animals

	Without mitigation	With mitigation
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	small (1)	small (1)
Probability	highly improbable (1)	highly improbable (1)
Significance	**Low (6)**	**Low (6)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible to some degree	Reversible to some degree
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Not required	

	Without mitigation	With mitigation
Mitigation: None required.		
Cumulative impacts: None		
Residual Impacts: None likely		

Impact 2: Bird collisions with power lines

There is a moderate likelihood of threatened or near threatened bird species occurring along the proposed overhead power line routes. The potential impact on them due to collisions is therefore not considered likely to be of high frequency. There is an existing power lines in the immediate area west of the proposed sites. The addition of an additional length of power line may only add slightly to this existing impact.

Table 23 Ecological Impact: Power line: Bird collisions with power lines

	Without mitigation	With mitigation
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	low (4)	small (2)
Probability	probable (3)	improbable (2)
Significance	**Low (27)**	**Low (14)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible to some degree	Reversible to some degree
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	To some degree	
Mitigation: Devices to make lines more visible must be attached to overhead power lines.		
Cumulative impacts: None		
Residual Impacts: None likely		

Impact 3: Damage to wetlands/watercourses

There are a number of dry stream beds and drainage areas on site. According to the National Water Act, these are classified as water resources. Construction may lead to some direct or indirect loss of or damage to these affected areas or changes to the catchment of these areas. The power line from Site 1 is approximately half the length of that from Site 2, but the power line from Site 2 runs mostly alongside an existing road.

Table 24 Ecological Impact: Power line: Damage to wetland / watercourse areas resulting in hydrological impacts

	Without mitigation	With mitigation
Extent	local and surroundings (2)	local and surroundings (2)

	Without mitigation	**With mitigation**
Duration	Long-term (4)	Long-term (4)
Magnitude	Moderate (6)	Low (4)
Probability	probable (3)	improbable (2)
Significance	**medium (36)**	**low (20)**
Status (positive or negative)	Negative	negative
Reversibility	Reversible with effective rehabilitation	Reversible
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	To some degree	
Mitigation: (1) Pylons must be positioned a minimum of 50 m outside of watercourse boundaries. (2) Existing roads must be used as service roads, where possible. (3) There is a legal obligation to apply for a Water Use Licence for any wetlands that may be affected, since they are classified in the National Water Act as a water resource. Any activity within 500 m of a wetland or watercourse boundary may require a WUL, depending on the activity.		
Cumulative impacts: Soil erosion, alien invasions, may all lead to additional impacts on watercourse habitats that will exacerbate this impact.		
Residual Impacts: None.		

The overall impacts of this proposed project are of low or medium significance. With mitigation measures implemented, it should be possible to reduce most negative impacts to low significance, except for the significance of the impacts of the solar array on watercourses, which remains medium. Taking this assessment into consideration, this project is supported from an ecological point of view, on condition reasonable mitigation measures are implemented to manage impacts.

The most important potential impact is on hydrological systems. If possible, the arrangement of infrastructure should be reconsidered to avoid directly impacting on these systems. The alternative site (Site 2) appears to be more suitable in this respect than the preferred site (Site 1). However, either site can be considered potentially suitable for the proposed development."

Input was sought from an aquatic ecologist to provide clarification on some of the freshwater related issues raised in this study.

Construction Phase – Aquatic ecology impacts

The aquatic ecology desktop study was not requested to undertake a full impact rating, but simply to provide supplementary comment to the Botanical and Ecological specialist studies.

Two small pans were identified in the vicinity of Site 1, photographed and geo-referenced by members of the assessment team shortly after rain. These were not visible on aerial photography. Since the identification of these features was done by members of the team who are not aquatic ecologists, based on the location of standing water after rain, the possibility cannot be ruled out that there may be other such small pans on the site.

"The potential impact of the proposed activity on the drainage channels and pans is some loss of aquatic habitats. However, considering the nature of the proposed development, there would not be a complete loss of habitat across the entire site, only at each footprint of the solar panels and at the associated infrastructure (access road and power line). As previously stated, in the 19.9ha identified for the proposed PV facilities, the drainage channels are small and any loss in habitat within these features would be some localised impact of a moderate to low intensity and of an overall low significance. A slight modification to the initially proposed development site is proposed to ensure minimal impact on the identified water features.

The pans are also considered to be small in extent such that the loss of this habitat is not highly significant. It would however be possible, if considered necessary, to develop around these features once delineated. In addition, considering the topography, small size of the features and the nature of the proposed activity, wide buffer zones of 30m are not seen to be a prerequisite. If necessary, depending on the size of the features, a buffer of approximately 10m should suffice. More importantly, any freshwater features to be protected should be delineated prior to construction and demarcated as 'no-go' areas. The disturbed areas adjacent to these features should be rehabilitated after construction is completed to ensure that there is not an increase in erosion and sedimentation within the feature, post construction."

The study recommended the relocation of the preferred site PV1 to a location indicated in Appendix D8 Figure 6). This proposal was accepted.

Construction Phase – Paleontological impacts

The Paleontological Impact Assessment (PIA) was a 'motivation for exemption' from a detailed specialist study rather than a full PIA. Accordingly, it did not include any rating tables. The report argues that the geology of the site would make finding fossils unlikely.

The PIA report states: "In view of the low paleontological sensitivity of both the ancient Precambrian bedrocks as well as the geologically recent superficial sediments along the Orange River in the Kakamas – Augrabies region, the proposed photovoltaic solar plant is not considered to pose a significant threat to paleontological heritage. Neither of the alternative development options is preferred on paleontological heritage grounds.

Pending any significant new fossil discoveries in the area, no further specialist studies or mitigation are considered necessary for this development project.

All South African fossil heritage is protected by the National Heritage Resources Act, 1999. Should substantial fossil remains (e.g. vertebrate bones and teeth) be encountered during construction, the responsible ECO should inform SAHRA at the earliest opportunity to consider possible mitigation measures."

Construction Phase – Agricultural impacts

The Agricultural Potential Assessment (APA) states: "The site is flat to gently undulating, with slopes of approximately 2% and no permanently wet drainage ways. The climate of the

study area is warm to hot with occasional rain in summer and dry winters. The long-term average annual rainfall in this region of the Northern Cape is only 142 mm, and is erratic, both locally and seasonally. The average evaporation is over 2 580 mm per year, peaking at 11.5 mm per day in January.

The area comprises shallow to very shallow, red and red-brown sandy or sandy loam topsoils, often calcareous, with rock in the west. The very low rainfall means that the only means of cultivation would be by irrigation and there is no sign of any agricultural infrastructure and certainly none of irrigation. However, the very shallow soils in the study area mean that, even if a source of water for irrigation was available, the potential of these soils for irrigation would be almost nonexistent.

The major impact would be the loss of potentially arable land due to the construction of infrastructure. However, due to the dry and hot climate, this impact would in all probability be of limited significance and would be local in extent. In addition, the nature of the infrastructure would mean that grazing between the solar panels would be possible, so that the actual area lost even to this form of agriculture would be small. At the end of the project life, it is anticipated that removal of the structures would enable the land to be returned to more or less a natural state following rehabilitation, with little impact.

Based on soil information and prevailing agricultural potential, there is no preference for either alternative. Due mainly to the prevailing unfavourable climatic conditions for arable agriculture, as well as the prevalence of soils with limited depth, it is not envisaged that any more detailed soil investigation will be required.

The major impact on the natural resources of the study area would be the loss of potentially arable land due to the construction of the various types of infrastructure. However, due to the dry and hot climate of the region (Section 2.3), this impact would in all probability be of limited significance and would be local in extent.

At the end of the project life, it is anticipated that removal of the structures would enable the land to be returned to more or less a natural state following rehabilitation, with little impact, especially given the low prevailing agricultural potential.

The impact can be summarized as follows:

Table 25 Agricultural Impact: Soil loss

Criteria	**Without mitigation**	**With mitigation**
Extent	Local	Local
Duration	Long Term	Long Term
Intensity	Low	Low
Probability	Probable	Probable
Confidence	High	High
Significance	Low	Low
Cumulative impact	Low	Low
Nature of Cumulative impact	Loss of agriculturally productive soils and land that is no longer able to be utilized due to construction of infrastructure	
Degree to which impact can be reversed	Removal of infrastructure at the end of the project should enable the site to be returned to close to its natural state.	

Criteria	Without mitigation	With mitigation
Degree to which impact may cause irreplaceable loss of resources	The low potential for arable agriculture, caused by a combination of shallow soils in many places and the hot, dry climate, means that the area has a low potential for cultivation and the resources are not irreplaceable.	
Degree to which impact can be mitigated	The main mitigation would be to ensure that as little pollution or other non-physical disturbance occurs.	

Table 26 Agricultural Impact: Soil erosion by wind

Criteria	Without mitigation	With mitigation
Extent	Local	Local
Duration	Long Term	Long Term
Intensity	Medium	Low
Probability	Probable	Unlikely
Confidence	High	High
Significance	Medium	Low
Cumulative impact	Low	Low
Nature of Cumulative impact	Loss of topsoil due to erosion by wind, caused by loss of vegetation	
Degree to which impact can be reversed	Difficult to reverse if it occurs, but proper mitigation should make the impact unlikely	
Degree to which impact may cause irreplaceable loss of resources	The low potential for arable agriculture, caused by a combination of shallow soils in many places and the hot, dry climate, means that the area has a low potential for cultivation and the resources are not irreplaceable.	
Degree to which impact can be mitigated	The main mitigation would be to put specific measures in place during both the construction and operational phases, which would include: absolute minimum removal of vegetation; possible construction of windbreaks. Also, ensure that as little pollution or other non-physical disturbance occurs.	

Alternatives

Based on soil information and prevailing agricultural potential, there is no preference for either Alternative 1 or Alternative 2.

Construction Phase – Heritage impacts

Figure 6: The large stone cairn / pile at RPD2011/002 (possible Khoi Grave)

A description of heritage issues has already been covered in section B-7 of the main Basic Assessment Report. These are not all restated in this section.

With respect to Site 2, the Heritage Impact Assessment (HIA) stated: "Much of the site contained a very low density scatter of stone artefacts, many of which probably pertain to the MSA. The artefacts tend to be abraded from thousands of years of exposure (Figures 13 & 14). This is in keeping with similar observations for the rest of Bushmanland. Occasional and isolated fresher artefacts were also noted from time to time and testify to the presence of later people all over the landscape as well. It is interesting to note that artefacts on Site 2, a very sandy area, were far too low in density to record any points at all."

"The proposed development footprints will have negligible impacts on archaeological resources, since these tend to cluster around rocky outcrops and ridges (Table 27, p26).

Concern over visual impacts to the landscape and Augrabies Falls National Park do exist but these will be investigated through a Visual Impact Assessment by Albert van der Stok. The imposition of a tree line to shield the site from the road is not going to provide an impact of any significance since an appropriate tree line would be in keeping with similar lines elsewhere in the vicinity. The assessment in Table 27 assumes planting of a tree line as a mitigation measure."

Nevertheless, since both the Botanical and Visual Specialists opposed the planting of a tree line, the recommendation of the Visual Specialist was instead incorporated into the Basic Assessment recommendations.

Table 27: Heritage Impacts for Alternative 1

Impact	**Archaeology**	**Landscape**
Extent	Footprint	Local
Duration	Permanent	Long

Impact	Archaeology	Landscape
Intensity	Negligible	Medium
Probability	Improbable	Definite
Significance (without mitigation)	Negligible	Medium
Status (without mitigation)	Negative	Negative
Significance (with mitigation)	n/a	Negligible
Status (with mitigation)	n/a	Neutral
Confidence	High	High

Table 28: Heritage Impacts for Alternative 2

Impact	Archaeology	Landscape
Extent	Footprint	Local
Duration	Permanent	Long
Intensity	Negligible	Medium
Probability	Improbable	Definite
Significance (without mitigation)	Negligible	Medium
Status (without mitigation)	Neutral	Negative
Significance (with mitigation)	n/a	Negligible
Status (with mitigation)	n/a	Neutral
Confidence	High	High

The HIA states "Overall it is considered that development of the proposed solar facility will have a very limited impact to heritage resources. The project should be allowed to proceed with no further archaeological or heritage inputs. However, the Visual Impact Assessment may require that the footprint be altered to reduce visual impacts to the Augrabies Falls National Park and surrounding landscape and this should be considered before final authorisation of the project. Site 1, although having a greater concentration of archaeological resources, is favoured due to the greater screening opportunity offered by a low ridge that traverses the property just northeast of the footprint area.

No permit requirements pertain to this project since no significant archaeological or heritage sites will need to be disturbed through the development provided that it stays away from all rocky ridges and prominent outcrops as well as from the house, historical grave and stone cairn. The flat sandy and gravelled areas hold no further concerns."

The recommendations relating to avoidance of the rocky ridges and stone cairn, since they are near to the preferred site 1, have been incorporated into the project recommendations. The historical grave and house would have been relevant if site 2 had been chosen, but are 4 kilometres from site 1.

The project should be allowed to proceed but subject to the following recommendations:

- *The stone cairn and historic grave must be avoided;*
- *The ECO should be made aware of the potentially very high significance of stone cairns and should ensure that any revised footprint location will not impact on any stone cairns not documented by the present report; and*

- *If any human remains are revealed during earthworks, excavations in the immediate vicinity should be halted and the find reported to an archaeologist or to SAHRA (telephone: 021 462 4502). Exhumation may be required at the expense of the developer.*

Impacts that may result from the operational phase

Operational Phase – Visual impacts

The visual impact rating for the Operational phase has been included with the Impact ratings for the Construction phase (see from Table 1*, p9) as to have separated these would have significantly lengthened this report.*

For most ratings in the tables, the Construction and Operational Phase ratings are the same. Differences include:

- *The Visual Absorption Capacity of Site 1 with mitigation is considered slightly higher in the operational phase than in the construction phase.*
- *The Compatibility with the Surrounding Landscape is higher in Operational phase than in Construction.*
- *It should be noted that unlike most other ratings, these two categories of righting a higher rating is more environmentally desirable. Presumably the change is because people will get used to the facility and because screening vegetation will slowly grow.*
- *For the Intensity of Visual Impact, from the R359 and from the roads in the park, the Operational phase impact is lower.*
- *On Overall significance of Visual Impact, the Operational Phase is lower. The reason is because the construction activity will be unexpected and draw attention to the project, whereas afterwards viewers will grow used to the project.*
- *Therefore on all visual impact criteria, the Operational Phase impact is either the same or less than the Construction phase impacts.*

Operational Phase – Ecological impacts

The impact ratings in the Operational Phase are expected to be the same as for the Construction Phase.

Operational Phase – Aquatic ecology impacts

The impacts of the Operational Phase are expected to be the same as for the Construction Phase.

Operational Phase – Agricultural impacts

The agricultural impacts for the Operational Phase would be the same as for the Construction Phase (Patterson, 2012b)

Operational Phase – Botanical impacts

The rating of Operational Phase Botanical Impacts was the same as for the Construction Phase and is found in that section.

Operational Phase – Paleontological impacts

From the Geology, the Paleontological Impact Assessment motivated that fossils were not expected to be found on the site and thus the impacts were not rated formally in a rating table. The Operational Phase would be even less likely to uncover fossils than the construction phase. Nevertheless, in the unlikely event that this did occur, the South African Heritage Resource Agency must be notified to consider mitigation measures.

Operational Phase – Heritage impacts

The Operational Phase Heritage Impacts are expected to be the same as the Construction Phase since all disturbance will take place at Construction Phase (Orton, 2012c).

Impacts that may result from the decommissioning phase

The decommissioning phase (expected after the expiry of the 20 year contract with the Department of Energy). The following description of decommissioning would apply to both the preferred alternative (Site 1) and the other alternative (Site 2).

The decommissioning phase will include a repeat of many of the impacts of the construction phase (i.e. the activities on site) and the reversal of many of the impacts resulting from the construction of the project.

It will result in the loss of the positive socio-economic impacts of jobs created during the operational phase of the development. The actual decommissioning process will however probably create a short-term net increase in employment as the infrastructure is dismantled and probably recycled.

There will be a short term visual impact of construction vehicles travelling to and from the site.

The impact of loss of agricultural grazing land will be reversed. The visual impact of the project from the vantage point of the Augrabies Park and adjacent road will be reversed. It will be returned to as near as possible to its pre-construction visual state.

The entire project is being designed with a 'minimum engineering' philosophy, which will result considerably less work to decommission the project and rehabilitate the site than would have been the case with a 'regular engineering' philosophy. In particular, the minimisation of the use of concrete and other hard surfaced roads will conserve most of the fertile soil crust and existing vegetation.

Engineering design with decommissioning in mind will help to minimise decommissioning impacts.

The Environmental Management Plan has made numerous recommendations to minimise the impacts of the decommissioning phase of the project including: sub-surface concrete footings, which will not need to be removed. Since the site will not be levelled for construction, minimal earthworks would be necessary for decommissioning. Grasses should re-establish over disturbed areas fairly quickly, but the slow growing thorn bushes will take much longer to re-establish. From a distance, however the impacts on the site are not expected to be noticeable. Ducts are recommended for cabling which will simplify their removal on decommissioning. The use of chemicals (for example for cleaning panels) is to be undertaken with caution to avoid damage to the potential of the soil.

Prior to construction, the entire site will be photographed and this will be kept as a record to assist the decommissioning process to restore the site to as close as possible as it was before construction.

A detailed decommissioning plan will be submitted to the Environmental Authority prior to commencement.

The above mitigation measures are expected to minimise the impacts of decommissioning.

Decommissioning impacts would be the same for both alternatives, except that Site 1 which is covered in slow growing thorn bushes would take longer to rehabilitate to its former state, in comparison with Site 2 which is covered in grassland.

Changes after completion of Specialist studies

Project description update: Transmission line extension

The initial project proposal in the brief given to the specialists was for the transmission line to tie into the 22 kV line running on the western edge of the Rooipad Wes property. With this proposal, the whole project would be confined to one farm (Portion 9 of Farm 15). The fieldwork was thus conducted on this property only. After completion of the specialist reports, during grid connection negotiations, Eskom indicated that they may require the project to tie directly into the Blouputs substation instead. In this event, it would then be necessary to construct an additional 385 metres of 22 kV transmission line on the adjacent farm 431. The specialists were asked whether they wished to make any supplementary comment on this additional section of transmission line (See Appendix D-9).

In summary: the heritage specialist requested that the transmission line route be checked for stone cairns (possible grave sites). Had any been identified, this would have affected the spacing of the poles, but not the route. The route was walked and photographed and no cairns were found.

The aquatic specialist requested that all structures be positioned outside the recommended 10m buffer area. The Environmental Management Programme Report did not require changes except to the project description. The visual, botanical and agricultural specialists

did not wish to make any changes.

In the judgement of the environmental practitioner, no significant new impacts have been identified associated with the addition of 385 metres of transmission line. The fact that the additional line would run alongside existing transmission lines reduces the additional visual impact.

Padrooi Solar PV Proposal

Padrooi Solar PV Proposal

After the completion of the specialist studies, the Environmental Assessment Practitioner (EAP) was informed of a proposed 19 MW Photovoltaic project proposal Padrooi Solar, by Aurora Power Solutions on the adjacent farm number 431 to the south of the Blouputs substation. (Escience, 2012a).

The Padrooi Solar project requests authorisation for the alternatives of both Photovoltaic and Concentrated Photovoltaic (CPV) technologies. Of the two, CPV would have considerably more visible due to the taller panel mounting structures. Padrooi Solar EIA process has identified a preferred 19.9 ha site.location envelope much larger than the proposed development, within which a 19.9 ha would be chosen at a later stage. There is a concurrent Environmental Impact Assessment (EIA) process for a larger project of up to 100 MW the same farm (farm number 431), which is currently at Scoping stage (Escience, 2012b). The 19 MW project appears to be a first phase of the 100 MW project. A methodology for evaluation of cumulative impacts is described.

The proposed location of the Padrooi Solar project is between 1.5 and 2.5 km from the Mulilo Augrabies PV project (Preferred Site 1). It is possible that both projects may be at some points visible from the roads in the vicinity of the Blouputs substation leading to a cumulative impact. Most likely this location would be adjacent to the Blouputs substation. The Blouputs substation and its associated transmission lines constitute a degradation of the visual quality of this location which the proposed Solar projects would incrementally add to. The Blouputs substation is immediately adjacent to the road and although the proposed PV developments are larger, the dominant effect on the viewer at this point would be from the Blouputs substation rather than the PV facilities. Solar PV development at a location which is already impacted by industrial features would be preferable to development at unspoilt locations near to the National Park view sites.

The Padrooi Solar Visual Impact Assessment viewshed (Figure 23) does not detail the park gravel road from which the Augrabies Solar PV project may be intermittently visible for a short section and it does not show the road transecting the park. This makes it difficult to compare the visual impacts of the two projects and to try to identify points from which both projects may be visible. The 100 MW EIA proposal is considerably larger than either of the two smaller PV projects both in height and in area. Solar CPV technology, which is proposed as one of the alternatives for the Padrooi Solar also has a much higher potential visual impact than Solar PV (proposed for Augrabies PV). In terms of assessment and quantifying the visual impact, The Padrooi 100 MW facility EIA Report includes the statement 'The subject facility will definitely in combination with the existing Blouputs substation and the various transmission/ distribution lines intersecting the site, add to the impact associated with these; however this impact is not in the opinion of the environmental

specialist considered to be significant and render the subject project fatally flawed' (Escience Associates, 2012c). A 70 hectare CPV facility and a 19 MW PV facility were authorised on the Padrooi farm in 2013 (copies of the authorisations are included in Appendix 6 to the application form to this Basic Assessment).

Both the proposed Padrooi Solar PV and CPV projects would be visible from key view sites of the National Park, but the impact would be mitigated by the distance of 10 kilometres, making them appear as black lines on the horizon. If alternative Site 2 of the Augrabies PV project were chosen, it would also be visible from the key view sites of the National Park. In this scenario, there would be a negative cumulative impact of three black lines on the landscape from the National Park view sites. The Augrabies PV Basic Assessment recommends Site 1 and not Site 2, and thus no such cumulative impact would occur.

Four issues from the Augrabies PV public participation process (PPP) are relevant to the evaluation of cumulative impacts. Firstly, all public comments concerning potential negative visual impacts related to impacts from the vantage point of the National Park and not the R359 road. The proposed Augrabies PV project in the final preferred location will not be visible from the National Park viewsites and thus cannot have a cumulative impact from this vantage point. Only the R359 road vantage point is relevant from the cumulative impact perspective and since the visual impact from the R359 was not raised as an issue of concern during the public participation one can assume that this is not a focal point for I&APs. Secondly, while both the draft and final Augrabies PV reports reported on the Padrooi Solar proposal, no public comment was received. Thirdly, there are only two landowners potentially affected by cumulative visual impacts (on opposite sides of the R359 road). The EAP met with these two landowners at their request in two separate meetings and explained the proposals, the environmental reports including their mutual visual impacts. Neither landowner submitted any objection or other comment on the other project. Fourthly, the only comment received relating to visual impacts from the vantage point of the R359 road was from the Kai Garib Municipality, who suggested that Solar PV at this location could itself become a tourist attraction. This subjective view would perceive it as a positive rather than a negative impact, in adding a feature of interest to this tourist route.

Thus taking into account: the project descriptions and technical viewsheds presented in the respective Visual Impact Reports for the two projects, the input from the public participation process, the nature of the proposed technologies, the existing industrial nature of the Blouputs substation, the relative scale of the two proposals: There would be a cumulative impact on those driving along the R359 road if both projects proceeded, but not on the National Park. The nature of this cumulative impact may be subjectively interpreted by the viewer as negative (as insertions in the natural desert landscape), neutral (for those already familiar with the industrial landscape already created by the Blouputs substation and associated transmission line) or positive (if taken as a feature of tourist interest). The road route from Kakamas through to Blouputs is varied, changing very few minutes driving including: desert contrasting the lush Orange river valley, vineyards, citrus plantations, hedges, industrial, housing and commercial features. PV facilities at this location would add to the variety of features. It is therefore argued that cumulative visual impacts should not be a deciding factor for either development but that each should be considered on its own merits, with particular weight regards impact on the National Park.

From a botanical perspective, the Padrooi PV project is located in an area of Bushmanland Arid Grassland, which is different to the vegetation type for the Augrabies PV project, which

is Blouputs Karroid Thornveld and thus this would not be a cumulative impact on this vegetation type.

While both projects can technically proceed in parallel, bid proposals in the Department of Energy Renewable bidding process are many times limited to the capacity allocated by the Department for applicants to bid for. This considerably reduces the probability of two adjacent projects both proceeding and thus the cumulative impacts for two adjacent facilities.