APPENDIX G2 - SIGNIFICANCE OF POTENTIAL IMPACTS

The following sections present the outcome of the significance rating exercise. The results suggest that almost none of the key issues identified as part of the scoping process had a negative high environmental significance after mitigation. Instead the overall score indicates a low environmental significance score.

1. **Impacts that may result from the construction phase**

Direct impacts: During the construction phase minor negative impacts are foreseen over the short term. The latter refers to a period of months. The installation of services may result in the loss or fragmentation of indigenous natural fauna and flora, loss or fragmentation of habitats, , impacts of the geology on the proposed development, soil erosion, hydrology, temporary noise disturbance, generation of waste, impacts on heritage objects, visual intrusions, increase in construction vehicle traffic, impact of construction workers on local communities, influx of job seekers, risk to safety, livestock and farm infrastructure, and increased risk of veld fires. It is obvious that the construction phase will also have a direct positive impact through the provision of employment opportunities for its duration and technical advice for local farmers and municipalities. The abovementioned impacts are discussed in more detail below:

- Loss of habitat for faunal and floral species – In terms of vegetation type the site falls within the Kathu Bushveld vegetation type, which is described by Mucina and Rutherford (2006) as 'least threatened'. The Kathu Bushveld is characterised by a mostly open landscape with a shrub layer, a medium-tall tree layer in places and some fewer mature A*cacia trees.* The areas studied are mostly flat sandy plains with shrubs and few tall trees and some small interspersed pans of which none are found on the preferred site. Livestock ranching dominates the immediate surrounds and mining activities are a prominent feature in the region. Topography remains homogeneous throughout the site with no obvious change in slope. The area is visibly transformed with signs of overgrazing (bush encroachment).

Loss of habitat for faunal and floral species	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Definite (4)	Definite (4)
Duration	Permanent (4)	Permanent (4)
Magnitude	Medium (2)	Low (1)
Reversibility	Irreversible (4)	Irreversible (4)
Irreplaceable loss of resources	Marginal loss of resource (2)	Marginal loss of resource (2)
Cumulative impact	Low cumulative impact (2), As more and more similar developments occur in the direct vicinity of the currently proposed development, habitat losses and fragmentation will occur more frequently and populations of threatened, protected or other	

	habitat specific species (both faunal and floral) will be put under increasing pressure through competition for suitable habitat.	
Significance	**Negative medium (36)**	**Negative low (18)**
Can impacts be mitigated?	• Injudicious and unnecessary destruction of natural vegetation, other than the footprint area of the proposed development, must be avoided at all cost. • To prevent the erosion of topsoil, management measures may include berms, soil traps, hessian curtains and stormwater diversion away from areas susceptible to erosion. Water control structures should be constructed and well maintained to minimize erosion and to create a favorable habitat for the establishment of vegetation during the operation of the development and after decommissioning and rehabilitation. • Wherever possible, any soil that can serve as a growth medium for plants must be stripped and stockpiled for future landscaping and/or rehabilitation after or during the construction phase and should be used as soon as possible after "harvesting" to ensure that seed sources does not become worthless due to decomposition of the seed over time. It must be ensured that such topsoil stockpiles are located outside of any drainage lines and areas susceptible to erosion or siltation. Stockpiles should also be placed away from areas known to contain hazardous substances such as fuel. • All soils compacted as a result of construction activities falling inside the development footprint areas should be ripped and profiled after the construction phase. Special attention should be paid to alien and invasive control within these areas. Alien and invasive vegetation control should take place throughout all development and decommissioning phases to prevent loss of floral habitat. • Proliferation of alien and invasive species is expected within any disturbed areas. These species should be eradicated and controlled to prevent their spread beyond the development/	

	decommissioning footprint. Alien plant seed dispersal within the top layers of the soil within footprint areas, that will have an impact on future rehabilitation, has to be controlled. A management plan and proper follow-up strategy for the prevention of the establishment and/or further spread of new populations of such species should be developed and enforced. • Vehicles should be well maintained to prevent oil and other chemically based materials to enter the area. Refueling points should be well managed and if any soils are contaminated, it should be stripped and disposed of at a registered hazardous waste dumping site. • After the construction phase and also during the decommissioning/rehabilitation phase, reseeding of indigenous grasses should be done in between the developed infrastructure and all affected areas to re-establish microclimates and niche habitats. These re-seeded areas should be well maintained during the operational phase. Upon decommissioning, all fencing should be removed to re-establish landscape connectivity.

- Destruction of Avifaunal Habitat: Bird habitat in the region consists mainly of bush-thickened *Acacia mellifera*, but with some mature camel thorn *Vachellia erioloba*. Taller trees and those growing near farm reservoirs are regularly used by passerine birds as nest sites, perch sites (for foraging) and for shade and roosting in the hottest times of day. Two studies in the Kalahari have indicated that taller trees add significantly to the avian species richness of an area (because of the diverse niches they offer) and their removal, therefore, can reduce species richness (Seymour and Simmons 2008, Seymour and Dean 2010).

Loss of avifaunal habitat habitats	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Site (1)
Probability	Definite (4)	Definite (4)
Duration	Long term (3)	Long term (3)
Magnitude	Medium (1)	Low (1)
Reversibility	Irreversible (4)	Irreversible (4)
Irreplaceable loss of resources	Marginal loss of resource (2)	Marginal loss of resource (2)
Cumulative impact	Low cumulative impact (2), the impact will result in insignificant cumulative impacts.	
Significance	**Negative low (15)**	**Negative low (9)**

Can impacts be mitigated?	• The footprint of construction related activities should be limited to the site and minimised where possible. • Clearance of the habitat should be timed to fall outside the main breeding season of as many of the affected species as possible. • Trees and scrubs earmarked for removal should be examined for active nests by a knowledgeable person as soon is the project is approved. If no nests are found, the plants should be removed immediately, even if clearance of the area is scheduled for a later date. If this proactive approach is followed, it will prevent birds from nesting in the trees/scrubs later, and if any active nests are found it will allow sufficient time for the birds to complete their breeding cycle before the plants must eventually be removed.

- Loss of indigenous faunal and floral species diversity – Site clearance and removal of vegetation for construction of infrastructure and access roads through natural areas leading to a loss of natural species diversity. Proliferation of alien species may alter plant community structure. Failure to implement a comprehensive alien weed control plan leading to an increase in alien vegetation encroachment.

Loss of indigenous faunal and floral species diversity	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Site (1)
Probability	Possible (2)	Definite (4)
Duration	Permanent (4)	Permanent (4)
Magnitude	Medium (2)	Low (1)
Reversibility	Irreversible (4)	Partly reversible (2)
Irreplaceable loss of resources	Significant loss of resource (3)	Marginal loss of resource (2)
Cumulative impact	Low cumulative impact (2), the impact will result in insignificant cumulative impacts.	
Significance	**Negative Medium (34)**	**Negative low (9)**
Can impacts be mitigated?	• An alien vegetation control plan has to be implemented in order to manage alien plant species occurring within the developed and surrounding area. • Removal of the alien and weed species encountered on the property must take place	

	in order to comply with existing legislation (amendments to the regulations under the Conservation of Agricultural Resources Act, 1983 and Section 28 of the National Environmental Management Act, 1998). Removal of species should take place throughout the construction, operational, closure/decommissioning and rehabilitation/ maintenance phases. Care should be taken with the choice of herbicides to ensure that no additional impact and loss of indigenous plant species occurs due to the herbicides used. Proper training should be given to contractors/applicators to avoid spraying indigenous vegetation. • Landscaping with local indigenous species is preferable and could include forage and host plants required by pollinators. • After the construction phase and also during the decommissioning/rehabilitation phase, reseeding of local indigenous plant species should be done in between the developed infrastructure and all affected areas to re-establish plant species diversity, which in turn will create habitat for the return of faunal species, especially small mammals and invertebrates. These re-seeded areas should be well maintained during the operational phase. • To prevent the erosion of topsoil, management measures may include berms, soil traps, hessian curtains and stormwater diversion away from areas susceptible to erosion. Water control structures should be constructed and well maintained to minimize erosion and to create a favorable habitat for the establishment of vegetation during the operation of the development and after decommissioning and rehabilitation.

- <u>Loss of faunal and floral species of conservation significance.</u> – According to the Ecological Fauna & Flora Habitat Survey (refer to Appendix H2) Ten (10) plant species of specific conservation significance were recorded in the study area during the study period. Two are listed by Raimondo et al (2009) in the South African Red Data list as Declining species. Two tree species are included in the protected tree species list published by the National Forests

Act (Act no.84 of 1998) (NFA, 1998), and nine of the 10 are listed as protected by the Northern Cape Nature Conservation Act (Act no. 9 of 2009) (NCNCA, 2009). Prominent, but not dominant trees are *Boscia albitrunca* and *Vachellia erioloba.* Site clearance and removal of vegetation could lead to a loss of any recorded and unrecorded species of conservation significance such as ToPS, Red Data Listed species, protected species (nationally and/or provincially), plant species with medicinal or other cultural value.

Loss of faunal and floral species of conservation significance	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Site (2)
Probability	Definite (4)	Definite (4)
Duration	Permanent (4)	Permanent (4)
Magnitude	High (3)	Low (1)
Reversibility	Irreversible (4)	Partly reversible (2)
Irreplaceable loss of resources	Marginal loss of resource (2)	Marginal loss of resource (2)
Cumulative impact	Medium cumulative impact (3), As more and more similar developments occur in the direct vicinity of the currently proposed development, habitat losses and fragmentation will occur more frequently and populations of threatened, protected or other habitat specific species (both faunal and floral) will be put under increasing pressure through competition for suitable habitat.	
Significance	**Negative High (57)**	**Negative low (17)**
Can impacts be mitigated?	• According to SANBI's Guidelines for Environmental Impact Assessments (http://redlist.sanbi.org/eiaguidelines.php), in situ conservation of species of conservation significance is vital and is recommended as the only option for conserving species of conservation concern. Ex situ conservation, i.e. the removal of a subpopulation from its natural habitat to an artificial environment, a practice often termed "search and rescue", will result in the erosion of the inherent genetic diversity and characteristics of that species and increase its risk of extinction in the wild. Similarly, translocation of subpopulations is an unacceptable conservation measure. Translocations are expensive and rarely successful. Even if they are successful, translocated individuals may	

	harm other species within the receiving environment, the translocated individuals may transmit pathogens and/or parasites, and translocation may result in rapid changes in the species itself. • In spite of the above point, if species of conservation significance, and more specifically plant species, are going to be destroyed due to the construction of the proposed development. It may be recommended that these species, especially geophytes, be located and "rescued" by transplanting specimens into a nursery or other safe site until they can be used during rehabilitation and/or landscaping. • Populations of species of conservation significance (ToPS, Red Data Listed species, protected species (nationally and/or provincially), plant species with medicinal or other cultural value) occurring outside the areas that will be directly impacted by the proposed development needs to be actively conserved in order to conserve a viable, non-fragmented gene pool of these species in the local area. • If possible, developments that jeopardize any large populations of species of conservation significance should be planned in such a way as to avoid the populations and their habitat. • Any specimens of protected plant species known to occur in the vicinity of the development footprint and may potentially be impacted by the development activities, are to be fenced off for the duration of the activity. If these species fall within the development footprint special authorisation is to be obtained from relevant conservation authorities for such species to be cut, disturbed, damaged or destroyed. Applications for such activities should be made to the responsible official within the relevant Northern Cape Nature Conservation Agency.

- Loss of topsoil – Caused by: poor topsoil management (burial, erosion, etc) during construction related soil profile disturbance (levelling, excavations, disposal of spoils from

excavations etc.) And having the effect of: loss of soil fertility on disturbed areas after rehabilitation. (Refer to Appendix H6 for the Agricultural and Soils Impact Assessment).

Loss of topsoil	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Negative	Negative
Geographical extent	Site (1)	Site (1)
Probability	Possible (2)	Unlikely (1)
Duration	Long term (3)	Long term (3)
Magnitude	Medium (2)	Medium (2)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	Marginal (2)	Marginal (2)
Cumulative impact	Negligible cumulative impact (1).	
Significance	**Negative low (22)**	**Negative low (20)**
Can impacts be mitigated?	The Agricultural and Soils Impact Assessment (refer to Appendix H6) provides the following mitigation or management measures: • If an activity will mechanically disturb below surface in any way, then any available topsoil should first be stripped from the entire surface and stockpiled for re-spreading during rehabilitation. • Topsoil stockpiles must be conserved against losses through erosion by establishing vegetation cover on them. • Dispose of all subsurface spoils from excavations where they will not impact on undisturbed land. • During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface. • Erosion must be controlled where necessary on top soiled areas. Establish an effective record keeping system for each area where soil is disturbed for constructional purposes. These records should be included in environmental performance reports, and should include all the records below. • Record the GPS coordinates of each area. • Record the date of topsoil stripping. • Record the GPS coordinates of where the topsoil is stockpiled. • Record the date of cessation of constructional	

	(or operational) activities at the particular site. • Photograph the area on cessation of constructional activities. • Record date and depth of re-spreading of topsoil. • Photograph the area on completion of rehabilitation and on an annual basis thereafter to show vegetation establishment and evaluate progress of restoration over time.

- Impacts of the geology on the proposed development – A brief preliminary geotechnical assessment was conducted in order to determine the area's suitability for the proposed development of a photovoltaic plant. The results of the assessment reveal that the entire site is underlain by shallow, hardpan carbonate that varies between 0 and 40cm below surface. It is likely to vary in thickness between about 20 and 80cm. There is a thin covering (0-40cm) of unconsolidated, sandy soil above the hardpan.The foundations for mounting structures will need to be erected through the hardpan carbonate layer. The geotechnical conditions are assessed, in terms of this investigation, as suitable for the development of a solar energy facility. Because soil conditions are fairly uniform across the site, there are no more and less suitable parts of the project area for development, but drainage areas between wetlands should be avoided– refer to Appendix H6.

Geological impacts	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Negative	Negative
Extent	Site (1)	Site (1)
Probability	Probable (3)	Probable (3)
Duration	Short term (1)	Short term (1)
Magnitude	Medium (2)	Medium (2)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	Negligible cumulative impact (1).	
Significance	**Negative low (16)**	**Negative low (16)**
Can impacts be mitigated?	It is recommended that a detailed engineering geological investigation be conducted prior to construction and that site-specific precautionary measures be implemented.	

- Soil erosion – Erosion due to alteration of the land surface run-off characteristics. Alteration of run-off characteristics may be caused by construction related land surface disturbance, vegetation removal, presence of panel surfaces, and the establishment of hard standing areas and roads. Erosion will cause loss and deterioration of soil resources. The erosion risk is low due to the low slope gradients and low to moderate erodibility of the soils. (Refer to Appendix H6 for the Agricultural and Soils Impact Assessment).

Soil erosion	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Geographical extent	Site (1)	Site (1)
Probability	Possible (2)	Unlikely (1)
Duration	Medium term (2)	Medium term (2)
Magnitude	Medium (2)	Medium (2)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	Marginal (2)	Marginal (2)
Cumulative impact	Negligible cumulative impact (1).	
Significance	**Negative low (20)**	**Negative low (18)**
Can impacts be mitigated?	The Agricultural and Soils Impact Assessment (refer to Appendix H6) provides the following mitigation or management measures: Implement an effective system of run-off control, where it is required, that collects and safely disseminates run-off water from all hardened surfaces and prevents potential down slope erosion. Include periodical site inspection in environmental performance reporting that inspects the effectiveness of the run-off control system and specifically records the occurrence any erosion on site or downstream.	

- Generation of alternative land use income – Generation of alternative land use income through rental for energy facility. This will provide the farming enterprise with increased cash flow and rural livelihood, and thereby improve its financial sustainability. (Refer to Appendix H6 for the Agricultural and Soils Impact Assessment).

Generation of alternative land use income	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Positive	
Geographical extent	Site (1)	
Probability	Definite (4)	
Duration	Long term (3)	
Magnitude	Medium (2)	
Reversibility	Completely reversible (1)	
Irreplaceable loss of resources	None (1)	
Cumulative impact	Low cumulative impact (1).	
Significance	**Positive low (24)**	
Can impacts be mitigated?	N/A	

- Impacts on the sites hydrology – The Wetland Assessment (refer to Appendix H4) confirmed that no pans were recorded directly on the preferred site only in the vicinity of the site. A 32 m buffer from the edge of all pans is proposed to conserve these wetland features. It is anticipated that the proposed development would not have a major influence on the hydrological regime of the depressions around the site. There appears to be no distinct reason (such as would have been the case for gatherings of large rare water birds; associated unique wetland vegetation; extensive edge effects of impacts; sensitive extensive wetlands) for the buffer zone to be increased, but in order to avoid the need for a Water Use License a buffer zone of 500m will be implemented.

Hydrological impacts	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Site (1)
Probability	Definite (4)	Unlikely (1)
Duration	Short term (1)	Short term (1)
Magnitude	Medium (2)	Low (1)
Reversibility	Irreversible (4)	Barely reversible (3)
Irreplaceable loss of resources	Marginal loss of resource (2)	Marginal loss of resource (2)
Cumulative impact	Low cumulative impact (2). Should these impacts occur, there may be a cumulative impact on the hydrology of the area.	
Significance	**Negative medium (30)**	**Negative low (10)**
Can impacts be mitigated?	The EMPr provides mitigation measures for the management of surface and groundwater.	

- Temporary noise disturbance - Construction activities will result in the generation of noise over a period of months. Sources of noise are likely to include vehicles, the use of machinery such as drills and people working on the site. The noise impact is unlikely to be significant; but construction activities should be limited to normal working days and hours (7:00 – 17:00).

Temporary noise disturbance	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Definite (4)	Probable (3)
Duration	Short term (1)	Short term (1)
Magnitude	Medium (2)	Low (1)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	The impact would result in negligible to no	

	cumulative effects (1).	
Significance	**Negative low (20)**	**Negative low (9)**
Can impacts be mitigated?	Yes, management actions related to noise pollution are included in the EMPr.	

- Generation of waste - general waste, construction waste, sewage and grey water - The workers on site are likely to generate general waste such as food wastes, packaging, bottles, etc. Construction waste is likely to consist of packaging, scrap metals, waste cement, etc. The applicant will need to ensure that general and construction waste is appropriately disposed of i.e. taken to the nearest licensed landfill. Sufficient ablution facilities will have to be provided, in the form of portable/VIP toilets. No pit latrines, French drain systems or soak away systems shall be allowed.

Generation of waste	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Negative	Negative
Extent	Local/district (2)	Local/district (2)
Probability	Definite (4)	Definite (4)
Duration	Short term (1)	Short term (1)
Magnitude	Low (1)	Low (1)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	Medium cumulative impact (3) - An additional demand for landfill space could result in significant cumulative impacts if services become unstable or unavailable, which in turn would negatively impact on the local community.	
Significance	**Negative medium (13)**	**Negative low (13)**
Can impacts be mitigated?	Yes, it is therefore important that all management actions and mitigation measures included in the EMPr are implemented.	

- Impacts on heritage objects – In accordance with Section 38 of the NHRA, an independent heritage consultant was therefore appointed to conduct a Heritage Impact Assessment (HIA) to determine if any sites, features or objects of cultural heritage significance occur within the boundaries of the area where it is planned to develop the photovoltaic power plant. The Heritage Impact Assessment (Refer to Appendix H7) recorded a number of stone tools dating to the Fauresmith assemblage and Middle Stone Age were identified with a density of approximately 1 stone tool/5m^2. Due to the fact that the material is surface material as well as the fact that it is found in a region larger than the study area, this material is viewed to have low significance on a regional level. It is recommended that no further action is required with reference to the identified stone tools. A small informal burial place was identified on the preferred site. This feature is viewed to have high significance on a local level. As the site is very much overgrown, it is difficult to establish the correct number of

graves, although there might be as many as five. The graves are all only marked with packed stones, although one seems to have been fenced off in the past.

Impacts on heritage objects	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Site (1)	Site (1)
Probability	Probable (3)	Possible (2)
Duration	Permanent (4)	Short term (1)
Magnitude	Very high (4)	Low (1)
Reversibility	Irreversible (4)	Irreversible (4)
Irreplaceable loss of resources	Marginal loss of resource (2)	Marginal loss of resource (2)
Cumulative impact	Low cumulative impact (2). Should these impacts occur, there may be a cumulative impact on the preservation of heritage objects in the area.	
Significance	Negative high (64)	Negative low (12)
Can impacts be mitigated?	Due to the low density of the material, this site is seen to be fully recorded after inclusion in this report and no further action is required. If at all possible, the burial site should be avoided and fenced off with wire, leaving a buffer zone of at least five metres from the outer edges of the graves. If the area cannot be avoided, it is recommended that graves are relocated after the proper procedure has been followed	

- Temporary employment and other economic benefits (business opportunities and skills development) – Approximately 453 temporary job opportunities will be created to undertake the construction activities. It is likely that local construction companies with the necessary expertise to construct solar facilities will be partnered with. The construction period is expected to extend over a period of 18-24 months. During this period security personnel will also be required to work at the site particularly after working hours. It is also likely that some materials such as fencing, and other construction related consumables will be sourced locally.

Temporary employment and other economic benefits	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Positive	Positive
Extent	Regional (3)	Province (3)
Probability	Definite (4)	Definite (4)
Duration	Short term (1)	Short term (1)
Magnitude	Very High (4)	Very High (4)
Reversibility	Irreversible (4)	Irreversible (4)

Irreplaceable loss of resources	N/A	N/A
Cumulative impact	Medium cumulative impact (3) - The community will have an opportunity to better their social and economic well-being, since they will have the opportunity to upgrade and improve skills levels in the area.	
Significance	**Positive Medium (40)**	**Positive Medium (45)**
Can impacts be mitigated?	The following enhancement measures can be implemented to effectively enhance the potential impacts regarding the creation of employment and business opportunities and training: • The proposed Boitshoko SPP should liaise with the local municipality regarding the establishment of a local database of companies which can be identified as potential service providers. • These providers/companies should be notified of the tender process and be assisted in this regard. • Strategies need to be identified by the local municipality and the business sectors in order to maximise the potential benefits associated with the establishment of the Boitshoko SPP. • The existence of a skills database for the local municipal area should be developed with the assistance from the local municipality in order to establish the extent of the available service providers in the local area. • Efforts should be made to employ local contractors first and contractors that are compliant with the Broad Based Black Economic Empowerment (BBBEE) criteria. Gender equality should also be promoted. • If possible a training and skills development programme for the local workers should be initiated prior to the construction phase.	

- Visual intrusion - The Visual Impact Assessment (Refer to Appendix H5) concluded that the the farm is currently vacant and surrounded by other vacant farmland and mine property. The farm is mainly used for livestock grazing. The proposed development is located approximately 13km north west from the town of Kathu, next to the R380. Nearby viewers will have a certain level of sensitivity resulting from the proposed development. Sensitivity

will occur mainly on tourists and other people not living in the mining area. The proposed development will transform the site itself from a pleasant rural view into a more industrial view. Taking into account all positive factors of such a development including economic factors, social factors and sustainability factors, the visual impact of this proposed development will be insignificant and is suggested that the development commence, from a visual impact point of view.

Visual intrusion	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Definite (4)	Definite (4)
Duration	Short term (1)	Short term (1)
Magnitude	Medium (2)	Medium (2)
Reversibility	Barely reversible (1)	Partly reversible (1)
Irreplaceable loss of resources	No loss of resources (1)	No loss of resources (1)
Cumulative impact	High cumulative impact (4). The construction of the PV facility may increase the cumulative visual impact together with farming and mining activities, dust on gravel roads, existing Eskom power infrastructure and the other proposed solar power facilities in the area.	
Significance	**Negative medium (30)**	**Negative low (28)**
Can impacts be mitigated?	Yes, mitigation is possible. Dust generation will be the main factor/problem during the construction phase. Due to the rather level terrain, mitigation measures will only solve the problem to a certain extent. Measures include: • Dust suppression will play an important role to minimise the visibility of dust. • Contractors must avoid using roads not relevant to the project. • Construction vehicle must limit travelling on nearby roads during peak hours when possible. • Contractors should try using public roads not used that often by the residents of the area. • New road construction must be avoided if possible. • Good housekeeping should be implemented.	

	• Proper rehabilitation of disturbed areas after construction. • Risk assessments relating to fire hazards, "No Smoking" signs and the implementation of smoking areas. • Proper fire fighting equipment should be available on site. Not only fire extinguishers but also equipment like a water truck which can store large amounts of water. • Partial screening is possible by adding indigenous flora.

Indirect impacts: The nuisance aspects generally associated with the installation of infrastructure will also be applicable to this development, which relates primarily to the increase in construction vehicle traffic, impact of construction workers on local communities, the influx of job seekers to the area, risk to safety, livestock and farm infrastructure, and increased risk of veld fires.

- Technical advice for local farmers and municipalities - The establishment of a Solar PV plant in the area creates an opportunity for the technical staff involved in the project to provide local farmers in the area with advice regarding the installation of solar energy technology to supplement their current and future energy needs. A number of farmers indicated that they would appreciate assistance in this regard in the form of expert opinion as to what type of solar technologies would be best suited to meet their needs and how best to install solar energy installations on their farms. This could be achieved via a workshop / discussion with the local farmers in the area. Local municipalities would also benefit from the knowledge of technical staff involved in the establishment of the project.

Technical advice for local farmers and municipalities	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Positive	Positive
Extent	Local (1)	Local (1)
Probability	Definite (4)	Definite (4)
Duration	Short term (1)	Short term (1)
Magnitude	Low (1)	Medium (2)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	N/A	N/A
Cumulative impact	Low cumulative impact (2) – Positive cumulative impact associated with reduced reliance on coal generated energy and move towards renewable energy.	
Significance	**Positive Low (10)**	**Positive Low (20)**
Can impacts be mitigated?	The Solar Power Plant in consultation with the contractor should hold a workshop/s with local	

	farmers and representatives from the Local Municipality to discuss options for installing solar energy facilities and the technology and costs involved.

- Increase in construction vehicle traffic – Building materials and infrastructure will be transported to site on a daily basis and there will be an increase in construction vehicles on access roads. The movement of heavy construction vehicles during the construction phase has the potential to damage local farm roads and create dust and safety impacts for other road users in the area. Access will be obtained via the R380. While the volume of traffic along this road is low, the movement of heavy vehicles along this road is likely to damage the road surface and impact on other road users. The contractor should be required to ensure that damage to the road is repaired before the handover of the project.

Increase in construction vehicle traffic	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Probable (3)	Probable (3)
Duration	Short term (1)	Short term (1)
Magnitude	Medium (2)	Low (1)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	Medium cumulative impact (3). If damage to roads is not repaired, then this will affect the farming and mining activities in the area and result in higher maintenance costs for vehicles of local farmers and other road users. The costs will be borne by road users who were no responsible for the damage.	
Significance	**Negative low (22)**	**Negative low (11)**
Can impacts be mitigated?	The potential impacts associated with heavy vehicles can be effectively mitigated. The mitigation measures include: • The contractor must ensure that damage caused by construction related traffic to the access road is repaired before the completion of the construction phase. The costs associated with the repair must be borne by the contractor; • Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis and	

	ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers; • All vehicles must be road-worthy and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits.

- Impact of construction workers on local communities - The presence of construction workers poses a potential risk to family structures and social networks. While the presence of construction workers does not in itself constitute a social impact, the manner in which construction workers conduct themselves can impact on local communities. The most significant negative impact is associated with the disruption of existing family structures and social networks.

Impacts of construction workers on local communities	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Negative	Negative
Extent	Local (1)	Local (1)
Probability	Probable (3)	Probable (3)
Duration	Short term for community as a whole (1) Long term-permanent for individuals who may be affected by STDs etc. (4)	Short term for community as a whole (1) Long term-permanent for individuals who may be affected by STDs etc. (4)
Magnitude	Low for the community as a whole (4) High-Very High for specific individuals who may be affected by STDs etc. (10)	Low for the community as a whole (4) High-Very High for specific individuals who may be affected by STDs etc. (10)
Reversibility	Completely reversible (1) but not in case of HIV and AIDS	Completely reversible (1) but not in case of HIV and AIDS
Irreplaceable loss of resources	Marginal loss of resource (2)	Marginal loss of resource (2)
Cumulative impact	Medium cumulative effects (3), impacts on family and community relations that may, in some cases, persist for a long period of time. Also in cases where unplanned / unwanted pregnancies occur or members of the community are infected by an STD, specifically HIV and or AIDS, the impacts may be	

	permanent and have long term to permanent cumulative impacts on the affected individuals and/or their families and the community.	
Significance	**Low for the community as a whole (13)** **Medium for specific individuals who may be affected by STDs etc. (52)**	**Low for the community as a whole (13)** **Medium for specific individuals who may be affected by STDs etc. (52)**
Can impacts be mitigated?	Yes, the potential risks associated with construction workers can be effectively mitigated. The detailed mitigation measures are outlined in the Environmental Management Programme (EMPr) for the Construction Phase. Aspects that should be covered include: • Where possible the Solar Power Plant should make it a requirement for contractors to implement a 'locals first' policy for construction jobs, specifically for semi and low-skilled job categories; • The Solar Power Plant should consider the need for establishing a Monitoring Forum (MF) in order to monitor the construction phase and the implementation of the recommended mitigation measures. The MF should be established before the construction phase commences, and should include key stakeholders, including representatives from the Local Municipality, farmers and the contractor(s). The MF should also be briefed on the potential risks to the local community and farm workers associated with construction workers; • The Solar Power Plant and the contractor(s) should, in consultation with representatives from the MF, develop a code of conduct for the construction phase. The code should identify which types of behaviour and activities are not acceptable. Construction workers in breach of the code should be dismissed. All dismissals must comply with the South African labour legislation; • The Solar Power Plant and the contractor should implement an HIV/AIDS awareness programme for all construction workers at the outset of the	

	construction phase; • The construction area should be fenced off before construction commences and no workers should be permitted to leave the fenced off area; • The contractor should provide transport to and from the site on a daily basis for low and semi-skilled construction workers. This will enable the contactor to effectively manage and monitor the movement of construction workers on and off the site; • Where necessary, the contractors should make the necessary arrangements to enable low and semi-skilled workers from outside the area to return home over weekends and/ or on a regular basis. This would reduce the risk posed to local family structures and social networks; • It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.

- Influx of job seekers - Large construction projects tend to attract people to the area in the hope that they will secure a job, even if it is a temporary job. These job seekers can in turn become "economically stranded" in the area or decide to stay on irrespective of finding a job or not. While the proposed facility on its own does not constitute a large construction project, other facilities are proposed in the area. When considered together these facility projects may attract job seekers to the area. As in the case of construction workers employed on the project, the actual presence of job seekers in the area does not in itself constitute a social impact. However, the manner in which they conduct themselves can impact on the local community.

Influx of job seekers	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Probable (3)	Probable (3)
Duration	Short term (1)	Short term (1)
Magnitude	Medium (2)	Low (1)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	Medium cumulative effects (3), Impacts on family and community relations that may, in some cases, persist for a long period of time. Also in cases where unplanned / unwanted pregnancies occur or	

	members of the community are infected by an STD, specifically HIV and or AIDS, the impacts may be permanent and have long term to permanent cumulative impacts on the affected individuals and/or their families and the community.	
Significance	**Negative low (22)**	**Negative low (11)**
Can impacts be mitigated?	It is not possible to prevent job seekers from coming to the area in search of a job. The potential influx of job seekers to the area as a result of the proposed Solar Power Plant facility and other projects is likely to be low. The following mitigation measures are proposed: • The Solar Power Plant should implement a "locals first" policy, specifically with regard to unskilled and low skilled opportunities; • The Solar Power Plant should implement a policy that no employment will be available at the gate.	

- Risk to safety, livestock and farm infrastructure - The presence on and movement of construction workers on and off the site poses a potential safety threat to local famer's and farm workers in the vicinity of the site threat. In addition, farm infrastructure, such as fences and gates, may be damaged and stock losses may also result from gates being left open and/or fences being damaged or stock theft linked either directly or indirectly to the presence of farm workers on the site.

Risk to safety, livestock and farm infrastructure	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Probable (3)	Probable (3)
Duration	Short term (1)	Short term (1)
Magnitude	Medium (2)	Low (1)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	Negligible cumulative effects (1), provided losses are compensated for.	
Significance	**Negative low (22)**	**Negative low (11)**
Can impacts be mitigated?	Key mitigation measures include: • The Solar Power Plant should enter into an agreement with the local farmers in the area whereby damages to farm property etc. during the construction phase will be compensated for. The agreement should be signed before the	

	construction phase commences; • The construction area should be fenced off prior to the commencement of the construction phase. The movement of construction workers on the site should be confined to the fenced off area; • Contractors appointed by the Solar Power Plant should provide daily transport for low and semi-skilled workers to and from the site. This would reduce the potential risk of trespassing on the remainder of the farm and adjacent properties; • The Solar Power Plant should consider the option of establishing a MF (see above) that includes local farmers and develop a Code of Conduct for construction workers. This committee should be established prior to commencement of the construction phase. The Code of Conduct should be signed by the proponent and the contractors before the contractors move onto site; • The Solar Power Plant should hold contractors liable for compensating farmers in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers. This should be contained in the Code of Conduct to be signed between the proponent, the contractors and neighbouring landowners. The agreement should also cover loses and costs associated with fires caused by construction workers or construction related activities (see below); • The Environmental Management Programme (EMPr) should outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested; • Contractors appointed by the Solar Power Plant must ensure that all workers are informed at the outset of the construction phase of the conditions contained on the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms. • Contractors appointed by the Solar Power Plant must ensure that construction workers who are found guilty of trespassing, stealing livestock and/or damaging farm infrastructure are dismissed and charged. This should be contained in the Code of Conduct. All dismissals must be in

	accordance with South African labour legislation; • The housing of construction workers on the site should be strictly limited to security personnel.

- Increased risk of veld fires - The presence of construction workers and construction-related activities on the site poses an increased risk of grass fires that could in turn pose a threat to livestock, crops, wildlife and farmsteads in the area. In the process, farm infrastructure may also be damaged or destroyed and human lives threatened. The potential risk of grass fires was heightened by the windy conditions in the area, especially during the dry, windy winter months from May to October. In terms of potential mitigation measures, fire-breaks should be constructed around the perimeter of the site prior to the commencement of the construction phase. In addition, fire-fighting equipment should be provided on site during the construction phase.

Increased risk of veld fires	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Negative	Negative
Extent	Region (3)	Local (2)
Probability	Probable (3)	Probable (3)
Duration	Medium term (2)	Short term (1)
Magnitude	High (3)	Low (1)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	Negligible cumulative effects (1), provided losses are compensated for.	
Significance	**Negative medium (33)**	**Negative low (9)**
Can impacts be mitigated?	The mitigation measures include: • The Solar Power Plant should enter into an agreement with the local farmers in the area whereby damages to farm property etc. during the construction phase will be compensated for. The agreement should be signed before the construction phase commences; • A fire-break should be constructed around the perimeter of the site prior to the commencement of the construction phase; • Contractor should ensure that open fires on the site for cooking or heating are not allowed except in designated areas; • Contractor to ensure that construction related activities that pose a potential fire risk, such as welding, are properly managed and are confined to areas where the risk of fires has been reduced.	

	Measures to reduce the risk of fires include avoiding working in high wind conditions when the risk of fires is greater. In this regard special care should be taken during the high risk dry, windy winter months; • Contractor to provide adequate firefighting equipment on-site, including a fire fighting vehicle; • Contractor to provide fire-fighting training to selected construction staff; • No construction staff, with the exception of security staff, to be accommodated on site over night; • As per the conditions of the Code of Conduct, in the advent of a fire being caused by construction workers and or construction activities, the appointed contractors must compensate farmers for any damage caused to their farms. The contractor should also compensate the firefighting costs borne by farmers and local authorities.

2. Impacts that may result from the operational phase

Direct impacts: During the operational phase the study area will serve as an electricity generation facility and the impacts are generally associated with soil erosion, change in land use, impacts associated with the surrounding land uses, increase in storm water runoff, increased consumption of water, visual intrusion, the generation of general waste, leakage of hazardous materials, and the change in the sense of place. The operational phase will also have a direct positive impact through the provision of permanent employment opportunities, the generation of additional electricity, the establishment of a community trust, financial implication to tourism in the area, and the development of infrastructure for the generation of clean, renewable energy. The abovementioned impacts are discussed in more detail below:

- Impact mortality around the PV site for the Red-listed bird groups identified as at risk – No collision-prone birds were recorded on site, although two collision prone birds were recorded in the study area around the site. This may change with further observations as these birds may hunt around the artificial water sources in the dry season where prey may be attracted. Other aerial birds were recorded within the two sites but they are not classified as highly collision-prone. Their presence was recorded on the assumption that they may be attracted to the panels as a source of water and could interact in an unknown manner with the perceived water as posited by the Lake Effect of Kagen et al. (2014). No wetland species were recorded in the study area, suggesting that future collisions by these species with the PV panels may be unlikely.

Impacts Bird Mortality in and around PV site	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Site (1)	Site (1)
Probability	Unlikely (1)	Unlikely (1)
Duration	Permanent (4)	Permanent (4)
Magnitude	Low (1)	Low (1)
Reversibility	Completely reversible (1)	N/A
Irreplaceable loss of resources	No loss of resources (1)	No loss of resources (1)
Cumulative impact	Low cumulative impact (2)	
Significance	**Negative low (11)**	**Negative low (9)**
Can impacts be mitigated?	• There are three classes of mitigation for the PV panels: (i) move them well away from highly sensitive bird area (especially pans or other well-used bird areas), or (ii) employ bird-diverters to deter birds mistaking the panels for open water. If, in the post-construction monitoring, hornbills are found to attack their own reflections in the panels, and smash them, then covering the affected panels with a fine wire mesh is recommended. • It is also recommended that Boitshoko Solar Power Plant (RF) (Pty) Ltd install video cameras above some panels for post-construction monitoring of any mortality of birds in the vicinity, through direct observation and carcass searches in a systematic and regular fashion.	

- Impact mortality on transmission line for the Red-listed bird groups identified as at risk – No collision-prone birds were recorded on site, although two collision prone birds were recorded in the study area around the site. Other aerial birds were recorded within the two sites but they are not classified as highly collision-prone. Their presence was recorded on the assumption that they may be attracted to the panels as a source of water and could interact in an unknown manner with the perceived water as posited by the Lake Effect of Kagen et al. (2014).

Impacts Bird Mortality 0n transmission line	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Site (1)	Site (1)
Probability	Unlikely (1)	Unlikely (1)
Duration	Permanent (4)	Permanent (4)
Magnitude	Medium (2)	Low (1)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	No loss of resources (1)	No loss of resources (1)

Cumulative impact	Low cumulative impact (2)	
Significance	**Negative low (22)**	**Negative low (11)**
Can impacts be mitigated?	• There are three classes of mitigation for birds around power lines: (i) re-position the lines to avoid intersecting the movements of the birds, (ii) add bird diverters to all new lines and motivate Eskom to mark all existing lines that are killing substantial numbers of birds, such that collision-prone species more readily detect and avoid contact, or (iii) bury the lines. • We suggest that there is now enough long-term and well-executed research to show that un-marked lines are killing such large numbers of birds (such as bustards) that we recommend that all new transmission lines be marked with bird diverters, as they go up. The priority areas - those with the highest mortality rate - should be considered first.	

- Nesting for birds: Birds may use the PV arrays and fencing for nesting, perching and shade. Nests can potentially interfere with the workings of the panels or create a fire hazard, and bird droppings may have a negative impact on the effectiveness of the PV panels.

Nesting of birds	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Positive	Negative
Extent	Site (1)	Regional (3)
Probability	Probable (3)	Probable (3)
Duration	Long term (3)	Long term (3)
Magnitude	Medium (2)	Medium (2)
Reversibility	Completely reversible (1)	Barely reversible (3)
Irreplaceable loss of resources	No loss (1)	Marginal loss of resource (2)
Cumulative impact	Medium cumulative impact (3), since other projects are proposed in the area	
Significance	**Positive low (24)**	**Negative low (28)**
Can impacts be mitigated?	• Avoid the use of lattice-type structures in order to minimize perching and nesting opportunities; • Minimize standing water. This will make it more difficult for the two swallow species to obtain mud for their nests. In addition, it will help to minimize the risk of large congregations of birds near the PV arrays.	

	• Inspect each PV module at least once a month throughout the year for any nest-building activity. This can be accomplished by the staff working at the facility during other routine maintenance activities. However, they will first need basic training in order to ensure that they know what to look for and how to fill in the Bird Incident Forms • Remove nesting material when it appears, but only if it would interfere with the operation of the PV module and/or create a fire risk. In cases where a species other than the six indicated above is involved, permission should first be obtained from the person responsible for the BMP or local nature conservation authorities. If the surveys for nests are done regularly (at least once a month), then it would help minimize the risk of eggs or nestling being involved.

- Soil erosion – The largest risk factor for soil erosion will be during the operational phase when storm water run-off from the surfaces of the photovoltaic panels will cause erosion. Erosion will be localised within the site boundary but will have a permanent effect that would stretch into the operational phase of the project. This will ultimately lead to the irretrievable commitment of this resource. The measurable effect of reducing erosion by utilizing mitigation measures may reduce possible erosion significantly (refer to Appendix H6 for the Agricultural and Soils Impact Assessment).

Soil erosion	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Negative	Negative
Geographical extent	Site (1)	Site (1)
Probability	Possible (2)	Unlikely (1)
Duration	Medium term (2)	Medium term (2)
Magnitude	Medium (2)	Medium (2)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	Marginal (2)	Marginal (2)
Cumulative impact	Negligible cumulative impact (1).	
Significance	**Negative low (20)**	**Negative low (18)**
Can impacts be mitigated?	The Agricultural and Soils Impact Assessment (refer to Appendix H6) provides the following mitigation or management measures: Implement an effective system of run-off control, where it is required, that collects and safely disseminates run-off water from all	

	hardened surfaces and prevents potential down slope erosion. Include periodical site inspection in environmental performance reporting that inspects the effectiveness of the run-off control system and specifically records the occurrence any erosion on site or downstream.

- Generation of alternative land use income – Generation of alternative land use income through rental for energy facility. This will provide the farming enterprise with increased cash flow and rural livelihood, and thereby improve its financial sustainability. (Refer to Appendix H6 for the Agricultural and Soils Impact Assessment).

Generation of alternative land use income	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Positive	
Geographical extent	Site (1)	
Probability	Definite (4)	
Duration	Long term (3)	
Magnitude	Medium (2)	
Reversibility	Completely reversible (1)	
Irreplaceable loss of resources	None (1)	
Cumulative impact	Low cumulative impact (1).	
Significance	**Positive low (24)**	
Can impacts be mitigated?	N/A	

- Loss of agricultural land use – Caused by: direct occupation of land by total footprint of energy facility infrastructure; and having the effect of: taking affected portions of land out of agricultural production. The impact is reversible after the life of the project, with effective top soiling of the land during rehabilitation, where necessary. During the operational phase the site can be used for grazing of small stock between the panels. Much less land is therefore excluded from agricultural use during the operational phase than during the construction phase.

Change in land use	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Negative	Negative
Extent	Site (1)	Site (1)
Probability	Definite (4)	Definite (4)
Duration	Long term (3)	Long term (3)
Magnitude	Medium (2)	Low (1)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	Low cumulative impacts (2). Overall loss of	

	farmland could affect the livelihoods of the affected farmers, their families, and the workers on the farms and their families. However, disturbed areas can be rehabilitated.	
Significance	**Negative low (26)**	**Negative low (12)**
Can impacts be mitigated?	• Set up the facility and the agreements with land owners in such a way that facilitates grazing of small stock within the panel areas during the operational phase. Minimise disturbance to vegetation during the construction phase so that the veld within panel areas remains intact for grazing during the operational phase. • The proponent should investigate the option of establishing a Rehabilitation Fund to be used to rehabilitate the area once the proposed facility has been decommissioned. The fund should be funded by revenue generated during the operational phase of the project. The motivation for the establishment of a Rehabilitation Fund is based on the experience from the mining sector where many mines on closure have not set aside sufficient funds for closure and decommissioning.	

- Increase in storm water runoff – The development will potentially result in an increase in storm water run-off that needs to be managed to prevent soil erosion, especially where vegetation will be cleared. Storm water canals will be designed into which the water from the panels can be channeled. These canals should reduce the speed of the water and allow the water to drain slowly onto the land. Vegetation corridors should be maintained within the subject area.

Increase in storm water runoff	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Probable (3)	Unlikely (1)
Duration	Long term (3)	Long term (3)
Magnitude	Medium (2)	Low (1)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	Marginal loss of	Marginal loss of

	resource (2)	resource (2)
Cumulative impact	Medium cumulative impact (3) - Should these impacts occur, there will be a cumulative impact on the wider area.	
Significance	**Negative medium (30)**	**Negative low (13)**
Can impacts be mitigated?	Yes. It is therefore important that all management actions and mitigation measures included in the EMPr are implemented to ensure that these impacts do not occur.	

- Increased consumption of water - Approximately 3,880,000 liters of water per annum will be required for the operation of the solar plant. Cleaning will take place once every quarter. The water will be sourced from groundwater sources.

Increased consumption of water	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Negative	Negative
Extent	Region (3)	Region (3)
Probability	Definite (4)	Definite (4)
Duration	Long term (3)	Long term (3)
Magnitude	Medium (2)	Medium (2)
Reversibility	Irreversible (4)	Irreversible (4)
Irreplaceable loss of resources	Marginal loss of resources (2)	Marginal loss of resources (2)
Cumulative impact	High cumulative impacts (4) - An additional demand on water sources could result in a significant cumulative impact with regards to the availability of water.	
Significance	**Negative medium (40)**	**Negative medium (40)**
Can impacts be mitigated?	Yes, management actions and mitigation measures related to the use of water are included in the EMPr.	

- Visual intrusion - The Visual Impact Assessment (Refer to Appendix H5) concluded that the the farm is currently vacant and surrounded by other vacant farmland and mine property. The farm is mainly used for livestock grazing. The proposed development is located approximately 13km north west from the town of Kathu, next to the R380. Nearby viewers will have a certain level of sensitivity resulting from the proposed development. Sensitivity will occur mainly on tourists and other people not living in the mining area. The proposed development will transform the site itself from a pleasant rural view into a more industrial view. Taking into account all positive factors of such a development including economic factors, social factors and sustainability factors, the visual impact of this proposed

development will be insignificant and is suggested that the development commence, from a visual impact point of view.

Visual intrusion	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Definite (4)	Definite (4)
Duration	Long term (3)	Long term (3)
Magnitude	Medium (2)	Medium (2)
Reversibility	Barely reversible (3)	Barely reversible (3)
Irreplaceable loss of resources	No loss of resources (1)	No loss of resources (1)
Cumulative impact	High cumulative impact (4). The operation of the plant may increase the cumulative visual impact together with dust from the nearby gravel roads, farming activities, existing Eskom power infrastructure and the 16 proposed solar power facilities in the area.	
Significance	**Negative medium (34)**	**Negative low (14)**
Can impacts be mitigated?	Yes, mitigation measures are included in the visual impact assessment study and the EMPr. The VIA recommends the following mitigation measures: • Mitigation of lighting impacts includes the pro-active design, planning and specification lighting for the facility by a lighting engineer. Security lighting should make use of down-lights to minimise light spill, and motion detectors where possible so that lighting at night is minimised. • Good housekeeping should be implemented. • Risk assessments relating to fire hazards, "No Smoking" signs and the implementation of smoking areas. • Proper firefighting equipment should be available on site. Not only fire extinguishers but also equipment like a water truck which can store large amounts of water. • Partial screening is possible by adding	

	and maintaining indigenous flora.

- Generation of waste - Security guards will be stationed at the solar facility 24 hours a day and 7 days a week. Sources of general waste will be waste food, packaging, paper, etc. General waste will be stored on the site and removed on a weekly basis. The proposed development will use the municipality for waste removal. The Local Municipality still has to confirm that the dumping site has the capacity to accommodate the additional waste generated by the employees working at the Solar Power Plant

Generation of waste	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Definite (4)	Definite (4)
Duration	Long term (3)	Long term (3)
Magnitude	Low (1)	Low (1)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	Medium cumulative impact (3) - An additional demand for landfill space could result in significant cumulative impacts with regards to the availability of landfill space.	
Significance	**Negative low (15)**	**Negative low (15)**
Can impacts be mitigated?	Yes, management actions related to waste management are included in the EMPr.	

- Leakage of hazardous materials - The proposed development will comprise of a distribution substation and will include transformer bays which will contain transformer oils. Leakage of these oils can contaminate water supplies and must be prevented by constructing oil bunds to ensure that any oil spills are suitably attenuated and not released into the environment.

Leakage of hazardous materials	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Possible (2)	Unlikely (1)
Duration	Long term (3)	Long term (3)
Magnitude	High (3)	Medium (2)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	Marginal loss of resource (2)	Marginal loss of resource (2)
Cumulative impact	The impact would result in negligible to no	

	cumulative effects (1)	
Significance	**Negative medium (36)**	**Negative low (22)**
Can impacts be mitigated?	Yes. It is therefore important that all management actions and mitigation measures included in the EMPr are implemented to ensure that these impacts do not occur.	

- Permanent employment - Based on information from estimated global employment ratios per MW of solar PV installed (viz. 0.7 direct long term opportunities/ MW), the proposed development would create ~ 50 employment opportunities for over a 20-year period.

Permanent employment	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Positive	Positive
Extent	Local (2)	Local (2)
Probability	Definite (4)	Definite (4)
Duration	Long term (3)	Long term (3)
Magnitude	Medium (2)	Medium (2)
Reversibility	Irreversible (4)	Irreversible (4)
Irreplaceable loss of resources	N/A	N/A
Cumulative impact	Low cumulative impact (2) – Creation of permanent employment and skills and development opportunities for members of the local community and creation of additional business and economic opportunities in the area.	
Significance	**Negative Medium (30)**	**Negative Medium (30)**
Can impacts be mitigated?	The enhancement measures listed for the temporary employment opportunities during the construction phase to enhance local employment and business opportunities, also apply to the operational phase. In addition: • The Solar Power Plant should implement a training and skills development programme for locals during the first 5 years of the operational phase. The aim of the programme should be to maximise the number of South African's and locals employed during the operational phase of the project; • The Solar Power Plant, in consultation with the Local Municipality, should investigate the options for the establishment of a Community Development Trust.	

- Generation of additional electricity - The photovoltaic effect of the panels will generate electricity that will be fed into the Ferrum-Umtu 132kV. The evacuation of generated electricity into the Eskom grid will strengthen and stabilize the grid (especially in the local area).

Generation of additional electricity	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Positive	Positive
Extent	Local (2)	Local (2)
Probability	Definite (4)	Definite (4)
Duration	Long term (3)	Long term (3)
Magnitude	Medium (2)	Medium (2)
Reversibility	Irreversible (4)	Irreversible (4)
Irreplaceable loss of resources	N/A	N/A
Cumulative impact	Low cumulative impact (2) - The evacuation of generated electricity into the Eskom grid will strengthen and stabilize the grid (especially in the local area).	
Significance	**Positive medium (30)**	**Positive medium (30)**
Can impacts be mitigated?	No mitigation measure required.	

- Establishment of a Community Trust - In terms of the Request for Proposal document prepared by the Department of Energy all bidders for operating licences for renewable energy projects must demonstrate how the proposed development will benefit the local community. This can be achieved by establishing a Community Trust which is funded by revenue generated from the sale for energy. Community Trusts provide an opportunity to generate a steady revenue stream that is guaranteed for a 20-year period. This revenue can be used to fund development initiatives in the area and support the local community. The long term duration of the revenue stream also allows local municipalities and communities to undertake long term planning for the area. The revenue from the proposed plant can be used to support a number of social and economic initiatives in the area.

Establishment of a community trust	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Positive	Positive
Extent	Local (2)	Local (2)
Probability	Probable (3)	Probable (3)
Duration	Long term (3)	Long term (3)
Magnitude	Medium (2)	High (3)
Reversibility	Irreversible (4)	Irreversible (4)
Irreplaceable loss of resources	N/A	N/A
Cumulative impact	Medium cumulative impact (3) - promotion of social and economic development and improvement in the overall well-being of the	

	community.	
Significance	**Positive medium (30)**	**Positive medium (48)**
Can impacts be mitigated?	In order to maximise the benefits and minimise the potential for corruption and misappropriation of funds the following measures should be implemented: • The Local Municipality should be consulted as to the structure and identification of potential trustees to sit on the Trust. The key departments in the Local Municipality that should be consulted include the Municipal Managers Office, IDP Manager and LED Manager. • Clear criteria for identifying and funding community projects and initiatives in the area should be identified. The criteria should be aimed at maximising the benefits for the community as a whole and not individuals within the community; • Strict financial management controls, including annual audits, should be instituted to manage the funds generated for the Community Trust from the plant.	

Indirect impacts: The operational phase will have an indirect negative impact through the change in the sense of place and an indirect positive impact through the provision of additional electrical infrastructure.

- Change in the sense of place – The components associated with the proposed facility will have a visual impact and, in so doing, impact on the landscape and rural sense of the place of the area. The proposed site will not be visible from the R380. In addition, the visual integrity of the area has been impacted by the existing Eskom power infrastructure and power lines (in close proximity to site) and mines in the area. The impact of the proposed SPP on the areas sense of place with mitigation is therefore likely to be low.

Change in sense of place	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Probable (3)	Probable (3)
Duration	Long term (4)	Long term (4)
Magnitude	Low (1)	Low (1)
Reversibility	Reversible (2)	Reversible (2)

Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	High cumulative impact (4). The operation of the plant may increase the cumulative visual impact together with dust from the nearby gravel roads, farming activities, existing Eskom power infrastructure and the other proposed solar power facilities in the area.	
Significance	**Negative low (16)**	**Negative low (16)**
Can impacts be mitigated?	Yes, mitigation measures relating to visual impacts are included in the EMPr. The recommendations contained in the VIA should also be implemented – refer to previous discussions on visual impacts.	

- Potential impact on tourism – In the Northern Cape province tourism is regarded as an important sector contributing to the provinces' economic sector. The main tourism in this area is linked to the mining industry and game reserves in the Kalahari. The impact however of the proposed Boitshoko SPP on the tourism sector is likely to be low, but in some cases the Boitshoko SPP may attract tourists to the proposed area and its surroundings.

Potential impacts on tourism	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Negative (Potential to distract from the tourist experience of the area) Positive (Potential to attract people to the area)	Negative (Potential to distract from the tourist experience of the area) Positive (Potential to attract people to the area)
Extent	Local (2)	Local (2)
Probability	Probable (3)	Probable (3)
Duration	Long term (4)	Long term (4)
Magnitude	Low (2) (Applies to both – and +)	Low (2) (Applies to both – and +)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	N/a	N/a
Cumulative impact	Cumulative impact (2) There are other proposed PV sites in the area	
Significance	**Negative & Positive low (24)**	**Negative & Positive low (24)**
Can impacts be mitigated?	The recommendations contained in the VIA should be implemented – refer to previous discussions on visual impacts.	

- Development of infrastructure for the generation of clean, renewable energy - South Africa currently relies on coal-powered energy to meet more than 90% of its energy needs. Much of the coal used has high sulphur content. As a result, South Africa is the nineteenth largest

per capita producer of carbon emissions in the world, and Eskom, as an energy utility, has been identified as the world's second largest producer carbon emissions. The overall contribution to South Africa's total energy requirements of the proposed facility is relatively small. However, the 115 MW produced will help to offset the total carbon emissions associated with energy generation in South Africa. Given South Africa's reliance on Eskom as a power utility, the benefits associated with an IPP based on renewable energy are regarded as an important contribution.

Development of infrastructure for the generation of clean, renewable energy	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Positive	Positive
Extent	National (4)	Local (2)
Probability	Definite (4)	Definite (4)
Duration	Long term (3)	Long term (3)
Magnitude	Low (1)	Low (1)
Reversibility	Irreversible (4)	Irreversible (4)
Irreplaceable loss of resources	N/A	N/A
Cumulative impact	Medium cumulative impact (3) Reduce carbon emissions via the use of renewable energy and associated benefits in terms of global warming and climate change.	
Significance	**Positive low (18)**	**Positive low (18)**
Can impacts be mitigated?	The establishment of the proposed facility is a mitigation measure in itself. In order to maximise the benefits of the proposed Solar Power Plant should: • Use the project to promote and increase the contribution of renewable energy to the national energy supply; • Maximise the public's exposure to the project via an extensive communication and advertising programme; • Implement a training and skills development programme for locals during the first 5 years of the operational phase. The aim of the programme should be to maximise the number of South African's employed during the operational phase of the project.	

3. Impacts that may result from the decommissioning and closure phase

Direct impacts: Typically, the major social impacts associated with the decommissioning phase are linked to the loss of jobs and associated income. This has implications for the households who are directly affected, the communities within which they live, and the relevant local authorities. However, in the case of the proposed facility the decommissioning phase is likely to involve the disassembly and replacement of the existing components with more modern technology. This is likely to take place in the 20 - 25 years post commissioning. The decommissioning phase is therefore likely to create additional, construction type jobs, as opposed to the jobs losses typically associated with decommissioning. If infrastructures are removed after a 20/25-year period, the site will be returned to its natural state. Therefore, the physical environment will benefit from the closure of the solar facility.

- Rehabilitation of the physical environment – The physical environment will benefit from the closure of the solar facility since the site will be restored to its natural state.

Rehabilitation of the physical environment	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Positive	Positive
Extent	Site (1)	Site (1)
Probability	Possible (2)	Probable (3)
Duration	Long term (3)	Long term (3)
Magnitude	Low (1)	Medium (2)
Reversibility	N/A	N/A
Irreplaceable loss of resources	N/A	N/A
Cumulative impact	The impact would result in negligible to no cumulative effects (1)	
Significance	**Negative low (7)**	**Negative low (16)**
Can impacts be mitigated?	No mitigation measures required.	

- Generation of waste - The panels contain material that may be hazardous in nature if released into the environment. If the panels are intact, there will be no risk of exposure. The removal of the supporting infrastructure such as the concrete foundations, cabling, fencing and control rooms, etc. will generate waste. Some of the waste will where possible be recycled, for example steel support structures can be re-used elsewhere or melted down to form new products. The amount of waste will be limited and is not expected to significantly reduce the capacity of the local landfill. However, the project is estimated to last for 20-25 years and the current licensed landfill sites near Kathu (such as Hotazel, Kuruman or Kathu), may at that stage (or sooner) reach its capacity. The applicant will need to assess the project lifespan and make suitable arrangements for waste disposal when the site is decommissioned.

Generation of waste	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)

Probability	Definite (4)	Definite (4)
Duration	Short term (1)	Short term (1)
Magnitude	High (3)	Medium (2)
Reversibility	Irreversible (4)	Partly reversible (2)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	Medium cumulative impact (3) - An additional demand on municipal services could result in significant cumulative impacts with regards to the availability of landfill space.	
Significance	**Negative medium (45)**	**Negative low (26)**
Can impacts be mitigated?	Yes –there are mitigation measures in the EMPr.	

- Loss of employment - Given the relatively large number of people employed during the operational phase, the decommissioning of the facility has the potential to have a negative social impact on the local community. However, the potential impacts associated with the decommissioning phase can also be effectively managed with the implementation of a retrenchment and downscaling programme.

Loss of employment	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Possible (2)	Possible (2)
Duration	Medium term (2)	Short term (1)
Magnitude	High (3)	Medium (2)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	The impact would result in negligible to no cumulative effects (1)	
Significance	**Negative medium (30)**	**Negative low (18)**
Can impacts be mitigated?	The following mitigation measures are recommended: • The Solar Power Plant should ensure that retrenchment packages are provided for all staff retrenched when the facility is decommissioned. • All structures and infrastructure associated with the proposed facility should be dismantled and transported off-site on decommissioning; • The Solar Power Plant should investigate the option of establishing an Environmental Rehabilitation Trust Fund to cover the costs	

	of decommissioning and rehabilitation of disturbed areas. The Trust Fund should be funded by a percentage of the revenue generated from the sale of energy to the national grid over the 20-year operational life of the facility. The rationale for the establishment of a Rehabilitation Trust Fund is linked to the experiences with the mining sector in South Africa and failure of many mining companies to allocate sufficient funds during the operational phase to cover the costs of rehabilitation and closure.

Indirect impacts: No indirect impacts are anticipated from the decommissioning phase of the proposed development.