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

DANIELSKUIL, PORTION ERF 753: SOLAR ENERGY FACILITY

VISUAL ASSESSMENT
ADDENDUM A

For consideration in the Basic Assessment
For
EnviroAfrica
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Addendum A (March 2017) to original Report (2012)

Compiled by:
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Report history:

Version	Date	Amendments
Draft Report: Version 1	26 March 2012	
Final Report	11 May 2012	
Addendum A	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 Erf 753, Danielskuil opposite the Indwala Lime mine.

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 Erf 753, Danielskuil opposite the Indwala Lime mine.

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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 remains unchanged.

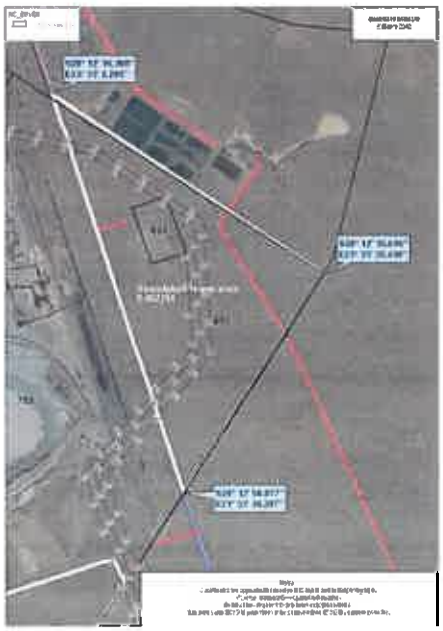

Figure 1: Site boundary

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.

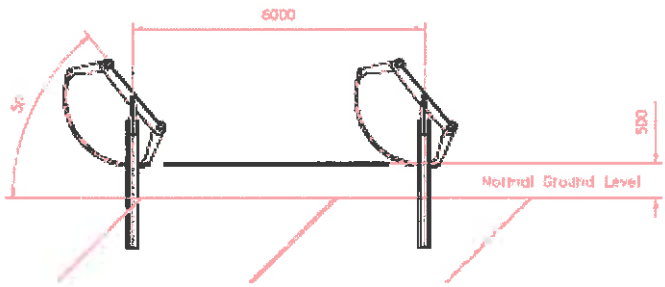

Figure 2: Single axis mounting system

No changes is made to the 22kV connector lines to the substation within the boundaries of 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

No changes has occurred within the receiving environment resulting in no additional visual receptors. 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 various 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 and due to the mining character of the region, the tolerance level of the receiving community is fairly high.

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 landscape consist a fairly flat plain interspersed with occasional low hills. The town to the north is situated on the lower slopes of a hill and face south towards the site.
The hills to the north and northwest restrict the catchment area to the slopes of these hills which are closer than 5km from the site. Due to the undulating landscape to the south and east, the catchment area is restricted to approximately 5km. (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 a number of energy facilities within this radius and generally within a timeframe of 30min. The R385 traverse through a number of proposed energy production sites in the direction of Postmansburg. The Danielskuil site is however screened from the R385 and does not add to space crowding on this route. The site is only exposed to the R31 and no other energy sites are located on this route. The effect of space crowding is thus extremely low and of no significant importance.

4.2.4 Cross Boundary

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

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

4.2.5 Fragmentation
The site is within the confines of an urban and industrial area and does not pose any visual fragmentation of the landscape.

4.2.6 Compounding Effects
From a visual perspective the site has no compounding impacts.

4.2.7 Indirect Effects
The development strenghen the industrial character of the immediate area and may result in support services developing in the vicinity. 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.

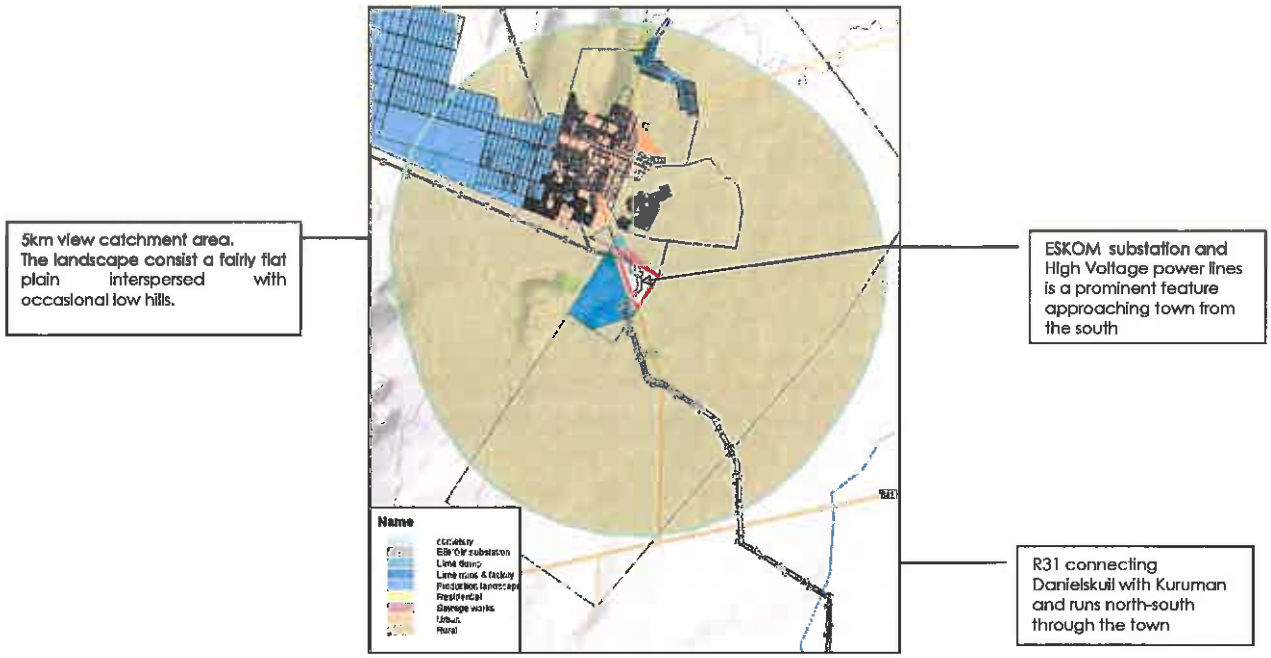

Figure 3: View catchment

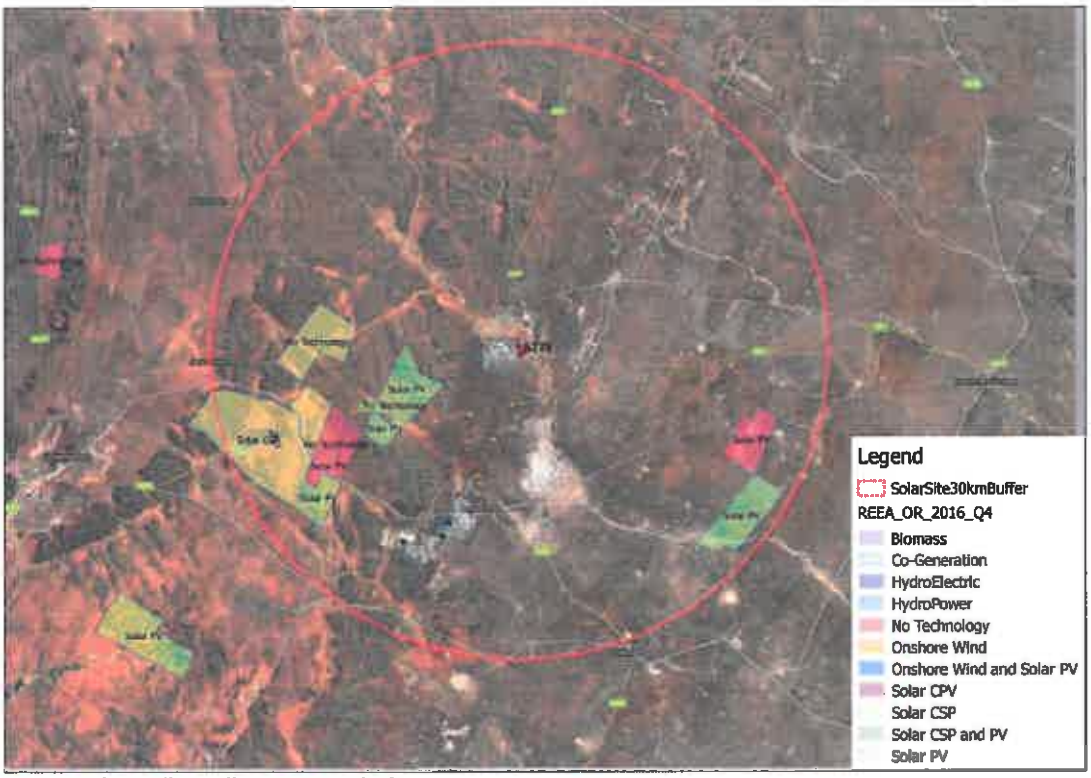

Figure 4: 30km Radius & other energy projects

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 proposed site is situated within the urban edge zone of Danielskuil in an area characterized by industrial type buildings and large infrastructure. The larger area reflects the characteristics of a rural to urban landscape and the site is situated within this land use continuum.

The area is characterized by a flowing topography of low rises on a large plain. It is interspersed with occasional low hills. 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 Danielskuil area however displays sufficient gradient variations to restrict this view significantly.

The site is situated in an area characterized by industrial type building, mine and utility land uses. The site has a high absorption capacity due to the presence of existing land use.

The sensitive receptors namely the monument and residential areas are situated such that the exposure to the site and the intrusion level is low, thus creating a low overall visual impact.

The less sensitive receptor namely the R31 will be more exposed to the site, but the impact is in character with the surrounding and thus of less significance.

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 a range of utility type of land use as well as large scale mining and therefore the proposed solar farm seem to be in character with these elements.

Statement 2: Due to the medium absorption capacity of the landscape, the development will easily be absorbed into the existing visual structure.

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

6 MITIGATION MEASURES

The level of visual impact is of such level that no mitigation to the proposed on-site development elements necessary, but in order to avoid any potential glare impacts of the R31 southbound, it can be considered to provide a soft screening along the road of height between 1,2 -1,8m.

Appendix D4: Visual Impact Assessment
(Original report)

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The site is situated on the southern outskirts of Danielskuil adjacent the R31, abutting the ESKOM substation.

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, i.e. an area of approximately 7km² 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 a mix of land uses often associated with commonages on the edge of towns with little sense of place or urban coherence as well as a mining character. The proximity of the development to industrial related uses and infrastructure e.g. the electrical substation, sewage works, landfill and mining, implies that the use is consistent with the overall land use of the area. From this perspective the proposed solar farm will not have a negative impact on the sense of place or urban context. Although the area appears fairly flat, it does host subtle altitude variations which create an area capable of absorbing a certain level of structures. With the high level of existing infrastructure, these elements will also absorb the solar farm.

The sensitive receptors identified include the R 31 giving access to the town, residential areas and the monument on the hill behind the town. It was however determined that the exact positioning of the facility behind existing infrastructure and taking into account the screening properties of the topographical features, the exposure level and intrusion factor reduce the impact to within the acceptable levels not to have a significant visual impact on the identified sensitive receptors.

The overall conclusion is 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.

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 Erf 753, Danielskuil opposite the Indwala Lime mine.

The site is situated on the southern outskirts of Danielskuil adjacent the R31, abutting the ESKOM substation. The portion utilized by the mine is zoned for mining purposes but the remainder of the erf is undetermined.

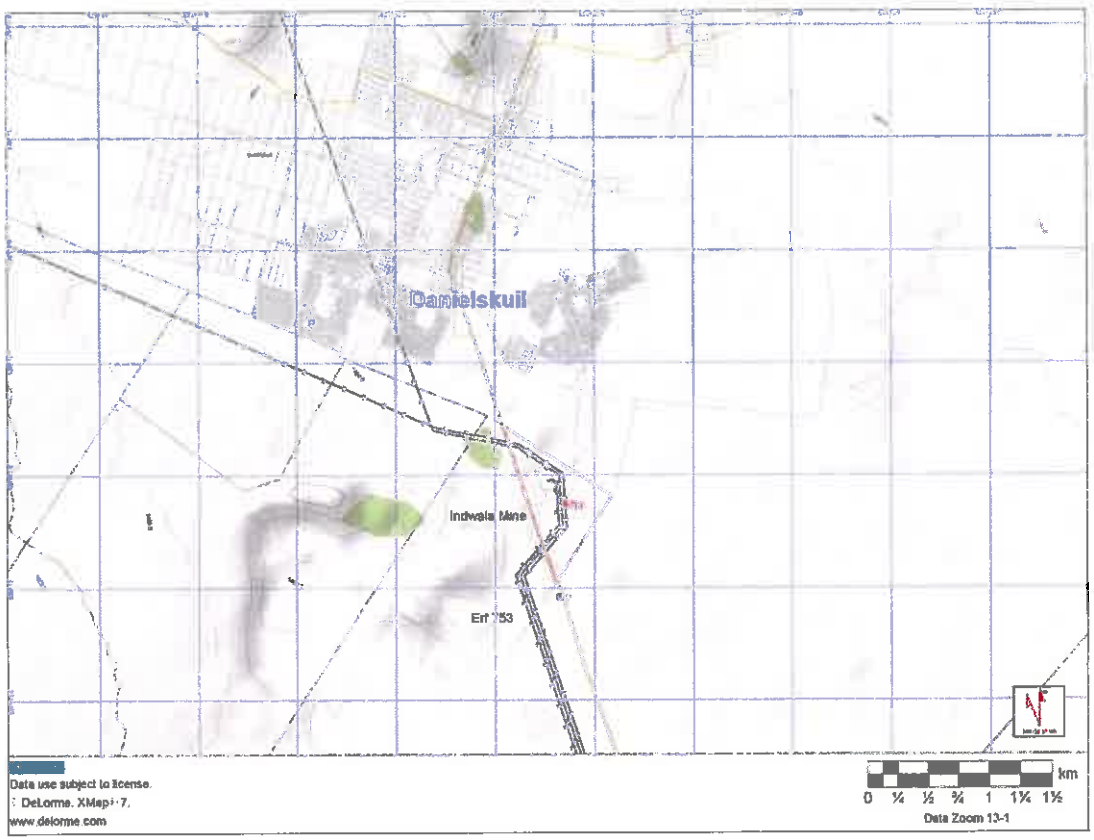

Figure 1: Locality

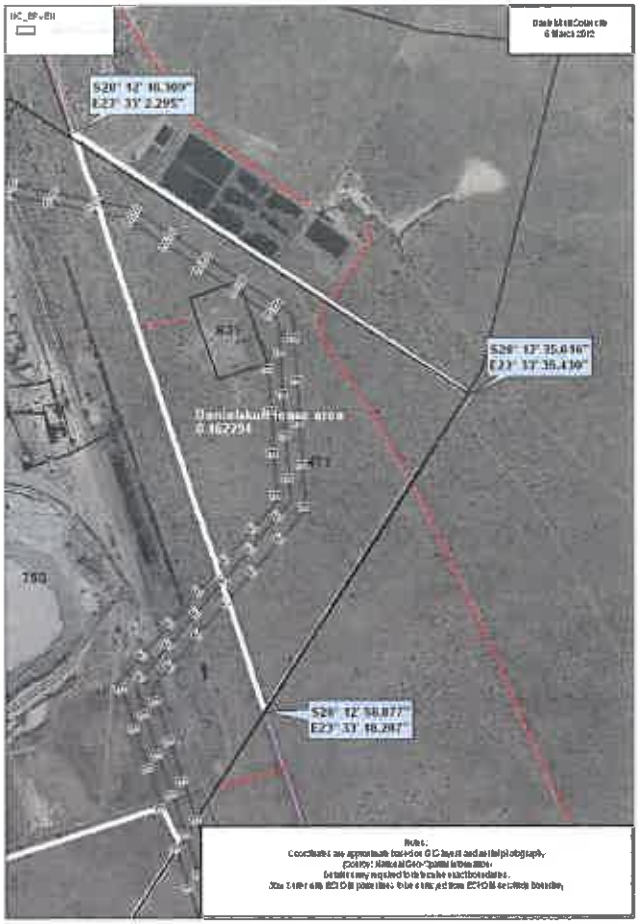

Figure 2: Site boundary

2 TERMS OF REFERENCE

The applicant intends the development of a solar farm on a portion of Erf 753, Danielskuil. The site gain access off the R31 just south of the town.

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	None.
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 of property currently used for utility/infrastructure
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	Potentially
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 is 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, but due to the locality of the substation adjacent the site 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 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.

3.2.4 Syianda Environmental Management Framework

The EMF indicates that the improvement of energy delivery to communities is important and makes the following statements in paragraph 2.3.6

"(b) Opportunities: Due to the climate of the area there is huge potential to utilise solar energy more widely, especially in the remote areas of the district.
(c) Constraints: The small communities in sparsely populated areas make effective distribution of electricity very difficult in some areas.
(d) Desired state. The desired actions relating to energy supply in the area:

- *Electricity provision should be extended to all areas in order to reduce the dependency on candles and wood as the main energy sources (the strong reliance on wood is not sustainable over the long term and can lead to the overexploitation of especially Camel Thorn trees in the area); and*
- *the excellent potential for the utilisation of alternative energy sources should be optimised by a sponsored programme to introduce alternative energy on a large scale to remote communities."*

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The EMF however only refers to visual impacts related to mining and made a broad statement that mines should be rehabilitated to reduce visual impact on the environment. No further guidelines or principles related to visual environment is provided in the EMF.

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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.

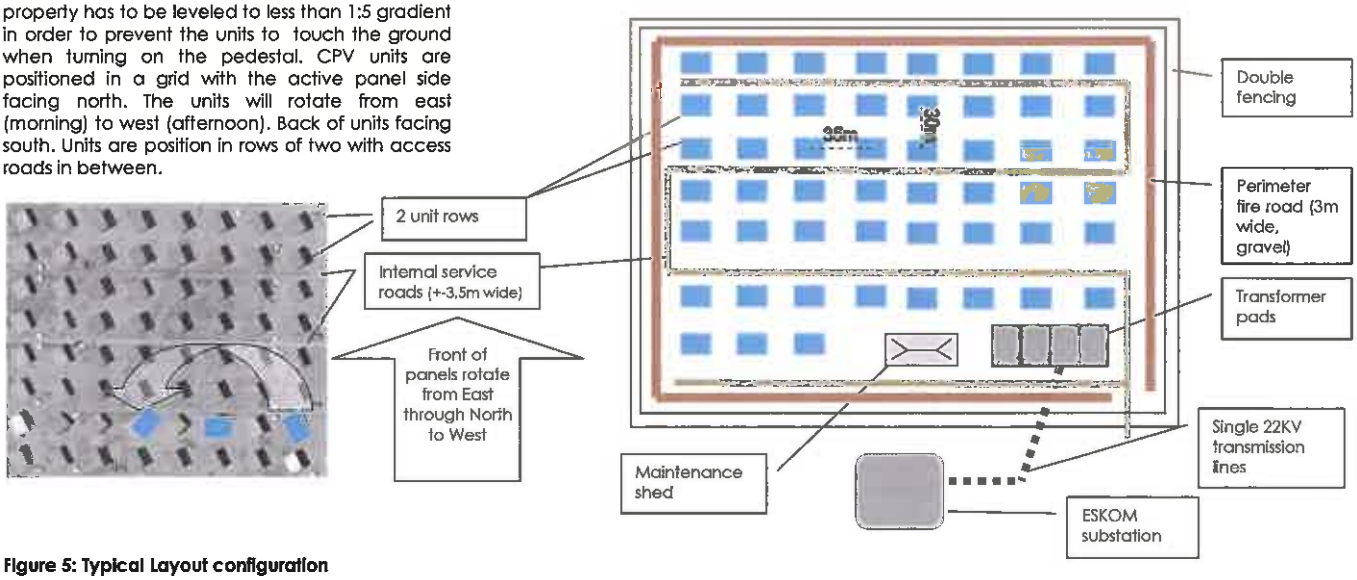


Figure 5: Typical Layout configuration

VIA: Danielskuil

4.2.2 Tracking CPV Units

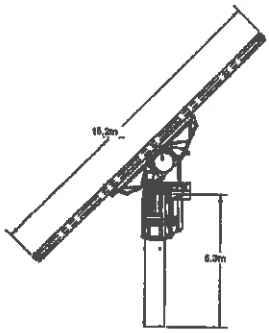


Figure 7: Typical Operational position

Figure 6: Storm Stow position

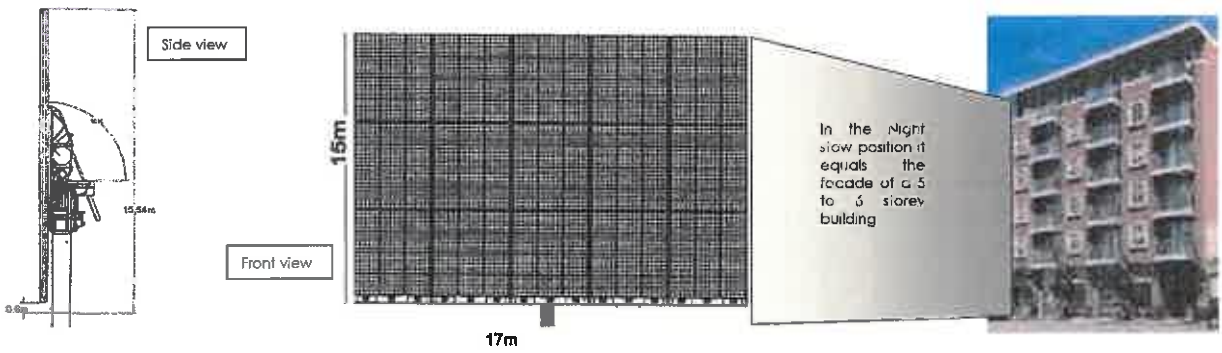


Figure 8: Night stow position

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

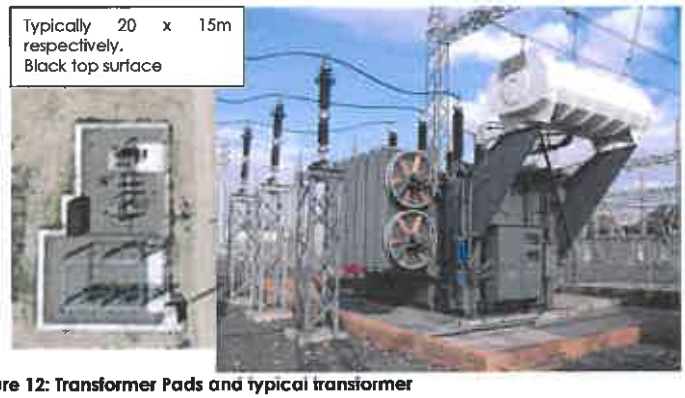


Figure 12: Transformer Pads and typical transformer

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

Figure 11: Typical 22KV single Powerline

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 landscape consist a fairly flat plain interspersed with occasional low hills. The town to the north is situated on the lower slopes of a hill and face south towards the site.
The hills to the north and northwest restrict the catchment area to the slopes of these hills which are closer than 5km from the site. Due to the undulating landscape to the south and east, the catchment area is restricted to approximately 5km (Figure 13).

5.1.2 Sense of Place:

The site is situated in the southern outskirts of the town. It is surrounded by infrastructure, which include High voltage power lines, an electrical substation, sewage works lime mine and mine dump (Figure 15). Other land uses in the area include urban development and large vacant land. Residential neighbourhoods are located north and northwest of this area.
The immediate area reflects a mining and infrastructure character

5.2 Findings

The proposed site is situated within the urban edge zone of Danielskuil in an area characterized by industrial type buildings and large infrastructure. The larger area reflects the characteristics of a rural to urban landscape and the site is situated within this land use continuum.

The area is characterized by a flowing topography of low rises on a large plain. It is interspersed with occasional low hills. 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 Danielskuil area however displays sufficient gradient variations to restrict this view significantly.

Statement 1: The property on which the development is proposed, is currently used for a range of utility type of land use as well as large scale mining and therefore the proposed solar farm seem to be in character with these elements.

Statement 2: Due to the medium absorption capacity of the landscape, the development will easily be absorbed into the existing visual structure.

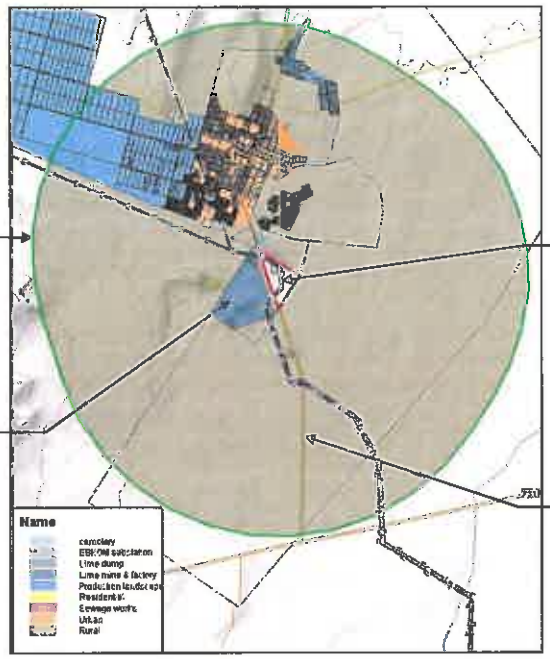


Figure 13: View catchment

VIA: Danielskuil

Figure 14: Land use continuum

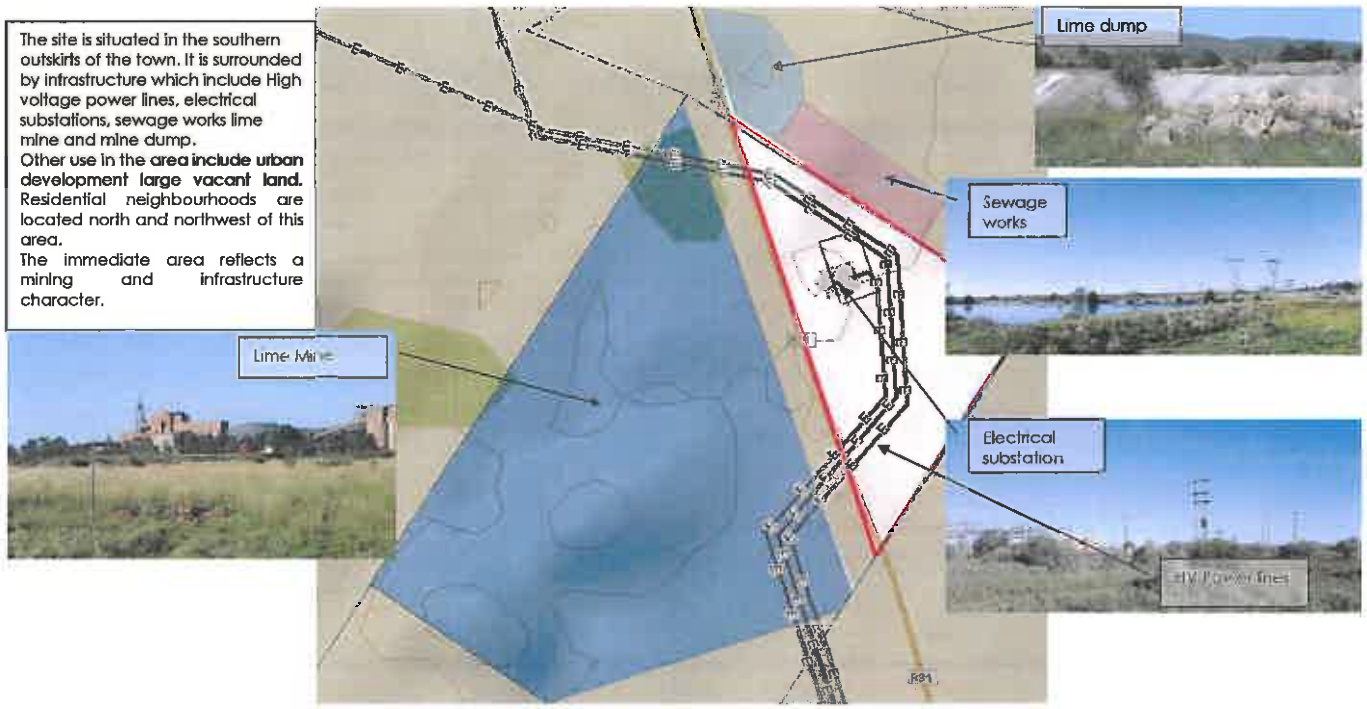


Figure 15: Immediate land use elements

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 following potential receptors were identified (Figure 16):

1. R31 north and south bound
2. Monument on hill behind town
3. Residential area on the slopes of the hill
4. Residential area to the west
5. Residential area to the north

6.2 Assessment of Receptors

1. R31 north and south bound. Travelling east-west on the R31 before it turns north into Danielskuil, the traveller is slightly lower than the site and more than 6km away from the site. The Lime mine's stacks are visible but the proposed solar site is screened by the low gradient variations in the landscape.
   Turning north onto the R31, the traveller becomes aware of the substation only when he is approximately 2km from the site. from this point the traveller will observe the range of infrastructure and the back of the CPV units (Figure 17).
   As the traveller leaves town the site is in the distance and partially screened by landscape elements such as the sewage works (Figure 18). However as the traveller move closer to the site the site becomes more visible and as the site is passed the travellers is within 100m of the units.
   The landscape is however dominated by the lime mine as well as existing substation and HV power lines. The infill of the site with CPV units is in character with the existing land use in this area.
   The overall visual impact on the road is thus medium to low but with mitigation can be reduced to low.

2. Monument on the hill behind the town (Figure 19). The view from the hill behind the town over the low lying plain on which the town, lime mine and proposed site is situated, diminish with distance. The viewer will observe the lime mine and substation with the numerous HV power lines in the distance. The solar farm will fill areas between the power lines and substation and although visible to the viewer will fit into this existing "industrial" character. Although the receptor, namely a monument is sensitive the overall impact is low due to the distance from the solar farm.

   The overall visual impact on the monument is of low significance.

3. Residential area situated in the northern section of the town on the slope of the hill, facing south (Figure 21). The viewer will notice solar farm only on detail scrutiny of the distant landscape. It is however amongst other similar infrastructure and thus fit in the character

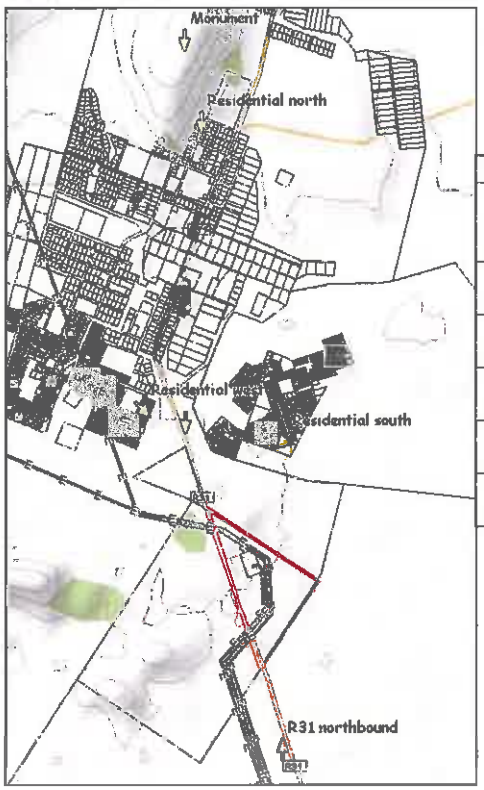
   The overall visual impact on the monument is of low significance.

4. Residential area to the north west of the site (Figure 22). The site is barely visible pass landscape elements, lime mine, sewage works and substation. At restricted points the top of units may be visible in the distance, but overall the site will have no significant impact on the view from this neighbourhood.

5. Southern residential neighbourhood just north of the site (Figure 23): The residential area is slightly lower than the site. Various infrastructure e.g. the sewage works screen the

neighbourhood from the site. The top of units will be visible but will be in character with the existing infrastructure within the view window of this neighbourhood.

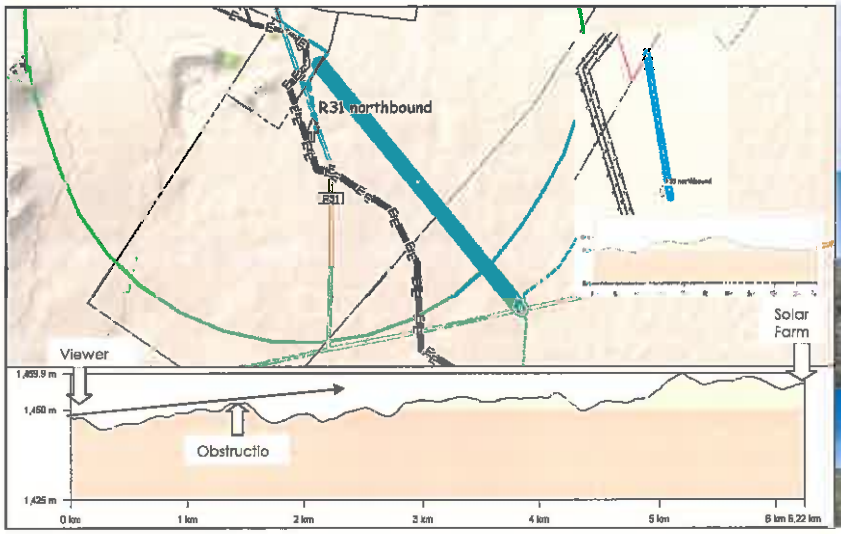
The overall visual impact on this residential area is of low significance.



Receptor	Latitude	Longitude	Comment
Monument	-28.1709	23.54861	Visible. Reduced by distance and absorbed by substation and power lines.
R31 southbound	-28 199	23.54869	Traveler looks straight into panels just after noon.
R31 northbound	-28.2216	23.55699	Traveler will see back of panels. Very visible
Residential west	-28.1978	23.54584	Low lying. Site screened by power lines and substation.
Residential south	-28.2001	23.55644	Area on same high. Site screened by sewage works
Residential north	-28 1769	23.55011	Limited view to site through houses and trees. Distance reduce visibility

Figure 16: Potential visual receptors identified

VIA: Danielskuil

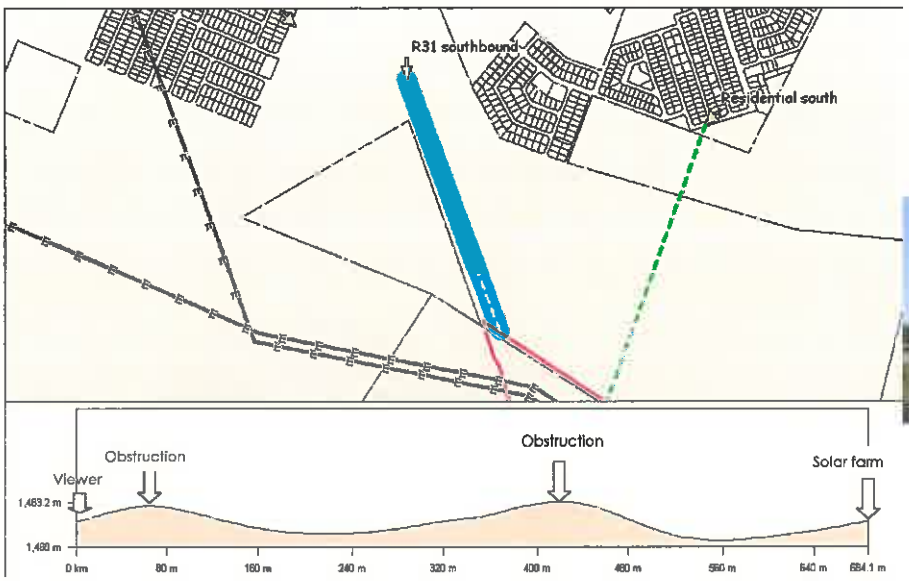


Travelling east-west on the R31 before it turns north into Danielskuil, the traveller is slightly lower than the site and more than 6km away from the site. The Lime mine's stacks are visible but the proposed solar site is screened by the low gradient variations in the landscape.
Turning north onto the R31, the traveller becomes aware of the substation only when he is approximately 2km from the site. From this point the traveller will observe the range of infrastructure and the back of the CPV units.

Figure 17: R31 northbound as receptor

Criteria	High	Moderate	Low
Exposure	[illegible]	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 3: R31 northbound assessed



As the traveller leaves town the site is in the distance and partially screened by landscape elements such as the sewage works. However as the traveller move closer to the site the site becomes more visible and as the site is passed the travellers is within 100m of the units.
The landscape is however dominated by the lime mine as well as existing substation and HV power lines. The infill of the site with CPV units is in character with the existing land use in this area.

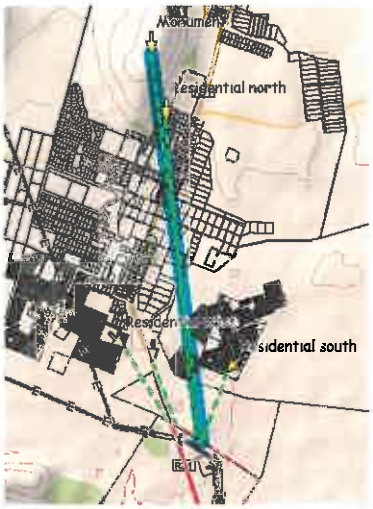
When the traveller pass the site directly, the CPV units are dominant and possible glare of the panels in late afternoon may be experienced.

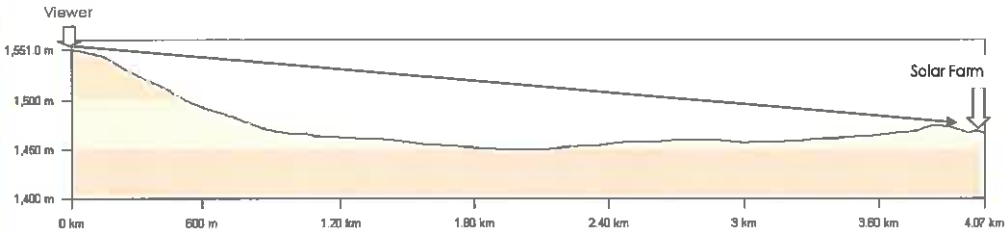
Figure 18: R31 southbound as receptor

Criteria	High	Moderate	Low
Exposure	dominant, seen, 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 fit, but clearly visible	minimal change or blends with surroundings

Table 4: R31 southbound view assessed

VIA: Danielskuil





The view from the hill behind the town over the low lying plain on which the town, lime mine and proposed site is situated, diminish with distance. The viewer will observe the lime mine and substation with the numerous HV power lines in the distance. The solar farm will fill areas between the power lines and substation and although visible to the viewer will fit into this existing "industrial" character. Although the receptor, namely a monument is sensitive the overall impact is low due to the distance from the solar farm

Figure 19: Monument as receptor

Criteria	High	Moderate	Low
Exposure	dominant, clearly visible	recognizable to the viewer	not particularly noticeable to the viewer
Sensitivity	[illegible]	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 5: Monument view assessed

VIA: Danielskuil

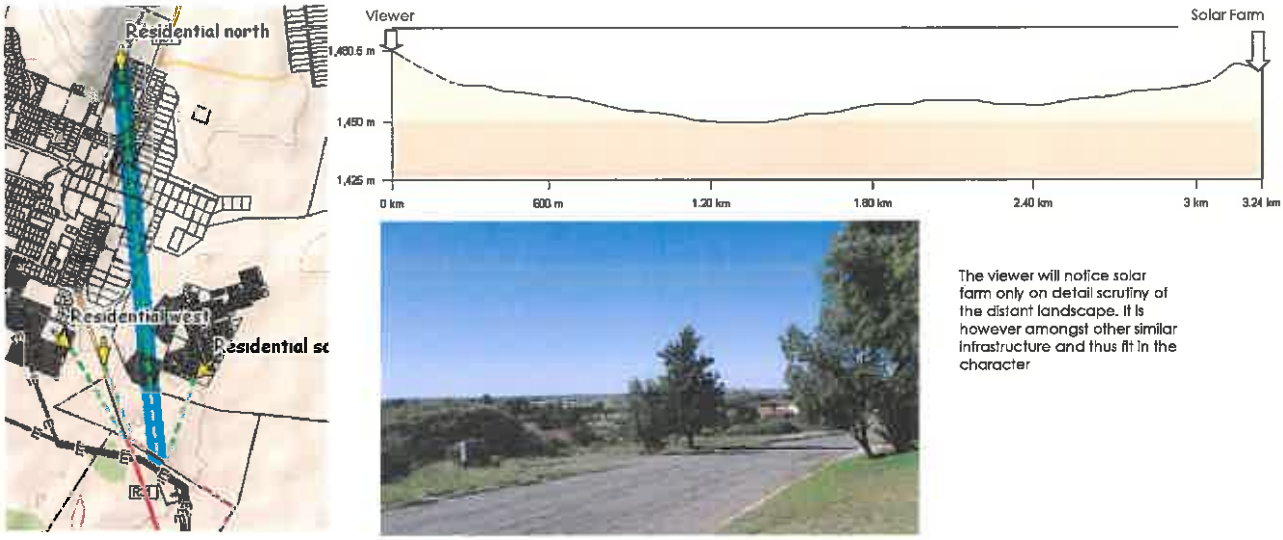


Figure 21: Residential north as receptor

Criteria	High	Moderate	Low
Exposure	dominant, clearly visible	recognizable to the viewer	not particularly noticeable to the viewer
Sensitivity	residential, tourist, cultural	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 6: Neighbourhood to the north assessed

VIA: Danielskuil

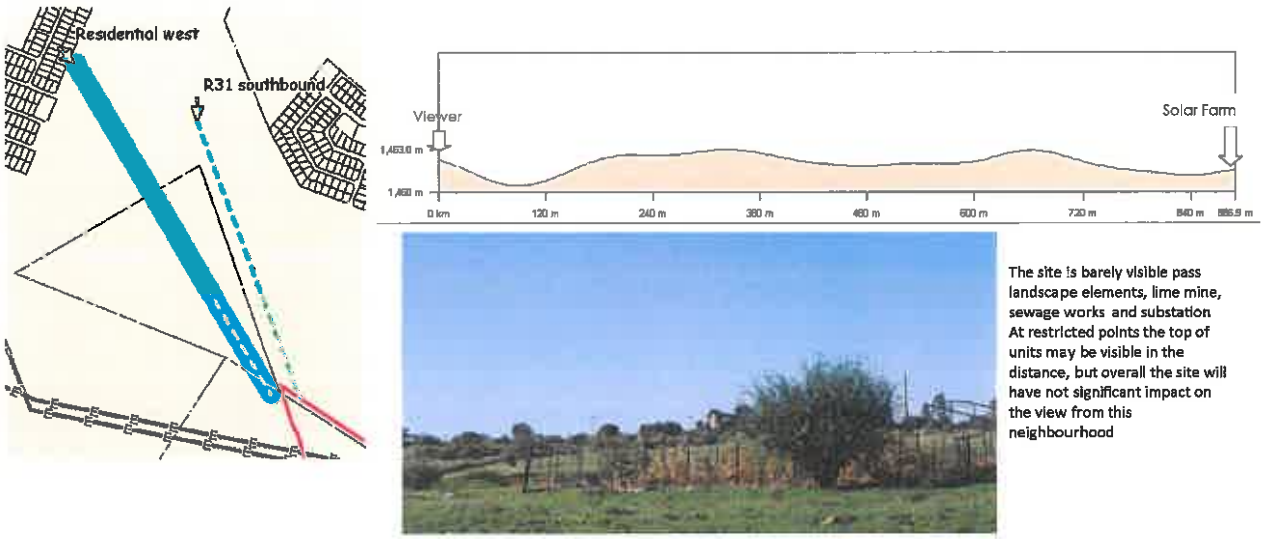
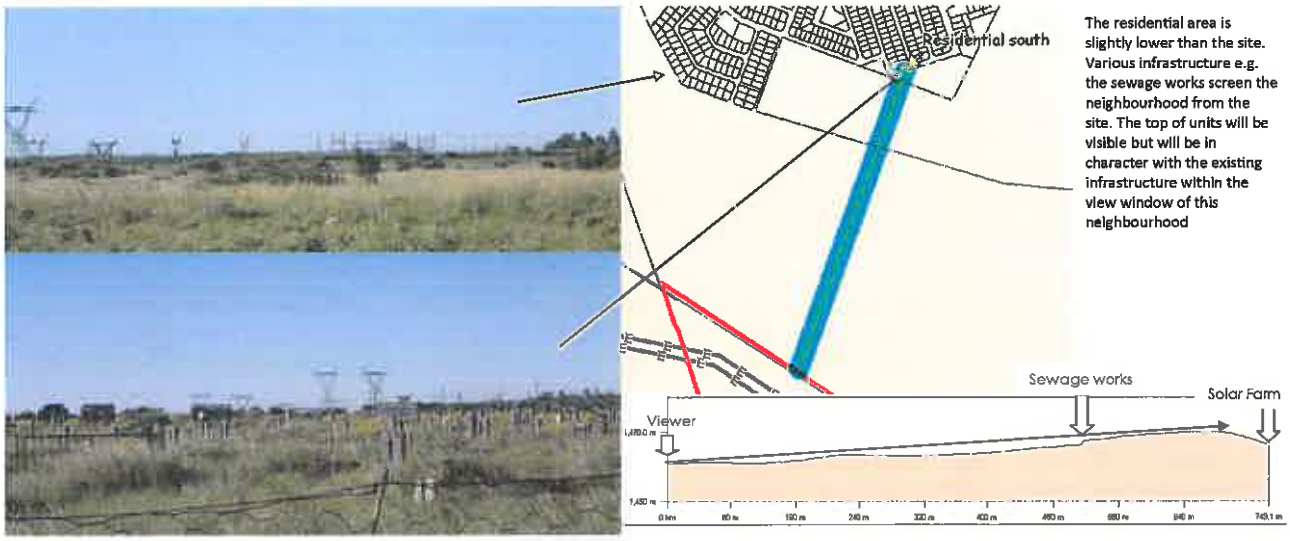


Figure 22: Residential west as receptor

Criteria	High	Moderate	Low
Exposure	dominant, clearly visible	recognizable to the viewer	not particularly noticeable to the viewer
Sensitivity	[illegible]	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 7: Residential area to the west view assessed

VIA: Danielskuil



The residential area is slightly lower than the site. Various infrastructure e.g. the sewage works screen the neighbourhood from the site. The top of units will be visible but will be in character with the existing infrastructure within the view window of this neighbourhood

Figure 23: Residential south as receptor

Criteria	High	Moderate	Low
Exposure	dominant, clearly visible	recognizable to the viewer	not particularly noticeable to the viewer
Sensitivity	[illegible]	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 8: Residential south view assessed

Table 9: Summary of Visual Receptor assessment

Receptor	Latitude	Longitude	Comment	Exposure	Sensitivity	Intrusion/Obstructive	Finding
Monument	-28.1709	23.54861	Visible. Reduced by distance and absorbed by substation and power lines.	Distance to site and other infrastructure reduce exposure Rating: Low	Tourist facility Rating: High.	Surrounding infrastructure such as substation, HV lines, sewage works as well as lime mine with industrial type buildings reduce intrusion in landscape and will absorbed the units to an acceptable level Rating: Low	Due to distance reduced intrusion. Infill of existing infrastructure implies acceptable level of change of use No significant impact
R31 southbound	-28.199	23.54869	Traveler looks straight into panels just after noon.	The units will be next to the road and very visible to the traveler. Rating high	Although the entrance to town, the lime mine is a very dominant feature and the area is characterized by this facility Rating: Low	The traveler will notice the units. Potential glare off the panels as the traveler will approach them from north. The speed limit is however 60km and thus the impact of possible flickering effect low. Rating Moderate	Although very visible infill of similar character. Glare impact low due to speed limit. Low significance
R31 northbound	-28.2216	23.55699	Traveler will see back of panels. Very visible	The units will be next to the road and very visible to the traveler. Rating: High	Although the entrance to town, the lime mine is a very dominant feature and the area is characterized by this faculty Rating: Low	The traveler will notice the units, but will view from the back and therefore no glare. Rating: Moderate	Although very visible infill of similar character. Low significance
Residential west	-28.1978	23.54584	Low lying. Site screened by power lines and substation.	The site is barely visible pass landscape elements, lime mine, sewage works and substation Rating: Low	Residential always rate high regardless of type of housing. Rating: High	The area is screened to a large extent to the site by other infrastructure Rating: Low	Due to low visibility and intrusion it has an overall low significance
Residential south	-28.2001	23.55644	Area on same high. Site screened by sewage works	Partially visible but screened by other infrastructure and residential area is slightly lower than the site Rating: Moderate	Residential always rate high regardless of type of housing. Rating: High	The area is screened to a large extent to the site by other infrastructure Rating: Low	Due to low visibility and intrusion it has an overall low significance

VIA: Danielskuil

Residential north	-28.1769	23.55011	Limited view to site through houses and trees. Distance reduce visibility	The view is in the distance **and fit among other similar Infrastructure** **Rating: Moderate**	Residential always rate high regardless of type of housing. Rating: High	Rating: Low	Not significant impact

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 characterized by industrial type building, mine and utility land uses. The site has a high absorption capacity due to the presence of existing land use.

The sensitive receptors namely the monument and residential areas are situated such that the exposure to the site and the intrusion level is low, thus creating a low overall visual impact.

The less sensitive receptor namely the R31 will be more exposed to the site, but the impact is in character with the surrounding and thus of less significance.

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.

9 MITIGATION MEASURES

The level of visual impact is of such level that no mitigation to the proposed on-site development elements necessary, but in order to avoid any potential glare impacts of the R31 southbound, it can be considered to provide a soft screening along the road of height between 1,2 -1,8m.