PROPOSED MIDDELBURG SOLAR PARK

North of Middelburg, Eastern Cape Province

VISUAL IMPACT ASSESSMENT

AS PART OF A BASIC ASSESSMENT PROCESS

Produced for:
African Clean Energy Developments (Pty) Ltd (ACED)

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1. STUDY APPROACH

1.1. Qualification and Experience of the Practitioner

MetroGIS (Pty) Ltd, specialising in visual assessment and Geographic Information Systems, undertook this visual assessment in collaboration with V&L Landscape Architects CC.

Lourens du Plessis, the lead practitioner undertaking the assessment, has been involved in the application of Geographical Information Systems (GIS) in Environmental Planning and Management since 1990.

The team undertaking the visual assessment has extensive practical knowledge in spatial analysis, environmental modelling and digital mapping, and applies this knowledge in various scientific fields and disciplines. The expertise of these practitioners is often utilised in Environmental Impact Assessments, State of the Environment Reports and Environmental Management Plans.

The visual assessment team is familiar with the "Guidelines for Involving Visual and Aesthetic Specialists in EIA Processes" (Provincial Government of the Western Cape: Department of Environmental Affairs and Development Planning) and utilises the principles and recommendations stated therein to successfully undertake visual impact assessments. Although the guidelines have been developed with specific reference to the Western Cape province of South Africa, the core elements are more widely applicable.

Savannah Environmental (Pty) Ltd appointed MetroGIS (Pty) Ltd as an independent specialist consultant to undertake the visual impact assessment for the proposed Middelburg Solar Park in the Eastern Cape Province. Neither the author, MetroGIS or V&L Landscape Architects will benefit from the outcome of the project decision-making.

1.2. Assumptions and Limitations

This assessment was undertaken during the planning stage of the project and is based on information available at that time.

1.3. Level of Confidence

Level of confidence[1] is determined as a function of:

- The information available, and understanding of the study area by the practitioner:
    - 3: A high level of information is available of the study area and a thorough knowledge base could be established during site visits, surveys etc. The study area was readily accessible.
    - 2: A moderate level of information is available of the study area and a moderate knowledge base could be established during site visits, surveys etc. Accessibility to the study area was acceptable for the level of assessment.
    - 1: Limited information is available of the study area and a poor knowledge base could be established during site visits and/or surveys, or no site visit and/or surveys were carried out.

- The information available, understanding of the project and experience of this type of project by the practitioner:

[1] Adapted from Oberholzer (2005).

- 3: A high level of information and knowledge is available of the project and the visual impact assessor is well experienced in this type of project and level of assessment.
- 2: A moderate level of information and knowledge is available of the project and/or the visual impact assessor is moderately experienced in this type of project and level of assessment.
- 1: Limited information and knowledge is available of the project and/or the visual impact assessor has a low experience level in this type of project and level of assessment.

These values are applied as follows:

Table 1: Level of Confidence

	Information on the project & experience of the practitioner			
Information on the study area		**3**	**2**	**1**
	3	9	6	3
	2	6	4	2
	1	3	2	1

*The level of confidence for this assessment is determined to be **3** and indicates that the author's confidence in the accuracy of the findings is moderate:*

- The information available, and understanding of the study area by the practitioner is rated as **1** and
- The information available, understanding of the project and experience of this type of project by the practitioner is rated as **3**.

1.4. Methodology

The study was undertaken using Geographic Information Systems (GIS) software as a tool to generate viewshed analyses and to apply relevant spatial criteria to the proposed facility. A detailed Digital Terrain Model (DTM) for the study area was created from 20m interval contours supplied by the Surveyor General.

The approach utilised to identify issues related to the visual impact included the following activities:

- The creation of a detailed digital terrain model (DTM) of the potentially affected environment;
- The sourcing of relevant spatial data. This included cadastral features, vegetation types, land use activities, topographical features, site placement, etc;
- The identification of sensitive environments upon which the proposed facility could have a potential impact;
- The creation of viewshed analyses from the proposed development area in order to determine the visual exposure and the topography's potential to absorb the potential visual impact. The viewshed analysis takes into account the dimensions of the proposed structures.

This report (visual impact assessment) sets out to identify and quantify the possible visual impacts related to the proposed facility, including associated infrastructure, as well as offer potential mitigation measures, where required.

The following methodology has been followed for the assessment of visual impact:

- **Determine Potential visual exposure**

  The visibility or visual exposure of any structure or activity is the point of departure for the visual impact assessment. It stands to reason that if the proposed Solar Energy Facility (SEF) and associated infrastructure were not visible, no impact would occur.

  Viewshed analyses of the proposed SEF and related infrastructure on the site indicate the potential visibility.

- **Determine the Visual Absorption Capacity of the Landscape**

  This is the capacity of the receiving environment to absorb the potential visual impact of the proposed facility. The VAC is primarily a function of the vegetation, and will be high if the vegetation is tall, dense and continuous. Conversely, low growing sparse and patchy vegetation will have a low VAC.

  The VAC would also be high where the environment can readily absorb the structure in terms of texture, colour, form and light / shade characteristics of the structure. On the other hand, the VAC for a structure contrasting markedly with one or more of the characteristics of the environment would be low.

  The VAC also generally increases with distance, where discernable detail in visual characteristics of both environment and structure decreases.

  The digital terrain model utilised in the calculation of the visual exposure of the facility does not incorporate the potential visual absorption capacity (VAC) of the natural vegetation of the region. It is therefore necessary to determine the VAC by means of the interpretation of the vegetation cover, supplemented with field observations.

- **Determine Visual Distance and Observer Proximity to the facility**

  In order to refine the visual exposure of the proposed facility on surrounding areas/receptors, the principle of reduced impact over distance is applied in order to determine the core area of visual influence for the SEF.

  Proximity radii for the proposed development site are created in order to indicate the scale and viewing distance of the facility and to determine the prominence of the structures in relation to their environment.

  The visual distance theory and the observer's proximity to the facility are closely related, and especially relevant, when considered from areas with a high viewer incidence and a predominantly negative visual perception of the proposed facility.

- **Determine Viewer Incidence and Viewer Perception**

  The number of observers and their perception of a structure determine the concept of visual impact. If there are no observers, then there would be no visual impact. If the visual perception of the structure is favourable to all the observers, then the visual impact would be positive.

It is therefore necessary to identify areas of high viewer incidence and to classify certain areas according to the observer's visual sensitivity towards the proposed SEF and its related infrastructure.

It would be impossible not to generalise the viewer incidence and sensitivity to some degree, as there are many variables when trying to determine the perception of the observer; regularity of sighting, cultural background, state of mind, and purpose of sighting which would create a myriad of options.

- **Determine the Visual impact index**

  The results of the above analyses are merged in order to determine where the areas of likely visual impact would occur. These areas are further analysed in terms of the previously mentioned issues (related to the visual impact) and in order to judge the magnitude of each impact.

- **Determine Impact significance**

  The potential visual impacts identified and described are quantified in their respective geographical locations in order to determine the significance of the anticipated impact. Significance is determined as a function of extent, duration, magnitude and probability.

2. BACKGROUND

African Clean Energy Developments (Pty) Ltd (ACED) is proposing the establishment of a Photovoltaic (PV) Solar Energy Facility (SEF) on a site about 14 km south of Noupoort (in the Northern Cape) and 20 km north of Middelburg (Eastern Cape) within the Camdeboo Local Municipality in the Eastern Cape Province.

Solar energy generation is generally considered to be an environmentally friendly electricity generation option. The company intends to utilise photovoltaic (PV) technology to construct two alternative energy generation facilities, each with a total generating capacity of 75MW.

Each of these parks will be operated by a Special Purpose Vehicle (SPV) to be established for the project and therefore separate Environmental Authorisations would be required for each park. However, a single EIA process is being undertaken as the sites are adjacent to one another. In light of this the following VIA addresses the impacts of both the Middelburg Solar Park 1 project (75MW) as well as the Middelburg Solar Park 2 project (75MW) separately but due to the inherent similarity (as the sites are adjacent to one another) of the impacts associated with the two Solar Parks, has combined these impacts into one set of maps.

The project is proposed on the following farm portions:

- Middleburg Solar Park 1 - Remainder of Farm 11 (Twee Fontein)
- Middleburg Solar Park 2 – Portion 4 of Farm 11 (Twee Fontein)

The proposed Solar Energy Facility will consist of a photovoltaic (PV) solar energy component as well as associated infrastructure. A formal layout of the SEF has not yet been finalised, but infrastructure is likely to include the following:

- An array of PV panels;
- A new on-site substation to evacuate the power from the facility into the Eskom grid (Middleburg Solar Park 1 has two possible substation options);

- Mounting structure/s to support the PV panels;
- Overhead powerlines to connect the facility to the existing Ludlow Substation (cabling between the project components, to be lain underground where practical);
- Internal access roads;
- Workshop area for maintenance and storage; and
- Office.

3. SCOPE OF WORK

The regional study area for the visual assessment encompasses a geographical area of 1643 km². However due to the constrained visual exposure of the facility the maps depict a smaller more concentrated area of 217.5 km² and include a minimum 4 km buffer zone from the boundaries of the proposed development area.

The project is proposed on the following farm portions:

- Middleburg Solar Park 1 - Remainder of Farm 11 (Twee Fontein)
- Middleburg Solar Park 2 – Portion 4 of Farm 11 (Twee Fontein)

The scope of work for this assessment includes the determination of the potential visual impacts in terms of nature, extent, duration, magnitude, probability and significance of the construction and operation of the proposed infrastructure.

Anticipated issues related to the proposed facility include:

- The visibility of the facility to, and potential visual impact on, observers travelling along main and secondary roads within the study area, specifically the N9, N10, R56 and R389.
- The visibility of the facility to, and potential visual impact on homesteads and settlements within the study area *Suidenhof, Groothoek, Landia, Gryskop, Marinodale, Winterhoek, Edendale, Hartebeeshoek, Holbrook, Saltoeterkrans, La Rochelle, De Vlei, Bergvliet, Uitkyk, Glenmoor, Vlakfontein, Beskuitfontein, Sherborne, Wolwekop, Ebenhaeser, Bangor, Wolwekop, Vleipooort*, etc).
- The visibility of the facility to, and visual impact on the larger built-up centres or populated places (i.e. Middelburg and Noupoort).
- The potential visual impact of the facility on the visual character of the landscape and sense of place of the region.
- The potential visual impact of ancillary infrastructure (i.e. substation, power line, workshop, office, internal and access roads) on observers in close proximity to the proposed facility.
- The potential visual impact of operational, safety and security lighting of the facility at night on observers residing in close proximity of the facility.
- Potential visual impacts associated with the construction phase.
- The potential to mitigate visual impacts and inform the design process.

4. THE AFFECTED ENVIRONMENT

The proposed site for the development of the facility is located on the Remainder of Farm 11 Twee Fontein (Middleburg Solar Park 1) and Portion 4 of Farm 11 Twee Fontein (Middleburg Solar Park 2).

Regionally, the site is located approximately 20km north of Middelburg (Eastern Cape Province) and 15km south of Noupoort in the Northern Cape Province. Both the N9 and N10 national roads traverse the proposed development site.

The study area is situated on land that ranges in elevation from about 1240m a.s.l. to 2080m a.s.l. The dominant topographical unit or terrain type of the study area is *hills and lowlands* (to the centre and south of the study area) and *low mountains* to the north. The area earmarked for the development of the SEF is located within a distinct sub-catchment (waters shed) basin located in the centre of the study area (shown on **Map 1** page 10). The mountains in the northern section of the study area form part of the *mountains of the great escarpment*. There are no major hydrological features (i.e. major perennial rivers) within the study area, though a number of man-made dams occur throughout the region.

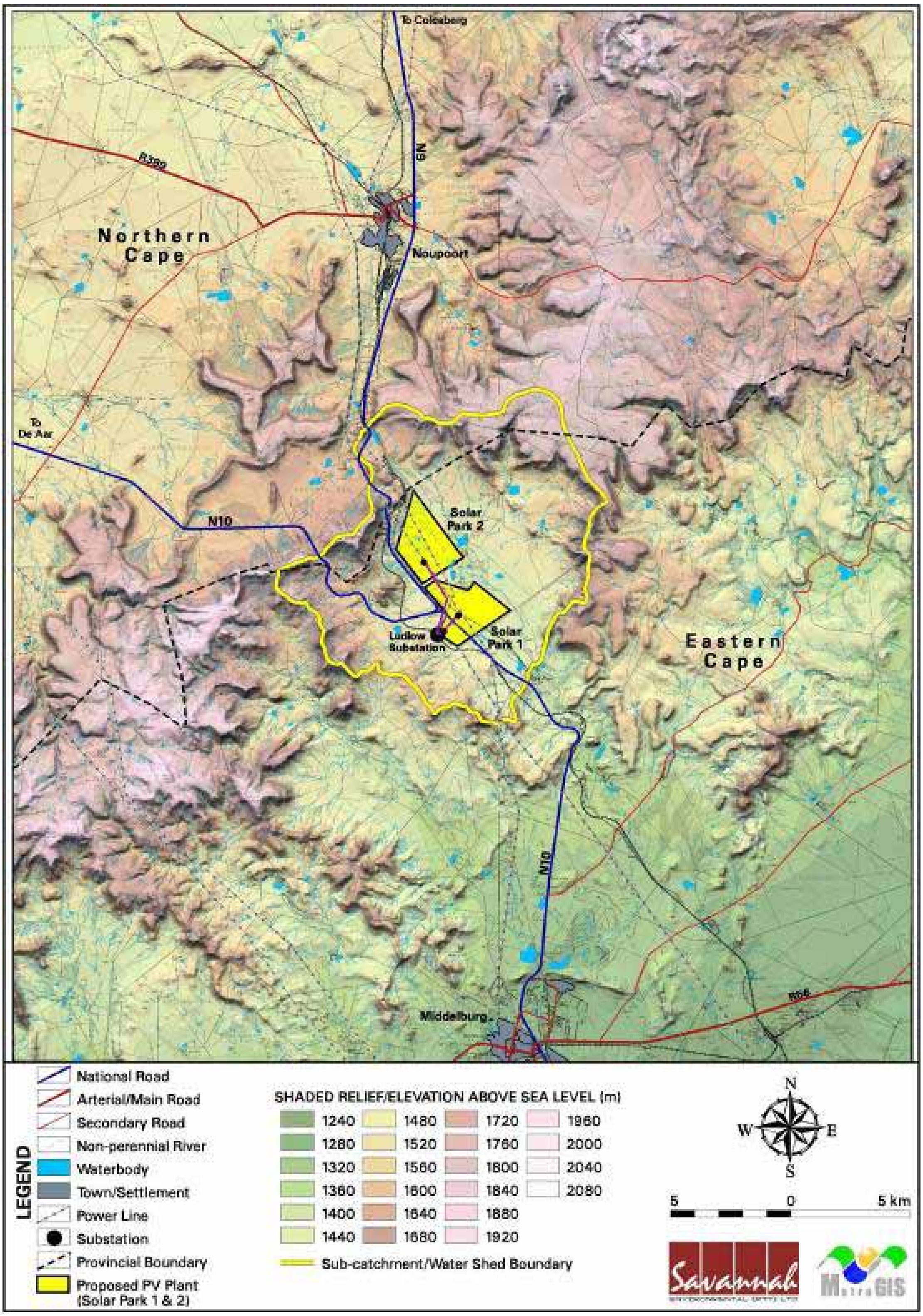
Figure 1: A photograph showing the dominant topographical unit or terrain type of the study area (including the Great Escarpment)

Sheep farming dominates the general land-use character of this relatively arid region with a rainfall of less than 500mm per annum, with very little agricultural crop production occurring within the study area. The region has a population density of less than 10 people per km^2 with the highest concentrations occurring at the towns of Middelburg and Noupoort. The study area has a rural character with very few structures outside of the previously mentioned town boundaries. Exceptions occur where distribution power lines (originating at the Eskom Ludlow transmission substation) and a railway line traverse the proposed development area. Farming homesteads dot the countryside at irregular intervals.

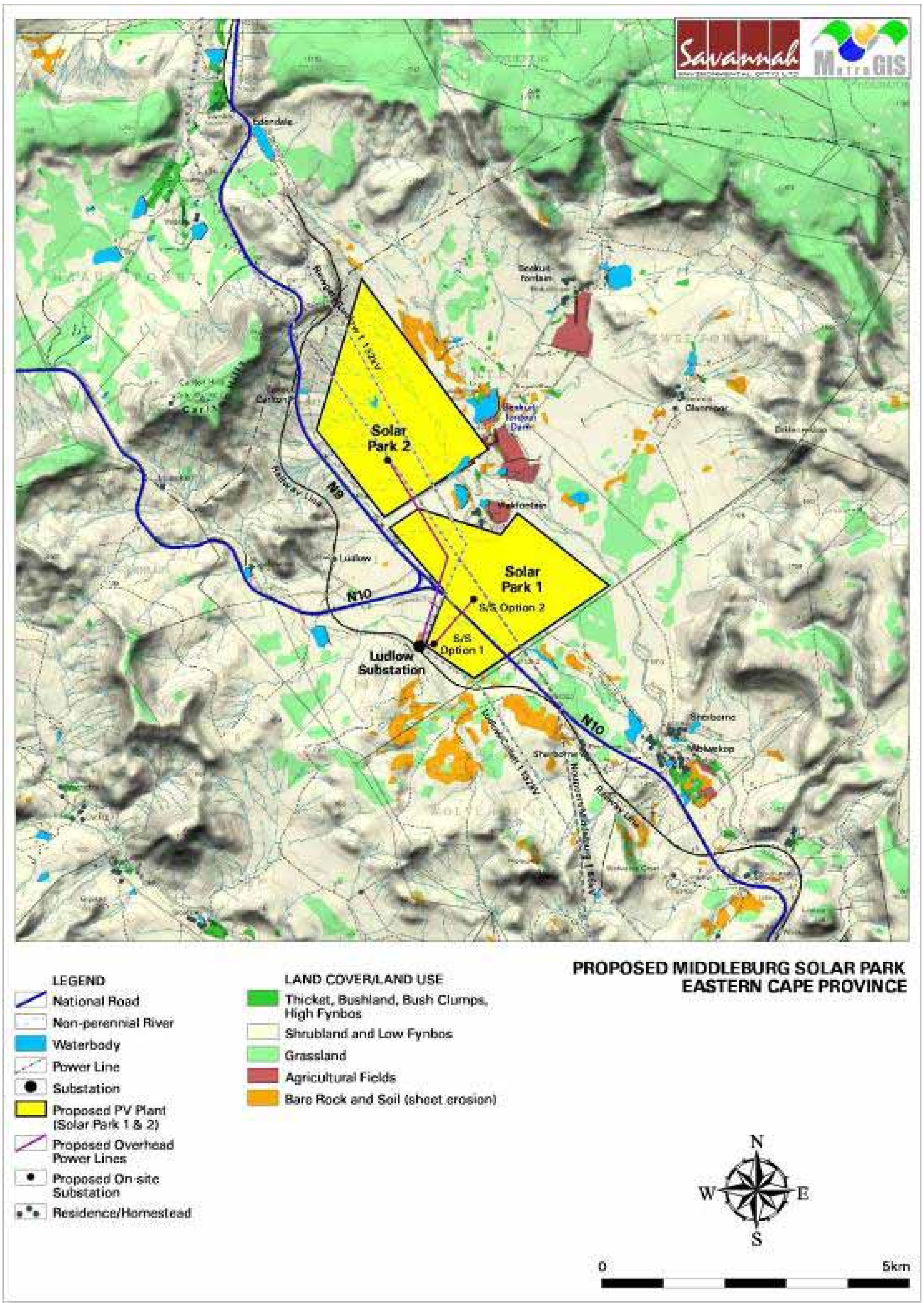
Figure 2: A photograph showing the dominant land use surrounding the site

As indicated on **Map 2** (page 11) natural vegetation, in the form of *Shrubland and Low Fynbos*, covers the largest section of the proposed development area, while natural *Grassland* occur north of the proposed SEF site in the mountainous terrain. The quality of these natural vegetation types ranges from virtually pristine in the northern mountainous sections of the study area, to degraded and overgrazed (with large sheet erosion scarring) in the centre and south of the study area.

There are no formally protected areas within the study area, although the N9 and N10 arterial routes run through the study area and are considered as major tourist routes in the Cape Province. Tourists travelling along these roads should be considered.



Map 1: Locality, topography and shaded relief of the broader study area.



Map 2: Land cover and broad land use patterns.

5. RESULTS

5.1. Potential visual exposure

The result of the combined viewshed analysis for the two sites (Including two possible substation options for Solar Park 1), is shown on the map overleaf (**Map 3**). The initial viewshed analysis was undertaken at an offset of 2m above average ground level (i.e. the approximate maximum height of the PV structures).

This was done in order to determine the general visual exposure of the area under investigation, simulating the proposed structures associated with the SEF.

It must be noted that the viewshed analysis does not include the effect of vegetation cover or existing structures on the exposure of the proposed SEF, therefore signifying a worst-case scenario. The viewshed analysis was based on a provisional zone identified for the development of the PV structures on site.

The extent of potential visual exposure is similar for both sites, with the proposed facilities likely to be visible on the site itself and within a core area extending about 4km to the north and east, as well as and intermittently to the south and west, up to a distance of 4km.

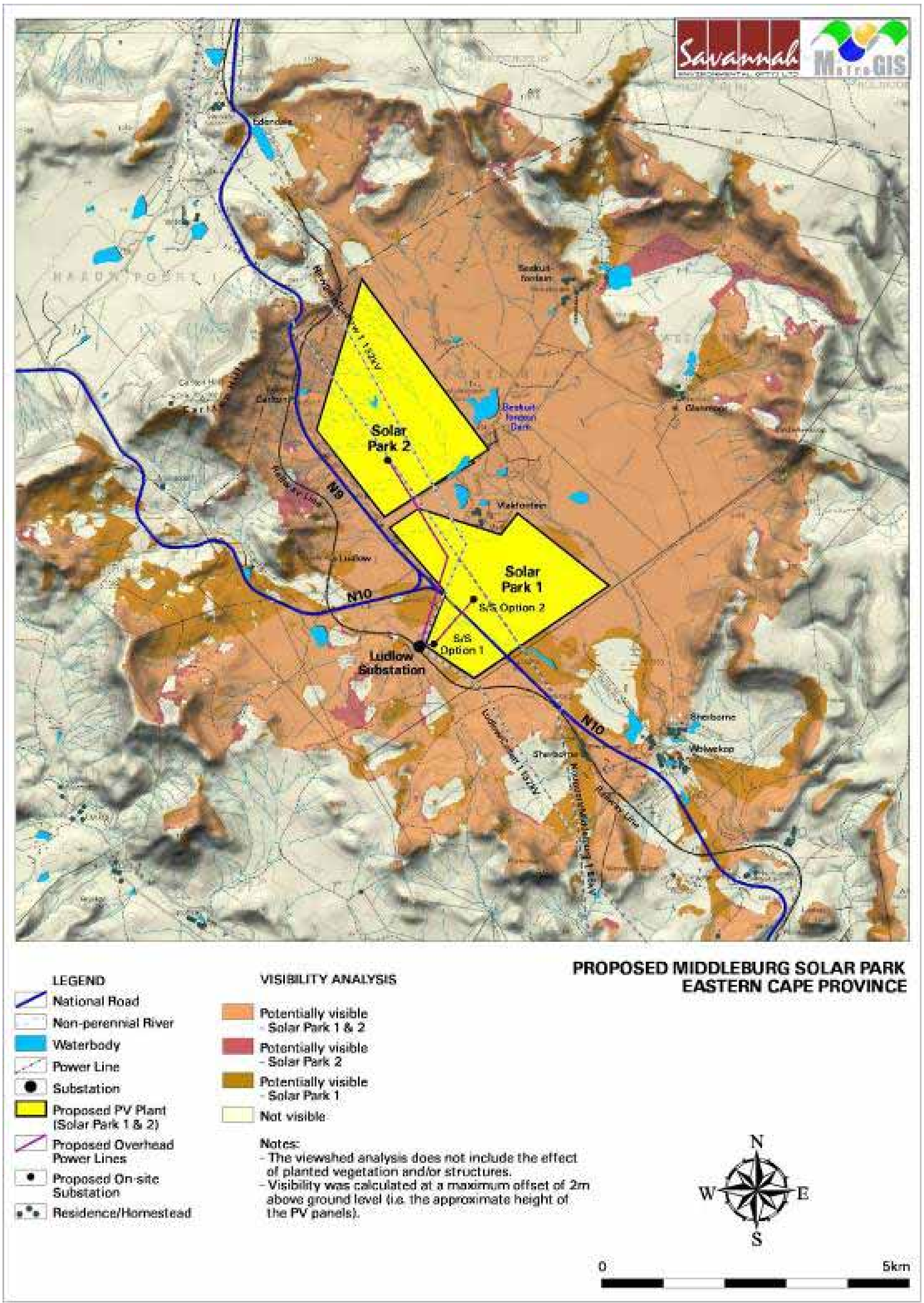
The escarpment in the north and north west as well as the raised topography to the east, south east, south and south west effectively screen the landscape beyond from potential visual exposure. In addition, sections of higher ground to the immediate west, south west and south of the facility results in visually screened pockets within the 4km core buffer area

To the south east, north east, north and west of the above mentioned core area; the viewshed of the proposed facility is fragmented, with areas of visual exposure located in the medium distance. These areas of visual exposure are concentrated on the southern slopes of the Great Escarpment.

Stretches of the N10 and N9 and a number of secondary roads all fall within the zone of potential visual exposure. Similarly, a number of homesteads may also be exposed to potential visual impact

The railway line to the west of the site will also be visually exposed.

It is envisaged that the proposed facility would be visible to observers travelling along roads and railway lines and to residents of homesteads and farms as well as tourists visiting the region, within (but not restricted to) a 4km radius of the proposed facility.



Map 3: Potential visual exposure of the proposed facilities. Including two possible substation options for Solar Park 1.

Note that the viewshed analysis does not include the effect of vegetation cover or existing structures on the exposure of the proposed SEF, therefore signifying a worst-case scenario

5.2. Visual absorption capacity

Land cover within the study area is characteristically in the form of *Shrubland and Low Fynbos*. This covers the largest section of the proposed development area, while natural *Grassland* occurs north of the proposed SEF site in the mountainous terrain. The quality of these natural vegetation types ranges from virtually pristine in the northern mountainous sections of the study area, to degraded and overgrazed (with large sheet erosion scarring) in the centre and south of the study area.

Overall, the Visual Absorption Capacity (VAC) of the receiving environment is low due to the nature and height of the vegetation and the largely undeveloped state of the receiving environment. VAC will thus not be taken into account in the undeveloped environment.

5.3. Visual distance / observer proximity to the facility

MetroGIS / V&L determined proximity radii based on the anticipated visual experience of the observer over varying distances. The following factors are considered for the determination of appropriate proximity radii:

- The normal cone of vision for a stationary person, which is accepted to be 30 degrees in both the vertical and the horizontal fields. This cone of vision allows for no head or eye movement and no loss of focus of the object in question.
- The maximum horizontal extent or widest cross section of the proposed facility that an observer will be able to perceive.
- The maximum height of the tallest infrastructure.

For a solar energy facility, the horizontal extent is of most significance. Despite being made up of smaller components (i.e. the individual PV panels), a SEF will manifest as a single visual entity. It follows that the larger the facility, the larger will be the anticipated visual impact at any given distance, and the more visible the facility will be over larger distances.

In this respect, the proximity radii are calculated as a function of the critical point at which an observer will be able to perceive the full extent of the facility within a normal 30 degree cone of vision.

MetroGIS / V&L developed this methodology in the absence of any known and/or acceptable standards for South African solar energy facilities.

The proximity radii used for this study (calculated from the boundary lines of the proposed facility options) are shown on **Map 4** for both sites respectively.

- 0 – 4 km - Short distance view where the facility would dominate the frame of vision and constitute a very high visual prominence.
- 4 – 8 km - Medium distance views where the facility would be easily and comfortably visible and constitute a high visual prominence.
- 8 – 16 km - Medium to longer distance view where the facility would become part of the visual environment, but would still be visible and recognisable. This zone constitutes a medium visual prominence.
- Greater than 16 km - Long distance view where the facility would still be visible though not as easily recognisable. This zone constitutes a low visual prominence for the facility.

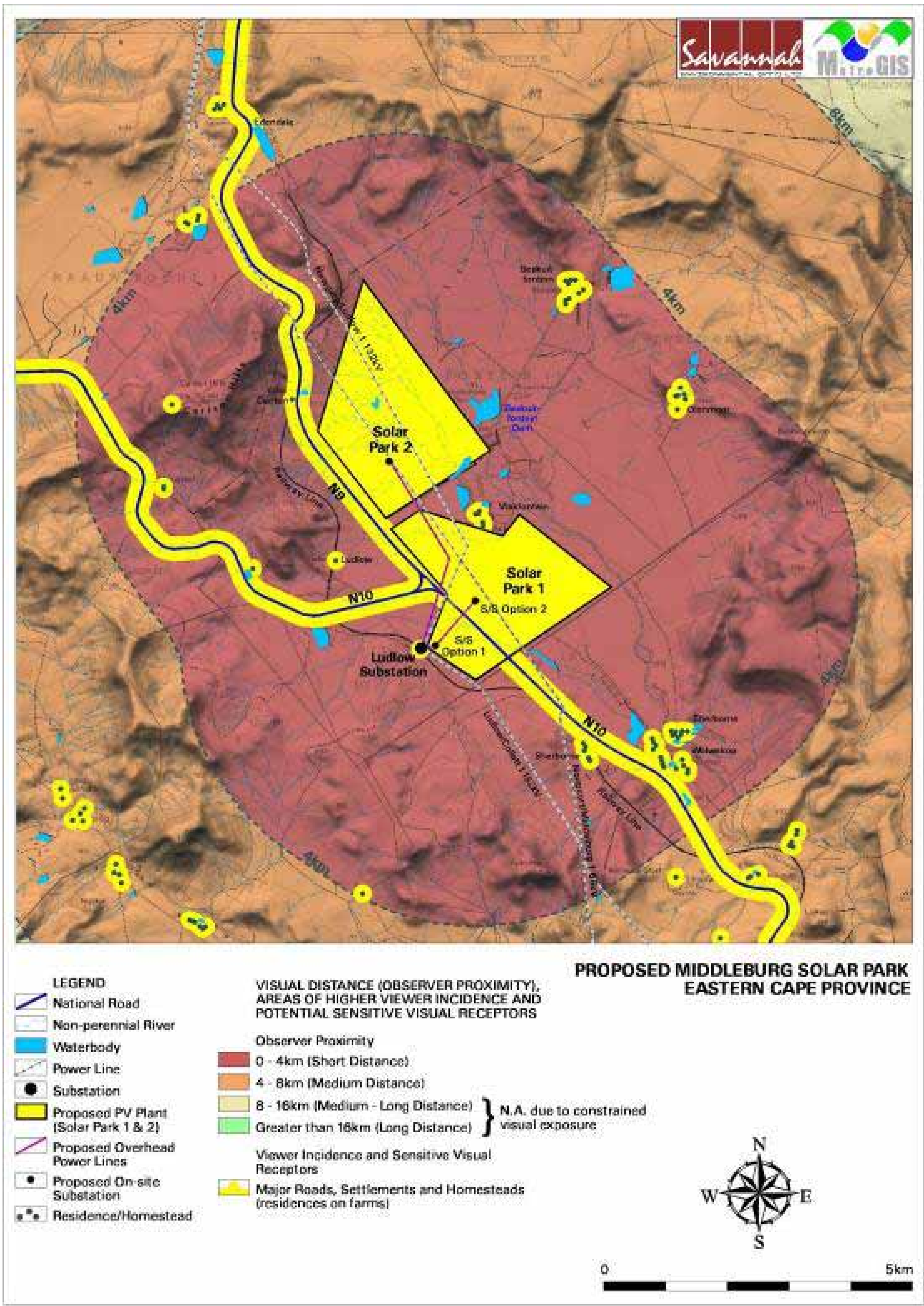
5.4. Viewer incidence / viewer perception

Refer to **Map 4**. Viewer incidence is calculated to be the highest along the N10 and N9 national roads, secondary roads within the study area as well as within settlements/homesteads within a 4km radius of the facilities. Commuters using these roads and residents inhabiting these settlements could be negatively impacted upon by visual exposure to the facility, and are thus considered to be sensitive to visual intrusion.

In terms of viewer sensitivity, the most vulnerable to potential visual impacts include residents of homesteads and settlements (who will be exposed while at home) and tourists visiting and travelling through the area.

Commuters on the railway lines (especially passenger trains) also represent visual receptors, but are not considered to be sensitive to visual intrusion.

The severity of the visual impact on visual receptors decreases with increased distance from the proposed facilities.



Map 4: Observer proximity, areas of high viewer incidence and potential sensitive visual receptors.

5.5. Visual impact index

The combined results of the visual exposure, viewer incidence / perception and visual distance of the proposed SEF sites (Including two possible substation options for Solar Park 1), are displayed on **Map 5**.

Here the weighted impact and the likely areas of impact have been indicated as a visual impact index. Values have been assigned for each potential visual impact per data category and merged in order to calculate the visual impact index.

An area with short distance, a potential visual exposure to the proposed facility, a high viewer incidence and a predominantly negative perception would therefore have a higher value (greater impact) on the index. This helps in focussing the attention to the critical areas of potential impact when evaluating the issues related to the visual impact.

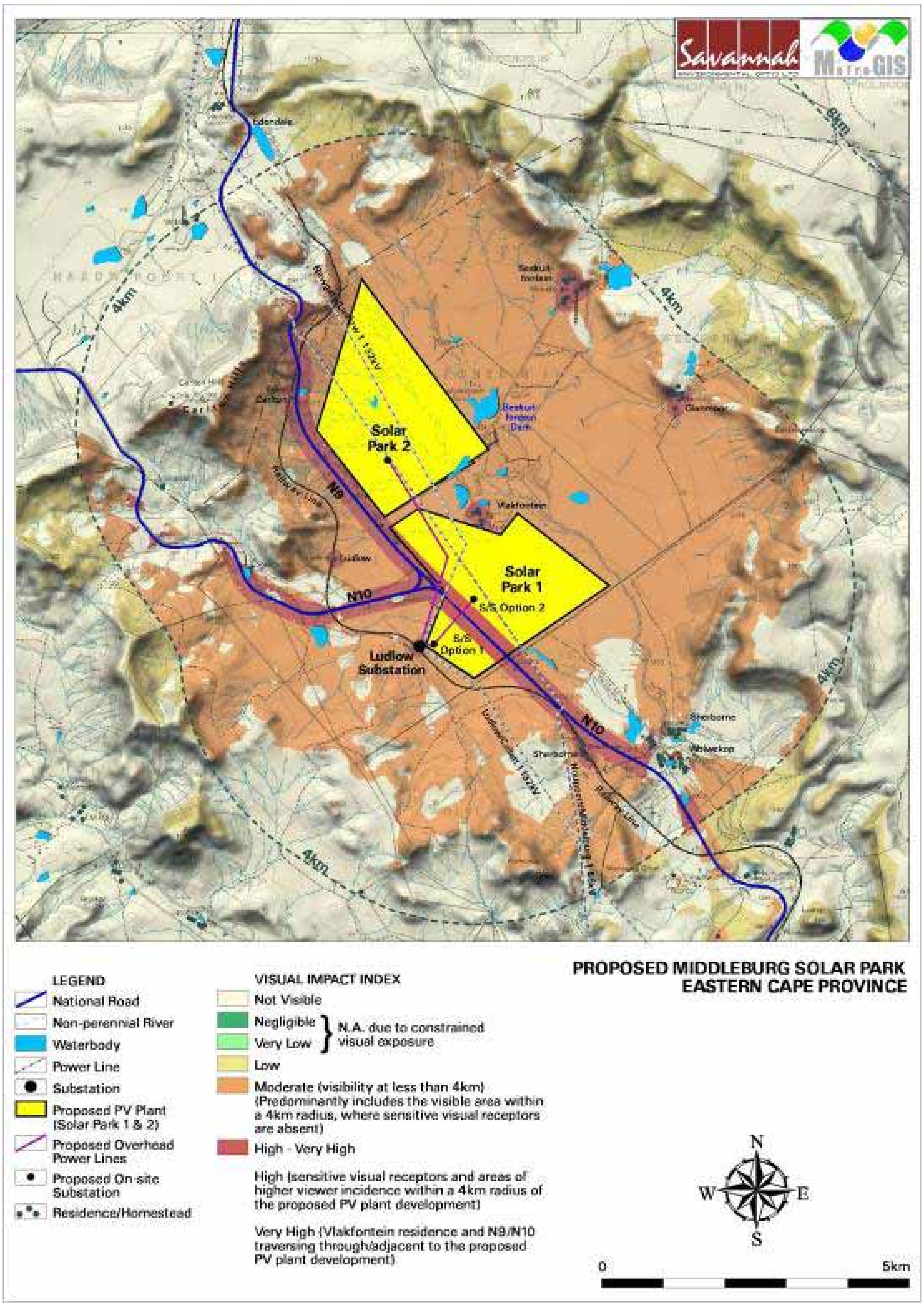
The following is of relevance for the sites:

- Areas of potentially **moderate** visual impact are indicated within a 4km radius of the proposed facility.

  Within the 4km radius, sensitive visual receptors are limited to users of the N9 and N10 and the farmsteads of *Beskuitfontein; Glenmoor*; *Vlakfontein; Ludlow* and *Carlton* (both railway stations), Users of the N9 and N10, driving in close proximity to the facility as well as the homestead Vlakfontein are likely to be exposed to potentially **very high** visual impact, while the farmsteads and other visual receptors within the 4km zone will experience a potentially **high** visual impact. The north western outskirts of *Sherborne* and *Wolwekop* may also experience potentially **high** visual impact.

- The extent of potential visual impact decreases somewhat beyond the 4km radius. Visually exposed areas lie mostly in the north, north east, south east and west of this zone and are likely to experience potentially **low** visual impact. Large areas in this zone, particularly to the north west, north and north east (beyond the Great Escarpment), east, and south will experience **no** visual exposure at all.

  Sensitive visual receptors are limited to users of a stretch of the N10 in the south east. These receptors are likely to experience a potentially **moderate** visual impact.



Map 5: Visual impact index of the proposed facilities. Including two possible substation options for Solar Park 1.

5.6. Visual impact assessment: methodology

The previous section of the report identified specific areas where likely visual impacts would occur. This section will attempt to quantify these potential visual impacts in their respective geographical locations and in terms of the identified issues (see Chapter 2: SCOPE OF WORK) related to the visual impact.

The methodology for the assessment of potential visual impacts states the **nature** of the potential visual impact (e.g. the visual impact on users of major roads in the vicinity of the proposed SEF) and includes a table quantifying the potential visual impact according to the following criteria:

- **Extent** - site only (very high = 5), local (high = 4), regional (medium = 3), national (low = 2) or international (very low = 1).
- **Duration** - very short (0-1 yrs = 1), short (2-5 yrs = 2), medium (5-15 yrs = 3), long (>15 yrs = 4), and permanent (= 5).
- **Magnitude** - None (= 0), minor (= 2), low (= 4), medium/moderate (= 6), high (= 8) and very high (= 10). This value is read off the Visual Impact Index Map. Where more than one value is applicable, then the higher of these will be used in order to simulate a worst case scenario.
- **Probability** – very improbable (= 1), improbable (= 2), probable (= 3), highly probable (= 4) and definite (= 5). This value is read from the visual impact index.
- **Status** (positive, negative or neutral).
- **Reversibility** - reversible (= 1), recoverable (= 3) and irreversible (= 5).
- **Significance** - low, medium or high.

The **significance** of the potential visual impact is equal to the **consequence** multiplied by the **probability** of the impact occurring, where the consequence is determined by the sum of the individual scores for magnitude, duration and extent (i.e. **significance = consequence (magnitude + duration + extent) x probability**).

The significance weighting for each potential visual impact (as calculated above) is as follows:

- <30 points: Low (where the impact would not have a direct influence on the decision to develop in the area)
- 31-60 points: Medium/moderate (where the impact could influence the decision to develop in the area)
- >60: High (where the impact must have an influence on the decision to develop in the area)

Please note that due to the declining visual impact over distance, the ***extent*** *(or spatial scale) rating is reversed (i.e. a localised visual impact has a higher value rating than a national or regional value rating). This implies that the visual impact is highly unlikely to have a national or international extent, but that the local or site-specific impact could be of high significance.*

5.7 Visual impact assessment: primary impacts

5.7.1 The SEF and ancillary infrastructure

Potential visual impact on sensitive visual receptors in close proximity to the proposed SEF.

Sensitive visual receptors in close proximity to the proposed SEF (i.e. **within a 4km radius**) include residents of homesteads and users of the N9 and N10 running through sites and to the west.

Primary infrastructure refers to the PV panels with a height of 2m, while ancillary infrastructure potentially includes the proposed on-site substations, workshop, office and a short stretch of new power line connecting with the existing Ludlow Substation.

Both the primary and ancillary infrastructure could present a visual impact as these structures are built forms within a natural context. In addition, vegetation will need to be removed for these structures to be built.

Both sites require an access road, which will also require a degree of vegetation clearing and grading. The access road/s, although devoid of any vertical dimension, has the potential of manifesting as a scar in the landscape.

The anticipated visual impact resulting from the proposed SEF and ancillary infrastructure is likely to be of **high** visual impact within a 4km radius of the facility and **very high** visual impact where the N9/N10 road traverses the development site, as well as the Vlakfontein homestead located immediately adjacent to the site.

Table 2: Impact table summarising the significance of visual impacts on sensitive visual receptors utilising the N9 & N10 roads as well as Vlakfontein, in close proximity to the proposed SEF.

Nature of Impact: Potential visual impact on sensitive visual receptors (N9 & N10 roads), in close proximity to the proposed SEF.		
	No mitigation	***Mitigation considered***
Extent	Local **(4)**	Local **(4)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	High **(10)**	High **(8)**
Probability	Highly probable **(4)**	Highly probable **(4)**
Significance	Very High **(72)**	High **(64)**
Status (positive, neutral or negative)	Negative	Negative
Reversibility	Recoverable **(3)**	Recoverable **(3)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: Planning: ➢ Retain a buffer (approximately 30-50m wide) of intact natural vegetation along the perimeter of the development site. ➢ Retain and maintain natural vegetation in all areas outside of the development footprint. ➢ Plan internal roads and ancillary infrastructure in such a way and in such a location that clearing of vegetation is minimised. Consolidate infrastructure as much as possible, and make use of already disturbed areas rather than pristine sites wherever possible. Construction: ➢ Rehabilitation of all construction areas. ➢ Ensure that vegetation is not cleared unnecessarily to make way for the access road		

and ancillary buildings. Operations: ➢ Maintain the general appearance of the facility as a whole. ➢ Maintenance of roads to avoid erosion and suppress dust. Decommissioning: ➢ Remove infrastructure and roads not required for the post-decommissioning use of the site. ➢ Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications. ➢ Monitor rehabilitated areas post-decommissioning and implement remedial actions.
Cumulative impacts: The construction of the SEF and ancillary infrastructure will increase the cumulative visual impact of industrial type infrastructure within the region. This is relevant in light of the existing power lines, the Ludlow Substation.
Residual impacts: The visual impact will be removed after decommissioning, provided the facility and ancillary infrastructure is removed. Failing this, the visual impact will remain.

Table 3: Impact table summarising the significance of visual impacts on sensitive visual receptors (farmsteads and settlements), in close proximity to the proposed SEF.

Nature of Impact: Potential visual impact on sensitive visual receptors (farmsteads and settlements) in close proximity to the proposed SEF.		
	No mitigation	***Mitigation considered***
Extent	Local **(4)**	Local **(4)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	High **(8)**	High **(8)**
Probability	Highly probable **(4)**	Probable **(3)**
Significance	High **(64)**	Moderate **(48)**
Status (positive, neutral or negative)	Negative	Negative
Reversibility	Recoverable **(3)**	Recoverable **(3)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: Planning: ➢ Retain a buffer (approximately 30-50m wide) of intact natural vegetation along the perimeter of the development site. ➢ Retain and maintain natural vegetation in all areas outside of the development footprint. ➢ Plan internal roads and ancillary infrastructure in such a way and in such a location that clearing of vegetation is minimised. Consolidate infrastructure as much as possible, and make use of already disturbed areas rather than pristine sites wherever possible. Construction: ➢ Rehabilitation of all construction areas. ➢ Ensure that vegetation is not cleared unnecessarily to make way for the access road and ancillary buildings. Operations: ➢ Maintain the general appearance of the facility as a whole. ➢ Maintenance of roads to avoid erosion and suppress dust. Decommissioning: ➢ Remove infrastructure and roads not required for the post-decommissioning use of the site. ➢ Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications. ➢ Monitor rehabilitated areas post-decommissioning and implement remedial actions.		
Cumulative impacts: The construction of the SEF and ancillary infrastructure will increase the cumulative visual impact of industrial type infrastructure within the region. This is relevant in light of the existing power lines, the Ludlow Substation.		
Residual impacts: The visual impact will be removed after decommissioning, provided the facility and ancillary infrastructure is removed. Failing this, the visual impact will remain.		

Potential visual impact on sensitive visual receptors within the region.

Sensitive visual receptors within the region (i.e. **beyond the 4km radius**) include users of limited sections of the N10, secondary roads and residents of homesteads and settlements.

The visual impact for the facility is likely to occur primarily as a result of primary infrastructure (i.e. the PV panels), but ancillary infrastructure may also be a factor.

The nature of the impact for both sites is again that of an expansive built form within a natural context. In addition, vegetation will need to be removed for these structures to be built.

The anticipated visual impact resulting from the proposed SEF and ancillary infrastructure is likely to be of **moderate** significance for both sites, but may be mitigated to **low**.

Table 4: Impact table summarising the significance of visual impacts on sensitive visual receptors within the region.

Nature of Impact: Potential visual impact on sensitive visual receptors within the region.		
	No mitigation	***Mitigation considered***
Extent	Regional **(3)**	Regional **(3)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	Moderate **(6)**	Moderate **(6)**
Probability	Probable **(3)**	Improbable **(2)**
Significance	Moderate **(39)**	Low **(26)**
Status (positive or negative)	Negative	Negative
Reversibility	Recoverable **(3)**	Recoverable **(3)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	

Mitigation:

<u>Planning:</u>

- Retain a buffer (approximately 30-50m wide) of intact natural vegetation along the perimeter of the development site.
- Retain and maintain natural vegetation in all areas outside of the development footprint.
- Plan internal roads and ancillary infrastructure in such a way and in such a location that clearing of vegetation is minimised. Consolidate infrastructure as much as possible, and make use of already disturbed areas rather than pristine sites wherever possible.

<u>Construction:</u>

- Rehabilitation of all construction areas.
- Ensure that vegetation is not cleared unnecessarily to make way for the access road and ancillary buildings.

<u>Operations:</u>

- Maintain the general appearance of the facility as a whole.
- Maintenance of roads to avoid erosion and suppress dust.

<u>Decommissioning:</u>

- Remove infrastructure and roads not required for the post-decommissioning use of the site.
- Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications.
- Monitor rehabilitated areas post-decommissioning and implement remedial actions.

Cumulative impacts:

The construction of the SEF and ancillary infrastructure will increase the cumulative visual impact of industrial type infrastructure within the region. This is relevant in light of the existing power lines, the Ludlow Substation.

Residual impacts: The visual impact will be removed after decommissioning, provided the facility and ancillary infrastructure is removed. Failing this, the visual impact will remain.

5.7.2. Lighting Impacts

Potential visual impact of lighting at night on observers in close proximity to the proposed SEF.

The area immediately surrounding the proposed facility has a relatively low incidence of receptors and light sources, so light trespass and glare from the security and after-hours operational lighting for the facility will have some significance for visual receptors in close proximity.

Another potential lighting impact is that known as sky glow. Sky glow is the condition where the night sky is illuminated when light reflects off particles in the atmosphere such as moisture, dust or smog. The sky glow intensifies with the increase in the amount of light sources. Each new light source, especially upwardly directed lighting, contribute to the increase in sky glow.

This anticipated impact for the facility is likely to be of **moderate** significance, and may be mitigated to **low**.

Table 5: Impact table summarising the significance of visual impact of lighting at night on visual receptors in close proximity to the proposed SEF.

Nature of Impact: Potential visual impact on of lighting on visual receptors in close proximity of the proposed SEF.		
	No mitigation	***Mitigation considered***
Extent	Local **(4)**	Local **(4)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	Moderate **(6)**	Moderate **(6)**
Probability	Probable **(3)**	Improbable **(2)**
Significance	Moderate **(42)**	Low **(28)**
Status (positive or negative)	Negative	Negative
Reversibility	Recoverable **(3)**	Recoverable **(3)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: Planning & operation: ➢ Shielding the sources of light by physical barriers (walls, vegetation, or the structure itself); ➢ Limiting mounting heights of lighting fixtures, or alternatively using foot-lights or bollard level lights; ➢ Making use of minimum lumen or wattage in fixtures; ➢ Making use of down-lighters, or shielded fixtures; ➢ Making use of Low Pressure Sodium lighting or other types of low impact lighting. ➢ Making use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes.		
Cumulative impacts: Some existing light impact exists as a result of settlements and homesteads in close proximity as well as the existing Ludlow Substation. The development of the proposed SEF will therefore contribute to a cumulative lighting impact within an otherwise rural region.		
Residual impacts: The visual impact will be removed after decommissioning, provided the facility and ancillary infrastructure is removed. Failing this, the visual impact will remain.		

5.7.3. Construction Impacts

Potential visual impact of construction on observers in close proximity to the proposed SEF.

During the construction period, there will be a noticeable increase in heavy vehicles utilising the roads to the development site that may cause, at the very least, a visual nuisance to other road users and land owners in the area. Dust from construction work could also result in potential visual impact.

This anticipated visual impact for both sites is likely to be of **moderate** significance, and may be mitigated to **low**.

Table 6: Impact table summarising the significance of visual impact of construction on visual receptors in close proximity to the proposed SEF.

<table>
<tr><td colspan="3">Nature of Impact:
Potential visual impact of construction on visual receptors in close proximity to the proposed SEF.</td></tr>
<tr><td></td><td>No mitigation</td><td>Mitigation considered</td></tr>
<tr><td>Extent</td><td>Local (4)</td><td>Local (4)</td></tr>
<tr><td>Duration</td><td>Very short term (1)</td><td>Very short term (1)</td></tr>
<tr><td>Magnitude</td><td>Moderate (6)</td><td>Moderate (6)</td></tr>
<tr><td>Probability</td><td>Probable (3)</td><td>Improbable (2)</td></tr>
<tr><td>Significance</td><td>Moderate (33)</td><td>Low (22)</td></tr>
<tr><td>Status (positive or negative)</td><td>Negative</td><td>Negative</td></tr>
<tr><td>Reversibility</td><td>Recoverable (3)</td><td>Recoverable (3)</td></tr>
<tr><td>Irreplaceable loss of resources?</td><td>No</td><td>No</td></tr>
<tr><td>Can impacts be mitigated?</td><td colspan="2">Yes</td></tr>
<tr><td colspan="3">Mitigation:
<u>Construction:</u>
➢ Ensure that vegetation is not unnecessarily cleared or removed during the construction period.
➢ Reduce the construction period through careful logistical planning and productive implementation of resources.
➢ Plan the placement of lay-down areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e. in already disturbed areas) wherever possible.
➢ Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.
➢ Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities.
➢ Reduce and control construction dust through the use of approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent).
➢ Restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting.
➢ Rehabilitate all disturbed areas, construction areas, roads, slopes etc. immediately after the completion of construction works.</td></tr>
<tr><td colspan="3">Cumulative impacts:
None.</td></tr>
<tr><td colspan="3">Residual impacts:
None.</td></tr>
</table>

5.8 Visual impact assessment: secondary impacts

5.8.1 The SEF and ancillary infrastructure

Potential visual impact of the proposed facility on the visual character of the landscape and the sense of place of the region and within the visual catchment.

Sense of place refers to a unique experience of an environment by a user, based on his or her cognitive experience of the place. Visual criteria and specifically the visual character of an area (informed by a combination of aspects such as topography, level of development, vegetation, noteworthy features, cultural / historical features, etc.) play a significant role.

A visual impact on the sense of place is one that alters the visual landscape to such an extent that the user experiences the environment differently, and more specifically, in a less appealing or less positive light.

Specific aspects contributing to the sense of place of this region include the undeveloped, wide open spaces against the backdrop of low hills and mountains (including the Great Escarpment). *Shrubland and Low Fynbos* as well as open fields associated with livestock farming dominates the land use. The study area has a rural character with very few structures outside of the town boundaries of Middelburg and Noupoort. This renders the overall visual quality of the study area to be high.

The tables overleaf illustrate the assessment of this anticipated impact, which is likely to be of **high** significance (mitigated to **Moderate**) within the catchment basin and of **low** significance within the region.

Table 7: Impact table summarising the significance of visual impacts on the visual character and sense of within the catchment basin.

Nature of Impact: Potential visual impact of facility on the visual character and sense of place of the region.		
	No mitigation	***Mitigation considered***
Extent	Local **(4)**	Local **(4)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	High **(6)**	High **(6)**
Probability	Definite**(5)**	Probable **(3)**
Significance	High **(70)**	Moderate **(42)**
Status (positive or negative)	Negative	Negative
Reversibility	Recoverable **(3)**	Recoverable **(3)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: <u>Planning:</u> ➢ Retain a buffer (approximately 30-50m wide) of intact natural vegetation along the perimeter of the development site. ➢ Retain and maintain natural vegetation in all areas outside of the development footprint. ➢ Plan internal roads and ancillary infrastructure in such a way and in such a location that clearing of vegetation is minimised. Consolidate infrastructure as much as possible, and make use of already disturbed areas rather than pristine sites wherever possible. <u>Construction:</u> ➢ Rehabilitation of all construction areas. ➢ Ensure that vegetation is not cleared unnecessarily to make way for the access road and ancillary buildings. <u>Operations:</u> ➢ Maintain the general appearance of the facility as a whole. ➢ Maintenance of roads to avoid erosion and suppress dust. <u>Decommissioning:</u> ➢ Remove infrastructure and roads not required for the post-decommissioning use of the site. ➢ Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications. ➢ Monitor rehabilitated areas post-decommissioning and implement remedial actions.		
Cumulative impacts: The construction of the SEF and ancillary infrastructure will increase the cumulative visual impact of industrial type infrastructure within the region. This is relevant in light of the existing power lines, the Ludlow Substation.		
Residual impacts: The visual impact will be removed after decommissioning, provided the facility and ancillary infrastructure is removed. Failing this, the visual impact will remain.		

Table 8: Impact table summarising the significance of visual impacts on the visual character and sense of place of the region.

Nature of Impact: Potential visual impact of facility on the visual character and sense of place of the region.		
	No mitigation	***Mitigation considered***
Extent	Regional **(3)**	Regional **(3)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	Low **(4)**	Low **(4)**
Probability	Improbable **(2)**	V Improbable **(1)**
Significance	Low **(22)**	Low **(11)**
Status (positive or negative)	Negative	Negative
Reversibility	Recoverable **(3)**	Recoverable **(3)**
Irreplaceable loss of resources?	No	No

Can impacts be mitigated?	Yes

Mitigation:

Planning:

- Retain a buffer (approximately 30-50m wide) of intact natural vegetation along the perimeter of the development site.
- Retain and maintain natural vegetation in all areas outside of the development footprint.
- Plan internal roads and ancillary infrastructure in such a way and in such a location that clearing of vegetation is minimised. Consolidate infrastructure as much as possible, and make use of already disturbed areas rather than pristine sites wherever possible.

Construction:

- Rehabilitation of all construction areas.
- Ensure that vegetation is not cleared unnecessarily to make way for the access road and ancillary buildings.

Operations:

- Maintain the general appearance of the facility as a whole.
- Maintenance of roads to avoid erosion and suppress dust.

Decommissioning:

- Remove infrastructure and roads not required for the post-decommissioning use of the site.
- Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications.
- Monitor rehabilitated areas post-decommissioning and implement remedial actions.

Cumulative impacts:

The construction of the SEF and ancillary infrastructure will increase the cumulative visual impact of industrial type infrastructure within the region. This is relevant in light of the existing power lines, the Ludlow Substation.

Residual impacts:

The visual impact will be removed after decommissioning, provided the facility and ancillary infrastructure is removed. Failing this, the visual impact will remain.

5.9 The potential to mitigate visual impacts

The appearance and size of the PV panels (with an approximate height of 2m) is not possible to mitigate. The functional design of the structures cannot be changed in order to reduce visual impacts.

Secondary impacts anticipated as a result of the proposed facility (i.e. visual character, sense of place, tourism value and tourism potential) are also not possible to mitigate.

The following mitigation is, however possible:

- Retain a buffer (approximately 30-50m wide) of intact natural vegetation along the perimeter of the development site. This measure will give some distance between the facility footprint and the visual receptors.

- Retain / re-establish and maintain natural vegetation in all areas outside of the development footprint. This measure will help to soften the appearance of the facility within its context.

- In terms of ancillary infrastructure, it is recommended that the access road and ancillary infrastructure be planned in such a way and in such a location that clearing of vegetation is minimised. This implies consolidating infrastructure as much as possible and making use of already disturbed areas rather than pristine sites wherever possible.

- Mitigation of lighting impacts includes the pro-active design, planning and specification lighting for the facility by a lighting engineer. The correct specification and placement of lighting and light fixtures for the SEF and the ancillary infrastructure will go far to contain rather than spread the light. Mitigation measures include the following:

  - Shielding the sources of light by physical barriers (walls, vegetation, or the structure itself);
  - Limiting mounting heights of lighting fixtures, or alternatively using foot-lights or bollard level lights;
  - Making use of minimum lumen or wattage in fixtures;
  - Making use of down-lighters, or shielded fixtures;
  - Making use of Low Pressure Sodium lighting or other types of low impact lighting.
  - Making use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes.

- Mitigation of visual impacts associated with the construction phase, albeit temporary, entails proper planning, management and rehabilitation of the construction site and all disturbed areas. Recommended mitigation measures include the following:

  - Ensure that vegetation is not unnecessarily cleared or removed during the construction period.
  - Reduce the construction period through careful logistical planning and productive implementation of resources.
  - Plan the placement of lay-down areas and any potential temporary construction camps in order to minimise vegetation clearing (i.e. in already disturbed areas) wherever possible.
  - Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.
  - Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities.
  - Reduce and control construction dust through the use of approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent).
  - Restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting.
  - Rehabilitate all disturbed areas, construction areas, roads, slopes etc immediately after the completion of construction works. If necessary, an ecologist should be consulted to assist or give input into rehabilitation specifications.

- During operation, the maintenance of the PV panels and all ancillary structures and infrastructure will ensure that the facility does not degrade, thus aggravating visual impact.

- Roads must be maintained to forego erosion and to suppress dust, and rehabilitated areas must be monitored for rehabilitation failure. Remedial actions must be implemented as a when required.

- Once the SEF has exhausted its life span, the main facility and all associated infrastructure not required for the post rehabilitation use of the site should be removed and all disturbed areas appropriately rehabilitated. An ecologist should be consulted to give input into rehabilitation specifications.

- All rehabilitated areas should be monitored for at least a year following decommissioning, and remedial actions implemented as and when required.

Good practice requires that the mitigation of both primary and secondary visual impacts as listed above be implemented and maintained on an ongoing basis.

6. IMPACT STATEMENT

The finding of the Visual Impact Assessment undertaken for the Proposed Middelburg Solar Park is that the visual environment surrounding the site will be visually impacted upon for the anticipated operational lifespan of the facility (i.e. 20 - 30 years). Potential visual impacts will be concentrated within 4km of the proposed facility, although the extent of visual impact will not be limited to this zone.

Both sites would be visible within an area that incorporates certain sensitive visual receptors. These include users of the N9 and N10 and the farmsteads of *Beskuitfontein; Glenmoor*; *Vlakfontein; Ludlow* and *Carlton*.

The following is a summary of impacts remaining, assuming mitigation as recommended is exercised:

- The anticipated visual impact resulting from the proposed SEF and ancillary infrastructure is likely to be of **moderate** visual impact within a 4km radius of the facility and **high** visual impact where the N9/N10 road traverses the development site, as well as the Vlakfontein homestead located immediately adjacent to the site.

- The anticipated visual impact of the facility and ancillary infrastructure on sensitive visual receptors (i.e. users of main and secondary roads and residents of homesteads) beyond the 4km radius will be of **low** significance.

- Visual impacts related to lighting will be of **low** significance, as will those related to construction.

The anticipated impact on the visual character and sense of place within the catchment basin will be of **moderate** significance for both sites.

The anticipated impact on the visual character and sense of place of the region will be of **low** significance for both sites.

The anticipated visual impacts listed above (i.e. post mitigation impacts) are **high**, **moderate** and **low** but despite the visual impact where the N9/N10 road traverses the development site and Vlakfontein homestead) being high, none are considered to be fatal flaws from a visual perspective. The main considerations in this regard are the relatively limited extent of visual exposure and the relatively low occurrence of potentially sensitive visual receptors.

It must also be noted that the viewshed analysis does not include the effect of vegetation cover or existing structures on the exposure of the proposed SEF, therefore signifying a worst-case scenario.

It is therefore recommended that the development of the facility as proposed be supported; subject to the implementation of the recommended mitigation measures (Chapter 5.9) and management plan (Chapter 7).

The 2 sites display very similar viewsheds, and because they lie adjacent to one another, have yielded identical significance ratings.

However where Solar Park 1 is concerned, small differences in the extent of the viewshed may be distinguished as a result of the two possible substation placement options, even if this is marginal.

In this respect, both options are considered acceptable from a visual perspective, but option 1 is preferred. The reason for this preference is that it is closer to the existing Ludlow Substation, thereby consolidating the substation infrastructure and limiting the length of overhead power lines required. The substation infrastructure would be consolidated and the length of overhead power lines required would be shorter. All of this would reduce the visual impact on the receiving environment.

7. MANAGEMENT PROGRAMME

The management plan tables aim to summarise the key findings of the visual impact report and to suggest possible management actions in order to mitigate the potential visual impacts.

Table 7: Management Programme – Planning.

OBJECTIVE: The mitigation and possible negation of visual impacts associated with the planning of the SEF.		
Project Component/s	SEF and ancillary infrastructure (i.e. access road, power lines, substation, workshop and offices).	
Potential Impact	Primary visual impact of the facility due to the presence of the PV panels and associated infrastructure as well as the visual impact of lighting at night.	
Activity/Risk Source	The viewing of the above mentioned by observers on or near the site (i.e. within 4 km of the site) as well as within the region.	
Mitigation: Target/Objective	Optimal planning of infrastructure to minimise visual impact.	
Mitigation: Action/control	**Responsibility**	**Timeframe**
Retain a buffer (approximately 30-50m wide) of intact natural vegetation along the perimeter of the development site. This buffer may be within or behind the security fence.	ACED / design consultant	Early in the planning phase.
Retain and maintain natural vegetation in all areas outside of the development footprint.	ACED/ design consultant	Early in the planning phase.
Plan the ancillary buildings in such a way and in such a location that clearing of vegetation is minimised. Consolidate infrastructure and make use of already disturbed sites rather than pristine areas.	ACED/ design consultant	Early in the planning phase.
Consult a lighting engineer in the design and planning of lighting to ensure the correct specification and placement of lighting and light fixtures for the facility and the ancillary infrastructure. The following is recommended: o Shielding the sources of light by physical barriers (walls, vegetation, or the structure itself);	ACED/ design consultant	Early in the planning phase.

o Limiting mounting heights of lighting fixtures, or alternatively using foot-lights or bollard level lights; o Making use of minimum lumen or wattage in fixtures; o Making use of down-lighters, or shielded fixtures; o Making use of Low Pressure Sodium lighting or other types of low impact lighting. o Making use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes.		

Performance Indicator	Minimal exposure of PV panels, ancillary infrastructure and lighting at night to observers on or near the site (i.e. within 4km) and within the region.
Monitoring	Not applicable.

Table 8: Management Programme – Construction.

OBJECTIVE: The mitigation and possible negation of visual impacts associated with the construction of the SEF.		
Project Component/s	Construction site	
Potential Impact	Visual impact of general construction activities, and the potential scarring of the landscape due to vegetation clearing and resulting erosion.	
Activity/Risk Source	The viewing of the above mentioned by observers on or near the site (i.e. within 4 km of the site).	
Mitigation: Target/Objective	Minimal visual intrusion by construction activities and intact vegetation cover outside of immediate works areas.	
Mitigation: Action/control	**Responsibility**	**Timeframe**
Ensure that vegetation is not unnecessarily cleared or removed during the construction period.	ACED/ contractor	Early in the construction phase.
Reduce the construction period through careful logistical planning and productive implementation of resources.	ACED/ contractor	Early in the construction phase.
Plan the placement of lay-down areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e. in already disturbed areas) wherever possible.	ACED/ contractor	Early in and throughout the construction phase.
Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.	ACED/ contractor	Throughout the construction phase.
Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities.	ACED/ contractor	Throughout the construction phase.
Reduce and control construction dust through the use of approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent).	ACED/ contractor	Throughout the construction phase.
Restrict construction activities to daylight hours in order to negate or reduce the	ACED/ contractor	Throughout the construction phase.

visual impacts associated with lighting.		
Rehabilitate all disturbed areas, construction areas, servitudes etc immediately after the completion of construction works. Consult an ecologist to give input into rehabilitation specifications.	ACED/ contractor	Throughout and at the end of the construction phase.
Performance Indicator	Vegetation cover on and in the vicinity of the site is intact (i.e. full cover as per natural vegetation within the environment) with no evidence of degradation or erosion.	
Monitoring	Monitoring of vegetation clearing during construction (by contractor as part of construction contract). Monitoring of rehabilitated areas quarterly for at least a year following the end of construction (by contractor as part of construction contract).	

Table 9: Management Programme – Operation.

OBJECTIVE: The mitigation and possible negation of visual impacts associated with the operation of the SEF.		
Project Component/s	SEF and ancillary infrastructure (i.e. access road, power lines, substation, workshop and offices).	
Potential Impact	Visual impact of facility degradation and vegetation rehabilitation failure.	
Activity/Risk Source	The viewing of the above mentioned by observers on or near the site (i.e. within 4 km of the site).	
Mitigation: Target/Objective	Well maintained and neat facility.	
Mitigation: Action/control	**Responsibility**	**Timeframe**
Maintain the general appearance of the facility as a whole, including the PV panels the internal roads, servitudes and the ancillary buildings.	ACED/ operator	Throughout the operational phase.
Maintain roads to forego erosion and to suppress dust.	ACED/ operator	Throughout the operational phase.
Monitor rehabilitated areas, and implement remedial action as and when required.	ACED/ operator	Throughout the operational phase.
Performance Indicator	Well maintained and neat facility with intact vegetation on and in the vicinity of the facility.	
Monitoring	Monitoring of the entire site on an ongoing basis (by operator).	

Table 10: Management Programme – Decommissioning.

OBJECTIVE: The mitigation and possible negation of visual impacts associated with the decommissioning of the SEF.		
Project Component/s	SEF and ancillary infrastructure (i.e. access road, power lines, offices and workshop).	
Potential Impact	Visual impact of residual visual scarring and vegetation rehabilitation failure.	
Activity/Risk Source	The viewing of the above mentioned by observers on or near the site (i.e. within 4 km of the site).	
Mitigation: Target/Objective	Only the infrastructure required for post decommissioning use of the site retained and rehabilitated vegetation in all disturbed areas.	
Mitigation: Action/control	**Responsibility**	**Timeframe**
Remove infrastructure not required for the post-decommissioning use of the site. This may include the offices, workshop, storage areas, access roads etc.	ACED/ operator	During the decommissioning phase.
Rehabilitate access roads not required for the post-decommissioning use of the site. Consult an ecologist to give input into	ACED/ operator	During the decommissioning phase.

rehabilitation specifications.		
Monitor rehabilitated areas quarterly for at least a year following decommissioning, and implement remedial action as and when required.	ACED/ operator	Post decommissioning.

Performance Indicator	Vegetation cover on and in the vicinity of the site is intact (i.e. full cover as per natural vegetation within the environment) with no evidence of degradation or erosion.
Monitoring	Monitoring of rehabilitated areas quarterly for at least a year following decommissioning.

8. REFERENCES / DATA SOURCES

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