



Social Impact Assessment Report

Proposed Portion 2 of Farm Roode Pan 150 PV
Solar Energy Facility in Orania, Northern Cape
Province

Prepared for: Solar Capital (Pty) Ltd

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D E K O R



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Proposed Portion 2 of Farm Roode Pan 150, Hopetown RD PV Solar Energy facility, Northern Cape

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GLOSSARY OF ABBREVIATIONS

BBBEE:	Broad based black economic empowerment
CO:	Compliance Officer
CLO:	Community Liaison Officer
DM:	District Municipality
DEA	Department of Environmental Affairs
DoE:	Department of Energy
EAP:	Economic Active Population (15 – 64 years of age)
EIA:	Environmental Impact Assessment
EMC:	Environmental Monitoring Committee
EMP:	Environmental Management Plan
FET:	Further Education and Training
GDP:	Gross Domestic Product
GDPR:	Gross Domestic Product of the Region
HDSA:	Historically Disadvantaged South African
I&AP:	Interested and Affected Party
IDP:	Integrated Development Plan
LED:	Local and Economic Development
LM:	Local Municipality
NCDENC:	Northern Cape Department of Environment and Nature Conservation
PKSDM:	Pixley ka Seme District Municipality
NEMA:	National Environmental Management Act
PV:	Photovoltaic
ROD:	Record of decision
SIA:	Social Impact Assessment
SDF:	Strategic Development Framework
SLP:	Social and Labour Plan
SMME:	Small, Medium Size Enterprises
SPV:	Special Purpose Vehicle

1. INTRODUCTION

1.1 Introduction

Solar Capital (Pty) Ltd (Solar Capital) is proposing to establish a commercial photovoltaic (PV) solar energy facility as well as associated infrastructure on a site approximately 4km from the town of Orania along the R369 between Orania and Petrusville in the Northern Cape Province. The facility will be referred to as the **Farm Roode Pan 150 PV Solar Energy Facility** and will have a generating capacity of approximately 20 MW. The proposed development requires an Environmental Authorisation and an Environmental Impact Assessment (EIA) is thus done to determine the potential environmental impacts associated with the construction, operation and decommissioning phases.

In order to obtain authorization, comprehensive, independent environmental studies must be undertaken in accordance with EIA Regulations. The project will therefore be registered with the National Department of Environmental Affairs (DEA) and the Northern Cape Department of Environment and Nature Conservation (NCDENC) will act as a commenting authority for the application. The EIA process consists of two phases, namely the Scoping and detailed EIA Phases and a Social Impact Assessment (SIA) is required as part of this process.

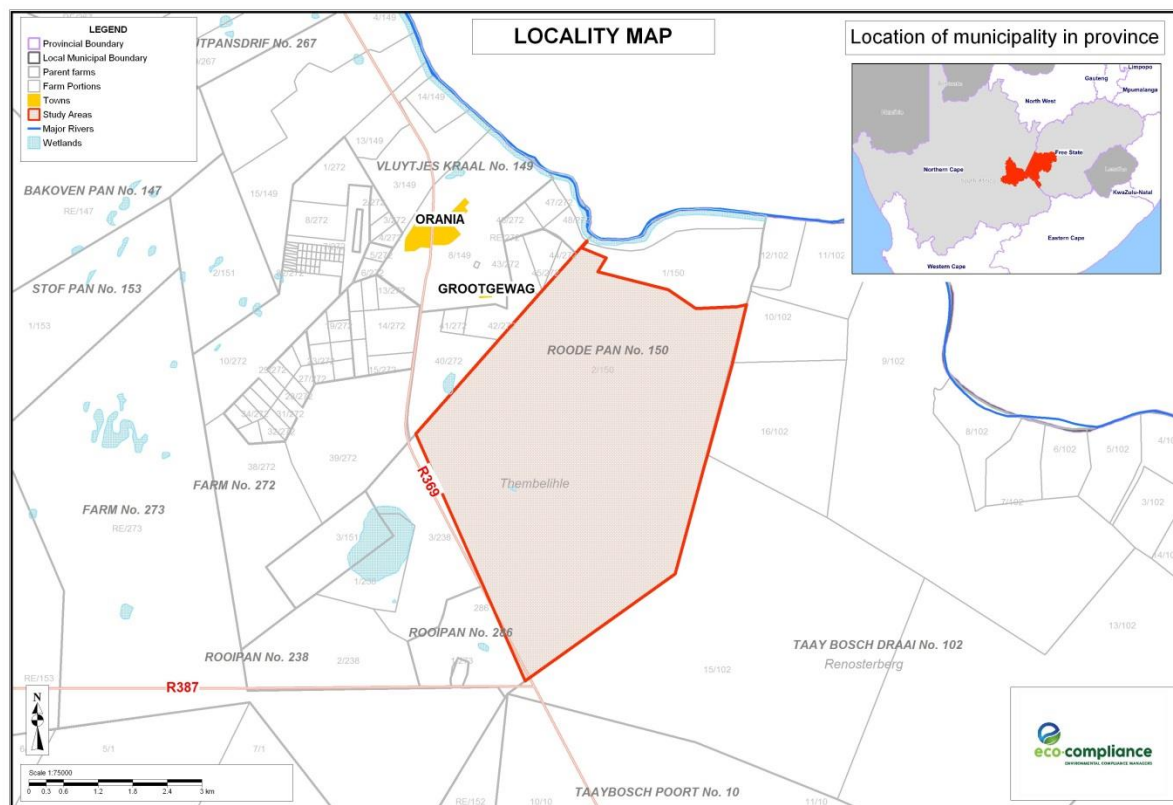
1.2 Locality

The proposed PV Solar Energy facility is situated on Portion 2 of Farm Roode Pan 150, Hopetown RD, Northern Cape Province and is located approximately 4km from Orania town within the Thembelihle Local Municipality. The Thembelihle Local Municipality is one of the local municipalities that constitute the Pixley ka Seme District Municipality.

A number of factors need to be considered when determining a suitable locality for a proposed photovoltaic solar energy facility. The Orania PV Solar facility project location was specifically chosen for the construction of a large-scale PV facility for the following reasons:

- Close proximity to the Orania Substation located approximately 2km from property.
- A study of available radiation shows that the proposed site is uniformly irradiated by the sun; hence has the required solar resource.
- The site is relatively flat as preferred for the installation of PV panels, and requires minimal earthworks.
- The site is readily accessible from the existing farm access road linked to the R369 to Orania and Petrusville.

Figure 1. Locality map indicating the town of De Aar, Northern Cape.



1.3 Project background

In terms of the EIA, a broader study area of approximately 2467 ha is being considered within which the facility is to be constructed, although the actual development footprint of the proposed facility would be much smaller in extent. Therefore, the PV panels and the associated infrastructure can be appropriately placed within the boundaries of the broader site to avoid any identified environmental sensitivities.

Infrastructure associated with each of the fourteen PV facilities will include:

- Photovoltaic solar panels with a generating capacity of up to 19MW nett into the Grid;
- Onsite underground distribution power lines to connect different sections of the facility to inverter boxes and ultimately to Eskom’s existing Orania Substation;
- Cabling between the project components, to be laid underground where practical;
- Site access and internal access roads;
- Temporary laydown;
- Workshop area for maintenance and storage.

2. PURPOSE OF THE SOCIAL IMPACT ASSESSMENT

2.1 Purpose of a SIA

The primary purpose of a Social Impact Assessment (SIA) is to determine and analyse the likely impacts of a proposed development or event on a specific group of people or a community's way of life, their character and cohesion. This is done by assessing and analysing the probable socio-economic impacts before the development actually takes place. From a social perspective the developer is thus guided in such a way that he realises and optimises the positive impacts and avoids or implements mitigation measures to minimise possible negative impacts of the proposed development.

Like a biological, physical, or economic impact, social impacts have to be pointed out and measured in order to be understood and communicated to the impacted population and decision-makers. SIAs provide a realistic appraisal of possible social and economic consequences and suggestions for project alternatives and possible mitigation measures. Social impacts are responsive to perceptions and therefore the intensity and significance thereof could change as and when new perceptions or policy guidelines are formed.

2.2 Purpose of this Social Impact Assessment Report

This SIA report aims to determine and provide the following information:

- The socio-economic profile of the region and the social characteristics of the receiving environment;
- Findings of the assessment phase that was specifically undertaken for the purposes of this SIA report;
- Comparison of similar large-scale projects and applying the lessons learnt to the proposed Roode Pan 150 solar facility;
- Identify possible impact categories and impact areas (possible hot spots);
- Description and significance rating of the possible impacts that were identified during the construction, operational and decommissioning phases;
- Mitigation and management measures that could be implemented during the construction, operational and decommissioning phases; and
- Recommendations from a social and economic perspective.

3. METHODOLOGY FOR THE DETAIL SIA PHASE

The broad steps followed as part of this SIA study are outlined below:

3.1 Scope of the Assessment

Based on information received from Solar Capital, the scope of the assessment was determined. Photographs and aerial maps were used to orientate the consultant and determine the preliminary potential social impacts that could emerge through the process.

3.2 Desktop studies and Literature Review

Various secondary data sources were used to extrapolate information and to determine and analyse the social and economic characteristics of the study area. Such data included maps, census data, internet searches and municipal documents. Where relevant, reference is made to the various sources in the report.

3.3 Primary data

In order to elaborate on the social setting and characteristics of the study area, as well as the key economic activities a site visit was undertaken. As part of the primary data gathering, links are usually established with the public participation process that would be done for the EIA phase of the project. Information obtained in the focus group meeting from a public participation specialist also formed part of the data used.

3.4 Consultation and fieldwork

Consultation and fieldwork for the SIA included interaction (personal and telephonic) with key stakeholders which ran parallel to the public consultation. In addition, information gathered and social issues identified in other similar projects usually serves as guiding input to the social assessment as similar impacts may be expected.

3.5 Analysis of data compiled by parallel studies

Similar studies that were done in the Pixley ka Seme District Municipality and the broader region were investigated and the information and results compared with data obtained for this SIA.

3.6 Impact Variables to be assessed

The following variables are usually assessed within a Social Impact Assessment (Burdge, 1995):

- Population impacts, including population change (ethnic composition, size, etc.), inflow or outflow of temporary workers, presence of seasonal residents and relocation of individuals and families.

- Socio-economic impacts, including job creation, enhanced economic equity, change in employment equity, changes in the industrial/commercial focus of the community.
- Individual and family level impacts, including disruption in daily living and movement patterns, disruption in social networks, introduction of new social classes, tourism and leisure impacts.
- Community/institutional arrangements, such as attitude formation, interest group activity and alteration in size and structure of local government.
- Public health, safety and security impacts.
- Community infrastructure, including changes in community infrastructure, land acquisition and disposal, effects on known cultural, historical and archaeological sites.
- Intrusion impacts, including noise pollution, light pollution, visual pollution, air pollution and malodour pollution.

Only impacts relevant to this project were assessed and rated and additional impacts that might emerge through the process will be included.

3.7 Reporting

Data and information obtained during the above processes were included and presented in the Social Impact Assessment Report.

4. SIGNIFICANCE RATING OF IMPACTS

To ensure uniformity across the various specialist studies and to facilitate comparison of impacts, the following rating approach was used (Eco-Compliance (Pty) Ltd). Direct, indirect and cumulative impacts of the socio-economic issues were assessed in terms of the following criteria:

- The **nature**, a description of what causes the effect, what will be affected, and how it will be affected
- The **extent**, wherein it is indicated whether the impact will be local (limited to the immediate area or site of development) or:
 - ❖ Local extending only as far as the development site area - assigned a score of 1;
 - ❖ Limited to the site and its immediate surroundings (up to 10km) - assigned a score of 2;
 - ❖ Will have an impact on the region - assigned a score of 3
 - ❖ Will have impacts on national scale - assigned a score of 4
 - ❖ Will have an impact across national borders - assigned a score of 5

- The **duration**, wherein it is indicated whether:
 - ❖ The lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1
 - ❖ The lifetime of the impact will be of a short duration (2–5 years) - assigned a score of 2
 - ❖ Medium-term (5–15 years) – assigned a score of 3
 - ❖ Long term (> 15 years) - assigned a score of 4
 - ❖ Permanent - assigned a score of 5

- The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
 - ❖ 0 is small and will have no effect on the environment
 - ❖ 2 is minor and will not result in an impact on processes
 - ❖ 4 is low and will cause a slight impact on processes
 - ❖ 6 is moderate and will result in processes continuing but in a modified way
 - ❖ 8 is high (processes are altered to the extent that they temporarily cease)
 - ❖ 10 is very high and results in complete destruction of patterns and permanent cessation of processes

- The **probability of occurrence**, which describes the likelihood of the impact actually occurring. Probability is estimated on a scale, and a score assigned:
 - ❖ Assigned a score of 1–5, where 1 is very improbable (probably will not happen)
 - ❖ Assigned a score of 2 is improbable (some possibility, but low likelihood)
 - ❖ Assigned a score of 3 is probable (distinct possibility)
 - ❖ Assigned a score of 4 is highly probable (most likely)
 - ❖ Assigned a score of 5 is definite (impact will occur regardless of any prevention measures)

- The **significance**, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high.
- The **status**, which is described as either positive, negative or neutral.
- The degree to which the impact can be reversed.
- The degree to which the impact may cause irreplaceable loss of resources.
- The degree to which the impact can be mitigated.

The **significance** is determined by combining the criteria in the following formula:

$$S = (E+D+M) P; \text{ where}$$

S = Significance weighting

M = Magnitude

E = Extent

P = Probability

D = Duration

The **significance weightings** for each potential impact are as follows:

- **< 30 points:** Low (i.e. where this impact would not have a direct influence on the decision to develop in the area)
- **30-60 points:** Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated)
- **> 60 points:** High (i.e. where the impact must have an influence on the decision process to develop in the area)

5. KEY DEMOGRAPHIC INFORMATION

5.1 General Description of the Study Area

The study area falls in the Northern Cape Province and is bordered by the Free State, Northwest and Western Cape Provinces. The province lies to the south of its most important asset, the Orange River, which feeds the agriculture and alluvial diamond industries. The Orange River forms the border with the country of Namibia in the north, while the Molopo River is at the border with Botswana to the northeast. The Atlantic Ocean forms the western boundary (www.northerncape.gov.za).

Climate wise, the Northern Cape is semi-desert, with arid conditions in general, but boasting some of the most beautiful and scarce fauna and flora in the world. The Namaqua region is widely known for its extravagant perennial spring flower display between August and October of each year. It is currently one of only six world plant sites namely the Cape Floral Kingdom (www.northerncape.org.za). The climate in the areas bordering the Orange River provides a good quality supply of grapes, subtropical fruits and dates. The beauty of the area, especially along the Orange River, and cultural richness of the resident population plays an important role in stimulating the tourism potential of the area, although the tourism potential have not yet been fully exploited (Khâi-Ma LM IDP, 2010). The Northern Cape is also home of the well-known Boesmanland region and is thought to house some of the last known scattered communities of indigenous Khomani-San.

The proposed site is located on private land that is currently zoned for agricultural purposes. The site is fairly level with a number of dry watercourses to the north of the property and will require minimal earthworks.

5.2 Municipal background

The proposed project will be located within the Thembelihle Local Municipality under the Pixley Ka Seme District Municipality with the in the Eastern Karoo Region of South Africa. The closest town to the proposed project site is Orania located approximately 4km North East of the site. The site is accessible via the R369 connecting Orania and Petrusville. There are several internal dirt roads which will be upgraded to accommodate construction vehicles during construction and operation phases

5.3 Education

The Orania Koördinerende Onderwysraad supervises all educational activities in Orania. Orania's schools have consistently achieved a 100% matric pass rate since 1991.

There are two schools, the CVO Skool Orania (Christelike Volks-Onderwys or Christian People's Education) and Volksskool Orania (Orania People's School). Afrikaans is the language of instruction, while English is taught as a second language. Both schools follow the IEB curriculum; the CVO school offers a more conservative education, while the Volksskool is relatively more progressive.

The CVO-school, established in January 1993, is run along conventional lines; enrolment in 2014 was 225 students, with some coming from neighbouring towns. The CVO School includes Christian tenets as a vital part of the education, and is part of the Beweging vir Christelik Volkseie Onderwys, a network of similarly minded schools across the country.

The Volksskool, established in June 1991 with Julian Visser as its first principal, uses a self-driven teaching system which is unorthodox by South African standards. Because the town had few school-aged children when it was established, the school adopted a computer-based learning system that allowed students of different levels to be taught by a single teacher. The Volksskool's e-learning system was seen as innovative and received attention from South African media in the early 2000s.

A vocational training school, offering courses in technical subjects such as welding, metalworking and engineering, was opened in 2017.

5.4 Population and Economic profile of the region

Orania is a predominantly Afrikaner farming town in South Africa located along the Orange River in the Karoo Region of the Northern Cape Province. A local census carried out in 2014 found 1,085 inhabitants in 386 households – an average of 3.5 people per household. The population is currently estimated at 1500 inhabitants. Children made up a quarter of the population in 2007. The population had grown by 10% annually over the three years to 2015. In 2013, more than 100 businesses were located in Orania. Economic services provided in town include a call centre, stockbroking and architecture. The community's annual turnover in

2011 was estimated at R48million with an average wage at approximately R4 000 per month. People from all levels of society generally perform their own manual labour and rapid growth had led to the construction of new commercial developments which contributes to the town economic growth.

The Orania Chamber of Commerce was established in 2001. The Orania Spaar-en Kredietkoöperatief (Orania Savings and Credit Co-operative) is a local cooperative bank. It registered with the South African Reserve Bank in 2011, and in 2013 it had R45 million in savings deposits.

Farming is an important part of Orania's economy, the most prominent project being a massive pecan nut plantation, one of the largest in South Africa. The plantation is said to have given Orania a substantial economic boost. Most of the agricultural production is exported to China. Since purchasing the 430-hectare town, the community has added 7,000 hectares of agricultural land to it. A pumping station on the Orange River, financed and built by the town's residents, provides water for agricultural use. The station is connected to a 9km pipeline. The construction industry is also an important element of the local economy. Orania counts 8 construction companies as of 2017.

In terms of economic importance, the Northern Cape's share of the country's Gross Domestic Product (GDP) in 2002 was 2%, the lowest contribution of the nine provinces. However, although the Northern Cape Province has the smallest economy of the nine provinces, Gross Domestic Product of the Region (GDPR) per capita is higher than the national average. In terms of economic activities, the economy of Northern Cape is heavily dependent on the primary sectors of the economy, which in 2002 made up 31% of GDPR. The largest sector is mining which has declined in contribution to the GDPR from 25.8% in 1996 to 23.7% in 2002. Agriculture, on the other hand, increased in its contribution from 6.2% to 7.3%.

A worrying characteristic of the Provincial economy is the limited amount of processing of the primary commodity output in mining and agriculture that takes place in the Northern Cape. This is reflected in the fact that manufacturing contributes only 4.2% towards GDPR. All the industries in the secondary sector have decreased in their contribution to the GDPR, with electricity and water sector showing the greatest decrease of 0.7% and the construction industry making the lowest contribution of 1.9% to the GDPR of the Northern Cape. At the same time the contribution to regional GDPR by industries in the tertiary sector increased, with the exception of the wholesale and retail industry, which decreased by 1.1%.

The oldest economy in the region is livestock farming. Although it is not a lucrative or large industry due to the dry and ecologically fragile ecosystem, it does still support a large number of people living in the area and is an important livelihood option for the local people.

6. SOCIO-ECONOMIC IMPACTS IDENTIFIED DURING THE CONSTRUCTION PHASE

The construction phase is expected to extend over a period of 12 months (i.e. for the construction of a 20MW plant) and will create significant employment opportunities at the peak of construction. Based on information from previous solar plants constructed and operated by Solar Capital, approximately 80% of the employment opportunities will be available to low skilled (construction labourers, security staff etc.), 10% to semi-skilled workers (drivers, equipment operators etc.) and 10% to skilled personnel (engineers, land surveyors, project managers etc.). Local businesses and the Orania in general will benefit greatly from the proposed development through the use of local service providers for a number of development needs. It is the intention of the developer to source low skilled personnel from the nearby towns of Wanda, Luckhoff, Petrusville, Hopetown, and Vanderkloof.

The construction phase will entail a series of activities including:

- Conducting surveys;
- Establishment of access roads;
- Undertake site preparation;
- Transport of components and construction equipment to site;
- Establishment of construction equipment camps;
- Establishment of the PV Panels;
- Establishment of ancillary infrastructure;
- Construct on-site switching station; and
- Undertake site remediation.

The potential socio-economic impacts that could occur during the construction phase are discussed and assessed in the following section and mitigation measures are proposed where appropriate.

6.1 Population impacts

Influx of jobseekers and the impact of temporary construction workers ('outsiders')

Discussion

The construction period for the proposed development is labour intensive and it is estimated that 500 to 800 workers would be on site over the 12 month construction period. An estimated 90% of these jobs would be allocated to unskilled and semi-skilled positions. The

cumulative impacts, whether negative or positive, brought about by the employment of workers will thus increase significantly should the proposed development be approved.

Negative impacts of an inflow of temporary workers and jobseekers could include:

- Conflict between locals and 'outsiders' if an outside labour force receives preference;
- Conflict due to cultural differences and impacts on social networks;
- Provision of accommodation for temporary workers could be an economic and social burden for the developer and the Local Municipality;
- Workers that remain in the area after the construction period ended could place additional pressure on local government for housing and associated infrastructure;
- 'Outsiders' that have short-term relationships with local women resulting in unwanted pregnancies and an increase in HIV/AIDS and other STD's, thereby placing more pressure on health care facilities;
- An increase of single-headed households without a main income provider and pressure on health care, social grants and infrastructure;
- Poor control and management of the area where jobseekers gather could result in environmental issues and pollution (littering, inadequate sanitation facilities, etc.); and
- Safety and security issues for the surrounding communities due to an influx of 'jobless' people.

It is clear from the above that it is not a realistic goal to exclusively emphasise the use of local labour and that the emphasis should rather shift to the appropriate management of an 'outside' labour force and specifically the management of the inflow of jobseekers to the area.

With **pro-active** mitigation and management the significance of the impact of the inflow of temporary workers and jobseekers could be addressed.

Significance rating

NATURE: Inflow of temporary workers and jobseekers ('outsiders') during the construction phase		
	WITHOUT MITIGATION	WITH MITIGATION
Extent	Region (3)	Region (3)
Duration	Short – medium (2)	Short – medium (2)
Magnitude	Moderate (6)	Low (4)
Probability	Highly probable (4)	Highly probable (4)
Significance	MEDIUM (44)	MEDIUM (36)

NATURE: Inflow of temporary workers and jobseekers ('outsiders') during the construction phase	
Status	Negative
Can impacts be mitigated?	Yes
Mitigation:	
<ul style="list-style-type: none"> » Work with LM, the Orania Town Council and all the relevant structures in Orania, Hopetown, Wanda, etc. to compile a database of an available labour force, skills requirements, etc. This process should start well in advance of the construction period commencing. Open communication lines between the Solar Capital and all stakeholders will make this process run smoothly. » Liaise with LM regarding their methods used to advertise for construction workers. Take care not to create unrealistic expectations and communicate the time frames, skills requirements and commencement of the activities clearly to the communities. » Set up a central labour desk where workers register. Only workers registered on this database should be considered for employment. » Recruitment of temporary workers at the access to the construction site should not be allowed. The Community Liaison Officer (CLO) should work in consultation with the Ward Councilors and community representatives to establish labour desks at the most suitable localities within the communities where workers are sourced. » The area where workers are recruited should not be near schools or other sensitive receptors where a large influx of people could cause safety and security impacts for the residents and other sensitive receptors. Provide sufficient sanitation and refuse facilities. » Identify a CLO for the various areas/regions well in advance of the construction period commencing. Set up criteria for the CLO's to ensure that the correct people are appointed. The CLO should have knowledge of the local community members and area, be educated, committed to the cause, accessible for community members as well as for the developer, etc. » Give preference to workers from the local municipal area, followed by people from the district municipality and then the broader Northern Cape Province. » Contractually oblige Sub-contractors to only employ workers through the labour desk and make this fact known to the communities. This would address and limit the uncoordinated influx of people to the site and to the surrounding towns, as they would be unable to secure work if not through the labour desk. » Issues such as accommodation for workers, transport, catering and any other needs for employees, whether locals or outsiders, must be discussed with the LM in good time. Once construction starts structures must already be in place to address these needs and implement management measures. 	
Cumulative impacts:	
<ul style="list-style-type: none"> » Due to the magnitude of the project, the construction phase would increase the likelihood and magnitude of an influx of jobseekers, increasing potential negative impacts for the LM. » Cumulative impacts would increase with the implementation of other large-scale construction projects in the LM. 	

Population changes**Discussion**

Population impacts refer to the degree to which the construction period could impact on the population size, gender, racial and age compositions of the local Municipal area and would thus be affected by the magnitude of 'outsiders' moving into the area and the length of the period that they remain.

The construction period of the proposed PV Solar Energy facility will employ over 500 workers, of which the majority (90%) will be lower and semi-skilled. It is highly likely that a large composition of these workers will be sourced from the district municipal area and even from the broader Northern.

Should the majority of the workforce remain in the area after the construction period ceased, the following population changes could be anticipated:

- The current female:male ratio in the LM could be widened further.
- Population numbers could increase, impacting infrastructure and service requirements, due to the following:
 - ❖ Workers that have temporary or long-term relationships with locals, resulting in pregnancies and new births; and
 - ❖ Family members of temporary workers that move into the area - they are often unemployed and are in need of housing and other social services;
- The economic active population (between 15 and 64 years) could increase, which could be beneficial for the local Municipality if employment opportunities are available;
- It is not expected that the racial profile of the local municipality will change significantly.

Although the increase of the young economic active people is beneficial for the local municipality, the increase in population numbers has implications, such as an increase in unemployment levels if insufficient employment opportunities are available and added pressure on the Municipality to provide services and infrastructure.

Significance rating

NATURE: Impact on population changes such as the population size, gender, age and racial compositions during the construction phase		
	WITHOUT MITIGATION	WITH MITIGATION
Extent	Region (3)	Region (3)
Duration	Short-medium (2)	Short-medium (2)

NATURE: Impact on population changes such as the population size, gender, age and racial compositions during the construction phase		
Magnitude	Low (4)	Low (4)
Probability	Probable (3)	Improbable (2)
Significance	LOW (27)	LOW (18)
Status	Negative	
Can impacts be mitigated?	Yes, to a certain extent.	
Mitigation:		
<ul style="list-style-type: none"> » Co-ordinate and liaise with the LM, Business Forums, Orania Town Council, and other structures within the local towns to draw up a database and expand on existing databases of workers from the local and district Municipalities. The Contractor, Sub-contractor and CLO should thus ensure that these people receive preference during the employment process. » Contractually oblige Sub-contractors to only employ workers through the labour desk. » Collaborate with the LM to establish the most effective local mediums to advertise employment, such as the local newspaper, notice boards and local community structures. 		
Cumulative impacts:		
<ul style="list-style-type: none"> » Numerous large-scale projects on the LM and region could collective increase the likelihood and significance of a population change over the medium to long-term. 		

Relocation of individuals and families

Discussion

The proposed site is not inhabited and no individuals and families will directly be affected and relocated in order to establish the facility. However, as discussed in the previous sections, it is unlikely that the majority of the temporary employment positions would be filled by workers sourced from the nearby towns.

Significance rating

NATURE: Relocation of individuals and families during the construction phase		
	WITHOUT MITIGATION	WITH MITIGATION
Extent	Region (3)	Region (3)
Duration	Short-medium (2)	Short-medium (2)
Magnitude	Moderate (6)	Low (4)
Probability	Highly probable (4)	Highly probable (4)
Significance	MEDIUM (44)	MEDIUM (36)
Status	Negative	

NATURE: Relocation of individuals and families during the construction phase	
Can impacts be mitigated?	Yes
Mitigation:	
<ul style="list-style-type: none"> » Negotiate with the LM prior to the commencement of construction to identify an area where temporary workers could be accommodated within the town 'borders' of De Aar. » Determine the approximate number of houses, service requirements, etc., work in co-operation with the various role-players and budget accordingly. » Ensure that the necessary legal requirements are in place once the temporary workers have to move out of the 'workers camp' and return to their original places of residence. 	
Cumulative impacts:	
<ul style="list-style-type: none"> » Demand on accommodation will increase significantly with the implementation of a number of large-scale construction projects in the LM area. » There are anticipated positive financial gains to be made by the hospitality industry such as guest houses, B&B's, hotels, etc as the skilled labour will require suitable local accommodation. 	

6.2 Socio-economic impacts

Employment opportunities and employment equity

Discussion

The construction period of a solar energy facility is labour intensive and is a positive socio-economic impact. An estimated 500 to 800 employees would work at the proposed Orania PV Solar Energy facility's construction site over the 12-month construction phases. The significance of the cumulative impact of job creation would thus multiply accordingly.

Approximately 80% of the positions would be allocated to unskilled labourers, 10% to semi-skilled workers and 10% to skilled employees.

Unskilled workers do not necessarily require previous work experience and would be employed to do basic labour such as site clearing, digging of trenches, erecting fences, laying foundations, etc. Although it is the intension of the developer to appoint locals as far as possible, it would most likely not be possible to fill all the unskilled positions by locals, i.e. people from Orania and the usual 50km radius will be considered. Unskilled labour would therefore also have to be sourced from the neighbouring towns and broader Northern Cape Provincial areas.

Semi-skilled workers include machine operators, drivers, rehabilitation workers, etc. It is expected that some of these positions would be filled by people from the local and district Municipalities. It is anticipated that semi-skilled workers from previous similar projects will be used during the construction phase of the proposed project.

Skilled professionals would include Engineers, Land Surveyor, Project Manager, Assistant Project Managers and an Environmental Control Officer. Solar energy facilities are relatively new technology in South Africa and require specialised skills, which is not always readily available in some Local or District Municipalities or some cases not available in the country. A portion of the skilled labour force would thus consist of foreigners and/or 'Outsiders'.

Although policies with regards to the employment of disabled people, the youth and women have not been formulated at this stage, it is recommended that the recruitment policy takes employment equity of minority groups into consideration (wherever possible) to increase the potential employment advantages of the proposed project.

The magnitude and overall significance of employment creation and employment equity would thus be enhanced through the maximum use of local labour.

Significance rating

NATURE: Employment creation and employment equity during the construction phase		
	WITHOUT MITIGATION	WITH MITIGATION
Extent	Region (3)	Region (3)
Duration	Short-medium (2)	Short-medium (2)
Magnitude	Moderate (6)	Moderate (6)
Probability	Highly probable (4)	Definite (5)
Significance	MEDIUM (44)	MEDIUM (55)
Status	Positive	
Can impacts be mitigated?	Yes, to enhance the positive impacts.	
Mitigation:		
<ul style="list-style-type: none"> » Work with the LM, Business Forum, Orania Town Council and do a skills audit of the available workforce to minimize the numbers of workers to be brought in from other areas. » Enhance on a capacity building and skills development strategy to lessen any possible skills disparities between the local skills available and the requirements of the project. » A policy regarding employment equity of minority groups (women, youth and the disabled) should be formulated and implemented wherever possible. 		
Cumulative impacts:		
<ul style="list-style-type: none"> » Significant increase in economic advantages for individuals and families. 		

Skills development and capacity building

Discussion

Skills development and capacity building for workers, whether through training or hands-on experience would be a positive outcome of the construction phase.

The majority of the workforce would be **unskilled labour** to do manual labour and activities which requires minimal previous work experience or training (digging of trenches, site clearing, etc.). However, experience gained at the construction site could, to a certain extent, be advantages for these workers once they seek employment at other construction sites, especially when similar project come into the District.

Semi-skilled labour would require previous work experience and/or a certain level of training as pre-requisite of employment. Skills development and capacity building for the anticipated 10% of the workforce (50 to 100 employees) would thus be valuable and significant and in addition to technical training, would include Fire Marshall training, First Aid Training, etc.

Skilled workers (10% of the workforce) would fill specialist positions and a higher / tertiary education would be compulsory. Even as such, renewable energy technology is new technology in South Africa and on-site training and skills development, especially for South Africans, is likely.

Skills development and training would increase capacity building and would enable the individuals to improve their quality of life and securing future employment at similar developments.

Significance rating

NATURE: Skills training and capacity building during the construction phase		
	WITHOUT MITIGATION	WITH MITIGATION
Extent	Regional (3)	Regional (3)
Duration	Short-medium (2)	Short-medium (2)
Magnitude	Low (4)	Moderate (6)
Probability	Probable (4)	Probable (4)
Significance	MEDIUM (36)	MEDIUM (44)
Status	Positive	
Can impacts be mitigated?	Yes, to enhance the positive impacts.	
Mitigation:		
» Suitable semi and skilled employees have to be identified. Tap into existing skills databases,		

NATURE: Skills training and capacity building during the construction phase
such as the LM, and do skills audit of the available workforce.
» Compile a training programme and train workers in advance to maximize skills development and minimize the number of people that are brought in from other areas.
Cumulative impacts:
» Collective skills development and capacity building will enhance the employability of the labour force with positive economic advantages for the LM.
Residual impacts:
» Workers that obtain skills would be able to use it on similar construction projects in future.

Skills development of supporting industries / local SMMEs

Discussion

Supporting industries refer to small business enterprises and services that would be required to fulfil needs or requirements that develop as a result of the construction activities. This could include catering, guesthouses, suppliers of protective clothing, transport and so forth.

An indirect objective and positive spin-off of the proposed PV Solar Energy construction period would be the establishment and support for local small businesses, and thus contributing to economic growth within the local Municipality. However, SMME development is a challenge in most rural areas as exposure to an economic growth climate has usually been absent.

Even though skills development and training for SMMEs is not directly the responsibility of the project proponent, there are a number of measures that could be **implemented in advance** to enhance the development and growth of local small service providers. This would include:

- Identify the needs, services and small business requirements necessary for all stages of the construction period;
- Draw up a strategy and policy to ensure the involvement / shareholding of upcoming local businesses that tender;
- Meet with the LM, Councillors, the local business forum, community representatives and other relevant structures to provide a list of the required services and convey the tender policy to them;
- Appoint a Compliance Officer (CO) to ensure compliance of SMMEs or individuals that tender; and
- Award the tenders well in advance to ensure that the SMMEs are prepared, trained and ready once construction commences.

The above strategy would thus aim to give preference to small upcoming businesses or individuals. Where the necessary skills, expertise or capital lack, established local businesses could be contracted but would be required to involve and train upcoming businesses, thereby contributing to skills development of small business. This will also allow the Local Municipality and community to align themselves with what services are required by the proposed development and prepare accordingly.

Significance rating

NATURE: Skills development of supportive industries / local SMMEs in the construction phase		
	WITHOUT MITIGATION	WITH MITIGATION
Extent	Regional (3)	Regional (3)
Duration	Short-medium (2)	Short-medium (2)
Magnitude	Low (4)	Moderate (6)
Probability	Improbable (2)	Probable (3)
Significance	LOW (18)	MEDIUM (33)
Status	Positive	
Can impacts be mitigated?	Yes, to enhance the positive impacts.	
Mitigation:		
<ul style="list-style-type: none"> » The recruitment process and strategy should include local businesses, enterprises and SMME’s to allow them to become part of the tender process. » Identify the needs and service requirements, convey this to the local structures and appoint service providers well in advance to ensure that they are prepared and trained once construction starts. » Appoint a Compliance Officer (CO) that monitors the processes and ensures compliance with the recruitment policies. 		
Cumulative impacts:		
<ul style="list-style-type: none"> » The establishment of additional SMMEs and enterprises that enter the small business market and are willing to compete in the local economy. 		

Impacts on the Local Economy

Discussion

Positive impacts associated with the construction phase for the local economy would include:

- Employment of locals and an increase in salary earners;
- Contracts with small and medium enterprises and service providers (catering, transport, etc.);

- Local procurement of material and goods, if possible;
- Increase in spending power and expenditure on groceries, goods and services, which would be advantages for local merchants, food suppliers and informal traders; and
- Accommodation in local establishments.

It is not at this stage certain where goods and material will be sourced for construction. However, it is highly likely that these commodities would be obtained from outside the district borders if they are not available locally.

In addition to this, local procurement and local production for the Solar PV industry (panels, etc.) is currently still a challenge, as funders / banks would usually require that a large supplier with a track record and financial statements be used. At this stage, the majority of the equipment manufactured for this industry by local suppliers in South Africa is more expensive than imported produce. The SA Government prescribes that a minimum of 35%, aiming for 60%, of the project should comprise local content. Currently it is not known how the local content of this project will be calculated, as procurement and local labour cannot be determined at this stage. However, economic advantages for the local, regional and national economies are extremely advantages.

Significance rating

NATURE: Impacts on the local economy		
	WITHOUT MITIGATION	WITH MITIGATION
Extent	National (4)	National (4)
Duration	Short-medium (2)	Short-medium (2)
Magnitude	Moderate (6)	High (8)
Probability	Probable (3)	Probable (3)
Significance	MEDIUM (36)	MEDIUM (42)
Status	Positive	
Can impacts be mitigated?	Yes, to a certain extent.	
Mitigation:		
» It is required from the developer to formulate a local procurement strategy to increase the local content of the project to the maximum.		
Cumulative impacts:		
» Demand might exceed local supply forcing the developer to procure goods and services from other provinces and abroad.		
» A positive impact on regional tourism.		

Changes in the industrial/commercial focus of the community**Discussion**

It is unlikely that construction of the proposed PV Solar facility will singly contribute significantly to the change in focus of the local and/or regional economies.

However, the cumulative impact created by the construction of current and future renewable energy projects could be a potential shift in the dependency of the local and regional economies from the primary sector to a more industrial and service-orientated economy. It is, however, unlikely that large-scale manufacturing and other industries will develop in the region and procurement of goods and materials for the renewable energy plants would be from the broader Northern Cape and other provinces.

Local government and local business should identify and use opportunities created by the renewable energy projects in the region to enhance long-term business, tourism and manufacturing development potential in the region.

Significance rating

NATURE: Changes in the industrial / commercial focus of the community	
	WITHOUT MITIGATION
Extent	Region (3)
Duration	Short-medium (2)
Magnitude	Minor (2)
Probability	Improbable (2)
Significance	LOW (14)
Status	Positive
Can impacts be mitigated?	No
Cumulative impacts:	
» Manufacturing industries in South Africa evolve to supply renewable energy products to the southern African markets.	

6.3 Individual and family level impacts**Disruption in daily living and movement patterns****Discussion**

The proposed PV Solar Energy facility is exceptionally well located in terms of access to major roads. The site is bordered by the R369, which is the major regional route linking Orania and Petrusville, with links to the R48 to neighbouring town such as Luckhoff and Koffiefontein. The National Route (N12) is approximately 43km from the proposed development site which links it to Britstown and Kimberley.

Approximately ten large construction vehicles and several smaller vehicles would enter and exit the site on a daily basis, transporting building material and modules, cables, electrical frames and tubes. On-site construction vehicles and equipment usually include excavators, drillers, trucks, graders, compaction equipment and cement trucks. It is anticipated that traffic to and from site will increase; however, based on experience from other already constructed bigger solar plants the traffic does not significantly disrupt the general traffic flow. Large construction vehicles stay on site until completion, such drillers, whereas others hardly leave the site and most of the work they do is inside the site.

Disruptions in living and moving patterns usually manifest through road safety issues and intrusion impacts for surrounding residents/landowners and road users, causing short-term disruptions and safety hazards, such as:

- Construction vehicles that are not road worthy;
- Damage to the road infrastructure resulting in an increase in accidents, frustrations for motorists and financial implications for local government;
- Negligent drivers that disobey traffic rules, disregard speed limits and cause obstructions;
- Workers that gather at the entrance to the proposed development and obstruct motorist’s vision and movement along the roads (depending on locality of accesses and access roads); and
- Noise, dust, visual and air pollution

A significant impact on daily living and movement patterns during the construction phase of the proposed Solar facility is not expected as traffic volumes on the surrounding roads are generally relative low, good road conditions exists and no sensitive receptors are located in close proximity to the site.

Significance rating

NATURE: Disruption in daily living and movement patterns		
	WITHOUT MITIGATION	WITH MITIGATION
Extent	Local (2)	Local (2)
Duration	Short-medium (2)	Short-medium (2)

NATURE: Disruption in daily living and movement patterns		
Magnitude	Low (4)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	LOW (24)	LOW (18)
Status	Negative	
Can impacts be mitigated?	Yes	
Mitigation:		
<ul style="list-style-type: none"> » Put up clear signboards along the surrounding roads indicating the accesses to the construction site. » Impose penalties for reckless drivers as a way to enforce compliance to traffic rules. » Inspect trucks and other heavy vehicles on a regular basis to avoid oil spillages and unroadworthy vehicles that could lead to accidents. » Display a contact number on the construction vehicles where motorists can report bad driving. » No heavy vehicles to be parked outside the designated construction area where it could obstruct motorists' views. » No informal traders to be allowed on or near the construction site. » Set up the labour desk in a secure and suitable area, preferably in the communities where workers are being sourced, to discourage the gathering of temporary workers at the gates of the construction site where it could affect road users. » Mitigation measures for intrusion impacts (noise, visual, air and dust pollution) are addressed in greater detail in Section 6.6 of the SIA report. 		
Cumulative impacts:		
<ul style="list-style-type: none"> » The significance of the cumulative negative impacts on movement and living patterns would increase. 		

Disruption in social networks

Discussion

By road, Portion 2 of Farm Roode Pan 150 construction site is located approximately 4 km from the town of Orania and it could be expected that many of the temporary workers would frequently support the local merchant, post office, and other amenities located in Orania. No negative impacts on social networks should be expected in this regard.

Significance rating

NATURE: Disruptions of social networks during the construction phase		
	WITHOUT MITIGATION	WITH MITIGATION
Extent	Local (2)	Local (2)
Duration	Short-medium (2)	Short-medium (2)
Magnitude	Low (4)	Low (4)
Probability	Probable (3)	Improbable (2)
Significance	LOW (24)	LOW (16)
Status	Negative	
Can impacts be mitigated?	Yes	
Mitigation:		
<ul style="list-style-type: none"> » It is the responsibility of the CO and CLO to ensure that locals receive preference and that only people who are registered on the skills database are employed. » Security at the “workers camp” is important to address potential safety and security issues, noise impacts and the uncontrolled movement of people. » Once shifts are over, daily commuters should be transported to their places of residence without delay. 		
Cumulative impacts:		
<ul style="list-style-type: none"> » An increase in construction projects would result in a greater influx of people and less control over movement patterns and social disruptions. 		

6.4 Community / institutional / infrastructure arrangements**Attitude formation, interest group activity****Discussion**

Although no interest group activity for or against the proposed project has been observed, construction of Solar Energy plants generates an excessive amount of dust in the dry harsh environment of this landscape, which has the potential to exacerbate negative attitude formation of land owners. Methods to suppress dust and an open communication channel between the developer and landowners are required.

This impact is not rated at this stage as no interest group activity for or against the project currently exists.

Impacts on the Thembelihle Local Municipality**Discussion**

As discussed in Section 6.2 (*Local economic impacts*) the proposed construction project would hold economic advantages for the LM in terms of employment, skills development, small business development and so forth.

However, a project of this nature would pose various challenges for a small Municipality such as the Thembelihle LM. This includes shortages in their capacity and management experience, bureaucratic procedures that hamper progress, financial constraints, possible exploitation and even corruption opportunities. Specific impacts on the Thembelihle LM as a result of the construction phase of the proposed PV Solar facility would include:

- An increase in responsibility to do a skills analysis, compile a database of an available local workforce, identify local service providers and provide relevant training;
- Scrutinizing and implementing various accommodation solutions for construction workers, technicians and managers and providing the necessary services (in conjunction with the developer), which requires time, finances and capacity;
- Issuing of zoning permits;
- Representation on the Environmental Monitoring Committee (EMC) to do environmental monitoring of the construction site and representation on a Project Steering Committee (PSC); and
- Legal responsibilities in terms of action against land owners, the developer or any other parties that contravene Municipal bylaws.

Council should, on a regular basis, be informed about expected timelines and any issues arising. It is advisable for the developer to establish a Steering Committee for the duration of the construction period. Members of the Steering Committee (developer, Contractor, LM, community representatives, etc.) would meet on a monthly basis to discuss issues that may arise during the course of the construction period. Contact details of the Steering Committee members could also be made available to the general public if community members or landowners wish to lodge complaints.

The significance of negative impacts on the LM could thus be addressed through proper communication, but would have to commence well in advance of the actual construction period commencing.

Significance rating

NATURE: Impacts on the Thembelihle Local Municipality during construction		
	WITHOUT MITIGATION	WITH MITIGATION
Extent	Region (3)	Region (3)
Duration	Short-medium (2)	Short-medium (2)
Magnitude	Moderate (6)	Low (4)
Probability	Highly probable (4)	Highly probable (4)
Significance	MEDIUM (44)	LOW (36)
Status	Negative	
Can impacts be mitigated?	Yes, to a certain extent	
Mitigation:		
<ul style="list-style-type: none"> » Consultation with the Thembelihle LM to identify specific needs would need to take place in good time to enable the LM to set up the required structures. » Clearly identify roles, responsibilities of the LM, EMC and PSC and communicate timeframes, etc. with the role-players. » Set up a Steering Committee for the duration of the construction period to serve as a platform where progress can be monitored and conduct monthly Steering committee meetings where any complaints and grievances can be addressed. » Apply timeously for the relevant zonings and permits. 		
Cumulative impacts:		
<ul style="list-style-type: none"> » Additional duties and responsibilities would increase the Municipality's work load. » Frustration and losses for the Developer and Contractor when issues are not being dealt with expediently. 		

Accommodation for workers**Significance rating**

NATURE: Impact of accommodation for construction workers, foreigners and Specialists during the construction period		
	WITHOUT MITIGATION	WITH MITIGATION
Extent	Local (2)	Local (2)
Duration	Short-medium (2)	Short-medium (2)
Magnitude	Moderate (6)	Low (4)
Probability	Highly probable (3)	Highly probable (3)

NATURE: Impact of accommodation for construction workers, foreigners and Specialists during the construction period		
Significance	MEDIUM (30)	LOW (24)
Status	Negative	
Can impacts be mitigated?	Yes	
Mitigation:		
<ul style="list-style-type: none"> » Discuss accommodation options with the LM » Investigate the possibility of an accommodation camp for Specialists on site and secure necessary approvals in advance. » Identify existing unoccupied buildings in the nearby towns, which could then be upgraded, used for accommodation purposes and donated to the LM post the construction period; » Rent and equip holiday resorts or similar facilities in the LM area that are not used to its full potential. 		
Cumulative impacts:		
<ul style="list-style-type: none"> » Demand for housing would increase significantly. 		

Impacts on infrastructure and services

Discussion

It is not anticipated that any water and electricity services will be disrupted during the construction phase. However, electricity might be disrupted briefly when the solar plant / switching station is connected into the grid. The local community and LM would be notified in time should this take place.

Significance rating

NATURE: Impacts on infrastructure and services in the construction phase		
	WITHOUT MITIGATION	WITH MITIGATION
Extent	Local (2)	Local (2)
Duration	Short-term (1)	Short-term (1)
Magnitude	Low (4)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	LOW (21)	LOW (15)
Status	Negative	
Can impacts be mitigated?	Yes	

NATURE: Impacts on infrastructure and services in the construction phase**Mitigation:**

- » Inform authorities well in advance of possible service disruptions and connect the service as soon as possible to reduce the magnitude of the impact.

6.5 Public health, safety and security impacts**Health risks*****Discussion***

Inadequate management of the construction process could result in health issues for workers and surrounding landowners/community members. Although the site is not located in close proximity to a residential area or farm houses and there are no open water bodies that could be subject to contamination, health issues could impact on workers and appropriate mitigation and management is thus required. Health issues could manifest through:

- Dust generation and air pollution resulting in respiratory diseases.
- Poor management of the construction process resulting in pollution problems (e.g. insufficient sanitation facilities, littering and refuse), flies rodents and pests and possible contamination of water sources.
- Unsafe and insufficient drinking water.
- An increase in HIV/AIDS and other STDs due to prostitution activities and temporary sexual relationships with local women, unwanted pregnancies that place further pressure on Basic Health Care Services.
- Dehydration and sunburn, as extreme temperatures are experienced during summer months.

Significance rating

NATURE: Health impacts during the construction period		
	WITHOUT MITIGATION	WITH MITIGATION
Extent	Region (3)	Region (3)
Duration	Short-medium (2)	Short-medium (2)
Magnitude	Low (4)	Low (4)
Probability	Probable (3)	Improbable (2)
Significance	LOW (27)	LOW (18)

NATURE: Health impacts during the construction period	
Status	Negative
Can impacts be mitigated?	Yes
<p>Mitigation:</p> <ul style="list-style-type: none"> » Implement measures to suppress dust, construction workers to wear protective clothing (e.g. masks that minimize dust inhalation and hats / clothing that protects against sunburn). » Dispose of the various types of waste generated in the appropriate manner at licensed waste fill sites at regular intervals. » Identify the waste types that are likely to be produced and aim to reduce the amount of waste as much as possible, through identifying routes to reuse or recycle materials. Label all waste storage and skips, detailing the type of waste. » Provide safe and clean drinking water and instill regular water breaks to keep workers hydrated. » Provide sufficient chemical toilets that are cleaned regularly. » Embark on a HIV/AIDS awareness campaign and provide condoms to workers. » Appoint a Health and Safety Officer and comply with the Occupational Health and Safety Management System’s requirements. The contact details of this person should be made available to the local community and procedures to lodge complaints set out. » Store any materials away from sensitive locations in fenced off areas. » Accommodation and facilities of security guards and any other personnel that stay on site should comply with health and safety standards. » Regularly inspect the site area for spillages and clean spillages using agreed wet handling methods. » Inform the LM and emergency services if harmful substances are spilled. 	

Safety issues

Significance rating

NATURE: Construction related accidents and general safety concerns	
Status	Negative
Can impacts be mitigated?	Yes
<p>Mitigation:</p> <ul style="list-style-type: none"> » Enforce the use of protective clothing and equipment for construction workers. » Identifiable tags and clothing for construction workers and the implementation of security measures at the entrance to the construction site. » Fence off of the construction site to avoid illegal trespassing. » Close off any excavation areas to prevent access. » Designate a suitable area for cooking fires. 	

NATURE: Construction related accidents and general safety concerns	
»	Display 'danger' warning signs and 'no public access' signs at all potential accesses and paths.
»	Lock away dangerous plant, equipment and material when not supervised or in use.
»	Appoint a Health and Safety Officer and implement an approved safety plan for the duration of the project.
»	The contact details of the Health and Safety Officer should be made available to the surrounding property owners and Councilor to enable them to lodge complaints when problems with regards to community and/or environmental health arise.

Traffic safety

The additional risk of accidents could place more pressure on the local emergency services, although only over the short term. It is not at this stage possible to determine the significance of traffic safety impacts, as the number of traffic accidents and their magnitude (should they occur) is not known.

Significance rating

NATURE: Traffic impacts during the construction phase	
Status	Negative
Can impacts be mitigated?	Yes
Mitigation:	
»	Heavy vehicles to keep headlights switched on at all times to improve visibility.
»	Inspect vehicles on a regular basis and impose penalties for reckless driving.
»	Ensure good visibility at the accesses to the site.
»	Jobseekers should not be allowed to gather at the entrance to the construction site.

Security impacts

Discussion

Criminal activities often increase in an area where construction projects take place. The appointment of local construction workers often aids to mitigate potential security issues. However, the shortage of an available local workforce will leave the Contractor no other option that to seek workers from the wider region. As the daily transport of these workers will not be feasible, alternative accommodation has to be provided. Strict security measures would have to be implemented at these "worker camps" to ensure crime does not affect the local communities, which would result in negative attitude formation against the project.

General security on site should also receive attention as copper cables and other valuable material could attract criminals with negative economic consequences for the developer. Electric fencing, CCTV cameras, 24-hour security guards and access control to the site are some of the safety measures that could be implemented to eradicate potential crime on site and in the area.

The magnitude and probability of security impacts actually occurring cannot be measured and rated at this stage.

Significance rating

NATURE: Security impacts during construction	
Status	Negative
Can impacts be mitigated?	Yes
Mitigation:	
<ul style="list-style-type: none"> » Keep the local SAPS and Ward Councillor informed about the construction progress and time-lines to ensure that they would be able to adequately deal with any type of disruptive behavior. » The use of local labour will minimize safety and security concerns to a large extent. Only appoint workers with valid SA identification documents who have no criminal records. » The gathering of jobseekers at the construction site should not be allowed. Establish a labour desk at suitable localities within communities and seek the assistance of the LM, CLO, Ward Councilor, etc. in this regard. » Provide workers with identity tags and prohibit the access of unauthorised people to the construction site. » Workers should not be allowed to remain in and around the construction site when they are off duty. Transport workers to their places of residence after each shift. » No informal traders to be allowed on or near the site. » Implement safety and security measures, such as electrical fencing, 24-hour security guards, CCTV cameras and access control. 	

6.6 Intrusion impacts

Noise impacts

Discussion

Noise impacts during the construction phase is a possibility, as large machinery and construction vehicles would be utilized to transport, construct and assemble structures. However, no sensitive receptors are located near the site and noise disruptions are thus not likely.

Significance rating

NATURE: Noise impacts during the construction phase	
Status	Negative
Can impacts be mitigated?	Yes
Mitigation:	
<ul style="list-style-type: none"> » Construction activities to take place during normal working hours » Make the contact details of the Contractor and procedures to lodge complaints available to the local communities. » Ensure that all construction machinery has the required silencers, if required. 	

Visual and light pollution**Discussion**

A Visual Impact Assessment has been done as part of this basic assessment and is therefore not rated in this SIA report. However, no sensitive receptors or residential areas are located close to the site and should be impacted on.

Air / dust pollution**Discussion**

Proper air / dust pollution control holds various advantages for the developer, surrounding communities and the environment. Negative impacts include health problems for residents and workers (respiratory diseases, eye, nose and throat irritations), air and water pollution, visibility problems, damaged or dirty property and belongings, unsafe work conditions, increased costs associated with the loss of materials and additional work involved. Not only do construction activities need to be considered, but also emissions from vehicles associated with the construction site and on-site machinery.

Significance rating

NATURE:		
	WITHOUT MITIGATION	WITH MITIGATION
Extent	Local (1)	Local (1)
Duration	Short-medium (2)	Short-medium (2)
Magnitude	Moderate (6)	Low (4)
Probability	Highly probable (4)	Highly probable (4)
Significance	MEDIUM (36)	LOW (28)

NATURE:	
Status	Negative
Can impacts be mitigated?	Yes
Mitigation:	
<ul style="list-style-type: none"> » Use low sulphur diesel and exhaust filtration measures on site, whenever possible, to reduce emissions of particles. » Wash or clean all vehicles effectively before leaving the site. Ideally there should be a paved area between the wheel wash and before the public road. » Vehicles carrying dusty materials should be securely covered before leaving the site. » All dusty activities and dirt roads should be damped down, especially during dry weather. » Temporarily cover earthworks if possible and minimize drop heights to control the fall of materials. » The use of long-term stockpiles on site wherever possible unless it performs the function of visual or noise screening. » Whenever possible keep stockpiles or mounds away from the site boundary, sensitive receptors, watercourses and surface drains. » Take into account the predominant wind direction when siting stockpiles to reduce the likelihood of affecting sensitive receptors. » Erect fences or use windbreaks such as trees, hedges and earth-banks of similar height and size to the stockpile to act as wind barriers and keep these clean using wet methods. » Service all fans and filters regularly to ensure they are properly maintained. » No vehicles or plant will be left idling unnecessarily. » Vehicles and plant should be well maintained. Should any emissions of dark smoke occur (except during start up) then the relevant machinery should be stopped immediately and any problem rectified before being used. » Engines and exhaust systems should be regularly serviced according to manufacturer's recommendations and maintained to meet statutory limits/opacity tests. » Agree a procedure to notify the LM and emergency services, so that immediate and appropriate measures can be put in place to rectify any problem. 	

7. SOCIO-ECONOMIC IMPACTS IDENTIFIED DURING THE OPERATIONAL PHASE

The electricity that is generated from the PV panels will be stepped up through the on-site inverters and transformers at the switching stations. Thereafter the power will be evacuated from the on-site switching station to the existing Eskom Orania Substation to feed into the national grid.

The proposed operational phase is expected to run for a period of approximately 25 - 30 years with plant maintenance. It is anticipated that during this time fulltime security,

maintenance, supervision and monitoring teams will be required on site. Maintenance activities will include *inter alia*, replacement and cleaning of the panels (using pressurised air). The photovoltaic plant will be operational during daylight hours only. However, it will not be operational under circumstances of mechanical breakdown, extreme weather conditions or maintenance activities.

Although a number of permanent and temporary employment opportunities would emerge during the operational phase, this phase is less employment intensive than the construction phase.

In previously constructed similar projects, the Department of Energy (DoE) requires local community shareholding in the project as part of a BBBEE Trust and a percentage of the net income of the project would be spent on community and Social development projects. Structures would be set up and finalised at a later stage.

The potential socio-economic impacts for the operational phase is discussed and rated in this section of the Report.

7.1 Job creation

Discussion

Although limited, a few permanent employment positions (unskilled, semi- and highly skilled) would emerge during the 20-30 year operational period of the plant. Employment positions could include:

- Technicians and electricians (highly skilled);
- Security (semi-skilled); and
- Cleaning of the panels and site maintenance (lower skilled).

A financial manager for the project could be appointed, if required. Temporary employment may become available as the need arises, depending on the number and duration of the cleaning cycles for the panels, which is predicted to be every 3 months. The opportunity for local service providers exists to conclude contracts with the developer to perform duties at the plant.

Should proposed solar plant be in operation, staff will not necessarily increase, as the same technicians, electricians, etc. would in all likelihood be able to do maintenance on the facility.

Significance rating

NATURE: Job creation during the operational phase		
	WITHOUT MITIGATION	WITH MITIGATION
Extent	Region (3)	Region (3)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (4)	Low (4)
Probability	Probable (3)	Highly probable (4)
Significance	MEDIUM (33)	MEDIUM (44)
Status	Positive	
Can impacts be mitigated?	Yes, to enhance the positive impacts.	
Mitigation:		
» Maximize the number of local permanent and temporary employees.		
» Do training and capacity building if necessary.		

7.2 Skills development and capacity building**Discussion**

Although limited, skills development and capacity building would result as on-site training is likely. An important outcome of skills development and training is that employees would be in a position to source work on similar plants once their contracts expire. A skilled labour force is more likely to find employment, resulting in economic advantages for the local economy over the long-term.

Significance rating

NATURE: Skills development and capacity building during the operational phase		
	WITHOUT MITIGATION	WITH MITIGATION
Extent	Region (3)	Region (3)
Duration	Long-term (4)	Long-term (4)
Magnitude	Minor (2)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	LOW (27)	MEDIUM (33)
Status	Positive	
Can impacts be mitigated?	Yes	

NATURE: Skills development and capacity building during the operational phase
<p>Mitigation:</p> <ul style="list-style-type: none"> » Implement measures (bonuses or other financial benefits) for highly skilled staff to minimize the negative impacts associated with a high staff turnover.

7.3 Impacts on the local economy

Discussion

It is expected that the local economy would benefit in the following ways:

- The families of employees would benefit economically with an increase in spending power;
- Increased municipal rates and taxes, as the land would be rezoned from “Agriculture” to “Special Use for Agriculture and Renewable Energy Infrastructure”, resulting in higher levels of rateable income;
- Local communities would benefit economically through shareholding and community upliftment and Social Development projects; and
- The establishment of local downstream industries and services that would support the solar plant’s operations (to a lesser extent).

The exact contribution and involvement of the local community will only be determined at a later stage.

Solar Capital has an existing Community Development Trust and their priorities revolve around education projects, social and recreational amenities and small business and enterprise development.

It is recommended that the project proponent embarks on a holistic, strategic approach for the Community Development component of the project in order to avoid fragmented development projects in the region. This would require the Thembelihle LM, the developer and existing community structures to formulate a long-term framework and strategy for the broader area and identify short, medium and long-term projects that are sustainable over the long-term. These projects would have to consider the existing IDP priorities and LED projects.

Even though the local economy would experience definite positive impacts, its significance cannot be rated at this stage as the Rand-value for rates and taxes, net incomes and shareholding dividends is not known at this stage.

Significance rating

NATURE: Impacts on the local economy during the operational phase	
	WITHOUT MITIGATION
Status	Positive
Can impacts be mitigated?	Yes, to certain extent.
Mitigation:	
<ul style="list-style-type: none"> » Co-ordinate with the local and district municipalities to identify the various community groups and define their involvement in the Trust. » Ensure a transparent process to avoid conflict between local community groups and organizations and to ensure that benefits reach the correct beneficiaries. » Assist and guide the local community with regards to the needs of the solar plant and the types of supporting industries and services required for its successful operation. » Link with the LM to identify feasible development projects and avoid fragmented development efforts. 	
Cumulative impacts:	
<ul style="list-style-type: none"> » Positive impacts on the local economy would increase with the implementation of additional renewable energy projects in the municipal area. » The financial contribution towards community development projects and community shareholding would increase with the operation of the proposed project. 	

7.4 Impacts on leisure and tourism activities**Discussion**

Thembelihle LM has realised the potential of tourism development in their region and has prioritised a number of LED tourism activities. The expectation is that the establishment of various Renewable energy facilities in the region would add to the available tourist attractions and would entice tourists to remain in the region for a longer period in time.

The LM and tourism bodies should make use of this opportunity and put a marketing strategy in place. Over the long-term the novelty could reduce as solar plants become more frequent. It would not be possible to rate the significance of the impact on tourism activities as insufficient information regarding current tourism trends is available.

Significance rating

NATURE: Impacts on leisure and tourism activities during the operational phase	
Status	Positive
Can impacts be mitigated?	Yes, to a certain extent.

NATURE: Impacts on leisure and tourism activities during the operational phase
Mitigation: <ul style="list-style-type: none"> » The LM and Tourism agencies should implement a marketing strategy and use the facility as an attraction to support tourism in the region.
Cumulative impacts: <ul style="list-style-type: none"> » An increase in tourism for the region over the medium to long-term.

7.5 Impacts associated with a change in land use

Discussion

Portion 2 of Farm Roode Pan 150 is privately owned farm land and the nature of the agreement between the landowner and project proponent will become available after the outcome of the Bids.

The site is typical of the Karoo landscape with vegetation consisting primarily of small shrubs interspersed by grass. The proposed change in land use to accommodate renewable energy infrastructure would require rezoning and Consent in terms of the South African Land Act No. 70 of 1970. Up until recently applications for Renewable Energy Zonings were a lengthy and uncertain process, but legislation has since been streamlined and is currently done relatively expediently by the various authorities.

Significance rating

NATURE: Impacts associated with a change in land use to accommodate a Renewable Energy Project	
Extent	Local (1)
Duration	Long-term (3)
Magnitude	Low (4)
Probability	Definite (5)
Significance	MEDIUM (40)
Status	Negative
Can impacts be mitigated?	No mitigation is required.
Residual impact: <ul style="list-style-type: none"> » Once decommissioned, the land zoning will be restored to Agriculture and rehabilitation of the site would be required. 	

7.6 Impacts on infrastructure and services

Discussion

No existing infrastructure would be removed, damaged or impacted on during the operational phase as the plant would have minimal water requirements.

Impacts on road infrastructure would be insignificant as the plants are designed to operate continuously, with low maintenance and with only a small workforce.

Involvement of the local and district municipalities would be required and their representatives should serve on the EMC to monitor operations at the plant.

7.7 Impacts of Dust on the facility

Discussion

Dust generated by the proposed could potentially be a nuisance factor for the plant, as panels would have to be cleaned more regularly.

7.8 Impacts on the 'sense of place'

Discussion

Extensive dust, noise and traffic impacts and security issues as a result of the Solar plant during the operational phase are highly unlikely, although visual impacts has the potential to impact on the local community's 'sense of place'. However, this impact is not significant as there are no sensitive receptors or residential areas in close proximity to the site except for the regional road R369. Impacts on road users will be during their driving time passing the site, which is anticipated to be minimal.

Significance rating

NATURE: Impacts on the 'sense of place' of the local community during the operational phase	
Status	Negative
Can impacts be mitigated?	To a certain extent.
Mitigation:	
<ul style="list-style-type: none"> » Implement all the mitigation measures as proposed by the Visual Impact Assessment. » Ensure that residents and landowners are aware of the procedures to lodge complaints and make the details of the EMC / Operations Manager available to the public. » Implement any mitigation measures that would deal with intrusion impacts, such as dust and air pollution, etc. 	

7.9 Impacts on public health and safety

Health and safety risks

Discussion

The potential leaching of hazardous chemicals from PV panels into the environment is exceptionally low, but should it occur, could result in health risks for workers and the surrounding community. Occupational Health and Safety practices are essential and at least one person on-site should have a First Aid qualification. This impact cannot be rated at this stage as the occurrence and magnitude of on-site accidents and potential leakages is not known.

Security impacts

Discussion

Although it is not likely that the proposed operation of the plant would impact on safety and security issues, vandalism and related criminal activities at the solar facilities could manifest and be an economic and social concern for the developer. The significance of the impact manifesting is low as the region is not exposed to high crime rates and the developer would inevitably implement security and safety precautions to protect the expensive equipment on site. Also, local communities would be less inclined to damage infrastructure in which they have shareholding and ownership.

Significance rating

NATURE: Security impacts at the Plant during the operational phase		
	WITHOUT MITIGATION	WITH MITIGATION
Extent	Local (1)	Local (1)
Duration	Long-term (3)	Long-term (3)
Magnitude	Minor (2)	Small (0)
Probability	Improbable (2)	Improbable (2)
Significance	LOW (12)	LOW (8)
Status	Negative	
Can impacts be mitigated?	Yes	
Mitigation:		
<ul style="list-style-type: none"> » Extend the benefits of the project to the local community by employing local people as far as possible, allocating a percentage of the turnover of the project for community and socio-economic upliftment projects and allocate shares in the project to a community Trust or similar entity. » Implement strict security measures, such as 24-hour security and access control, electric 		

NATURE: Security impacts at the Plant during the operational phase
fencing, CCTV cameras and night lights where possible.
» Maintain good relationships with neighboring landowners, discuss security issues and measures and make the contact details of the Operations Manager / EMC available to lodge complaints.
Cumulative impacts:
» Increasing activities and potential security concerns with the establishment of additional phases and additional solar plants in and around the study area.

7.10 Electricity supply and the environment

Discussion

Even though the cost-competitiveness of renewable energy sources still holds many challenges, the proposed PV Solar Energy facility would have a positive impact on a regional and national level:

- Solar energy is renewable and sustainable and cannot be depleted;
- Solar energy facilities generally requires less maintenance with lower operational costs;
- Renewable energy has minimal impact on the environment and produces little or no waste products, such as carbon dioxide and other chemical pollutants; and
- Renewable energy projects can bring economic benefits for the country, e.g. in the form of new 'green' jobs.

Significance rating

NATURE: Impacts of the proposed facility on national electricity supply and positive impacts on the environment	
	WITHOUT MITIGATION
Extent	National (4)
Duration	Long-term (4)
Magnitude	Moderate (6)
Probability	Definite (5)
Significance	HIGH (70)
Status	Positive
Can impacts be mitigated?	Not required.
Cumulative impacts:	
» Eskom's intention to purchase 3 750 MW of electricity from renewable energy projects over the	

NATURE: Impacts of the proposed facility on national electricity supply and positive impacts on the environment

next few years, would contribute significantly to environmental advantages.

7.11 Intrusion impacts, such as noise, air / dust pollution and visual / aesthetic impacts

Once in operation, the solar plant might be visible (negative visual impact) to surrounding properties and road users on the R369. Security lights (night lights) at the facilities could also be a nuisance. A Visual Impact Assessment is done as part of this EIA and suitable mitigation will be proposed accordingly. Locality of the footprint and natural vegetation are some of the factors that the developer and EIA consultants would take into consideration. Noise and air pollution during the operational phase are not likely, and should it occur, would be of low significance.

8. SOCIO-ECONOMIC IMPACTS IDENTIFIED DURING THE DECOMMISSIONING PHASE

Depending on the economics of the development following the operational period, the plant will either be decommissioned or the operational phase will be extended. If it is deemed financially viable to continue, existing components would be disassembled and replaced with more appropriate technology/infrastructure available at that time. However, if the decision is made to decommission the facility the following activities will form part of the project scope:

- Site preparation – activities will include confirming the integrity of the access to the site to accommodate the required decommissioning equipment.
- Disassemble and replace existing components, where after they would be reused and recycled (where possible) or disposed of in accordance with regulatory requirements.

Socio-economic impacts during the decommissioning phase is briefly discussed in this section, although it would not be possible to determine the significance of these impacts, as there are too many unknown and unclear factors that could influence the impacts at the time of decommissioning (between 30 to 50 years from now).

8.1 Job creation

Temporary workers would be required to do the disassembling and/or replacement of components and skilled employees (project managers, technicians, etc.) would also be required. The number of employment positions is unknown as this is new technology and none of the existing plants in any part of the world have as yet been decommissioned. However, it could be expected that suitable workers will be available as a large number of people would have gained relevant skills over the 20-30 operational period of the proposed PV Solar facility.

8.2 Impacts on living and movement patterns

Negative impacts on traffic movement patterns would be inevitable as large construction vehicles would be required to move new and old components to and from the site. Traffic volumes on the R369 and road conditions at the time of decommissioning is unknown at this stage.

8.3 Impacts associated with a change in land use

Two scenarios that are at this stage foreseen are:

- The land would be rehabilitated and rezoned to Agriculture, in which case it could be used for livestock grazing; or

- New technology would enable the proponent to extend the operational phase and applications would be lodged to extend rezoning Consents and / or Long-term lease agreements with landowners and authorities.

8.4 Safety and security concerns

The decommissioning phase would increase the influx of people, which could increase the likelihood of safety and security issues.

8.5 Intrusion impacts

Dust / air pollution, visual impacts and other nuisance factors not unlike those experienced during the construction phase is possible and could be mitigated in a similar way.

9. CONCLUSION

In addition to the mitigation measures and recommendations made in this report, the following socio-economic conclusions can be drawn:

- The proposed site, situated 4km south of Orania in the Thembelihle Local Municipality, is well located in terms of access to the R369 R48, N12 highways, which connects Kimberley, Bloemfontein, Cape Town and Gauteng.
- Distances between towns are vast and the area is sparsely populated.
- The largest segment of the LM population is aged between 15 and 64 years (68,6%), indicating pressure on government and the private sector to provide employment opportunities, educational facilities, infrastructure and social services. However, an out-migration of young people to other more viable regions is evident in the district and is ascribed to limited economic opportunities, closure of certain mines and retrenchment of workers in the overall Province.
- Impacts associated with the construction phase are generally short-medium term, although residual long-term / permanent impacts on the local Municipality and local economy could be experienced.
- A positive impact of the construction phase is large-scale employment creation.
- It is not realistic to expect that the unskilled labour force would be sourced exclusively from the local Municipal area.
- A general lack in technical skills and an absence of a 'working culture' amongst the local population exists (within 50km radius), as many of the locals have not been exposed to industry, construction, and intensive development projects. Although this may not be the

case in Orania as the community is much more organised but the neighbouring towns may experience general lack of technical skills.

- It is expected that semi-skilled labour could be sourced from the Pixley ka Seme DM, as the completion of construction phases solar energy projects has resulted in large-scale retrenchments.
- Negative impacts for the Municipality as a result of an influx of people are the added pressure on infrastructure and services.
- An indirect objective and positive spin-off of the Roode Pan 150 PV Solar Energy construction period would be the establishment and support for local small businesses, and thus contributing to economic growth within the local Municipality. However, SMME development is a challenge in most rural areas as exposure to an economic growth climate has usually been absent.
- Even though skills development and training for SMMEs is not directly the responsibility of the project proponent, there are a number of measures that could be implemented in advance to enhance the development and growth of local small service providers.
- The operational phase is not labour intensive and few long-term negative social impacts are associated with the facility.
- The facility holds long-term advantages for the environment as national dependence on coal-fire energy sources are reduced.
- Many of the impacts (positive and negative) associated with the construction phase would be applicable during the decommissioning phase. However, these impacts cannot be rated at this stage as there are too many unknown factors associated with this phase. Renewable energy is a new technology and none of the solar facilities anywhere in the world has as yet been decommissioned.
- It is recommended that the mitigation and management measures as contained in this SIA report be actively pursued and incorporated in the EMP where applicable. This would enhance the positive impacts and minimise any negative impacts that could manifest during the construction, operational and decommissioning phases of the proposed PV Solar Energy facility.

10. ADDENDA

10.1 Sources Consulted

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