VISUAL IMPACT ASSESSMENT

75 MW PHOTOVOLTAIC ELECTRICITY GENERATION FACILITY ON PORTION 8 OF THE FARM OLYVEN KOLK NO 187, DIVISION KENHARDT

Prepared for:

GREENCONTINENT PARTNERS

Prepared by:

PLANSCAPE
CONSULTING TOWN AND REGIONAL PLANNERS

M Langenhoven
(Pr.Pln. A/048/2007)
PO Box 557, Moorreesburg, 7310
(022) 433 4408 (tel), 086 697 2069 (fax), 0722026587 (cell)
planscape@telkomsa.net

and

Piet Groenewald Landscape Architect
PO Box 559, Stilbaai, 6674
T: 028-7541858, F: 0865803073, C: 0728756877.
pietgroen@telkomsa.net

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EXECUTIVE SUMMARY

This visual impact assessment is carried out for the Applicant, Green Continent Partners who will be responsible for the development of the activity, namely a Photo-Voltaic Electricity Generation facility on portion 12 of the farm Olyven Kolk no 187, Division Kenhardt, Northern Cape Province.

The facility will cover approximately 156ha of the 1402ha land unit and it will include the photovoltaic arrays and structures for the management, maintenance and housing of the workers. At present the site is used for the grazing of sheep, not developed with any structures and is uninhabited.

The prime objective of this study is to establish the nature and extent of the visual impact of the proposed activity on the receiving environment with receptors. Principles and concepts as well as triggers and key issues are taken into account with the assessment of the nature of the visual impact. Several criteria are used to determine the nature and extent of the visual impact like visibility, visual exposure, visual sensitivity of both the activity as well as the receptors, visual absorption capacity and visual intrusion. The issues are categorised in order to ascertain the degree of impact.

The nature of the receiving environment must also be analysed and possible receptors identified. In this case the landscape around the site has a uniform character consisting of gently undulating plains with no prominent topographical features, shallow drainage valleys and flat ridges. The elevation difference noticed is only about 30m. From a subregional perspective a distinct viewshed cannot be defined with consequence that the facility will be alternately visible and hidden from view depending on the location of the viewpoint in the landscape. No views of the facility will be possible beyond 12km from the site, with the only significant views thereof restricted to relative short distance of ±5km along the bypassing public road, by and large only apparent to motorists approaching the facility from an eastern direction.

The landscape has a typical rural farmland character of peaceful tranquillity, uninterrupted openness and isolation, simply organized by minimal farming infrastructure. The Aries substation and associated transmission lines though, dominates the landscape and sets a precedent for large scale human intervention in the area and lowers the potential intensity of the visual impact considerably.

The sense of place within the surrounding area will be significantly altered; however, a new sense of place will be created which will represent South Africa's attempts to address the challenges of climate change in a responsible and sustainable manner. The visual impacts will therefore be experienced by many, including many who are sensitive to environmental issues, as being positive.

The visual impact is measured against the impact assessment criteria and the threshold of significance determined. The summary criteria like extent, duration, intensity, probability and significance are considered important information in order to evaluate the impact.

To conclude, management actions like avoidance, mitigation and rehabilitation are also proposed in order to reduce any visual impact.

A review as well as conclusions is made. **The visual impact is assessed to be of moderate significance with mitigation.** The reasons for this are mainly the nature of the activity (low level) as well as the shape of the view catchment area and the fact that most receptors will be restricted to the Pofadder – Kenhardt road. The implication of this situation is that views from the road will in any case be of short duration (travellers). Furthermore, during the operational phase, activities on-site will be minimal and will only include maintenance and security. Any mitigation measures as proposed will ensure that the impact will be reduced even further.

As no significant visual or aesthetic issues are present, the authors of this report recommend that approval for the proposal be granted, subject thereto that the proposed mitigation measures be implemented.

The analysis is visually illustrated by means of maps, plans, photographs and drawings inserted in the Annexures A to I.

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1. INTRODUCTION

Green Continent Partners proposes the establishment of a 75 MW Photovoltaic electricity generation facility and associated infrastructure in the district of Kenhardt.

The authors of this report were approached by Green Continent Partners to prepare a Visual Impact Assessment as part of the EIA process associated with the project.

The Visual Assessment will be compiled as per the criteria, definitions and terminology as set out in the reference document: Oberholzer, B. 2005: ***Guideline for involving Visual & Aesthetic Specialists in EIA processes***: Edition 1. CSIR Report No ENV-S-C 2005 053 F. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town.

The guidelines issued by the Provincial Government of the Western Cape are used as no similar guidelines are available for the Northern Cape Province.

1.1 Background

The proposed project is located on portion 8 of the farm Olyvenkolk no 187, Division Kenhardt, in the Northern Cape Province, within the Municipality of Kai!Garib.

The proposed site for the PV facility would occupy approximately 156ha of land currently used for grazing of sheep. Farm buildings are located to the south of the proposed site, on a separate land unit (3/187). The surrounding land uses are primarily agricultural, consisting of small stock farming (sheep), as well as the Aries substation and associated powerlines which feed into it.

1.2 Terms of reference

The authors were appointed to conduct Visual Impact Assessment. The specific objectives of this report will be to:

- Identify issues related to visual resources raised during the public participation processes and site inspection.
- Describe the receiving environment and visual characteristics of the site.
- Describe the proposed Photovoltaic Facility, inclusive of the spatial dimensions thereof.
- Establish the viewshed, view corridors, important viewpoints and sensitive receptors, generally based on topographical information and a site inspection.
- Identify potential visual impacts, inclusive of lighting impacts at night, using established rating criteria, inter alia based on viewshed mapping and photographic montages.
- Visual impact assessment rating based on veiwshed mapping and photographic montages.

- Provide recommendations to mitigate/reduce the visual impact of the development if required.

1.3 Methodology

The method followed to produce this report has been to:

- Collect and review existing information, inclusive of the Final Scoping Report.

- Undertake a field survey on 13 November 2012; during which:
  - the potential visibility of the proposed facility was determined,
  - a photographic survey of the surrounding and immediate landscape was conducted, and
  - the sensitive landscape and visual receptors within the spatial context and zone of influence of the site was identified.

- Undertake mapping exercises to establish the scenic character, extent of visibility, visual exposure to viewpoints and visual sensitivity of the site.

- Prepare panoramic photomontages of the proposed development site as viewed from the critical view points.

- Evaluate the potential impacts based on a synthesis of the following criteria: nature of impact, extent, duration, intensity, probability and significance.

- Propose and recommend appropriate mitigation measures.

1.4 Assumptions and limitations

- Information on the extent of the project has been obtained from the Final Scoping Report dated August 2012, prepared by Eco Impact Legal Consulting (Pty) Ltd, with DEA reference number 14/12/16/3/3/2/344.

- It is assumed that the information provided by others is correct. Information needed to execute the study was acquired from other consultants as well as during the environmental site investigation. No uncertainties therefore exist. The level of assessment and approach used for this visual impact can be described as complete. Therefore this comprehensive visual investigation will provide sufficient information to all parties involved to get a clear vision and understanding of the nature of this particular visual impact.

- The report relies on topographical and visual information form a combination of 1:50 000 topocadastral maps, aerial photographs and GIS data.

- The proposed location of the site is determined by the following factors, namely solar availability, proximity to a grid connection point and availability of land. As the project site meets these specific criteria and taking into consideration that connectivity to the grid is a critical factor to the overall feasibility of the project, alternative locations are not identified and assessed. The visual assessment therefore only assesses the single proposal as included in the EIA.

1.5 Statement of independence

The report has been prepared by Martin Langenhoven of Planscape in collaboration with Dr. Piet Groenewald.

Martin Langenhoven is a registered Professional Planner with the South African Council for Planners[1] who holds an Honours Degree in Geography (urban / economic geography and GIS) and a Masters Degree in Town and Regional Planning (including urban design). He has 18 years of experience working for a District Municipality where he evaluated, reviewed and commented on development applications, inclusive of visual impact assessments, in the Western Cape.

Dr. Piet Groenewald is a qualified landscape architect registered with the South African Council for the Landscape Architect Profession[2](SACLAP). He is also a professional town planner, architectural-technologist and environmental consultant registered with SACPLAN and SACAP and has 25 years of experience conducting a variety of landscape architectural, town planning, environmental and architectural studies during this period. He holds Masters Degrees in Landscape Architecture, Town and Regional Planning and Regional Geography as well as a Doctorate in Urban Geography. During his stay in Pretoria, he was a partner in a town planning firm and lectured at UNISA (Urban Geography) and the University of Pretoria (Landscape Architecture). He conducted a VIA for the construction of a SENTECH radio/TV broadcasting tower. Most recent VIA studies conducted by him, include future residential developments in Riversdale and Stilbaai.

The authors hereby declare that we have no conflicts on interest related to the work of this report. Specifically we declare that we have no personal financial interest in the property and/or development proposal being assessed and that we have no personal or financial connections to the developers or financiers of the development other than the fees paid for conducting the assessment.

1.6 Principles and Concepts

Visual, scenic and cultural components of the environment can be seen as a resource which has a value to people, the society and the economy of the area. In addition, this resource may have a scarcity value, be easily degraded, and is usually not replaceable. These resources are by their nature difficult to assess and quantify. To overcome these difficulties, principles are considered with this visual study:

- It must be logic, holistic, transparent and consistent.

The following concepts are also considered with this visual input of the EIA process:

- The full range of visual, aesthetic, cultural and spiritual aspects of the environment contribute to the sense of place of the area.
- The consideration of the nature of the natural and cultural landscape and their inter-relatedness.
- The identification of all scenic resources, protected areas and sites of special interest and their relative importance in the area.

[1]Registration number A/048/2007
[2]Registration number 87013

- Understanding the landscape processes, namely landform, vegetation and settlement patterns which give the landscape its particular character and scenic attributes.
- The inclusion of both quantitative criteria such as visibility, as well as qualitative criteria such as aesthetic value in the assessment.
- The visual input can be used as an integral part of the project planning and design process in order to improve the quality of the development.

1.7 Triggers and Key Issues

Triggers for specialist input are determined by the characteristics of the activity as well as the receiving environment which indicate that aesthetics and visibility are likely to be key issues and may require a visual assessment. In many cases, although not in this instance, requests from I&AP's trigger such an investigation.

Environments vary in respect of visual sensitivity and activities in respect of intensity. In this particular case, the nature of the receiving environment as well as the nature of the activity, the triggers are restricted to only a few characteristics.

Several categories of development in respect of intensity are identified. These vary from Category 1 (lowest intensity) like nature reserves, camping, nature related recreation, to Category 5 (highest Intensity) like high density residential, retail, industrial, mining development.

Because of the nature of the activity it can be categorised as belonging to Category 4 which includes light industry and medium-scale infrastructure. The receiving environment can be considered of low scenic significance. As a result of these characteristics, the visual impact expected, will be moderate to low.

1.8 Scope of Specialist Input

- Identifying Issues
  The visual issues are identified during the site investigation and also as a result of comments received. Several questions must therefore be answered:
  - Are issues raised, valid?
  - Is sufficient information available to predict significance of impacts?
  - Any additional issues to be considered?
  - Can impacts be avoided?
  - Any potentially significant issues?

- Space boundaries
  The space boundary for the visual input depends on the extent of the view catchment area, namely the zone of visual influence of the project. The boundary depends on the visibility of the proposed activity and includes all receptors in the receiving environment.

- Development alternatives
  Initially, during the planning process, the design and location alternatives are considered. The chosen alternative includes the location, layout, circulation and structures.

- Addressing effects
  Potentially significant direct, indirect and cumulative impacts of the proposed activity must be considered:
  - Conceptualisation of possible cause-effect pathways resulting from the proposed development.
  - An understanding of current and future proposals, plans, projects and activities in the same area.
  - An awareness of other threats or trends that could affect the landscape of the area in which the development is proposed.
  - An understanding of the likely resilience and status of affected landscapes and visual resources.
  - An understanding of broader strategic goals or targets for the area that would be affected by the proposed activity.

  Direct effects will most probably be of more importance than indirect effects occurring later as well as cumulative effects. Therefore, visual impacts caused by structures will be of primary importance and thus attention to structural design needs special attention.

- The appropriate approach
  Visual assessments become more critical where the receiving environment involves wilderness and protected landscapes and where the activities include high category developments. Therefore the approach and method for visual input relates to the degree of sensitivity of the landscape and the degree of density and volume of the activity. In this particular case, the receiving environment is of low scenic significance and the activity is a Category 4 development, already mentioned. Although the development is classified in a relative high category, the nature of the receiving environment causes the impact to be most probably minimal. This assumption can be further justified by the fact that all viewpoints will be located at low levels (road). The low elevated structures will also be constructed at ground level with the result that no high obtrusive structural elements will be visible on this rather flat landscape.

2 THE PROPOSED PROJECT

2.1 Location

The proposed site for the PV facility is located approximately 37km south-west of the town of Kenhardt which is the nearest urban settlement (see annexure A). The property on which the site is located is accessible via a public gravel road between Kenhardt and Pofadder. Pofadder is located ±150km to the west.

The road does not traverse the property and is the facility at its closest point, located approximately 1000m thereof.

2.2 Development description

2.2.1 Current land-use

The property is currently zoned for agricultural purposes and is used for the grazing of sheep as part of a farming unit that includes various other land units which surrounds it.

The property is not inhabited or developed and no buildings and / or dwellings occur. The original farmstead is located to the south of the site on an adjoining land unit and outside the development footprint. These buildings are not occupied and are only occasionally used by the farmer who leases the land.

2.2.2 Construction phase

The proposed Green Continent Partners Photovoltaic Electricity Generation Facility will have generating capacity of approximately 75 MW with a total footprint of approximately 156ha and comprises of the following elements which potentially have a visual implication:

- Arrays of photovoltaic panels using Polycrystalline and thin-film solar cell technology.
- The panels are arranged in 50 blocks each with its own converter unit and step-up transformer.
- Electricity from the step-up transformers will feed to a central point of connection consisting of switch gear and protection infrastructure and is located on the southern edge of the facility.
- Electricity generated is fed via the central point of connection to an ESKOM 132Kv transmission line which is connected to small substation with the necessary infrastructure, which will feed the electricity into the Aries substation.
- The photovoltaic array / panels are mounted on pedestals not exceeding a hight of 2 meters from the natural ground level.
- The pedestals will be screwed into the ground and if not possible, it will be supported by means of a concrete foundation block.
- The array will be fixed at an angle to face in a northern direction. The arrays will thus face away from the public road located ±1000m to the south of the site.
- A 5m wide gravel road will surround each block and will be used to service and maintain the infrastructure.

- A 4m wide gravel road, which will follow the route of an existing track, will give direct access to the public road.

- Construction workers will be housed in temporary structures with materials and workshops to be housed in temporary containers that will be removed from the site.

- A security fence will be erected around the facility.

Attached find as annexure B the layout of the facility. Annexure C includes photographs of similar infrastructure as will be developed on the site.

2.2.3 Operational phase

- Following the construction phase the site will be commissioned and solar energy will be harnessed.

- Electricity generated is fed via an ESKOM 132Kv transmission line which is located adjacent to an existing power line, to the Aries substation. It also follows the same route as transmission lines which will be erected on behalf of approved photovoltaic facilities located on adjoining land to the east and south (13/187 and 7/178) as well as for an facility applied for under a separate application on land to the east (8/187).

- It is anticipated that the operational phase is a fairly passive process with minimal human activity present on site. Activity will be restricted to maintenance, cleaning and security operations and will involved limited use of vehicles.

- The operational phase is estimated to last ±25 years, that being the lifespan of the photovoltaic infrastructure.

3 RECEIVING ENVIRONMENT

3.1 Description of site and scenic resources

This section describes the existing visual environment that will be effected by the proposed photovoltaic facility. It involves the identification of landscape types, landscape character and sense of place, based on landforms, topography, land cover and land use patterns.

3.1.1 Landscape types

Landscape types are generic classifications of landscape character and may occur anywhere where the same combinations of physical landscape attributes such as soils, landform, vegetation and settlement pattern can be found.

The landscape around the site has a uniform character consisting of gently undulating plains with no prominent topographical features and homogeneous vegetative cover. The landscape is characterized by various seasonal / dry streambed and small gullies that feed into it.

3.1.2 Topography

The landscape surrounding the development site, from a subregional perspective, lacks any prominent topographical features with elevations of between 900 to 930m above mean sea level for many kilometres around the site. The landscape does not include any prominent koppies or definable ridgelines from where the proposed facility will significantly be visible. The highest point (965m amsl) is a ridgeline located ±10km to the south which is only accessible by the owners of the land (see annexure D).

From a more local perspective the only elevated area (940m amsl) of note is around the Aries substation which is located ±5km to the south-west.

The photovoltaic arrays will primarily be located on the eastern and southern facing slopes of a hill situated in the south-eastern corner of the property.

3.1.3 Land cover

The site is surrounded by land which has not been transformed by agricultural activity. Vegetation cover consists of a mixture of grass and small shrubs with no screening potential. Small stands of trees only occur where it has been planted for example at the Olyvenkolk farmstead or near watering holes.

As the region is arid with sparse vegetation the colour of the landscape is primarily determined by the colour of rocks and sands during the dry season and vegetation during the winter.

3.1.4 Settlement pattern

There are no settlements within the visual catchment of the proposed site. Thus the human landscape pattern is derived from linear farm boundaries, angular junctions of property fences, gravel farm roads and the odd windmill suppling water to livestock.

The only farmstead located within the visual catchment is the Olyvenkolk farmstead ±1500m to the south. The farmstead is uninhabited and is only occasionally used by the farmer who leases the land.

3.1.5 Views and view corridors

As the site is located in an undulating plain with no prominent topographical features, it has expansive views in all directions. The site is thus not enclosed by natural features and can a definite viewshed not be defined.

Although the site will be partially and completely visible from some of the elevated points in the landscape, it is only visible for the general public from a section of the Kenhardt – Pofadder gravel road. Except for this road, no other view corridors exist in the landscape.

The road (R27) between Kenhardt and Brandvlei is situated 20km to the south. The site is not visible from this road.

Significant views of the proposed facility will primarily be from the bypassing road as well as limited viewpoints around the site to which only the relevant land owners have access. As distance is a limiting factor to visibility, it is anticipated that the site will not be visible beyond 12km.

3.1.6 Landscape character / Sense of place

Sense of place it is a subjective feeling or perception held by people to described the character or quality of a geographic place and involve natural features, patterns of human settlement and land-use and social relationships.

From a subregional perspective the area has a typical rural farmland character of peaceful tranquillity, uninterrupted openness and isolation, simply organized by minimal farming infrastructure.

Simple farm buildings, windmills, dams, fences and other farming infrastructure are sparsely dotted throughout the region.

From a local perspective, although the area where the proposed facility will be developed conform to the general sense of place, the area around the site has considerably been impacted on by human interference in the form of extensive “industrial” visual elements. The Aries substation and various transmission lines that feed into it, dominates the skyline and influence the sense of tranquillity and isolation.(see annexure E).

4 VISUAL IMPACT ASSESSMENT OF THE PROPOSED FACILITY

Potential impacts

Possible visual impacts of the activity are identified and assessed in respect of the receptors. This means that the likely consequences of impacts, the severity and those receptors affected by these impacts will be identified and analysed. The potentially direct impacts are predicted, assessed and evaluated. The evaluation of significance is linked to thresholds of significance. In this particular case the visual impact may be significant for the receiving site, but beyond the site boundaries, the impact may not be significant because of vast distances and the fact that the proposed development will not be visible from the larger environment.

The visual simulation will compare the view with, and without the proposed development as seen from the most important view points and by receptors along the road. It is necessary to include both quantitative criteria like viewing distances as well as qualitative criteria such as sense of place when assessing the visual impact. The assessment relies on the evaluation of a wide range of considerations, both objective and subjective, including the context of the proposed development within the surrounding area.

In this case the visual impact does not constitute a potential flaw, meaning an impact that has a "no-go" implication for the project. It does not lead to non-compliance with Acts, Ordinances, By-laws and adopted policies related to visual pollution, scenic routes, special areas or proclaimed heritage sites. It also does not lead to non-compliance in respect of any records of decision.

Impact assessment criteria
In order to aid decision-making, the assessment and reporting of possible impacts require consistency in the interpretation of visual impact assessment criteria. The proposed activity is assessed against these criteria. Thereafter it will also be assessed against the summary criteria.

The assessment of the impact significance needs to consider the predicted impact of the activity in the light of the vision for the area, rather than in terms of the impact on the current baseline conditions. This means that the visual impact is of lower significance if the activity is located within an area earmarked for lower sensitivity land-use (grazing), than if the activity falls within an area of high conservation quality. In this particular case, the activity is located within an environment of low conservation quality.

4.1 Zone of visual influence

Zone of visual influence: This means the visibility of the activity and includes the area from which the activity will be visible, namely the view catchment area. The visibility is determined by screening effects of vegetation and possible structures as well as the number of receptors.	
Rating	**Description**
High visibility	The facility will be visible in its entirety from a large area extending over several square kilometres.
Moderate visibility	The facility will partly be visible from an intermediate area extending over several hectares.
Low visibility	The facility will be partially or intermittently visible from a small area.

As the site is located in an undulating plain with no prominent topographical features, it has expansive views in all directions. The site is not enclosed by natural features and can a definite view catchment area from a subregional perspective not be defined.

Due to the lack of prominent topographical features in the landscape, the facility may become visible from many points within the landscape. There will also be as many points within the landscape from where the facility will not be visible.

From a more local perspective, the site is visually screened by a small ridgeline extending from the Aries substation, running along the public road in an eastern direction. Views in a western direction towards the site are uninterrupted. Views from a western and northern direction could not be confirmed during the site visit as such land is totally inaccessible.

The facility will only be significantly visible from an eastern direction, with views from a southern direction, obscured by the above mention ridgeline.

The only noteworthy zone from where the facility will be visible is along a 5km stretch of the bypassing public road, to the east of the site (see annexure F)

VISUAL INFLUANCE	Construction phase	Operational phase	Night
No development	-	-	-
Development with no mitigation.	Moderate to high	Moderate to high	Moderate
Development with mitigation.	Moderate	Moderate	Low

4.2 Visual absorption capacity

Visual absorption capacity: This means the potential capacity of the landscape to conceal the proposed development, including topography, vegetation and structures.	
Rating	**Description**
High	The landscape can visually absorb medium to large changes in character.
Moderate	The landscape can visually absorb small to medium sized changes to the landscape.
Low	The landscape is very sensitive to any alterations in it visual character.

The visual absorption capacity of the landscape depends on the density and distribution of similar developments in the area as well as the similarity between existing and the new land-use to be introduced. Other factors that may influence the visual absorption capacity include the colour, texture and topography of the landscape. The distance between the observer and the proposed development also plays an important role as the foreground act as a visual buffer and distraction from the development itself.

The visual absorption capacity of the facility from a local perspective is moderate to low. A similar facility on land much closer to the viewer (sited directly alongside the road) and located between the proposed facility and the zone of visual influence described in the preceding paragraph, will act as a distraction from the development itself. From a subregional perspective though, the facility will be absorbed in the landscape as a result of the lack of prominent topographical features and gentle undulations of the vast surrounding plains.

VISUAL ABSORTION CAPACITY	Construction phase	Operational phase	Night
No development	-	-	-
Development with no mitigation.	Low	Low	Low
Development with mitigation.	Moderate	Moderate - Low	Moderate - High

4.3 Receptor sensitivity

Receptors sensitivity: This means the level of visual impact which is considered acceptable by the specific type of receptors.	
Rating	**Description**
Low	Viewers who momentarily view and experience the facility.
Moderate	Viewers who occasionally are visually exposed to the facility.
High	Viewers with a prolonged / sustained visual exposure to the facility. Viewers who appreciate the quality of the landscape and visit it for enjoyment purposes.

Receptors identified to be exposed to the facility include the following:

- Residents of the area i.e. local farmers.
- Tourists
- ESKOM staff working at Aries substation and maintaining distribution lines.

No inhabited farmsteads will directly be exposed to the facility and the Kenhardt – Pofadder route is not considered to be a route regularly frequented by tourists visiting the Kenhardt region. The overall number of potential viewers is very small and their exposure to the visual impact will be temporary as they pass through the region. As permanent residents in the region grow accustomed to the presence of the facility, their sensitivity will reduce over time.

ESKOM employees on the other hand are in all probability desensitised to the potential visual impact as they experience on a regular basis, large scale electricity infrastructure within the rural landscapes i.e. transmission lines, substations and other related infrastructure.

It is anticipated that in future more viewers will visit the area. These viewers will be linked to visitors to a similar facility which include tourism facilities (guest house and self catering cottages) which will be developed on an adjacent portion of land to the south. As the purpose of these tourists will be to view the facility, their response and sensitivity to the visual changes to the landscape will be positive and low.

RECEPTOR SENSITIVITY	**Receptor**	**Construction phase**	**Operational phase**	**Night**
No development	All	-	-	-
Development with no mitigation.	Residents	Moderate - High	Moderate - High	Moderate
	Tourists	High	High	High
	ESKOM staff	Low - Moderate	Low - Moderate	Low - Moderate
Development with mitigation.	Residents	Moderate	Moderate	Low
	Tourists	Moderate - High	Moderate - High	Moderate - High
	ESKOM staff	Low	Low	Low

4.4 Visual exposure

Visual exposure: Visual exposure is based on distance from the activity to selected viewpoints.	
Rating	**Description**
Zero	Not visible by the viewer.
Low	Not particularly noticeable by the viewer.
Moderate	Recognisable by the viewer.
High	Dominant or clearly visible by the viewer.

Visual exposure diminishes over distance i.e. the closer the receptor is to the facility, the higher the level of visual exposure will be and vice versa.

Four viewpoints (see annexure F) were identified and assessed, namely:

- Viewpoint 1 is located ±12km to the east of the site.
- Viewpoint 2 is located ±5km east of the site. From this viewpoint receptors have there first sight of the site as they approach it from the east.
- Viewpoint 3 is the closest to and located ±2km from the site.
- Viewpoint 4 is located ±5km to the west of the site.

From viewpoint 3 the development would be particularly noticeable to the viewer, whereas from viewpoint 2 the facility would indeed be recognisable. The site is not visible from viewpoints 1 and 4. New transmission lines that will be positioned alongside existing transmission lines will be most prominently visible from viewpoint 4 (see annexures G and H).

VISUAL EXPOSURE	**Viewpoint**	**Construction phase**	**Operational phase**	**Night**
No development	All	-	-	-
Development with no mitigation.	1	Zero	Zero	Zero
	2	Moderate	Moderate	Moderate
	3	Moderate	Moderate - High	Moderate
	4	Zero	Zero	Zero
Development with mitigation.	1	Zero	Zero	Zero
	2	Low - Moderate	Low - Moderate	Low - Moderate
	3	Low - Moderate	Moderate	Low - Moderate
	4	Zero	Zero	Zero

4.5 Visual intrusion

Visual intrusion: This means the level of compatibility of the activity with particular qualities of the area or its sense of place. The compatibility of land uses and natural features play a role in visual intrusion.	
Rating	**Description**
High	Results in a noticeable change or is discordant with the surroundings.
Moderate	Partially fits into the surroundings, but clearly noticeable.
Low	Minimal change or blends in well with the surroundings.

Although the facility differs considerably from the existing visual character of the area, the level of visual intrusion is mitigated by the fact that the solar arrays will face away (in a northern direction) from the identified viewpoints. As viewers approach the site from an eastern direction they will view the non reflective sides and back of the solar panels.

The facility will not be the first similar facility to be introduced into the landscape as at least 3 others, to the knowledge of the authors, have been authorised in the area. One of these facilities is located on land much closer to the viewer and sited between the proposed facility and the zone of visual influence described in the preceding paragraph 4.1. Photovoltaic facilities are not alien to, and are typically located within agricultural / rural landscapes.

VISUAL INTRUSION	**Construction phase**	**Operational phase**	**Night**
No development	-	-	-
Development with no mitigation.	Moderate - High	Moderate - High	High
Development with mitigation.	Moderate	Moderate	Moderate

4.6 Extent of impact

Extent of visual impact: This is the spatial or geographical areas of influence of visual impacts which may vary in area from local, to regional, to national or international.	
Rating	**Description**
Site-related	Extending only as far as the activity.
Local	Affecting the immediate surroundings.
Subregional	Affecting a portion of a larger region.
Regional	Affecting a large regional area.
National	Affecting large parts of the country.
International	Affecting areas across national boundaries.

The facility is located in a gently undulating plain with visibility extending beyond the immediate surroundings of the site. The visibility extent of visual impact will influence a subregional area as significant views of the facility will not extend beyond 10km. It is not anticipated that the facility will be visible at a distance of more than 12km from the site.

Although new transmission lines are proposed, these will be positioned alongside existing transmission lines and will thus add to an existing visual state and not introduce a new visual element in the landscape.

EXTENT	Construction phase	Operational phase	Night
No development	-	-	-
Development	Subregional	Subregional	Subregional

4.7 Duration of impact

Duration of visual impact:
This means the expected duration of the visual impact which may only be during construction phase, provision of screening vegetation, lifespan of the activity or in the case where time will not mitigate the visual impact.

Rating	Description
Short term	0 – 3 years
Medium term	3 – 15 years
Long term	More than 15 years
Permanent	The impact is irreversible

Once implemented the infrastructure will remain on the land for the duration of the 20 to 30 year life expectancy of the infrastructure. On decommissioning of the facility all infrastructure can be removed and the land returned to its original visual state.

DURATION	Construction phase	Operational phase
No development	-	-
Development	Short term	Long term

4.8 Probability of impact

Probability of visual impact:
Meaning the degree of possibility of the visual impact occurring which is usually determined by the nature of activity and sensitivity of the receptors and preventive measures taken.

Rating	Description
Improbable	Possibility of impact occurring is very low.
Probable	Distinct possibility that impact will occur.
Highly probable	Most likely that impact will occur.
Definite	The impact will occur.

It is assessed that it is most likely that the facility will be implemented on authorisation. The rating is based on the fact that other authorisations, i.e. rezoning, still need to be issued.

PROBABILITY	Construction phase	Operational phase
No development	-	-
Development	Highly probable	Highly probable

4.9 Intensity of impact

Intensity of visual impact: This means the extent of the impact on environmental and cultural resources within the viewshed or view catchment area.	
Rating	**Description**
Low	The visual character of the area will negligibly change.
Medium	The visual character of the area will be subject to change but not in an unacceptable way.
High	The visual character of the area will severely be changed.

The intensity of the visual impact as perceived form the view corridor and viewpoints, the bypassing public road, is assessed as, depending on the distance from the facility, raging from medium to high.

As indicated in annexure F the facility is visible for a stretch of 5km along the public road. The intensity of the impact will be higher for travellers in a western direction; with travellers in an eastern direction who most probably will not be aware of the facility located behind them as thy pass it. The assessment below is for the worst case scenario, that being for the visual impact for travellers in a western direction.

INTENSITY	**Construction phase**		**Operational phase**		**Night**	
	Distance from site					
	1-5km	5-10km	1-5km	5-10km	1-5km	5-10km
No development	-	-	-	-	-	-
Development with no mitigation	High - Medium	Medium	High	Medium	High	High
Development with mitigation	Medium	Medium - Low	Medium	Medium - Low	Medium	Medium

4.10 Overall visual impact significance

The overall significance of the visual impacts can be derived through a synthesis of the aspects produced in terms of their duration, intensity, extent and probability and be described as:

Low	Where it will not have an influence on the authority decision.
Medium	Where it should have an influence on the authority decision and in the case of negative impacts requires management actions to avoid or mitigate the impacts.
High	Where it would influence the authority decision regardless of any possible mitigation.

Although the impact will be permanent of nature, will definitely occur, is of subregional extent and will have a medium intensity, it is overall of **medium significance** and will require that management actions be implement to mitigate the impacts.

4.11 Cumulative impacts

Renewable energy facilities tend to locate, due to economic factors[3], as close as possible to existing electricity infrastructure into which it feeds the power it generates. As Aries substation and the transmission lines that feed into it are mayor infrastructure connected to the national electricity grid, it can thus be expected that more renewable energy facilities will locate around it.

The facility that is the subject to this report is one of 5 photovoltaic electricity generation projects in the immediate vicinity of Aries substation, known to the authors, of which 3 has already been authorised. (see annexure G).

If all 5 projects were to be implemented the intensity of the visual impact, from a local perspective would be higher as the visual character of a larger area will be affected. From a subregional perspective though, the 5 facilities impact on the same viewshed and will the visual impact not be significantly enlarged.

These possible future activities will however, consist of the same structural components, with similar visual characteristics and therefore, with similar visual impacts as the present activity. The nature of this future cumulative visual impact will have a horizontal, rather than a vertical characteristic.

From a visual perspective it would be preferable to locate all similar visual impacts within sight of the substation rather than affecting more distant areas within the landscape.

5 MITIGATION MEASURES

When considering mitigation measures to reduce the visual impact, the following should be considered. Mitigation measures should be:

- Economically feasible;
- Effective (time allowed for implementation and provision of management and maintenance); and
- Visually acceptable (within the context of the existing landscape).

To address these measures the following principles should be considered:

- Mitigation should be planned to fit into the existing landscape character or to enhance it.
- It should respect and build upon landscape distinctiveness;
- Mitigation should primarily aim to blend the proposed development into its surroundings and generally reduce its visibility; and
- It should be recognized that some mitigation measures will not be effective immediately.

[3]Mainly the cost of providing infrastructure i.e. transmission lines and substation.

The following mitigation measures are proposed:

General mitigation measures throughout the life expectancy of the facility
• Signage related to the facility should be discrete and confined to the entrance gates. • No other corporate or advertising signs should be permitted.
• All structures should be kept as small and low as possible.
• All painted surfaces are to use earth tones chosen for its ability to blend into the background.
• Security fencing should be as transparent as possible and mimic agricultural fencing fond in the area (see annexure G for an example). • The fence should not be visually dominant over the solar arrays. • The use of razor wire should be avoided.
• Screen planting in the form of tree lines should not be considered. • Only in exceptional circumstances should vegetation screening be considered in clumps around structures to mimic farmsteads found in the region.
• Security lighting must be kept to the absolute minimum and be confined to only those sections of the facility that are necessary to be illuminated. • No external up-lighting of any part of the facility must be allowed. • External, inclusive of perimeter security lighting must be by means of shielded down-lighters, minimizing light pollution beyond the extent of the area to be lit.
• Transmission lines to Aries substation should follow the path of the existing power line. • Underground cabling should be installed where possible.
Construction mitigation measures
• Flattening and grading of the site should be kept to the minimum. • The natural profile and shape of the site is to be maintained.
• Provision should be made for the rehabilitation of areas damaged by construction activities.
• Measures should be implemented to prevent possible soils erosion.
• An attempt must be made to control dust generated during the construction phase.
• Litter and waste disposal, inclusive of construction rubble, must be controlled.
• Fires, inclusive of burning of waste, should not be allowed on site.
• If possible, laydown areas, storage of building materials and other off-site construction activities, should be accommodated at the Olyvenkolk farmstead or other low lying, visually inconspicuous area.

6 CONCLUSIONS

The result of the visual impact assessment is indicative of a Best Practicable Environmental Option. It will ensure avoidance and minimisation of drastic and obtrusive visual intrusion in this rural area.

The nature and degree of visual impact of the proposed activity within the receiving environment during the construction phase, operational phase as well as during the night varies in respect of the criteria used. The construction phase is of relative short term and during the night far less receptors are of importance. The most important phase in respect of assessment of visual impact is therefore during the long term operational phase.

The visual impact during the Operational phase is shown to be moderate to low, mainly because of the following:

- Visibility :
  The facility will be partly visible from an intermediate area. The greatest visual impact is restricted to relative short distance of ±5km along the bypassing public road, by and large only apparent to motorists approaching the facility from an eastern direction.
  With no mitigation: Moderate - High
  With mitigation: Moderate.

- Visual Absorption Capacity:
  The landscape can visually absorb only small to medium size changes.
  With no mitigation: Low (Low means worst)
  With mitigation: Moderate – Low.

- Receptor sensitivity:
  Facility is occasionally visually noticeable by viewer. No existing tourism facilities exist in the region. Potential tourists attracted to the area by the accommodation facilities to be developed on land to the south, will have a positive attitude and low sensitivity to the visual impact of the proposal.
  With no mitigation: Moderate – High
  With mitigation: Moderate.

- Visual exposure:
  Facility is partly recognisable by viewer. The proposed facility maintains a very low profile and follows the natural lay of the land.
  With no mitigation: Moderate
  With mitigation: Moderate - Low.

- Visual intrusion:
  Facility fits only partially into surroundings. The Aries substation and associated transmission lines, as well as other similar facilities authorized in the direct vicinity of the proposal, sets a precedent for the development of similar activities in the area.
  With no mitigation: Moderate – High
  With mitigation: Moderate.

- Extent of visual impact:
  Facility is of subregional importance.
  Affecting a portion of a larger region of homogonous character.

- Duration of impact:
  Facility duration more than 15 years
  Long term duration.

- Probability of impact:
  Most likely that visual impact will occur
  Highly probable.

- Intensity of impact:
  The visual change in character is acceptable. No unique visual resources will be impacted on.
  With no mitigation: Moderate – High
  With mitigation: Low – Moderate.

- Overall visual impact significance:

  Taking the above-mentioned criteria into consideration, the following overall result in respect of the cumulative significance of the visual impact is reached, measured against the visual assessment criteria:

Visual Impact	Low	Low - Moderate	Moderate	Moderate - High	High
Without mitigation	0	0	1	4	1
With mitigation	0	3	3	0	0

  Although numeric values are not always a precise indication of the significance of visual impact, it nevertheless gives an indication of the relative significance of impact, especially in the case of comparisons of impacts, without and with mitigation. Values allocated to the different categories and number of appearances, show that visual impact in this case can be reduced by 30% if mitigation measures are applied.

  The significance of the visual impact can be classified as **MODERATE inclined to LOW** on condition that the mitigation measures as specified are implemented. This conclusion is reached as a result of the positive effect mitigation has on all VIAC (visual impact assessment criteria).

  As no significant visual or aesthetic issues are present, the authors of this report recommend that approval for the proposal be granted, subject thereto that the proposed mitigation measures be implemented.

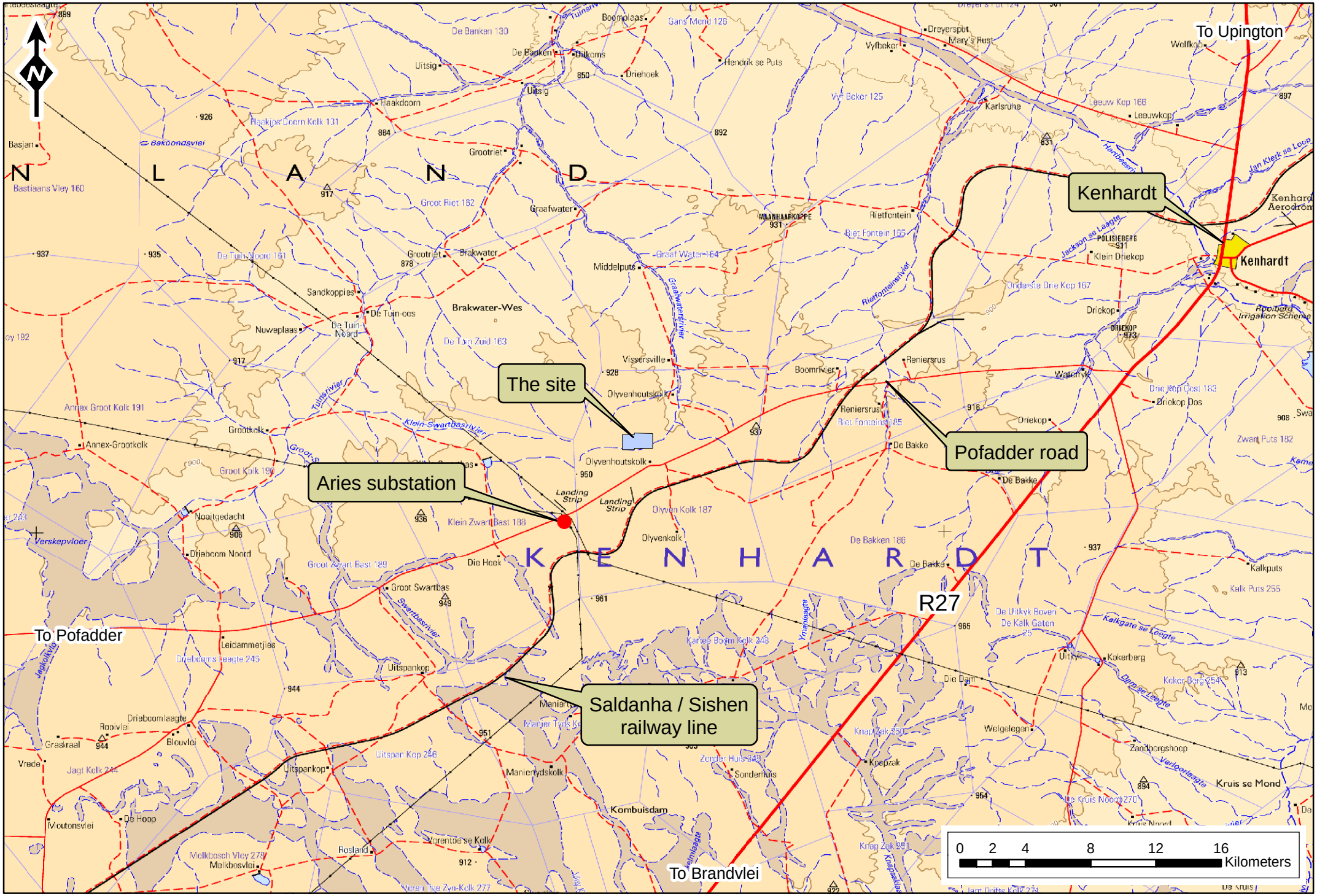
7 REFFERENCES

Eco Impact Legal Consulting (Pty) Ltd, August 2012: Final Scoping Report, Application for Environmental Authorisation, Government Notice Regulations 543, GNR 544, GNR 545, GNR 546, National Environmental Management Act 1998, 75MW Photovoltaic Electricity Generation Facility on Portion 12 of Farm 187, Olyvenkolk, Kenhardt District.

Oberholzer, B. 2005: Guideline for involving Visual & Aesthetic Specialists in EIA processes: Edition 1. CSIR Report No ENV-S-C 2005 053 F. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town.

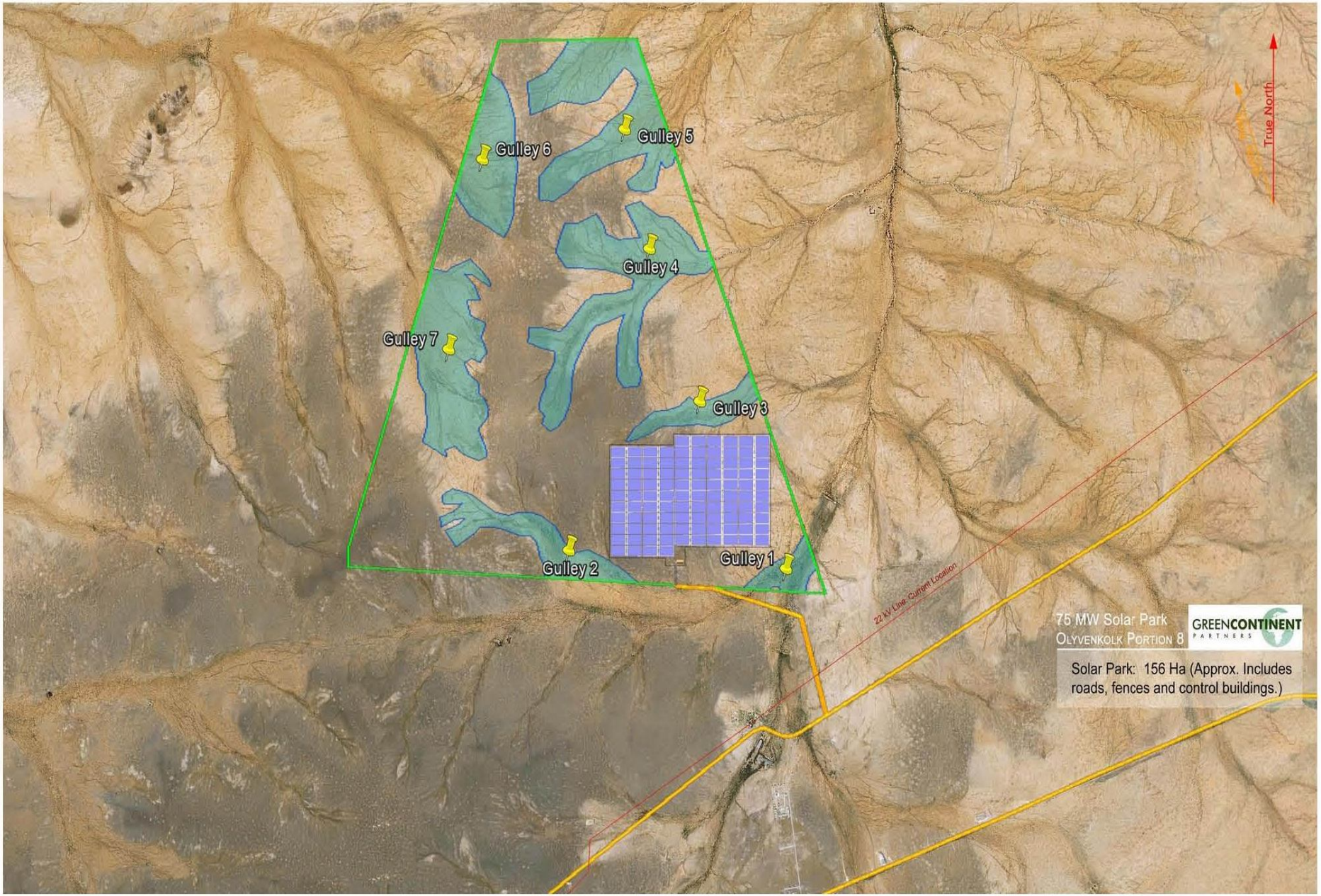
Topographical Map 1:50 000: 2920BD Grootriet, Third Edition, 2003.

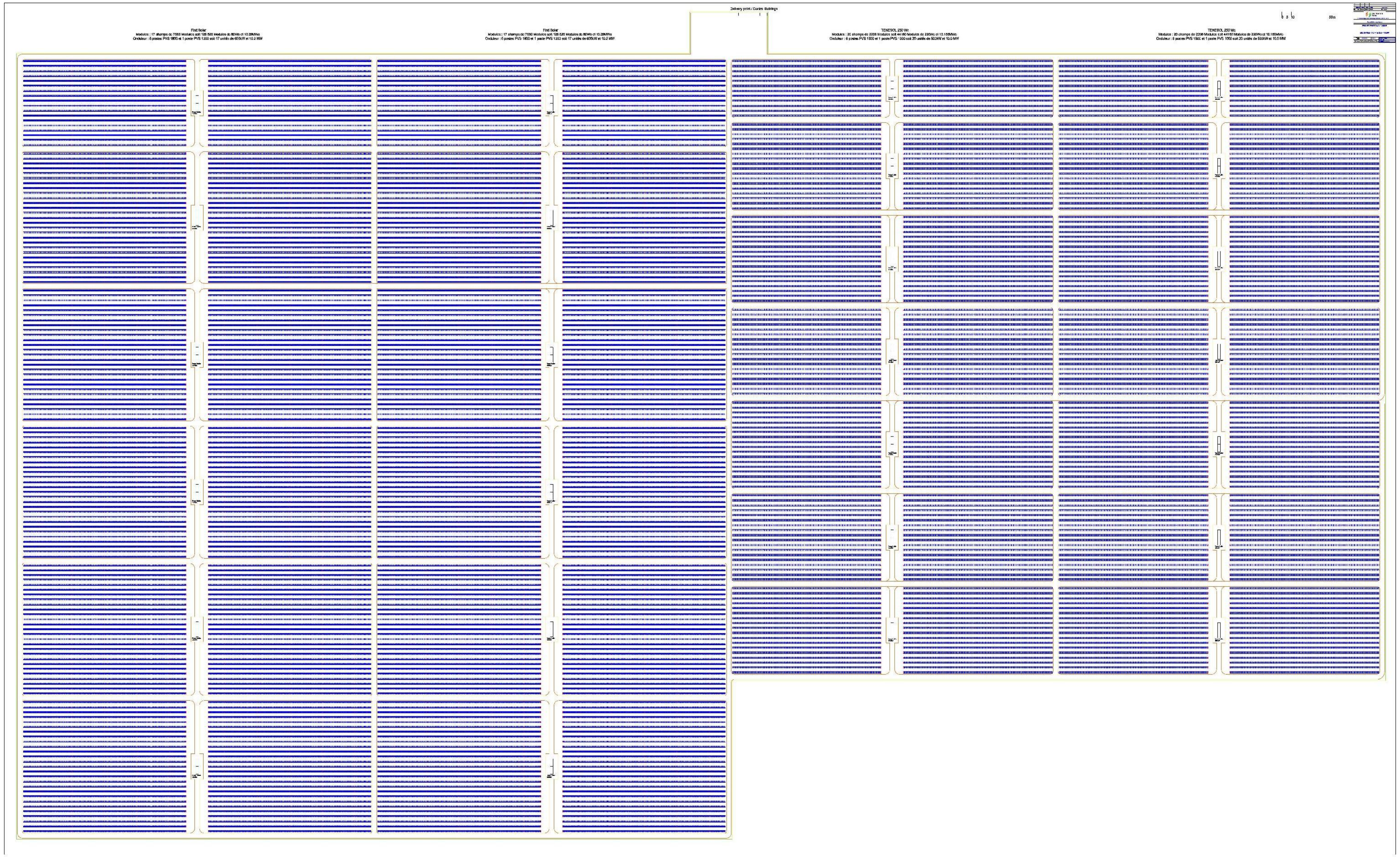
Topographical Map 1:250 000: 2920 Kenhardt, Fifth Edition, 2003.



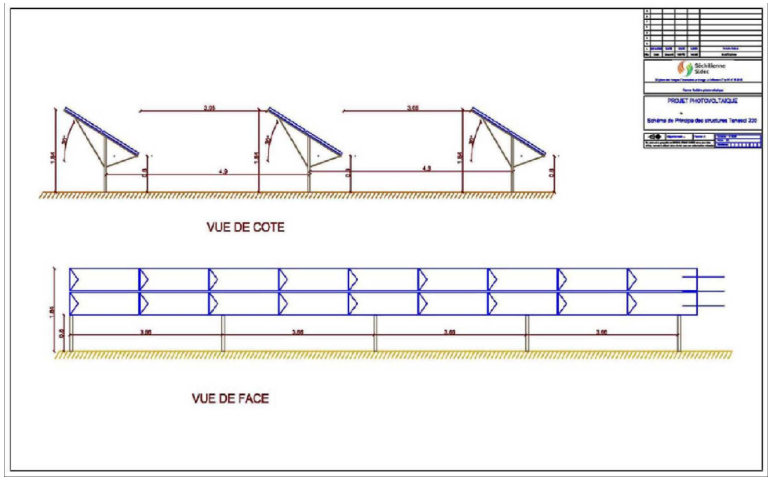
ANNEXURE A: REGIONAL CONTEXT

PLANSCAPE


Gulley 6
Gulley 5
Gulley 4
Gulley 7
Gulley 3
Gulley 2
Gulley 1
True North
22 kV Line Current Location
75 MW Solar Park
Olyvenkolk Portion 8
GREENCONTINENT
PARTNERS
Solar Park: 156 Ha (Approx. Includes roads, fences and control buildings.)



Delivery point / Control Buildings
First Solar
Modules : 17 champs de 7560 Modules soit 128 520 Modules de 80Wc et 10.28MWc
Onduleur : 5 postes PVS 1800 et 1 poste PVS 1200 soit 17 unités de 600kW et 10.2 MW
First Solar
Modules : 17 champs de 7560 Modules soit 128 520 Modules de 80Wc et 10.28MWc
Onduleur : 5 postes PVS 1800 et 1 poste PVS 1200 soit 17 unités de 600kW et 10.2 MW
TENESOL 230 Wc
Modules : 20 champs de 2208 Modules soit 44 160 Modules de 230Wc et 10.156MWc
Onduleur : 6 postes PVS 1500 et 1 poste PVS 1000 soit 20 unités de 500kW et 10.0 MW
TENESOL 230 Wc
Modules : 20 champs de 2208 Modules soit 44160 Modules de 230Wc et 10.156MWc
Onduleur : 6 postes PVS 1500 et 1 poste PVS 1000 soit 20 unités de 500kW et 10.0 MW
0 5 10
50m



Drawings showing dimensions of solar panels and support structures

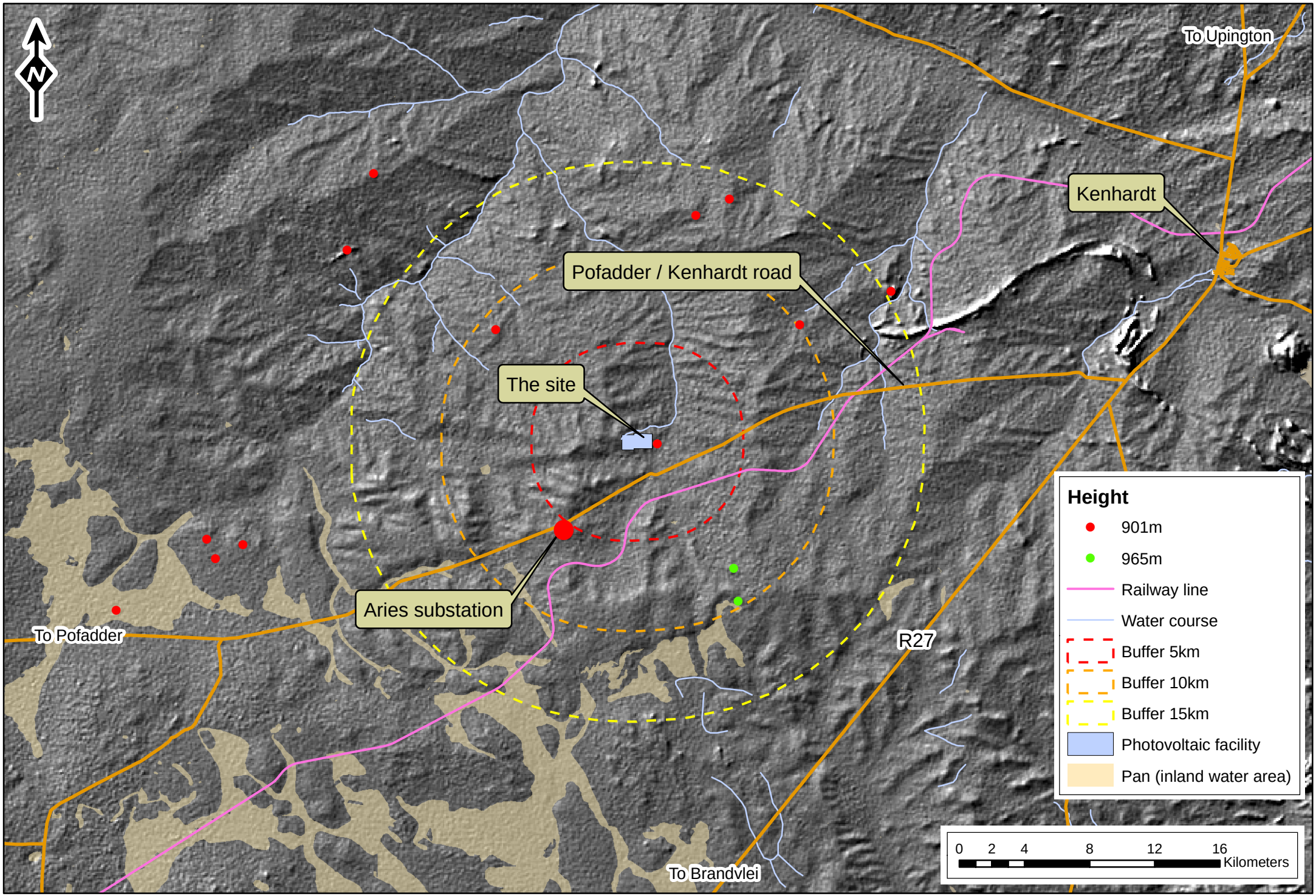
Photovoltaic facility in an arid / rural setting

Front veiw of solar panels

Back veiw of solar panels

Unobtrusive security fencing around facility

Annexure C: Photographs



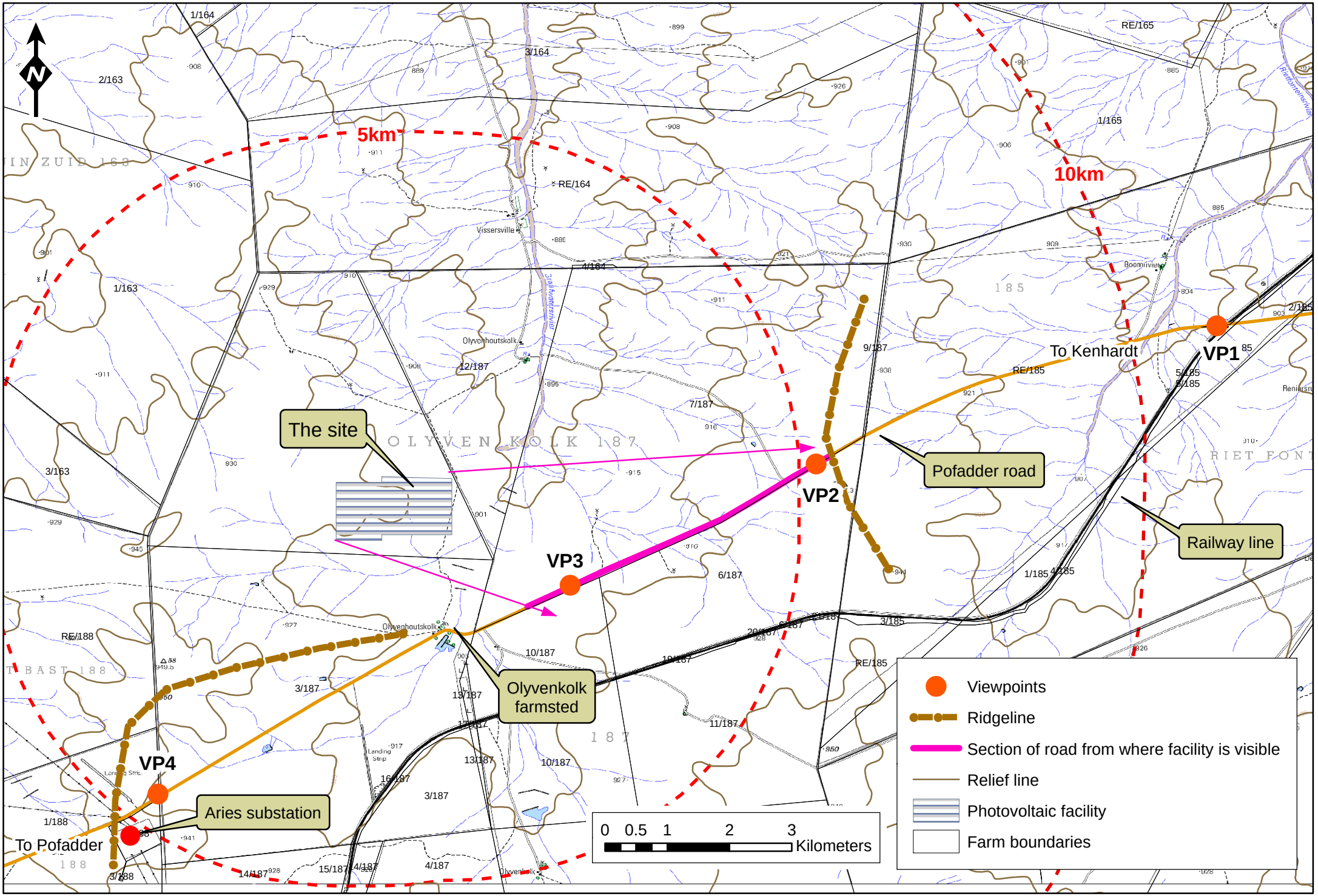
ANNEXURE D:TOPOGRAPHY

PLANSCAPE

Aries substation as seen from Kenhardt / Pofadder road

Electricity transmission lines feeding into Aries substation

ANNEXURE E: PHOTOGRAPHS OF EXISTING ELECTRICITY INFRASTRUCTURE



ANNEXURE F: LOCAL CONTEXT ANALYSIS

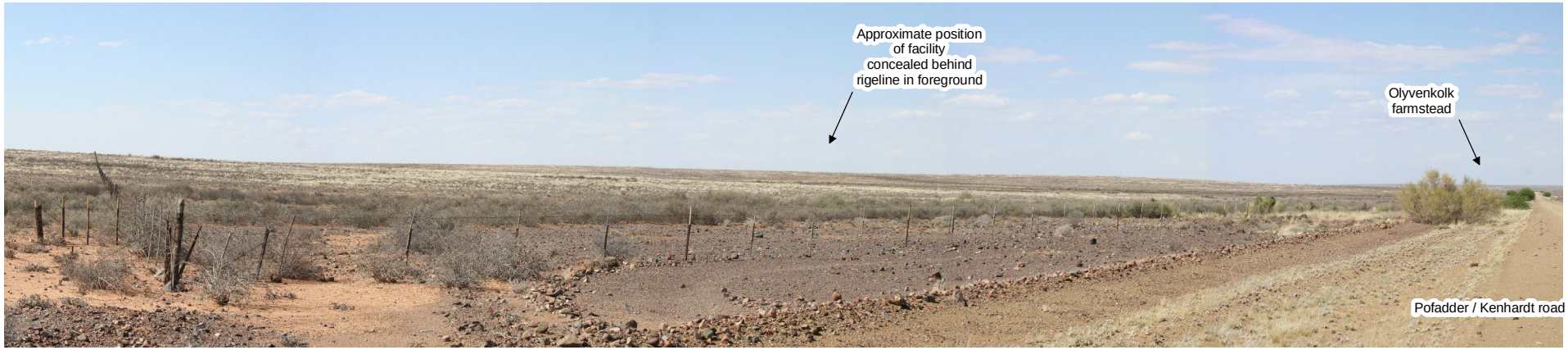
PLANSCAPE

VIEWPOINT 1: View in western direction from railway bridge. Distance to site is ±12km

VIEWPOINT 2: View in western direction towards Aries sub-station. Distance to site is ±5km

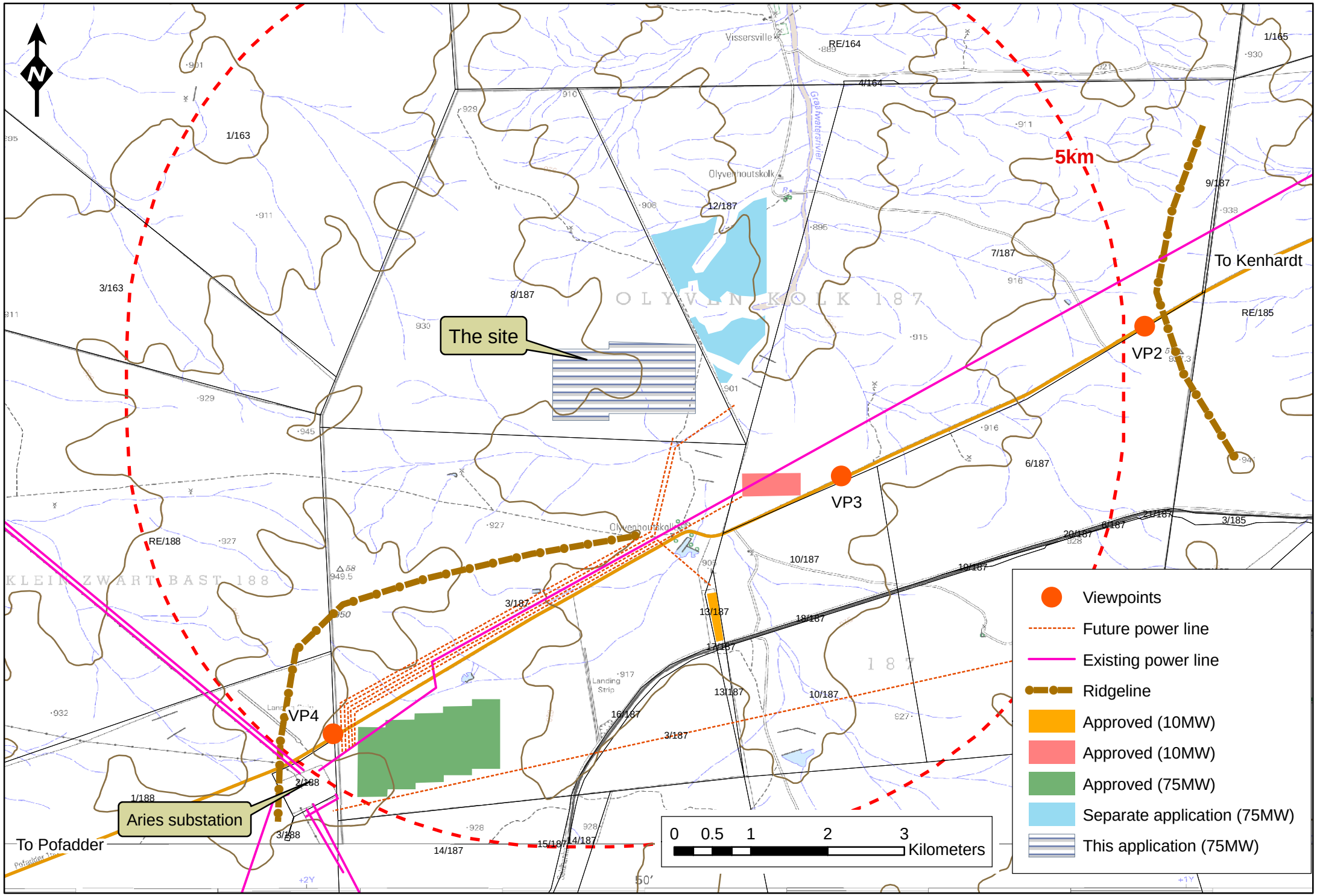
ANNEXURE G: PHOTOGRAPHS FROM VIEWPOINTS 1 AND 2

VIEWPOINT 3: View in western direction from roadside. Distance to site is ±2km



VIEWPOINT 4: View in north eastern direction towards the site. Distance to site is ±5km

ANNEXURE H: PHOTOGRAPHS OF VIEWPOINTS 3 AND 4



ANNEXURE I: CUMULATIVE IMPACTS

PLANSCAPE