Appendix D4: Updated Visual Impact Assessment/Addendum (2017 revision)

DISSELFONTEIN, PORTION OF PORTION 8 FARM77: SOLAR ENERGY FACILITY

VISUAL ASSESSMENT
ADDENDUM A

For consideration in the Basic Assessment
For
EnviroAfrica
PO Box 5367
Helderberg
7135
info@enviroafrica.co.za

Addendum A (March 2017) to original Report (2012)

Compiled by:
S.C. Lategan

GeoStratics

PO Box 1082
Strand
7139

Report history:

Version	Date	Amendments
Draft Report: Version 1	26 March 2012	
Final Report	11 May 2012	
Addendum	18 March 2017	

CONTENT

Tables

Figures:

Relevant Qualifications & Experience of the Author
Ms Sarien Lategan holds a Honours Degree in Geography as well as a Masters Degree in Town and Regional Planning from the University of Stellenbosch. She has 7 years experience as Town planner at a local government, 3 years with South African national Parks as planner and project manager of various GEF and World Bank managed, tourist facilities in the Table Mountain National Park and since 2004 as private practitioner involved in inter alia Site Analysis and Visual Impact assessments for various types of developments ranging from housing, tourism to infrastructure developments.

Ms Lategan is registered as a professional Town and Regional Planner as well as Environmental Assessment Practitioner.

Declaration of Independence

I, Sarah C. Lategan, fully authorized by Geostratics CC, declare that I am an independent consultant to EnviroAfrica and neither myself nor Geostratics, has any business, financial, personal or other interest in the proposed project or application in respect of which I was appointed, other than fair remuneration for work performed in connection with the application. There are furthermore no circumstances which compromise my objectivity in executing the task appointed for.

SC Lategan

EXECUTIVE SUMMARY

Sarien Lategan of Geostratics was appointed to undertake the visual impact assessment of a maximum 10Megawatt solar facility, as input to the Basic Assessment in terms of the National Environmental Management Act, 1998 (Act no. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2010 by undertaken EnviroAfrica. The development of the solar farm is proposed by Keren Energy (Pty) Ltd. The site on which the facility is planned comprises a portion of Farm 8/77, Disselfontein in the Hopetown district.

An environmental authorization was obtained but has since expired. A new application will now be submitted for which the original VIA needs to be re-assessed to accommodate any changes that may have occurred since the original assessment as well as include an assessment of cumulative impacts. This report serves as an addendum to the original VIA for this purpose and should be read with the original report.

At the time of the original assessment a final decision was not yet been taken on the exact technology or mix of technology to be used in the development and therefore the worst case scenario was followed by assessing the technology most probably going to have the highest visual impact in terms of size of structures. For the purposes of the original study thus, tracking CPV units of dimensions 15,64m in height and 17m wide has been assessed. The technology currently proposed comprise single axis tracking system with a max tilt of 50°. This setup results in infrastructure to be significantly lower than the units assessed in the original VIA and therefore has a significant lower visual impact.

The overall conclusion in the original assessment was that the visual impact is within acceptable levels and could thus be recommended. Due to the nature of the type of technology, little mitigation measures can be implemented to further reduces any potential visual impacts. With the technology now proposed the visual impact is even further reduced.

With regard to cumulative impacts it is concluded in this addendum that no significant cumulative visual impacts will arise from the development and it is thus within the acceptable level of change.

It can thus be concluded that the overall visual impact of the new application is similar and even slightly less than the original proposal and from a visual perspective can be considered for approval. No additional mitigation measures are required.

1 OBJECTIVE

In 2012, Sarien Lategan of Geostratics was appointed to undertake the visual impact assessment of a maximum 10Megawatt solar facility, as input to the Basic Assessment in terms of the National Environmental Management Act, 1998 (Act no. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2010 by undertaken EnviroAfrica. The development of the solar farm is proposed by Keren Energy (Pty) Ltd. The site on which the facility is planned comprises a portion of Farm 8/77, Disselfontein in the Hopetown district

An environmental authorization was obtained but has since expired. A new application will now be submitted for which the original VIA needs to be re-assessed to accommodate any changes that may have occurred since the original assessment as well as include an assessment of cumulative impacts. This report serves as an addendum t.o the original VIA for this purpose and should be read with the original report.

The objective of this addendum is to access changes that occurred since the original VIA and the subsequent impact thereof on the recommendations. It will futher more also assess the cumulative impacts of the proposal.

The changes that may have occurred includes the following:

1. Changes in the proposal namely -
    a. Site boundary
    b. Extent of solar production
    c. Technology
2. Changes in the receiving environment

Cumulative impact holds two components namely the visual catchment area of assement and the criteria as defined by the DEA guideline on cumulative impacts.
It is important to note that the original VIA did assess impacts within the normal visual sphere of observation namely 30km.

2 CHANGES IN PROPOSAL

2.1 Site Boundary

The site boundary has changed slightly but no to the effect that it will change the assessment of the receptors as per the original report. Therefore the previous assessment of receptors remains unchanged.

Figure 1: Site boundary

2.2 Extend of solar production

The proposal has been changed from the assessed extent of 10MW to a final proposal of 5MW. The footprint area however remains the same. The visual impact is thus similar to the original proposal.

2.3 Proposed Technology

At the time of the original assessment a final decision was not yet been taken on the exact technology or mix of technology to be used in the development and therefore the worst case scenario was followed by assessing the technology most probably going to have the highest visual impact in terms of size of structures. For the purposes of the original study thus, tracking CPV units of dimensions 15,64m in height and 17m wide has been assessed.

The technology currently proposed, comprise is a crystalline PV single axis plant. It has 18540 solar modules connected to 7 central inverters, and makes use of Exosun single axis trackers. The facility will be connected to Eskom's Ouplaas Substation.
This proposal result in significant downscale in the size of infrastructure being less intrusive. The orignal proposal comprise units of up to 6m in height where the PV single axis system is approximately 2m.

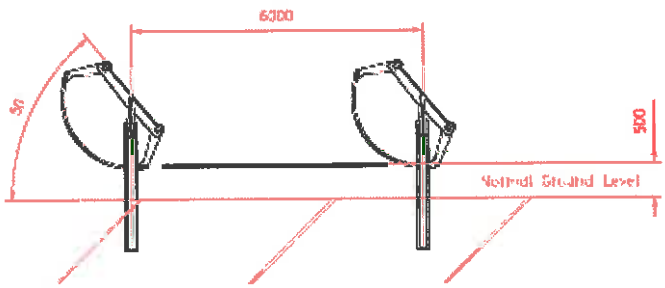


Figure 2: Single axis mounting system

No changes is made to the 22kV connector lines to the substation adjacent the proposal site.
No changes has been made to site parameter fencing and type of access roads.

The new proposed technology therefor reduce the visual impact with regard to the production technology and remains similar with regard to the connection lines.

3 CHANGES IN RECEIVING ENVIRONMENT

The only change in the receiving environment is the road that has been tarred which may imply that it will carry more traffic in future. This does increase the frequency of exposure slightly but not to the extend that it will change the orignal assessment of the site. The original assessment conclusion to this effect thus remains unchanged.

4 CUMULATIVE IMPACTS

4.1 Methodology

Ccumulative effects occur when:

- Impacts on the environment take place so frequently in time or so densely in space that the effects of individual impacts cannot be assimilated; or
- The impacts of one activity combine with those of another in a synergistic manner

DEAT has issued a guideline which identify types and characteristics of different cumulative effects.[1] Table 1 below summarise these criteria and these have been used to assess the cumulative visual impact.

Table 1: Types and characteristics of cumulative impacts

TYPE	CHARACTERISTIC
Time Crowding	Frequent and repetitive effects.
Time Lags	Delayed effects.
Space Crowding	High spatial density of effects.
Cross-boundary	Effects occur away from the source.
Fragmentation	Change in landscape pattern.
Compounding Effects	Effects arising from multiple sources or pathways.
Indirect Effects	Secondary effects.
Triggers and Thresholds	Fundamental changes in system functioning and structure.

DEAT also require that cumulative impacts of all energy projects within a 30km radius be assessed.

4.2 Assessment of cumulative impacts

4.2.1 Time Crowding

With regard to construction, should the other proposed projects in the area be undertaken at the same time the construction activities can cause increased level of such activities. However this is only temporary. There are futhermore only 2 other PV sites within a 30km radius and thus the impacts will be limited. It is unclear what the construction of a prposed hydro facility will entail but the construction extent of the application PV site will be far less than that of the hydro faclity. The fact that the road has been tarred will futher reduce the impact on the area as less dust will be experienced.

With regard to operational visual impact of a static land use change as proposed, this aspect is not relevant.

4.2.2 Time Lags

The facility does not change in its visual appeal over time and therefore there are no visual time lag effects.

4.2.3 Space crowding

The area is characterized by a flowing topography of low rises just outside the valley corridor. More hills and ridges occur closer to the river. The plain area however display such a level of gradient that present a fairly high level of absorption and view is on average restricted to the immediate environment and seldom more than 5km. The human eye can observe the horizon on a perfectly flat surface up to 30km. The Disselfontein area however displays sufficient gradient variations to restrict this view significantly, mostly below 2km. (Refer Figure 3 below)

This thus concluded that the catchment area does not extent to the 30km radius. (Refer Figure 4 below) However a traveller through the landscape may experience the other two energy facilities within this radius and generally within a timeframe of 30min. The R369 pass two solar facilities to the southeast and a potential facility to the northwest. A traveller will thus experience a number of solar sites on his journey through the landscape but since they are approximately 15km apart it is sufficient to provide a flow in variation. The topography of the landscape also absort the sites and prevent crowding within the space.

[1] DEAT (2004) Cumulative Effects Assessment, Integrated Environmental Management, Information Series 7, Department of Environmental Affairs and Tourism (DEAT), Pretoria

4.2.4 Cross Boundary

From a visual perspective the site has no cross boundary impacts.

4.2.5 Fragmentation

The site is adjacent an existing substation and due to the small extent of the proposed development will not pose a significant impact on fragmentation of the landscape. It is unclear what infrastructure is proposed for the Hydro electric facility. Such facility is however significantly larger and may have a higher level of fragmentation to the landscape as it extents from the road to the river. The level of fragmentation by the solar facility is low and within acceptable level of change.

4.2.6 Compounding Effects

From a visual perspective the site has no compounding impacts.

4.2.7 Indirect Effects

The development enlarge the current substation enclave and does has the potential to attract further development. The support services anticipated should however be of low impact such as general maintenance services as the facility does not require large scale industrial maintenance systems of equipment. The anticipated indirect visual effects are thus insignificant.

4.2.8 Triggers and Thresholds

From a visual perspective the site has no impacts on Triggers and Thresholds.

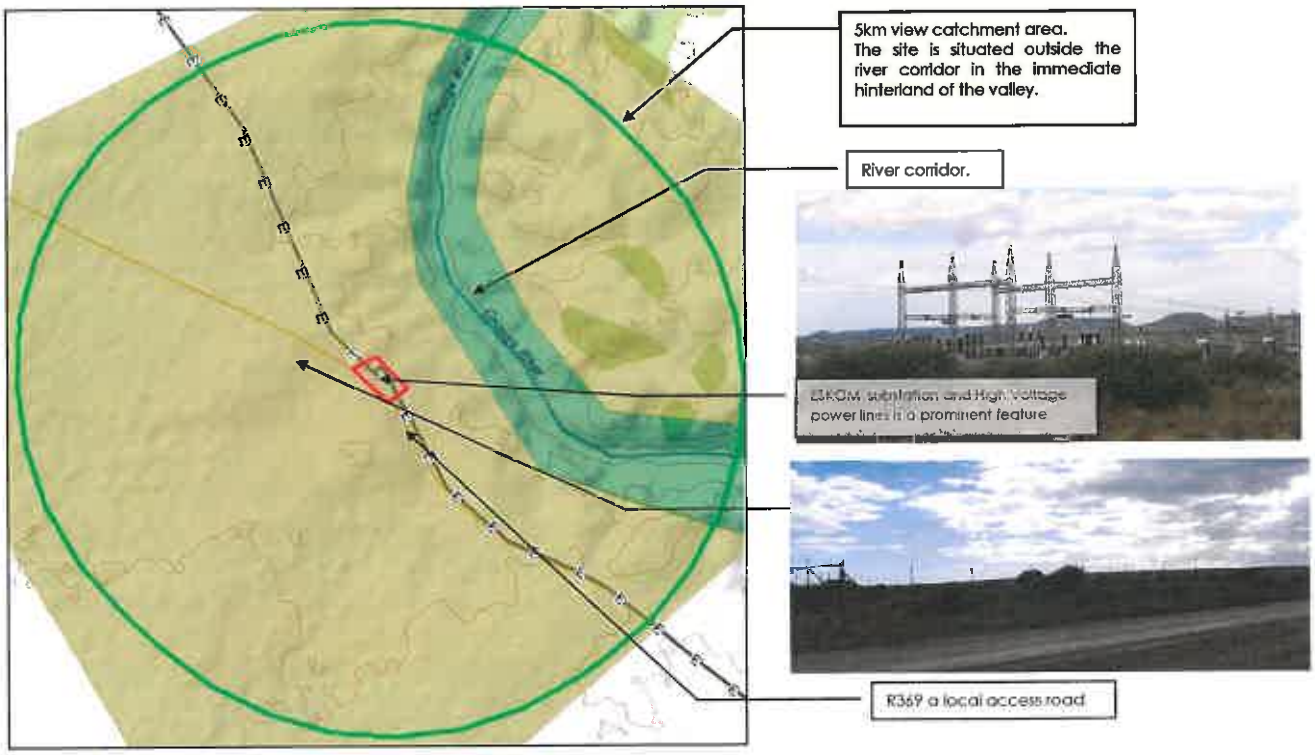


Figure 3: View catchment and site elements

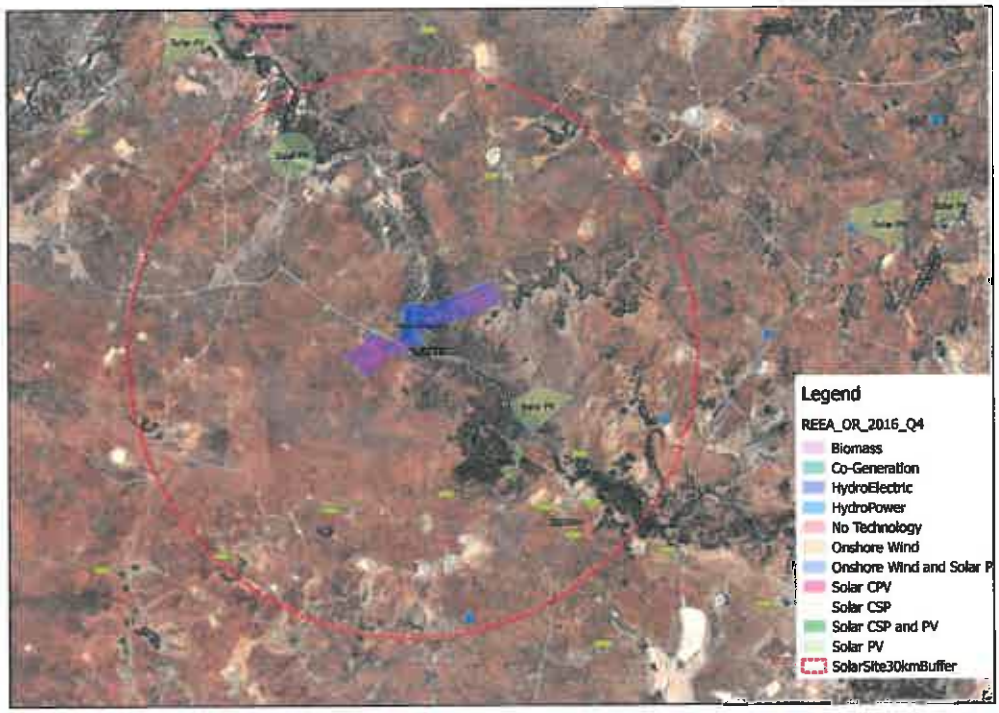


Figure 5: 30km Radius & other energy projects

5 FINDINGS AND CONCLUSIONS

5.1 Construction Impacts

During construction, various large earth moving equipment and equipment will be transported to the site and work on the site. This will impact on the general experience of viewers. This impact is however temporary and not uncommon during construction of infrastructure. Communities have fairly high tolerance levels for such activities if it contributes to the infrastructure of the area.
Rating: Low

5.2 Operational Impacts

The site is situated in an area with a rural character. The immediate are however do host an electrical substation and HV lines. The solar farm will thus change the character of the immediate environment. The view catchment is however small due to topographical variations. The landscape has a medium absorption rate which reduces the significance of land use change.

The R369 will be exposed to the site, but the impact is of short duration and linked to existing similar infrastructure namely the substation and HV lines. The short duration of view reduce the significance of impact.

As the PV units are planned next to the substation, the transmission lines will be on-site and not add any additional off-site visual impact to the development

The facility has a high exposure when the viewer is within approximately 1km of the site. The duration of view is however short as the viewer travel passes the site. The change in technology reduce the intrusion level of the proposal and thus result in a lower overall impact than the original proposal. Therefore the new proposal does not present an unacceptable level of change to the visual environment and therefore the development can be recommended.

Due to the locality of the units on the same site as the substation, the transmission lines will have very little additional impact on the current land use and thus visual appearance.

The proposal does not present an unacceptable level of change to the visual environment and therefore the development can be recommended.

Statement 1: The property on which the development is proposed, is currently used for substation and HV Power lines but the surrounding area has a rural character. The proposed solar farm will change the character of the immediate surrounds but within acceptable levels of change.

Statement 2: The new technology reduces the visual impact.

Statement 3: The proposal does not pose any significant cumulative visual impacts which would deem the proposal unacceptable.

6 MITIGATION MEASURES

The nature of the development is such that very little mitigation measures is required. A vegetation strip between the road and the solar facility provides soft boundary and this vegetation strip should be retained.

Appendix D4: Visual Impact Assessment
(Original report)

DISSELFONTEIN, PORTION OF PORTION 8 FARM77: SOLAR ENERGY FACILITY

VISUAL ASSESSMENT

For consideration in the Basic Assessment
For
EnviroAfrica
PO Box 5367
Helderberg
7135
info@enviroafrica.co.za

Final Report
11 May 2012

Compiled by:
S.C. Lategan

GeoStratics

PO Box 1082
Strand
7139

Report history:

Version	Date	Amendments
Draft Report	26 March 2012	
Final Report	11 May 2012	

CONTENT

Tables:

Figures:

Relevant Qualifications & Experience of the Author
Ms Sarien Lategan holds a Honours Degree in Geography as well as a Masters Degree in Town and Regional Planning from the University of Stellenbosch. She has 7 years experience as Town planner at a local government, 3 years with South African national Parks as planner and project manager of various GEF and World Bank managed, tourist facilities in the Table Mountain National Park and since 2004 as private practitioner involved in inter alia Site Analysis and Visual Impact assessments for various types of developments ranging from housing, tourism to infrastructure developments.

Ms Lategan is registered as a professional Town and Regional Planner as well as Environmental Assessment Practitioner.

Declaration of Independence

I, Sarah C. Lategan, fully authorized by Geostratics CC, declare that I am an independent consultant to EnviroAfrica and neither myself nor Geostratics, has any business, financial, personal or other interest in the proposed project or application in respect of which I was appointed, other than fair remuneration for work performed in connection with the application. There are furthermore no circumstances which compromise my objectivity in executing the task appointed for.

SC Lategan

EXECUTIVE SUMMARY

Sarien Lategan of Geostratics was appointed to undertake the visual impact assessment of a maximum 10Megawatt solar facility, as input to the Basic Assessment in terms of the national Environmental management Act, 1998 (Act no. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2010 by undertaken EnviroAfrica. The development of the solar farm is proposed by Keren Energy (Pty) Ltd. The site on which the facility is planned comprises a portion of Farm 8/77, Disselfontein in the Hopetown district.

The site is situated on a secondary gravel road approximately 25km northwest of Hopetown, south of the Orangeriver.

The aim of the assessment is to identify view receptors and assess the impact of the development on these receptors. In this regard the larger site was screened and based on this findings as well as inputs by other specialists, a most suitable area of 20ha was identified on which the final assessment focus.

At the time of assessment a final decision has not yet been taken on the exact technology or mix of technology to be used in the development. In this regard the worst case scenario has been followed by assessing the technology most probably going to have the most visual impact in terms of size of structures. Should a different technology thus been decided on which involve smaller units, the visual impacts will certainly be less than what is assessed in this report. For the purposes of this study thus, tracking CPV units of dimensions 15,64m in height and 17m wide has been assessed.

The assessment established that the receiving environment comprise an area dominated by low intensity agriculture, irrigation farming and game farming. The site is in close proximity to an ESKOM substation and HV power lines. The development will change the character of the area but the assessment establishes that due to the scale and absorption capacity of the environment, the change is within acceptable levels.

The only sensitive receptor identified is the road. The assessment established that the visual significance is medium and within acceptable levels.

The overall conclusion is that the visual impact is within acceptable levels and could thus be recommended.

1 BACKGROUND

Sarien Lategan of Geostratics was appointed to undertake the visual impact assessment of a maximum 10Megawatt solar facility, as input to the Basic Assessment in terms of the national Environmental management Act, 1998 (Act no. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2010 by undertaken EnviroAfrica. The development of the solar farm is proposed by Keren Energy (Pty) Ltd. The site on which the facility is planned comprises a portion of Farm 8/77, Disselfontein in the Hopetown district.

The site is situated on a secondary gravel road approximately 25km northwest of Hopetown, south of the Orangeriver.

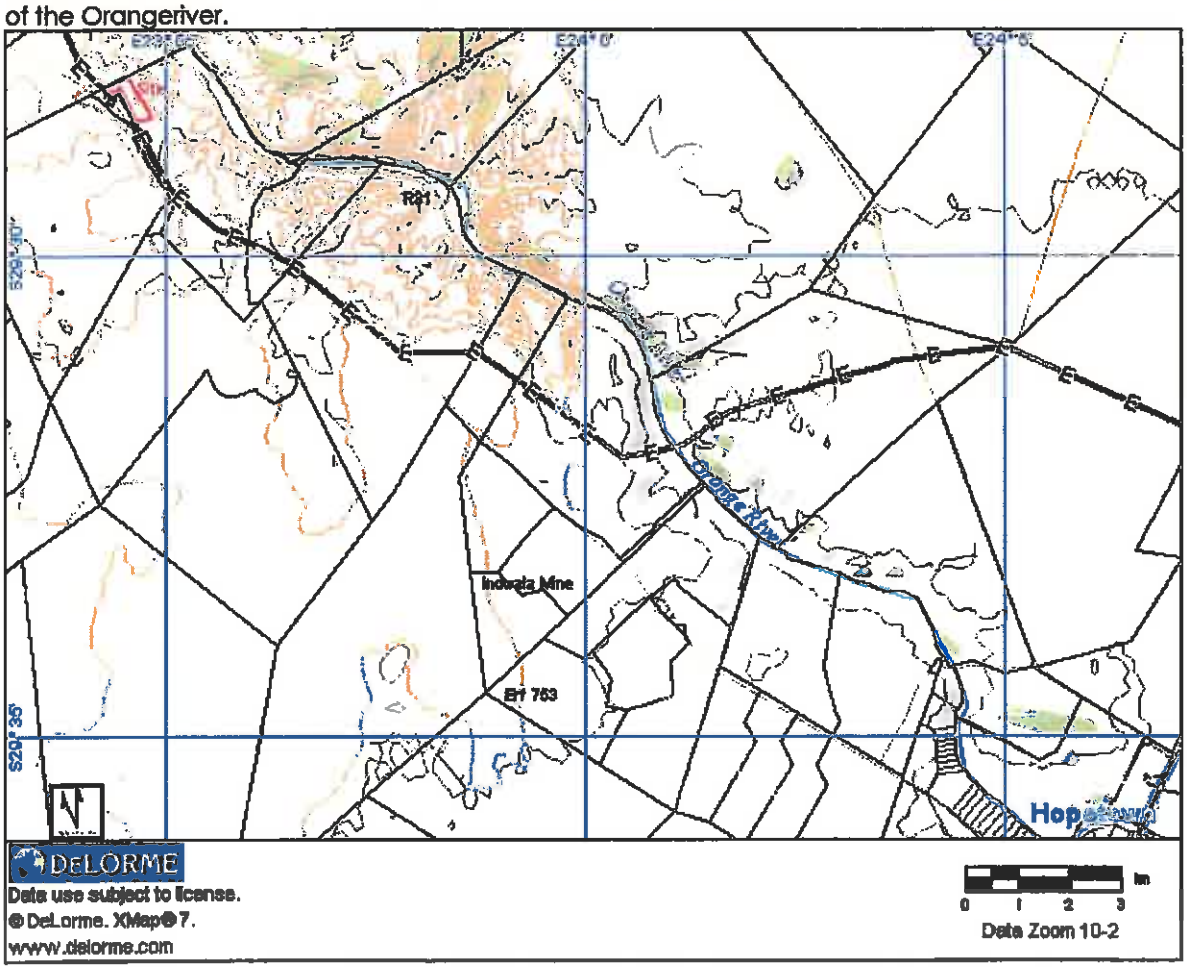


Figure 1: Locality

Figure 2: Site boundary

2 TERMS OF REFERENCE

The applicant intends the development of a solar farm on a portion of Farm 8/77, Disselfontein, Hopetown district. The site gain access off the R369 between Hopetown and Douglas, approximately 20km from Hopetown.

The objective of the Visual Impact assessment is to determine the significance of any visual impact. This assessment will indicate whether from a visual perspective the development constitute and acceptable level of change and if so what potential mitigation measures can reduce any visual impact as to limit

To determine the potential extent of the VIA required the following broad criteria are considered.

Areas with protection status, e.g. nature reserves	None
Areas with proclaimed heritage sites or scenic routes	None.
Areas with intact wilderness qualities, or pristine ecosystems	Natural areas, low intensity agriculture and game farming.
Areas with intact or outstanding rural or townscape qualities	None
Areas with a recognized special character or sense of place	None

Areas with sites of cultural or religious significance	None
Areas of important tourism or recreation value	The site is in a region where such elements exists and are important in the Green Kalahari tourist route, although the specific route, namely R31 has not been identified as a scenic drive or tourist route.
Areas with important vistas or scenic corridors	To assess.
Areas with visually prominent ridgelines or skylines.	None

Table 1: Requirements for visual assessment

High intensity type projects including large-scale infrastructure	yes
A change in land use from the prevailing use	Infill and expansion of property currently used for utility/infrastructure (ESKOM substation and HV power lines)
A use that is in conflict with an adopted plan or vision for the area	No
A significant change to the fabric and character of the area	No
A significant change to the townscape or streetscape	No
Possible visual intrusion in the landscape	Potentially
Obstruction of views of others in the area	Potentially

Table 2: Nature of intended development

From the above it is clear that the receiving environment holds certain visual elements which may be impacted upon by development of the site.

It is thus clear that the potential exist that development of the site may have a visual impact. In order to assist authorities thus to make an informed decision, the input of a specialist is required to assist in the project design and assess the visual impact of the preferred project proposal.

The term visual and aesthetic is defined to cover the broad range of visual, scenic, cultural, and spiritual aspects of the landscape. The terms of reference for the specialist are to:

- Provide the visual context of the site with regard to the broader landscape context and site specific characteristics.
- Provide input in compiling layout alternatives.
- To describe the affected environment and set the visual baseline for assessment
- Identify the legal, policy and planning context
- Identifying visual receptors
- Predicting and assessing impacts
- Recommending management and monitoring actions

3 Methodology and principles

3.1 Methodology

Table 4: Summary of methodology

Task undertaken	Purpose	Resources used
A screening of the site and environment	To obtain an understanding of the site and area characteristics and potential visual elements	Photographs Site visits
Identify visual receptors	To assess visual impact from specific view points	Photographs, profiles
Contextualize the site within the visual resources	To present an easy to understand context of the site within the visual resource baseline	Specialist: S Lategan Graphic presentation Superimposed photo's Model in case of high significance
Propose possible mitigation measures	To present practical guidelines to reduce any potential negative impacts.	Specialist: S. Lategan

Throughout the evaluation the following fundamental criteria applied:

- Awareness that "visual' implies the full range of visual, aesthetic, cultural and spiritual aspects of the environment that contribute to the area's sense of place.
- Consideration of both the natural and cultural (urban) landscape, and their inter-connectivity.
- The identification of all scenic resources, protected areas and sites of special interest, as well as their relative importance in the region.
- Understanding of the landscape processes, including geological, vegetation and settlements patterns which give the landscape its particular character or scenic attributes.
- The inclusion of both quantitative criteria, such as visibility and qualitative criteria, such as aesthetic value or sense of place.
- The incorporation of visual input as an integral part of the project planning and design process, so that the findings and recommended mitigation measures can inform the final design and quality of the project.
- To test the value of visual/aesthetic resources through public involvement.

3.1.1 Principles

The following principles to apply throughout the project:

- The need to maintain the integrity of the landscape within a changing land use process
- To preserve the special character or 'sense of place' of the area
- To minimize visual intrusion or obstruction of views
- To recognize the regional or local idiom of the landscape.

3.1.2 Fatal flaw statement

A potential fatal flaw is defined as an impact that could have a "no-go" implication for the project. A "no-go" situation could arise if the proposed project were to lead to (Oberholzer, 2005):

1. Non-compliance with Acts, Ordinance, By-laws and adopted policies relating to visual pollution, scenic routes, special areas or proclaimed heritage sites.
2. Non-compliance with conditions of existing Records of Decision.
3. Impacts that may be evaluated to be of high significance and that are considered by the majority of stakeholders and decision-makers to be unacceptable.

The screening of the site and initial project intentions did not reveal any of the above issues which may result in a fatal flaw.

3.1.3 Gaps, limitations and assumptions

The assessment has to be read with the following in mind:

1. No information is available on the alignment of transmission lines linking the solar facility with the ESKOM substation. Due to the fact that the site is adjacent the substation it is assumed that no off-site transmission lines will be required.

2. Access is obtained via existing roads and no road upgrades or new roads will be constructed.

3.1.4 Assessment explained

The assessment of visual impact is done on two levels namely the absorption rate of the receiving environment and the individual view receptors. The absorption rate of the receiving environment is determined by various elements e.g. topography, land use etc and the assessment will focus on the acceptable level of change of the area.
Visual receptors are assessed individually based on the sensitivity of the receptor, exposure to the development and intrusion rate.
The following framework is used in order to assess view receptors:

Criteria	High	Moderate	Low
Exposure	Dominant, clearly visible	Recognizable to the viewer	Not particularly noticeable to the viewer
Sensitivity	Residential, nature reserves, scenic routes	Sporting, recreational, places of work	Industrial, mining, degraded areas
Intrusion/Obstructive	Noticeable change, discordant with surroundings	Partially fits but clearly visible	Minimal change or blends with surroundings

A sensitive receptor with a low exposure and/or low intrusion rate can be regarded as a low significance rating. A receptor of low sensitivity but with high exposure can be of high significance if the intrusion rate is also high but is reduced if the intrusion rate is medium or low.
The overall significance therefore depends not only on the sensitivity of the receptor but also on the exposure and intrusion rate and thus a combination of the criteria.

3.2 Legal Framework, Guidelines and policies

3.2.1 National Environmental Management Act, 107, 1998 and relevant Guidelines:

An assessment in terms of any activity that required an EIA or Basic Assessment may be subjected to a specialist visual assessment in order to determine the significance of the potential impacts to result from a proposed activity.

The National Dept has subsequently determined that all applications for solar farms are subject to a visual impact assessment.

3.2.2 Northern Cape PSDF

The NCPSDF identified various use zones.
The PSDF provides guidance to ensure that

- development is of a quality that promotes environmental integrity.
- based upon the principles of 'critical regionalism" which promotes a return to the development of high-quality settlements.
- remised upon "The Big Five" principles that guide the planning, design and management of development namely sense of place, sense of history, sense of nature, sense of craft and sense of limits.

3.2.3 Green Kalahari tourism

The Green Kalahari tourist plan is an initiative to promote tourism in the region. The protection of cultural and heritage resources as well as the active involvement and empowerment of local communities through tourism is a core theme through the tourism plan.

4 DEVELOPMENT PROPOSAL

4.1 General Description

Construction of Solar energy production facility ("Solar Farm") with a maximum capacity of 10Megawatt, consisting of approximately 140 tracking CPV units, on approximately 20ha. The exact technology to be used has not been determined and this assessment is based on the following typical parameters. Units are typically positioned in rows with access roads between every second row. Unit spacing typically varies between 43x37 and 33x30m.

Figure 3: Typical Solar Farm layout

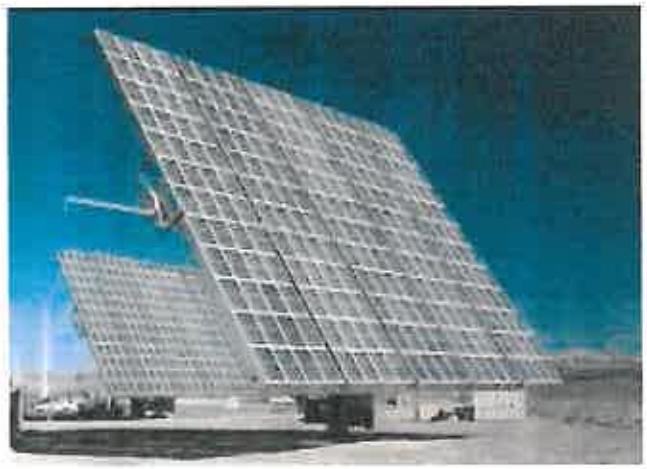


Figure 4: Typical CPV Unit

The Solar Farm includes supportive infrastructure which consists of 2 -4 concrete transformer pads approximately 20x15m respectively, a fenced construction staging area, maintenance shed and a switch panel for connection to the grid and transmission lines from the transformers to the closest ESKOM substation.

4.2 Project Elements

4.2.1 Extent and layout

The Solar farm will occupy approximately 20ha. The nature of the tracking CPV units are such that the property has to be leveled to less than 1:5 gradient in order to prevent the units to touch the ground when turning on the pedestal. CPV units are positioned in a grid with the active panel side facing north. The units will rotate from east (morning) to west (afternoon). Back of units facing south. Units are position in rows of two with access roads in between.

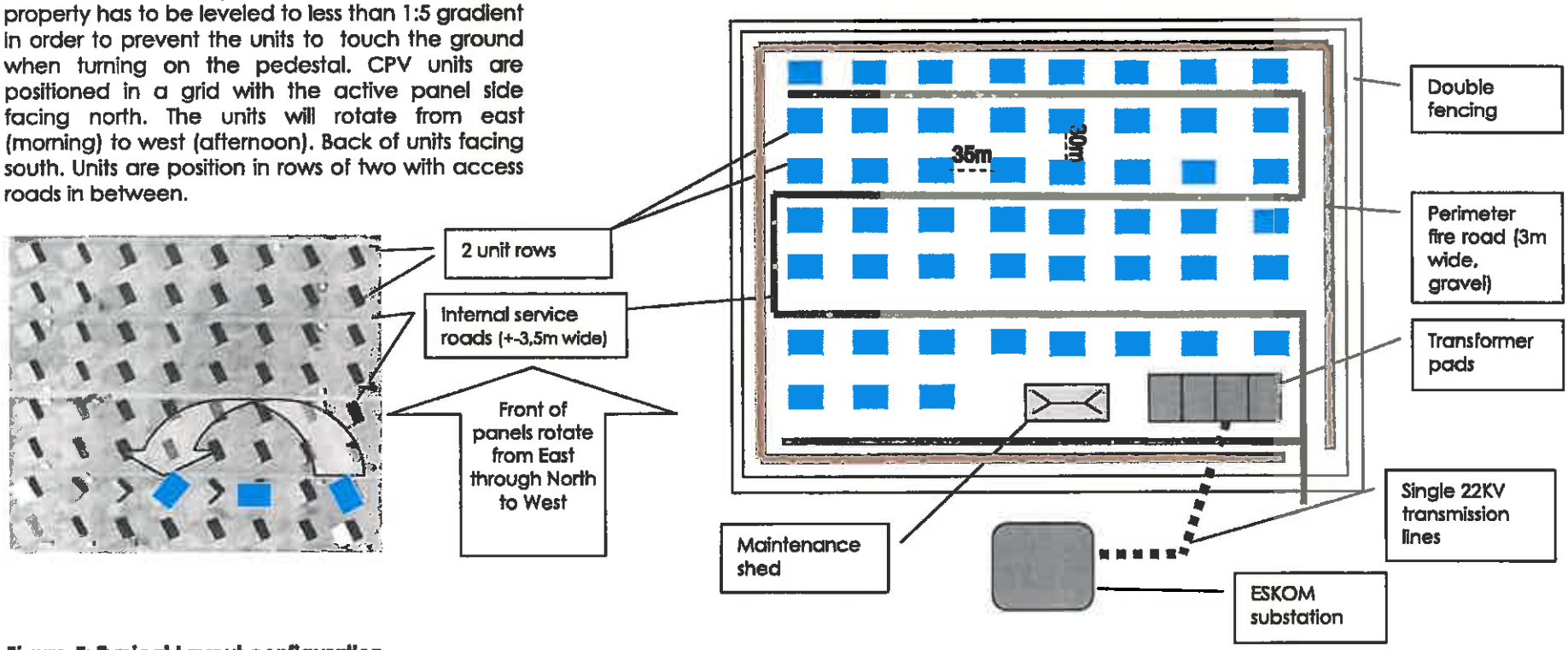


Figure 5: Typical Layout configuration

4.2.2 Tracking CPV Units

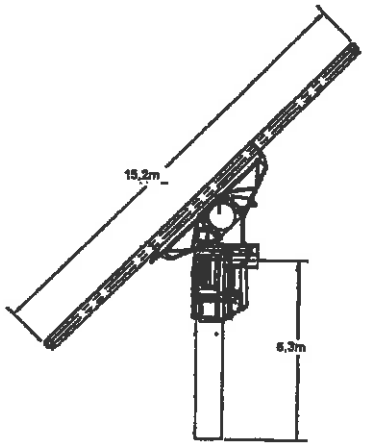
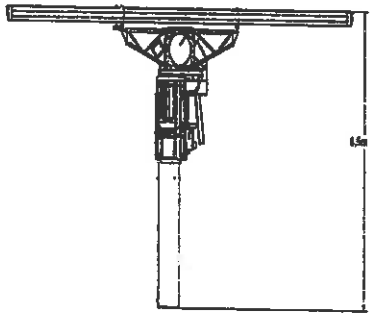
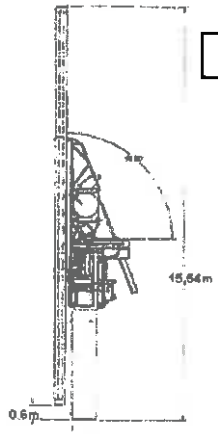


Figure 7: Typical Operational position



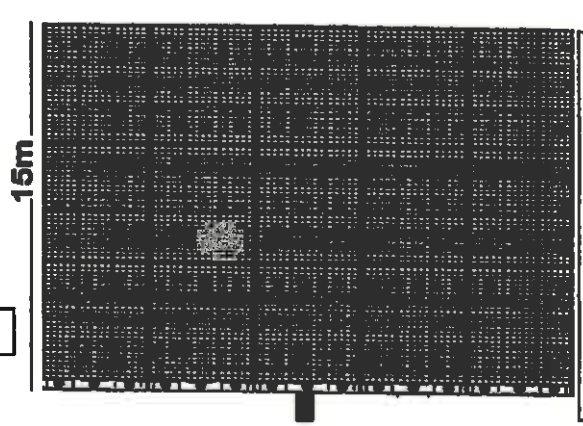
In stow: >28 mph. > 10 sec. Out of stow : <26 mph. >300 sec.

Figure 6: Storm Stow position



Side view

Front view



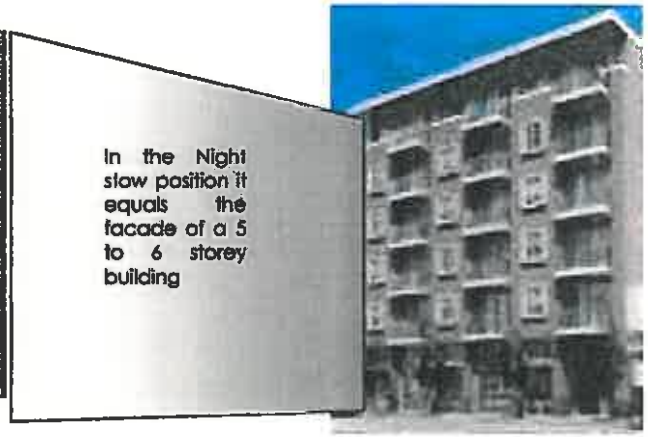


Figure 8: Night stow position

4.2.3 Project perimeter

Double fencing with inner fence consisting of galvanized palisade fence and outer an electrified fence of 2,4m in height.

Figure 9: Typical electrical fence

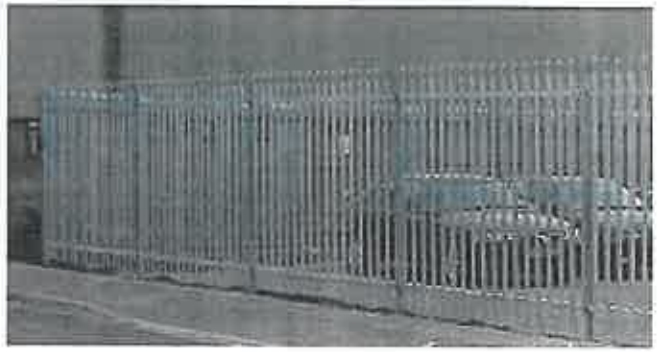


Figure 10: Typical galvanized palisade fence

4.2.4 Supportive Infrastructure

Typically 20 x 15m respectively.
Black top surface

Figure 12: Transformer Pads and typical transformer

Single 22KV Power lines will feed from the transformers to the ESKOM

Figure 11: Typical 22KV single Power line

4.2.5 Operational elements

Depending on the exact technology the operational activities can vary. Tor the typical units described above, teams will access the site and physically clean panels. This is done either by rope access or the use of "cherry pickers". In areas of high dust conditions, cleaning can be more regular.

4.3 Construction elements

For the construction of the typical units describe above, large earth moving equipment will be used as well as high lift equipment and cranes. Large transport trucks for delivery will enter the site during construction. For technology that uses smaller units or static units the scale of equipment required for construction will be less.

Construction process entails:

- clearing and leveling of the site,
- construction of pedestals which involve concrete bases and
- fitting of panels
- construction of internal and access roads
- Fencing and security infrastructure
- Construction of support facilities such as maintenance sheds, etc
- Construction of transmission lines

5 RECEIVING VISUAL ENVIRONMENT

5.1 Description

Understanding the potential impact of a proposed development, an understanding of the receiving environment is important. In this regard the main elements of the receiving environment relates to the character of the current surrounding land use and the absorption capacity of the area. The character of the area entails the sense of place created by the current land use and the scale and type of infrastructure or physical elements within the immediate area. The absorption capacity relate to the density of physical elements and topographical variations of the landscape, which will determine the catchment area. The human eye will observe the horizon on a perfectly flat surface at a distance of 30km. This is however significantly reduced by landscape elements which obstruct the view.

5.1.1 Catchment area

The site is situated outside the river corridor in the immediate hinterland of the valley. Due to the topographical features consisting of low hills, the catchment area is restricted to approximately 5km in almost all directions. Limited viewpoints will be beyond this catchment area.

5.1.2 Sense of Place:

The site is situated in a rural to natural landscape and although low intensity farming occurs and electrical infrastructure exists, the overall sense of place display a natural character. The traveler on is between towns and will thus have a lower capacity to accept urban infrastructure than within a town. The region is however known for irrigation farming and intermittent observation of such activities again increases the traveler's capacity slightly. The presence of infrastructure is thus not totally foreign to the area, as long as it does not create a high level of intrusion.

5.2 Findings

The proposed site is situated in the rural area adjacent to the Orangeriver corridor. The Orangeriver corridor represent a production landscape, which in the immediate surrounds of the site has a lower level of irrigation farming and more extensive farming due to the topography. The proposed solar farm is however on the site of an existing ESKOM substation with HV power lines. The area displays a rural character with low intensity farming, game farming and natural areas.

The area is characterized by a flowing topography of low rises just outside the valley corridor. More hills and ridges occur closer to the river. The plain area however display such a level of gradient that present a fairly high level of absorption and view is on average restricted to the immediate environment and seldom more than 5km. The human eye can observe the horizon on a perfectly flat surface up to 30km. The Disselfontein area however displays sufficient gradient variations to restrict this view significantly, mostly below 2km.

Statement 1: The property on which the development is proposed, is currently used for substation and HV Power lines but the surrounding area has a rural character. The proposed solar farm will change the character of the immediate surrounds.

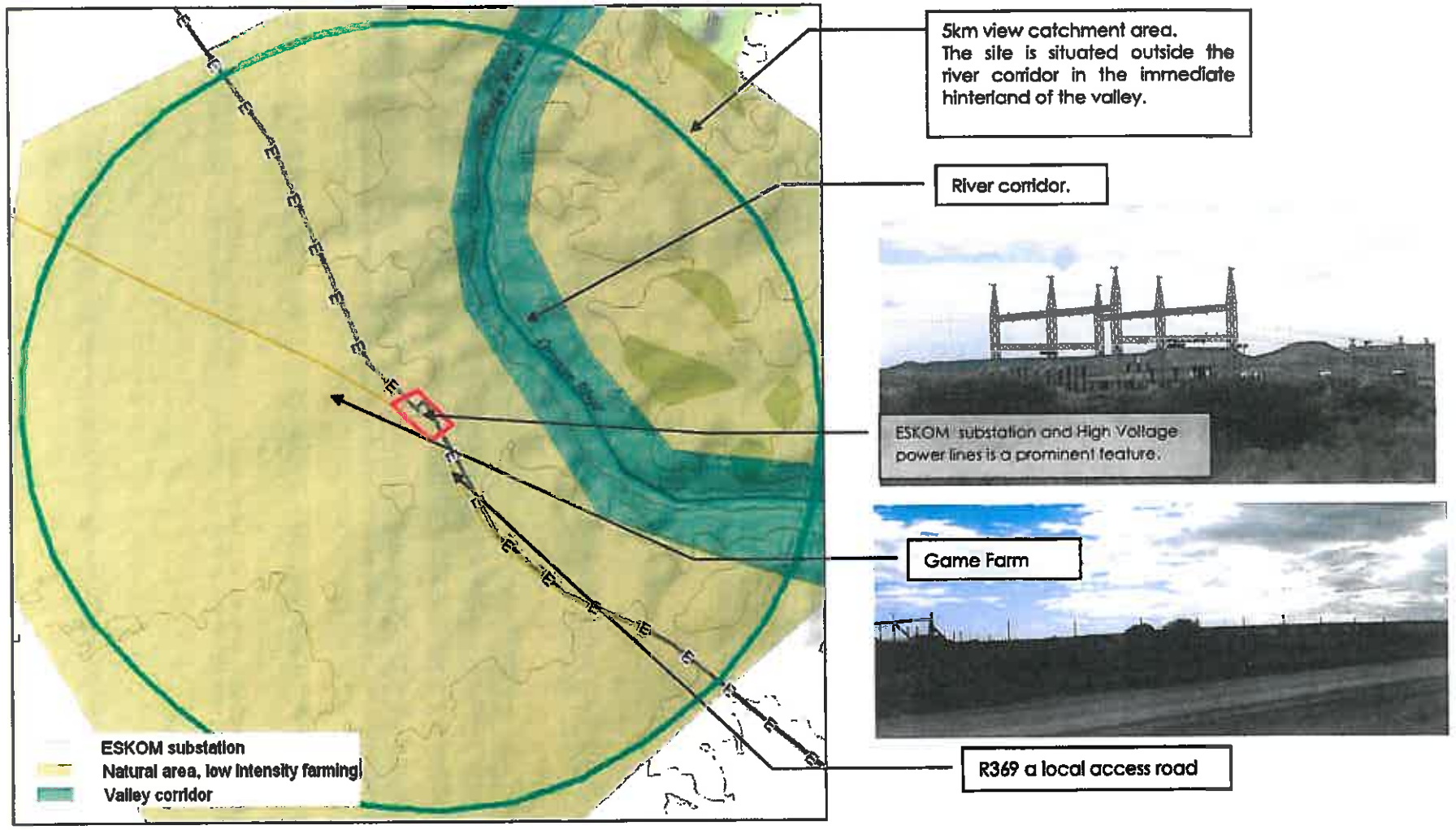


Figure 13: View catchment and site elements

6 VISUAL RECEPTORS

Visual receptors are those positions from where the development site is potentially visible. Based on the character of the locality of the receptor its sensitivity can be rated. Generally residential areas and tourism related destinations and routes are sensitive to visual intrusions as they relate to the well-being of residents and the tourism quality of the area.

6.1 Potential Receptors

The only identified receptor is the secondary road linking Hopetown and Douglas. (Figure 14)

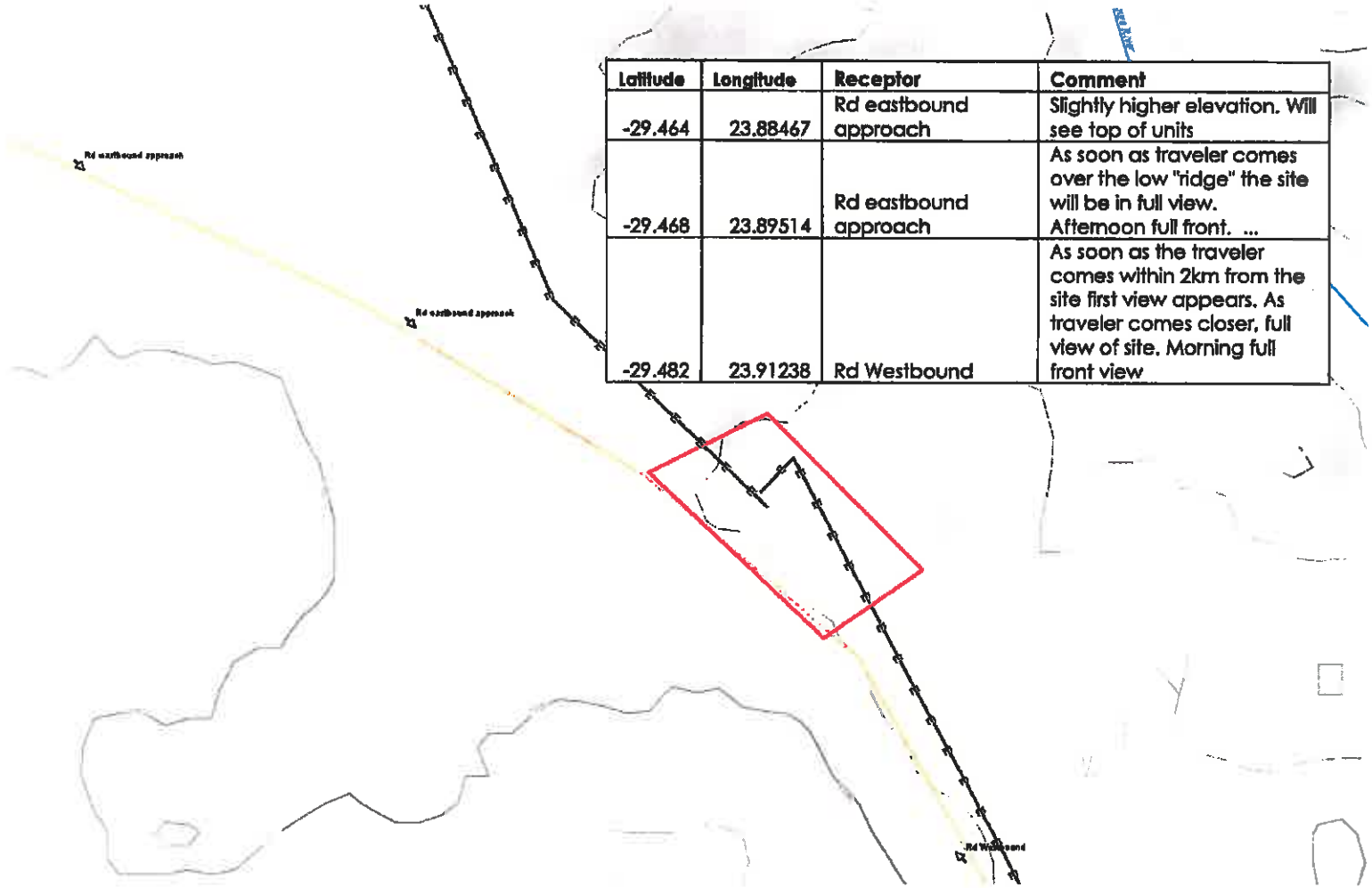
6.2 Assessment of Receptors

1. Eastbound (Figure 15): As the traveller approach from the west the site is out of view until crossing a low ridge to the east, from where the landscape terraced down to the site and exposure increases.
   When the traveller passes the site, the units are dominant. The units are however facing north and thus the back of units are visible and no glare is expected off the back of the panels.

   Visual significance is medium

2. Westbound (Figure 16): As the traveller approach from the east, the site is out of view until approximately 800m from the site.
   When the traveller passes the site, the units are dominant. The units are however facing north and thus the back of units are visible and no glare is expected off the back of the panels. In the morning the panels will be facing east, but the orientation of the traveller is such that the panels will not face the approaching traveller

   Visual significance is medium

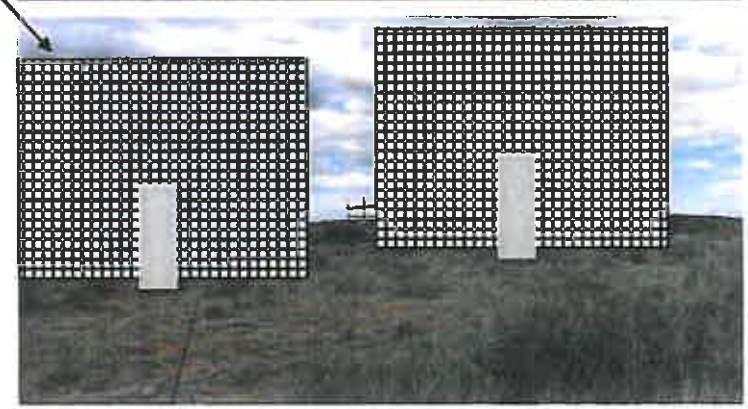


Latitude	Longitude	Receptor	Comment
-29.464	23.88467	Rd eastbound approach	Slightly higher elevation. Will see top of units
-29.468	23.89514	Rd eastbound approach	As soon as traveler comes over the low "ridge" the site will be in full view. Afternoon full front. ...
-29.482	23.91238	Rd Westbound	As soon as the traveler comes within 2km from the site first view appears. As traveler comes closer, full view of site. Morning full front view

Figure 14: Visual Receptors

VIA: Disselfontein

As the traveller approach from the west the site is out of view until crossing a low ridge to the east, from where the landscape terraced down to the site and exposure increases.
When the traveller passes the site, the units are dominant. The units are however facing north and thus the back of units are visible and no glare is expected off the back of the panels.



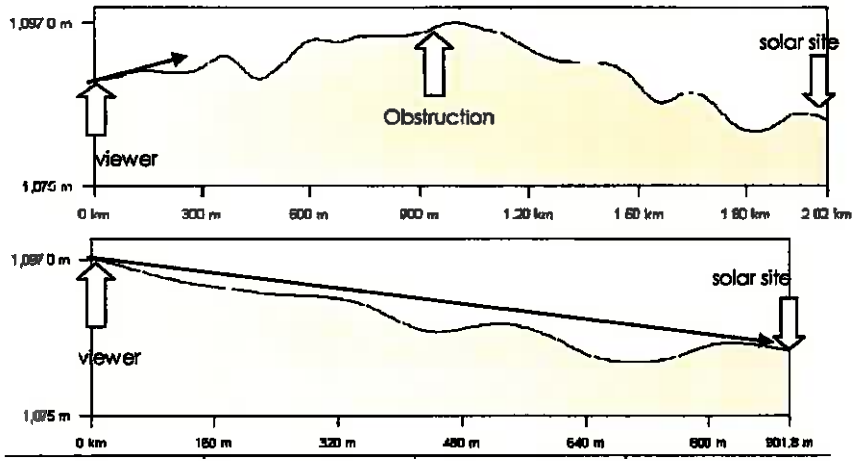
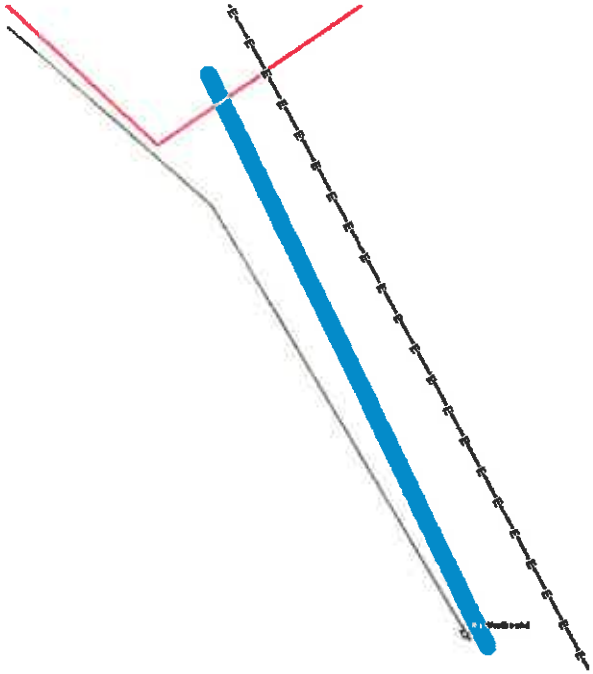
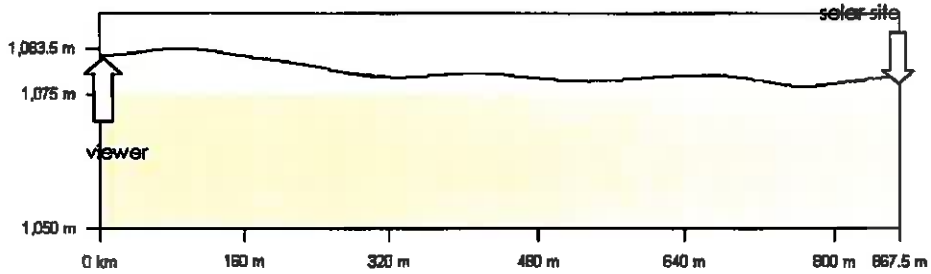


Figure 15: Road Eastbound as receptor

Criteria	High	Moderate	Low
Exposure		recognizable to the viewer	not particularly noticeable to the viewer
Sensitivity	residential, nature reserves, scenic routes	sporting, recreational, places of work	industrial, mining, degraded areas, local access road
Intrusion/Obstructive	noticeable change, discordant with surroundings	Partially fits but clearly visible	minimal change or blends with surroundings

Table 3: Road Eastbound as receptor assessed





As the traveller approach from the east, the site is out of view until approximately 800m from the site.
When the traveller passes the site, the units are dominant. The units are however facing north and thus the back of units are visible and no glare is expected off the back of the panels. In the morning the panels will be facing east, but the orientation of the traveller is such that the panels will not face the approaching traveller

Figure 16: Road Westbound as receptor

Criteria	High	Moderate	Low
Exposure		recognizable to the viewer	not particularly noticeable to the viewer
Sensitivity	residential, nature reserves, scenic routes	sporting, recreational, places of work	industrial, mining, degraded areas
Intrusion/Obstructive	noticeable change, discordant with surroundings	Partially fits but clearly visible	minimal change or blends with surroundings

Table 4: Road Westbound receptor assessed

Table 5: Summary of Visual Receptor assessment

Latitude	Longitude	Receptor	Comment	Exposure	Sensitivity	Intrusion/Obstructive	Finding
-29.464	23.88467	Rd eastbound approach distant	Slightly higher elevation. Will see top of units.	The low flowing hills screen view from a distance. Only once traveler pass over last low hill does the site becomes visible Rating: Low	The R369 is a local gravel road giving access to local farmers. Rating: Low	The top of units may be visible but not obstructive. A side view of units which reduce extent of view. Rating: Moderate	Although the site will be in full view of the traveler the road is of low order and the CPV panels are in character with the substation and ESKOM power lines. The duration of view is short as the viewer travel at least at 80km/h along this route. The overall significance of the change of landscape is low.
-29.468	23.89514	Rd eastbound approach	As soon as traveler comes over the low "ridge" the site will be in full view. Afternoon full front. ...	The solar farm will be in full view of the traveler with no screening. Rating: High		The units will be in full view. The traveler passes at the back of the units and will at first only have a side view of the units. Only when pass directly next to units will the extent be increased. Does however fit with substation and HV power lines Rating: Moderate	
-29.482	23.91238	Rd Westbound	As soon as the traveler comes within 2km from the site first view appears. As traveler comes closer, full view of site. Morning full front view	The solar farm will be in full view of the traveler with no screening. Rating: High		The units will be in full view. The traveler passes at the back of the units but will at first have a full front view during the morning. Only when pass directly next to units will the extent be increased. Does however fit with substation and HV power lines. Rating: Moderate	

7 CONSTRUCTION

During construction, various large earth moving equipment and equipment will be transported to the site and work on the site. This will impact on the general experience of viewers. This impact is however temporary and not uncommon during construction of infrastructure. Communities have fairly high tolerance levels for such activities if it contributes to the infrastructure of the area.
Rating: Low

8 FINDINGS

The site is situated in an area with a rural character. The immediate are however do host an electrical substation and HV lines. The solar farm will thus change the character of the immediate environment. The view catchment is however small due to topographical variations. The landscape has a medium absorption rate which reduces the significance of land use change.

The R369 will be exposed to the site, but the impact is of short duration and linked to existing similar infrastructure namely the substation and HV lines. The short duration of view reduce the significance of impact.

As the CPV units are planned next to the substation, the transmission lines will be on-site and not add any additional off-site visual impact to the development

The facility has a high exposure when the viewer is within approximately 1km of the site. The duration of view is however short as the viewer travel passes the site. Although the proposal does have a high intrusion level in close proximity, the short duration reduce the overall visual impact and therefore not present an unacceptable level of change to the visual environment and therefore the development can be recommended.

9 MITIGATION MEASURES

The nature of the development is such that very little mitigation measures is possible. It can be considered to provide a soft screening along the road to create a buffer between the imposing CPV units and the traveler.