

## 16.1 INTRODUCTION

The aim of the EIA for the proposed Graspan PV Power Facility is to provide information to inform decision-making that will contribute to environmentally sound and sustainable development. This report is submitted to the Department of Environmental Affairs (DEA) to provide information and an independent assessment, thus enabling the DEA to make an informed decision regarding whether or not to grant an environmental authorisation for the proposed development in terms of NEMA. If granted, this report will also assist the DEA to define under what conditions the development should go ahead. In considering the development of renewable energy projects, it is inevitable that there will be some negative environmental impacts. However, there is also the need to encourage renewable energy in South Africa in order to move toward more sustainable energy practices and meet targets set by the government of sourcing 10,000 GWh from renewable energy projects by 2013 <sup>(1)</sup>.

Through the EIA process which included various stakeholder and specialist input, ERM has identified and assessed a number of potential impacts relating to the development. This chapter provides an overview of the EIA findings and makes recommendations regarding key mitigation measures for the preferred and final layout (Layout Alternative 2) which supersedes the original layout, Layout Alternative 1.

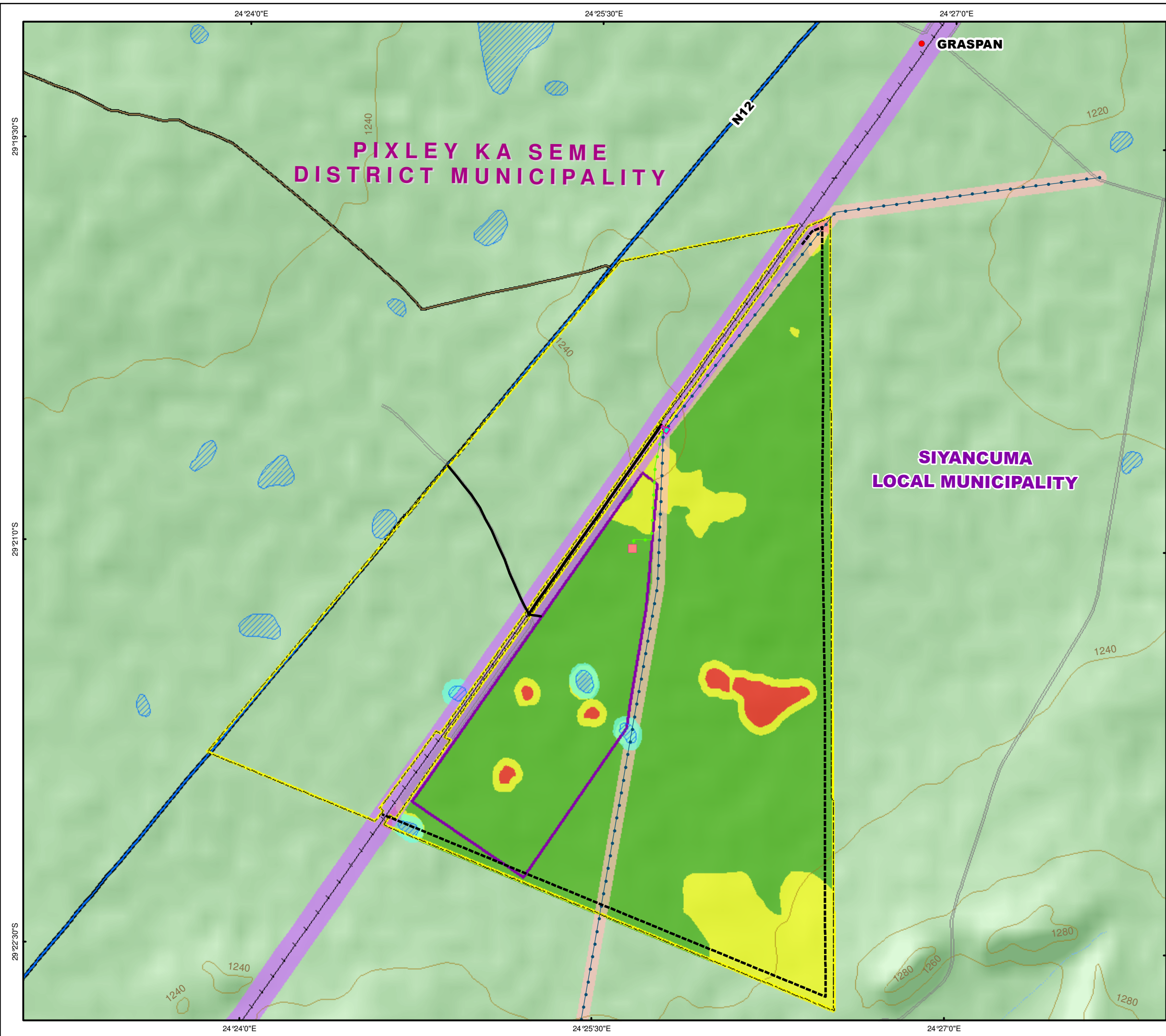
Layout Alternative 2 has been designed based on the sensitivity constraints of the site as established during the EIA process. *Figure 16.1* and *Figure 16.2* show the site layouts, Layout Alternative 1 and Layout Alternative 2 (final layout), and illustrate how the site layout has been changed based on specialist feedback during the process. The final layout of the PV arrays is based on the best currently available information but may require some minor alterations as a consequence of more detailed geo-technical studies. Any revisions of the design will, however, be within the allowable zones prescribed by this EIR and any amendments to the final layout will be submitted to DEA before construction, with an indication of the extent of change and associated changes in significance ratings of impacts, if applicable.

This EIA report provides a description of the EIA process followed to date.

The potential impacts associated with the development are summarised below and should be considered both in the context of the project rationale and the discussion of cumulative impacts in the previous chapter.

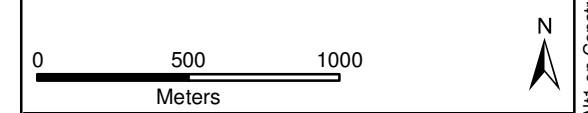
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(1) National Energy Regulator of South Africa, South Africa Renewable Energy Feed-In Tariff (2009), NERSA Publications.



- Legend**
- Town
  - Contours
  - Non-Perennial River
  - ▨ Water Bodies
  - National Route
  - Secondary Road
  - Other Access
  - + Railway Line
  - Existing Overhead Transmission Line ESKOM
  - Transmission Line
  - Access Road
  - Proposed Substation
  - Graspán Eskom Traction Substation
  - 50m Existing Transmission Line Buffer
  - 100m Railway Buffer
  - 50m Dry Pan Buffer
  - 50m Visual Setback Line
  - ▭ Site Layout Alternative 1 (90MW)
  - ▭ Graspán Photovoltaic (PV) Power Facility

- Ecological Sensitivity**
- Very High
  - High
  - Medium



TITLE:  
**Figure 16.1: Site Layout Alternative 1 on Constraints Map**


CLIENT:



The solar MWh company

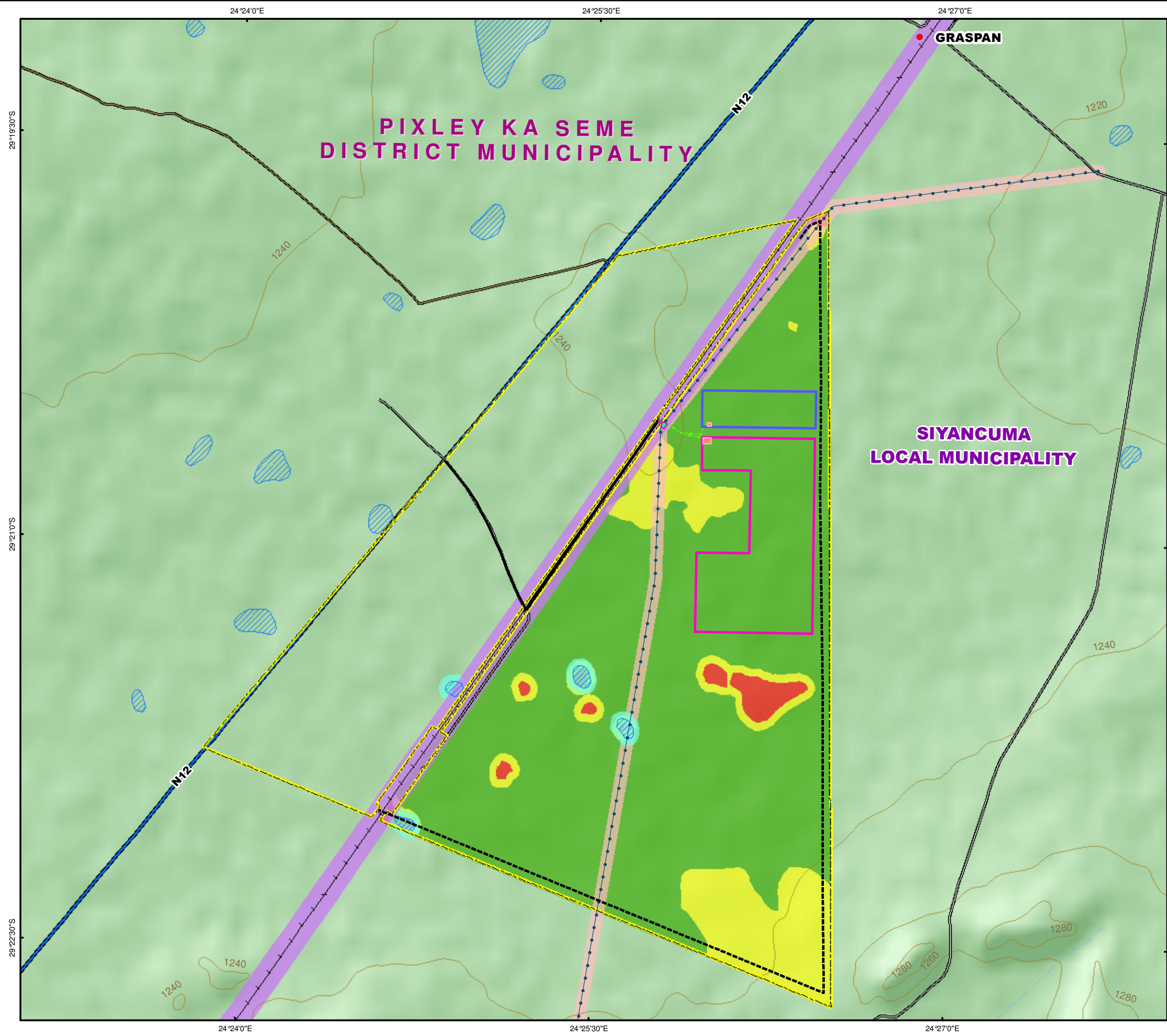
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DRAWN: AB	APPROVED: SHC	SCALE: 1 : 25 000
DRAWING: Graspán EIR Alt1 on Constraints Map.mxd		REV: 0

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Projection: Transverse Mercator, CM 23, WGS84  
 Source: Chief Directorate National Geo-Spatial Information - Base Data Simon Todd - Ecological Sensitivity  
 Inset Map: Esri Data & Maps

SIZE:  
**A3**

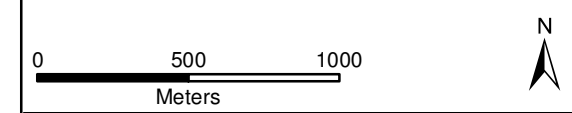


### Legend

- Town
- Contours
- Non-Perennial River
- ▨ Water Bodies
- National Route
- Secondary Road
- Other Access
- + Railway Line
- Existing Overhead Transmission Line ESKOM
- Transmission Line
- Access Road
- Proposed Substation
- Graspán Eskom Traction Substation
- 50m Existing Transmission Line Buffer
- 100m Railway Buffer
- 50m Dry Pan Buffer
- 50m Visual Setback Line
- Site Layout Alternative 2 (10MW)
- Site Layout Alternative 2 (80MW)
- Graspán Photovoltaic (PV) Power Facility

### Ecological Sensitivity

- Very High
- High
- Medium



TITLE:  
**Figure 16.2: Site Layout Alternative 2 (Preferred and Final Layout)**

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Projection: Transverse Mercator, CM 23, WGS84  
 Source: Chief Directorate National Geo-Spatial Information - Base Data Simon Todd - Ecological Sensitivity  
 Inset Map: Esri Data & Maps

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## 16.2.1

*Construction Phase Impacts*

Layout Alternative 2 is considered the preferred alternative. The location of the 90 MW Layout Alternative 1 includes several small pans and ecologically sensitive areas, and therefore would have a significantly larger impact than Layout Alternative 2. The Very High sensitivity areas at the site consist of the rocky outcrop as well as the pans. Although these areas do not constitute a large proportion of the site, they are quite widely distributed and consequently place some spatial constraints on the possible location of infrastructure at the site. The 90 MW Layout Alternative 2 avoids the ecologically sensitive areas on the site and would not have a significant direct impact on the ecologically important parts of the site. Additionally, Layout Alternative 1 would require the installation of overhead powerlines across the ecologically sensitive *Rhus ciliata* Shrubland as identified in *Chapter 5*. However, Layout Alternative 2 requires the installation of overhead powerlines that avoid all ecologically sensitive areas on the site. Layout Alternative 2 also allows for a greater buffer from identified heritage resources in the Layout Alternative 1 footprint and from the existing railway line, which is preferable in avoiding impacts to heritage resources, as most heritage resources were identified along the railway line.

The potential impact from the loss of topsoil, soil compaction and erosion is primarily due to the preparation of the site for the establishment of PV arrays, underground cables, access road(s), temporary laydown area and buildings (control and accommodation ) requiring vegetation clearance, some site levelling and grading and soil compaction. This negative impact is considered to be of *Minor* residual significance.

The negative impact on surface and groundwater due to a change in drainage network on the site and potential spills of contaminants is of *Minor* residual significance.

The destruction and loss of natural vegetation as a result of the vegetation clearance for the installation of the PV arrays is considered to have a residual significance of a *Minor* nature.

The negative impacts on fauna due to noise, pollution, potential poaching and disturbance caused by construction activities will be of *Minor* residual significance.

Potential negative avifaunal impacts resulting from noise, pollution, possible poaching and disturbance caused by construction activities is considered to have a *Minor* residual significance.

A negative visual impact will occur during construction as a result of the presence of construction vehicles, equipment and project components. This impact is considered to be of *Moderate* residual significance.

The potential damage or destruction to paleontological resources as a result of construction activities such as drilling and screwing of the PV arrays supports into the ground is considered to have a *Negligible* residual significance. The potential impacts on archaeological resources due to construction activities is considered to be of *Minor* positive residual significance if archaeological finds are unearthed and documented appropriately, but *Minor* negative residual significance if archaeological finds are damaged or destroyed. The potential negative impact on cultural heritage as a result of damage or destruction to historical military burial sites and landmark cairns is considered to be of *Negligible* residual significance.

The positive impact of creation of direct employment and training opportunities, and for indirect employment and procurement for the local economy, will be of *Moderate* residual significance. The positive impact from induced economic benefits as a result of an increase in disposable income in the local economy will be of *Minor* residual significance. The positive impact from community investment through the Community Trust to be established is considered to be of *Moderate-Major* residual significance.

During construction, the negative impact from inflation and an increased cost of living as a result of increased demand for goods, services and accommodation will be of *Minor* residual significance. The possible negative impact due to social nuisances, such as increased levels of crime, drug and alcohol abuse, increased incidences of sex workers, domestic violence, and the additional pressure on the existing infrastructure and services as a result of an influx of workers is considered to be *Negligible*. The potential negative impact on the socio-economic aspects of agricultural activities is considered to be of *Negligible* residual significance. Any potential impact on tourism is considered to be *Negligible*.

A summary of the bio-physical and socio-economic impacts associated with the construction phase of the proposed Graspan PV Power Facility, including their pre-mitigation and residual impacts, are given in *Table 16.1* below. All negative impacts associated with the proposed development have been mitigated to a level which is deemed appropriate for the construction phase to proceed.

**Table 16.1** *Summary of Pre-mitigation Significance during Construction Phase for Layout Alternative 1 and Layout Alternative 2 and Residual Impact Significance for Layout Alternative 2 (preferred and final layout)*

	Section	Impact	Pre-mitigation Significance (Based on Layout Alternative 1)	Pre-mitigation Significance (Based on Layout Alternative 2)	Residual Impact Significance (Based on mitigation and Layout Alternative 2)
Soils	7.1	Loss of Topsoil, Soil Compaction and Soil Erosion	MODERATE (-VE)	MODERATE (-VE)	MINOR (-VE)
Water	7.2	Impact on Surface and Groundwater	MAJOR-MODERATE (-VE)	MINOR (-VE)	MINOR (-VE)
Flora	9.1	Destruction and Loss of Natural Vegetation and Sensitive Plant Communities	MAJOR (-VE)	MODERATE (-VE)	MINOR (-VE)
Fauna	9.3	Impacts from Habitat Loss and Disturbance	MAJOR (-VE)	MODERATE (-VE)	MINOR (-VE)
Avifauna	9.4	Impacts on Avifauna	MAJOR (-VE)	MODERATE-MINOR (-VE)	MINOR (-VE)
Visual	10.4	Visual Impacts	N/A	MODERATE(-VE)	MODERATE(-VE)
Palaeontology	11.1	Damage or Destruction to Paleontological Resources	N/A	MINOR (-VE)	NEGLIGIBLE
Archaeology	11.2	Archaeological Finds	N/A	MINOR (-VE)	MINOR (+VE)
	11.2	Destruction or Disturbance to Archaeological Resources	N/A	MINOR (-VE)	MINOR (-VE)
Cultural Heritage	11.3	Destruction or Disturbance of Cultural Heritage	N/A	MINOR (-VE)	NEGLIGIBLE
Socio-economic	12.1	Direct Employment and Training	N/A	MINOR - MODERATE (+VE)	MODERATE (+VE)
	12.1	Procurement and Indirect Employment	N/A	MINOR - MODERATE (+VE)	MODERATE (+VE)
	12.1	Induced Economic Benefits	N/A	MINOR (+VE)	MINOR (+VE)
	12.1	Increased Community Investment	N/A	MODERATE (+VE)	MODERATE-MAJOR (+VE)
	12.1	Inflation and Increased Cost of Living	N/A	MINOR (+VE)	MINOR (+VE)
	12.2	Social Nuisance Factors	N/A	MINOR (-VE)	NEGLIGIBLE
	12.3	Impact on Agricultural Activities	N/A	MINOR (-VE)	NEGLIGIBLE
	12.4	Impact on Tourism	N/A	MINOR (-VE)	NEGLIGIBLE
Traffic	13.1	Impact from Increased Traffic	N/A	MODERATE (-VE)	MINOR (-VE)
Waste	13.2	Impact from Waste and Effluent	N/A	MODERATE (-VE)	MINOR (-VE)
Air Quality	13.3	Dust and Emissions	N/A	MINOR (-VE)	NEGLIGIBLE

\* The visual, cultural heritage, socio-economic, traffic, waste and air quality impact assessments only assessed the preferred and final layout, Site Layout Alternative 2

## 16.2.2

### *Operational Phase Impacts*

The negative impact on loss of topsoil, soil compaction and erosion due to site maintenance activities and potential drainage network changes on the site is considered to be of *Minor* residual significance.

The negative impact on surface and groundwater from potential increased sediment loading in site runoff and potential spills of contaminants is considered to be of *Minor* residual significance.

The potential impact on the agricultural potential of the site due to the installation of the PV arrays and loss of land for agricultural purposes is considered to be of *Negligible* residual significance, primarily as a result of the low rated existing agricultural potential of the site.

The destruction and loss of natural vegetation due to vegetation clearance for maintenance purposes is considered to be of *Minor* negative residual significance. The potential for alien plant invasions due to the disturbance of the site's established natural vegetation is considered to be of *Minor* negative residual significance.

The negative impacts on fauna due to disruption of landscape connectivity and habitat alteration is considered to be of *Minor* residual significance.

Potential negative avifaunal impacts primarily due to the presence of new powerlines on the site, posing a threat to large avifauna through collisions and electrocution, is considered to be of *Minor* residual significance.

The negative visual impact of the PV power facility on the landscape is considered to be of *Moderate* residual significance.

The negative cultural heritage impact on the landscape and sense of place due to the presence of the PV power facility in a currently rural and remote area is considered to be of *Minor* residual significance.

The positive impact from the creation of direct employment and training, and for indirect employment and procurement for the local economy during operations is considered to be of *Minor* residual significance owing to the relatively lower number of job opportunities compared to the construction phase. The positive impact from induced economic benefits as a result of an increase in disposable income is considered to be of *Negligible* residual significance, due to relatively fewer jobs during the operational phase. The *Moderate-Major* residual significance for the positive impact from community investment derived from the establishment of a Community Trust will continue through the operational phase.

The negative impact from inflation and an increased cost of living as a result of increased demand in the local economy for goods, services and accommodation is considered to be of *Negligible* residual significance. The

possible negative impact of social nuisances, such as increased levels of crime, drug and alcohol abuse, increased incidences of sex workers, domestic violence, and the additional pressure on the existing infrastructure and services as a result of an influx of workers is considered to be *Negligible*. Any potential negative impact on the socio-economic aspects of a loss of agricultural activities during operations is considered to be *Negligible*. There will be a *Negligible* impact on tourism in the area.

A summary of the bio-physical and socio-economic impacts associated with the operational phase of the proposed Graspan PV Power Facility, including their pre-mitigation and residual impacts, are given in *Table 16.2* below.

All negative impacts associated with the proposed development have been mitigated to a level which is deemed appropriate for the operational phase of the PV power facility to be sustainable.



**Table 16.2** *Summary of Pre-mitigation Significance during Operational Phase for Layout Alternative 1 and Layout Alternative 2 and Residual Impact Significance for Layout Alternative 2 (preferred and final layout)*

	Section	Impact	Pre-mitigation Significance (Based on Layout Alternative 1)	Pre-mitigation Significance (Based on Layout Alternative 2)	Residual Impact Significance (Based on mitigation and Layout Alternative 2)
Soils	7.1	Loss of Topsoil, Soil Compaction and Soil Erosion	MINOR (-VE)	MINOR (-VE)	MINOR (-VE)
Water	7.2	Impact on Surface and Groundwater	MODERATE (-VE)	MODERATE-MINOR (-VE)	MINOR (-VE)
Agriculture	8.1	Loss of Agricultural Land and/or Production	N/A	MINOR (-VE)	NEGLIGIBLE
Flora	9.1	Impacts of Maintenance Activities on Vegetation	MODERATE (-VE)	MINOR (-VE)	MINOR (-VE)
	9.2	Alien Plant Invasion	MODERATE (-VE)	MODERATE (-VE)	MINOR (-VE)
Fauna	9.3	Impacts from Habitat Loss and Disturbance	MODERATE (-VE)	MODERATE-MINOR (-VE)	MINOR (-VE)
Avifauna	9.4	Impacts on Avifauna	MAJOR (-VE)	MODERATE (-VE)	MINOR (-VE)
Visual	10.4	Visual Impacts	N/A	MODERATE(-VE)	MODERATE(-VE)
Cultural Heritage	11.4	Impact on Sense of Place	N/A	MODERATE (-VE)	MINOR (-VE)
Socio-economic	12.1	Direct Employment and Training	N/A	MINOR (+VE)	MINOR (+VE)
	12.1	Procurement and Indirect Employment	N/A	MINOR (+VE)	MINOR (+VE)
	12.1	Induced Economic Benefits	N/A	NEGLIGIBLE	NEGLIGIBLE
	12.1	Increased Community Investment	N/A	MODERATE (+VE)	MODERATE-MAJOR (+VE)
	12.1	Inflation and Increased Cost of Living	N/A	NEGLIGIBLE	NEGLIGIBLE
	12.2	Social Nuisance Factors	N/A	NEGLIGIBLE	NEGLIGIBLE
	12.3	Impact on Agricultural Activities	N/A	MINOR (-VE)	NEGLIGIBLE
	12.4	Impact on Tourism	N/A	MINOR (-VE)	NEGLIGIBLE
Traffic	13.1	Impact of Increased Traffic	N/A	NEGLIGIBLE	NEGLIGIBLE
Waste	13.2	Impact from Waste and Effluent	N/A	MINOR (-VE)	MINOR (-VE)
Air Quality	13.3	Dust and Emissions	N/A	NEGLIGIBLE	NEGLIGIBLE

\* The agricultural, visual, cultural heritage, socio-economic, traffic, waste and air quality impact assessments only assessed the preferred and final layout, Site Layout Alternative 2

ERM is confident that every effort has been made by Solaire Direct to accommodate the mitigation measures recommended during the EIA process to the extent that is practically possible, without compromising the economic viability of the proposed PV power facility. The implementation of the mitigation measures detailed in *Chapters 7 to 14* and listed in the Environmental Management Programme (EMP), including monitoring, will provide a basis for ensuring that the potential positive and negative impacts associated with the establishment of the development are enhanced and mitigated to a level which is deemed adequate for the development to proceed.

In summary, based on the findings of this assessment, ERM finds no reason why the 90 MW PV power facility proposed for the Graspan site (Layout Alternative 2) should not be authorised, contingent on the mitigations and monitoring for potential environmental and socio-economic impacts as outlined in the EIR and EMP being implemented.