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**FINAL BASIC ASSESSMENT &
ENVIRONMENTAL
MANAGEMENT PROGRAMME
REPORT**

**IVANPLATS (PTY) LTD:
PLATREEF MINE SOLAR
FACILITY, NEAR MOKOPANE,
LIMPOPO**





mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

FINAL BASIC ASSESSMENT REPORT

AND

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

PLATREEF MINE– 19MW SOLAR PV FACILITY, NEAR MOKOPANE, LIMPOPO PROVINCE

SUBMITTED FOR ENVIRONMENTAL AUTHORISATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (MPRDA) (AS AMENDED).

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FINAL BASIC ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT
FOR
**IVANPLATS PLATREEF MINE 19MW SOLAR PHOTOVOLTAIC (PV) FACILITY, NEAR MOKOPANE,
LIMPOPO PROVINCE**

Conducted by
OMI SOLUTIONS (PTY) LTD

On behalf of
IVANPLATS (PTY) LTD

In respect of
LP 30/1/2/3/2/1(10067) EM

DATED:
SEPTEMBER 2022

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PLEASE NOTE:

The outline of this report was compiled in terms of the official BA&EMPr template provided by the Department of Mineral Resources and Energy (DMRE). Where repetition occurs as a result of the template being used, the relevant information will be cross referenced. An executive summary of the most important aspects of the report is provided in order to assist the reader.

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EXECUTIVE SUMMARY

INTRODUCTION AND BACKGROUND

OMI Solutions (Pty) Ltd was appointed by Ivanplats (Pty) Ltd (Ivanplats) as the independent Environmental Assessment Practitioner (EAP) to facilitate the Environmental Authorisation (EA) Process in support of the proposed Platreef Mine solar photovoltaic (PV) facility within the Platreef Mine Mining Right (MR) area, located approximately 12 km north west of Mokopane along the N11 opposite the village of Tshamahansi in the Limpopo Province.

Ivanplats is a holder of an existing MR granted by the Department of Mineral Resources and Energy (DMRE) in 2014 (DMRE Reference No: LP 30/5/2/2/1/10067 MR). The MR was issued for the development of an underground mine, namely the Platreef Mine, on the farms Macalacaskop 243 KR and Turfspruit 241 KR. The mine has a Life of Mine (LoM) of 30 years. In an effort to reduce its carbon footprint and ensure continued electricity supply for the Platreef operations, Ivanplats proposes to develop a solar photovoltaic (PV) facility, with the associated electrical infrastructure, over three (3) identified areas namely Area 1, Area 2 and Area 3. The solar facility development will be undertaken in a phased approach, commencing with the initial phase being a 3MW supply from Area 3 and 2MW supply from Area 2. In total these areas may possibly yield 7MW of electricity supply. Ivanplats plans to upgrade the solar PV facility to supply up to 19MW of electricity in the near future. Construction is estimated to take approximately ten (10) months, with the operational phase being line with the LoM. Area 3 has been identified as a parking area and will have solar panels mounted on the roof of carports. Area 2 will comprise of fixed structures anchored to the ground and mounted with the latest N-type TopCON, bi-facial, double glass solar modules. In total, the solar PV facility will encompass an area of 19.59 hectares and will be used to generate power for private consumption at the mine operations.

The EA application for the proposed solar PV facility was lodged with the DMRE: Limpopo Region on 15 June 2022. The EA application was accepted by the Department on 14 July 2022 with reference number LP 30/1/2/3/2/1(10067) EM.

NEED AND DESIRABILITY

South Africa is currently faced with an energy challenge which is manifesting in rising electricity tariffs combined with load shedding patterns that are increasingly being experienced. These challenges have had negative impacts on citizen's livelihoods and more particularly on businesses and industry. To address this challenge, as well as reduce its carbon foot, Ivanplats have proposed to develop a solar facility to ensure continued electrical supply for its Platreef Mine operations.

The typical energy supply in South Africa has been mainly through coal-fired power stations (DMRE, 2019), and it is noted that these resources have an impact on climate change. Solar energy on the other hand, provides an opportunity for greener energy through renewable energy. Implementing renewable energy reduces reliance on fossil fuels thus having an overall positive impact towards climate change. South Africa is a party to both the United Nations Framework Convention on Climate Change (UNFCCC) and its Kyoto Protocol, having acceded to the Convention in 1997 and ratified the Kyoto Protocol in 2002. South Africa is also a signatory of the Paris agreement, but not as yet ratified. The protocols above commit developed countries to reduce Greenhouse Gas (GHG) Emissions. The Paris agreement is a universal, legally binding international climate agreement, and sets out a global action plan for emission-cutting pledges known as "intended nationally determined contributions" (INDCs), to limit global warming to below 2°C or, if possible, below 1.5°C as agreed under the Copenhagen Accord (UNFCCC, 2015). This further reiterates the importance of developments such as the proposed solar PV facility for Platreef Mine. In line with these protocols, Ivanplats is committed to being a mine of the future with efforts to reduce its carbon footprint and implementing green and clean energy, through developing the proposed Platreef solar facility to combat climate change. Moreover, Ivanplats have has

recently invested in the JSE-listed company RENERGEN which is a Renewable Energy organisation and are also implementing various policies to improve its Environmental, Social and Governance (ESG) Score.

The anticipated potential impacts of the proposed project can be seen as outweighing the negative impacts. The proposed project will potentially result in a loss of vegetation, some faunal biodiversity, loss of grazing land and potentially infringe on sensitive receptors along the N11 adjacent to the proposed site. It should be noted however that the habitat fragmentation and visual effects of the solar facility can be minimised and managed. Additionally, solar power will provide cumulative positive impacts on a local and regional scale. It will provide the Platreef Mine with continued electrical supply, thus enabling mining and production without possible interruptions from load shedding. It will provide some additional job opportunities as well ensuring continued employment for workers already employed by the mine. The proposed project can also result in skills transfer thus contributing positively to the local industry and Gross Domestic Product growth, and most importantly, contributing to a greener future through green energy.

In the event that the EA application is not granted, any positive benefits of the project will also not be realised, thus resulting in:

- No contribution from this project towards electricity generation from renewable energy technologies, to contribute towards Ivanplats' efforts to reduce its carbon footprint and to play its role in the fight against climate change;
- No increased job opportunities (however limited) or economic benefits associated with this project thus the benefits derived from the proposed project would be foregone; and
- Continued uncertainty of electricity supply to the mine, thus impacting on the mine's ability to continue mining and production, thus having a knock-on effect on the overall Platinum Group Metals (PGM) economy as well as reducing socio-economic benefits for the area and the country as a whole.

ALTERNATIVES

The alternatives considered for the project included site, design, technology and operational alternatives. Furthermore, a 'no-go' alternative was also considered. These alternatives are discussed as follows:

Site Alternatives

Ivanplats considered various locations to establish the solar facility within the existing MR area as it is economically and environmentally unfeasible to establish the plant outside the existing MR area. The following site location alternatives were considered:

- Site Location Alternative 1: located north east of the Platreef Mine and is approximately 6.5 ha
- Site Location Alternative 2: located north of the Platreef Mine and is approximately 5 ha
- Site Location Alternative 3: located directly east of the Platreef Mine and is approximately 19.59 ha

The size of site location alternatives 1 and 2 areas combined are smaller than the 19.59 ha area required for the proposed 19 MW solar facility and would only yield approximately 7MW power supply to the mine. There is also a 10 m waste rock berm proposed to the west of Alternative 1 and to the south of Alternative 2 which would cast shade onto the PV panels at certain times during the day and which would impact on the efficacy of the solar plants at these locations. Both the above alternatives are also further away from the existing 8MVA substation on site which would result in a longer OHL than that which is required for Alternative 3, with a larger subsequent economic impact in terms of Capital

Expenditure (CAPEX). Thus, neither of these two (2) sites were suitable for the solar plant due to size, access and economic constraints.

Design / Layout Alternatives

The original layout allowed for 4 solar area with a combined area of 23.11 ha while the preferred layout only has 3 areas. The footprint of the original layout was reduced by the design engineers to limit the disturbance of natural areas and reduce negative impacts. As per the current mine plan, a carport is proposed to be constructed on Area 3 and therefore the solar panels will be placed on the carport's roof, thus further reducing the areas to be disturbed due to the solar facility development (17.48 ha vs 23.11 ha). The preferred layout comprises a solar facility with a footprint of 19.59 ha in total. Apart from the smaller footprint, all other impacts for the layout alternatives would be similar (impact on watercourses, visual impacts etc.). Potential alternatives to the powerline routes were also considered. It was decided that connection to the existing 8MVA substation on site would be the most feasible option at this stage until such time that the proposed new 3X40MVA substation has been constructed. The powerlines will tie into the existing services corridors proposed for the mine.

Technology Alternative

Various technologies exist and have been considered by the applicant and engineering design team, to ensure the technology alternative presents the optimal solution. The following considerations were taken into account:

Solar Photovoltaic Power: The high irradiation values of the Limpopo Province make this area ideally suitable for the proposed solar facility. The solar PV technology generally requires relatively low water requirements and provides a reliable source of power, and all the components can be recycled.

Concentrated Solar Power (CSP): CSP technology requires large volumes of water, and this is a major constraint for this type of technology. Moreover, the size, visual impacts and water requirements in relation to the project area tend to render this alternative not feasible. The Platreef Mine is located in a water scarce area with surrounding communities in line of sight of the mine, and thus a CSP facility would have a much larger visual and water supply impact compared to the PV option.

Wind Energy: Ivanplats has not considered the generation of electricity via wind power as it is believed that the climatic characteristics of the project area would render a wind energy facility not as efficient compared to a solar energy facility. This alternative was therefore not considered or evaluated further in this report.

Operational Alternative

The option to use dry cleaning vs wet cleaning for the solar panels was investigated. In general, a dry cleaning system is less effective compared to wet cleaning as the water involved in wet cleaning serves as a medium for dust particles to release. The robotic cleaners associated with dry cleaning systems also require electricity to operate which makes it more costly and less economically viable. Due to the relatively low volumes of water required to wash the panels, wet cleaning was identified as the preferred alternative at this stage. It must be noted that panels will not be cleaned on those days when it rains. The wet cleaning alternative will also provide for more job opportunities to be created. In future if wet cleaning becomes less economically viable, the dry cleaning alternative will be revisited.

“No-Go” Alternative

The entire project area is within the approved MR area of the Platreef Mine, which is largely open veld that is intermittently used for livestock grazing by the surrounding villages. It has been noted that this

veld has been severely overgrazed, which has resulted in large stretches of bare ground. Grass species such as *Heteropogon contortus*, *Hyparrhenia hirta* and *Aristida congesta* were often dominant within the graminoid layer (a typical indicator of poor veld conditions) (Scientific Terrestrial Services, 2022). It was further noted that the preferential surface flow paths observed in the project area has been confirmed to be degraded and no longer functional.

In light of the above, it must be noted that the country's continued power supply interruptions, particularly load shedding, have cumulative negative effects on industry and citizens' livelihood. In the case of the Platreef Mine, if power supply to the mine is disrupted due to load shedding (or other power supply constraints), the increased cost of the mine having to use diesel-generated power affects the economic viability of the operations. The emissions from diesel generators also have an impact on the air quality of the project area. As the project is located in the Waterberg-Bojanala Air Quality Priority Area, all efforts should be made to avoid or reduce air quality impacts as far as possible. It is therefore beneficial for the mine to have a reliable source of electricity generated from renewable resources. Moreover, when considering the environment, taking into account the poor veld conditions and the historical land use of the project area, it is highly unlikely that floral or faunal species of conservation concern will be able to establish viable populations (Scientific Terrestrial Services, 2022). Thus, not developing the proposed solar facility on the identified site, does not guarantee conservation of the site or its associated environmental sensitivities – the land falls within the MR area of Platreef Mine and is not being used for conservation purposes or managed as such. If not used for the proposed Solar PV Project, it is possible the land may be affected by continued overgrazing and mismanagement, potentially resulting in similar environmental impacts as the development proposal, but without implementation of necessary management measures as stipulated in the EMPr for this Project and without realising the same benefits as the development proposal.

Additionally, any positive benefits of the project will also not be realised and will result in the potential impacts stated in the need and desirability section.

PUBLIC PARTICIPATION

The Public Participation Process (PPP) conducted was in line with Chapter 6 of the EIA Regulations (2014) (as amended) to ensure compliance with the requirements in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (as amended) (MPRDA) and the National Environmental Management Act, 1998 (Act No. 107 of 1998) (as amended) (NEMA). The PPP conducted is described in **Section 9** of this report. The Draft Basic Assessment Report and Environmental Management Programme (BA&EMPr) was made available for public review for a period of 30 days, from the 11th of August 2022 to the 9th of September 2022. A public open day was also held during the review period of the Draft BA&EMPr. The comments received and issues raised by Interested and Affected Parties (I&APs) are included in the Comments and Response Register in **ANNEXURE G** of this Final BA&EMPr.

BASELINE ENVIRONMENT

Climate

The climatic conditions for this region comprise average summer temperatures of 24.4°C, with February being the hottest month of the year. The warm season lasts for 6 months i.e., October to March. Average winter temperatures of 13.1°C in July. Precipitation is the lowest in July, with an average of 3 mm. Most of the precipitation occurs in January, averaging 115 mm (Digby Wells Environmental, 2021).

When considering the climate change risks of the overall MR area, Graham. (2021) indicates that hazards such as wildfires are predicted to be at high risk of occurrence in the project location, thus Ivanplats must investigate climate change adaptation strategies such as altering the physical design of

mining operations or infrastructure, implementing business procedures, and altering operating patterns. Furthermore, Graham. (2021) states that in terms of greenhouse gas emissions, the bulk of the emissions impact of the Platreef Project will be electricity consumption and transportation of materials. It must be noted that this report is taking a Life Cycle Assessment (LCA) approach. However, considering that Ivanplats is proposing to develop a solar facility which is renewable energy, it is anticipated that this would reduce any cumulative impacts of greenhouse gas emissions.

Geology

The project area is located on the Northern Limb of the Bushveld Igneous Complex (BIC). The BIC intrudes the Transvaal Supergroup, forming a massive igneous province up to 7 km in thickness, extending over 60 000 km². The BIC is the world's largest layered intrusion and the world's largest source of platinum (Cawthorn, 1999). The BIC is divided into four exposed sections, known as the Eastern, Western, Northern and Southern Limbs. A fifth section, the Bethal Limb, is located under younger sedimentary cover and does not outcrop.

Topography and Drainage

The project area is situated within the Mogalakwena River valley. Mountainous areas run to the east and west of the project area. The project area is relatively flat except for the mountainous area in the north-eastern corner and several isolated ridges. The land within the project area is mainly used for agricultural activities and livestock.

The topographical model indicates that the elevation of the project area increases from 1 028 metres above mean sea level (mamsl.) in the Mogalakwena River floodplain in the south-western corner to 1 747 mamsl. on the ridges in the north-eastern corner of the project area. The majority of the project area has gentle slopes of less than 2.8°. Slopes of between 2.9° and 8.5° occur near the base of the ridges in the north-east of the project area. Moderate slopes of between 8.6° and 16.6° occur at the foot of the ridges. The steepest slopes occur on the ridges and range between 16.7° and 56.6°. The slope aspect / direction of the project area is generally in a westerly and south-westerly direction towards the Mogalakwena River.

Soil Type and Land Capability and Land Use

The entire solar PV areas 1 and 2 are comprised of the Nkonkoni/Vaalbos soil formation, whereas the solar PV area 3 site comprises soils of the Nkonkoni/Vaalbos and Witbank formations. The identified Nkonkoni/Vaalbos soil formation are of moderate (Class III) land capability, and suitable for arable agricultural land use with restrictions. Therefore, these soils are considered able to make a moderate contribution to agricultural productivity on a regional and national scale. Additionally, land potential is categorised as L3, meaning it is of infrequent and/or moderate limitations due to soil, slope, temperatures or rainfall. Appropriate contour protection must be implemented and inspected. The Witbank soil formation has very poor (class VIII) land capability due to the significant disturbance that has occurred as a result of mining activities. This has led to the long-term alteration of the soil physical chemical properties such that these soils are no longer viable for agriculture. These soils are therefore not considered to make a significant contribution to agricultural productivity, even on a local scale.

The current land use activities within the proposed areas are primarily open veld often used for grazing. The land uses in the immediate vicinity of the project area include residential areas along with mining and related activities (Zimpane Research Collaborative, 2022). Livestock overgrazing and trampling has also contributed to erosion in freshwater systems and drainage lines (Digby Wells Environmental, 2021). The establishment of Alien Invasive Plants (AIPs) has resulted in a loss of vegetation integrity due to the decrease in biodiversity associated with the land uses (Scientific Terrestrial Services, 2022).

Surface Water

The project area is situated in the catchment area of the Mogalakwena River and the quaternary catchments A61F and A61G, with the Limpopo Water Management Area (WMA). The Mogalakwena River flows approximately 5 km to the west of the project area and ultimately flows into the Limpopo River. The sub-catchments drainage to the Mogalakwena River is characterised by the presence of non-perennial streams, vleis and wetlands along its drainage course on both the Turfspruit and Macalacaskop farms.

According to Scientific Terrestrial Services (2022a) no watercourses from an ecological perspective were identified within the solar facility development footprint or its associated 500 m investigation area. This site observation confirms the Screening Tool results and the desktop investigation findings. The 1:50 000 topographical maps from 2014 for the 2428 BB Quarter Degree Square (QDS), however, identified preferential surface flow paths within the investigation area. During the site assessment, these were found to no longer be functional, and the linear features no longer existed within the landscape due to the land-use in the area. Where these preferential surface flow paths previously existed, there are isolated patches of damp red soil similar to soils throughout the rest of the investigation area.

Terrestrial Biodiversity (Flora and Fauna)

Field survey results indicate that the project area largely comprises open bushveld where the habitat is in a secondary state of succession (referred to as “Secondary Grassland” in the 2013 Digby Wells Environmental report). Approximately half of Solar Area 3, however, has already undergone vegetation clearance. Historically, the project area was associated with an agricultural land use, which is likely the reason for the “Low” sensitivity produced by the screening tool report.

Flora

Currently, the habitat in the project area is over utilised by livestock (e.g., cattle) which has resulted in large stretches of bare ground. As is typical for historically cultivated lands, the vegetation communities were homogenous and overall, the habitat was sparsely vegetated. Grass species such as *Heteropogon contortus*, *Hyparrhenia hirta* and *Aristida congesta* were often dominant within the graminoid layer (a typical indicator of poor veld conditions).

Thorn trees were sparsely scattered throughout the project area, interspersed with isolated occurrences of broad-leaf species such as *Ziziphus mucronata* and the National Forestry Act (NFA)-protected *Combretum imberbe* and *Sclerocarya birrea* subsp. *caffra*. Forbs were largely absent.

AIP species were restricted to areas of anthropogenic disturbances such as along roads, fences, and historic structures.

Taking into account the presence of poor veld conditions and the historical land use of the project area, it is highly unlikely that floral or faunal species of conservation concern will be able to establish viable populations.

Fauna

Due to the largely lacking vegetation cover, the project area does not provide ideal habitat or food sources to support a diversity of faunal assemblages. The tree component provides perching and nesting habitat for several, albeit common, avifaunal species, and with the seasonal flowers attracting common invertebrates. The project area was noted to be associated with moderate harvester termite (common and widespread species) activity collecting remnant plant material from the cow dung due to lack of vegetation resources. Smaller common rodent species are likely to utilise the habitat in the

project area, whereas larger mammals are less likely to reside (or move through) the project area due to high levels of anthropogenic activities, fences, and possible hunting of such species by local communities. From a faunal perspective, the presence of faunal species of conservation concern within the study area is unlikely given the level of anthropogenic disturbances and the notable lack of suitable habitat.

Socio-Economic Environment

The Platreef MR area, which the solar PV facility is proposed, falls within the jurisdiction of the Waterberg District Municipality (WDM) within the Mogalakwena Local Municipality (MLM). The main town of the MLM is Mokopane, which is located approximately 50 km south west of Polokwane, the capital of the Limpopo Province. The MLM was identified as the primary project area and forms basis of the socio-economic environment.

The MLM has an overall population of approximately 342 684 people and constitutes 46% of the WDM, thus having the highest population in the district. The most prevalent crimes in Mokopane are community-reported serious crimes and drug related crimes. MLM experienced an increase in crime rates from 2017-2020. Over the reviewed period, the LM saw its highest crime levels in 2020 and its lowest crime levels in 2017. The COVID-19 pandemic, which had stringent national lockdown regulations and led to some individuals losing their jobs or income, may have also contributed to the crime levels reported in 2020.

According to Stats SA, (2016) the average disposable income of households in MLM equated to R9 976 per month, in 2017, which was slightly below the average monthly household disposable income in the province but only two-thirds of the average monthly disposable income observed in South Africa. As of 2020, the working-age population (WAP) constituted 56.9% of the MLM's total population, which translates into 194 987 people. over half of the WAP is not economically active (NEA) while just under a third of the WAP is employed. About 18% (\pm 35098 individuals) of the WAP is unemployed while about 7% (\pm 13649 individuals) are employed in the informal sector.

The Gross Value Added (GVA) of the MLM was valued at R15 120.16 million at constant prices for 2020.

Heritage and Archaeological Resources

The project area is situated in a landscape well-known for its Iron Age Farmer and Colonial Period frontier zones. The larger landscape around Mokopane holds a rich history and, besides for the commercially driven heritage assessments previously undertaken in the project area, no particular reference to archaeological sites or features of heritage potential were recorded during an examination of literature specifically related to the Platreef Solar Project area (Heritage Management Consulting, 2022).

A number of Heritage Specialist Assessment Reports were conducted for the Platreef Mining Project and associated developments by Digby Wells Environmental in 2013, PGS Heritage in 2015 and 2016 Van Der Walt and Hutten in 2015 as well as various Ground Radar Penetrating (GRP) scans by PGS Heritage. These studies identified a range of heritage resources in the mining project area and a number of burial sites were documented within the footprint of the proposed Platreef Solar Project area. Some of these sites were assessed and further investigated.

Ten (10) burial sites were previously identified by Heritage specialist within the footprint of the proposed solar PV facility, of these ten (10) sites, four (4) of the burial sites have been relocated successfully while another four (4) of the identified burial sites which has anomalies and later investigated were found not to be burial sites. One (1) burial site (Site 012A-05) which was described as an "undetermined

amount of graves within burial ground” located within a fence was further investigated however the investigations proved to be inconclusive and further exploratory actions is required. Additionally, another burial site (Site“PLR70”) was not included in the Ivanplats or Digby Wells Environmental site inventories, were sampled by means of Ground Penetrating Radar (GPR) by PGS Heritage where the survey found anomalies not consistent with graves and no further action was recommended.

At this stage, it cannot be confirmed whether the two (2) burial sites exist and the potential impact thereof, of particularly Site 012A-05 as GPR scans proved to be inconclusive, as such various recommendations were proposed in the Heritage Memo undertaken by Heritage Management Consulting (2022), which include implementing the chance find procedure.

Visual Aesthetics

Within the 5 km zone of potential influence of the project area, the landscape is characterised by primarily flat to gently sloping plains towards the west and the Mogalakwena River valley, which flows past the western extreme of the project area. the solar PV facility area can be divided into the following landscape types:

- Natural hills in the north and north east;
- Cultivated subsistent farming lands in the southwest, north west, central and south central;
- Dense urban development dominating and scattered across all sectors of the project area; and
- Mining infrastructure associated with the Platreef Mine in the centre of the project area and into which the proposed Project is proposed to be developed.

The sense of place for the project area derives from the local landscape described above and the impact that urban, farming and mining activities have had on the original landscape. The domination of dense urban housing and subsistence farming, impacts the greatest on the senses, although as is observed that the ever-present backdrop of mountains mitigates the negative effects associated with dense urban environments. This is also the case with the mining activities, specifically from elevated viewpoints. The sensitivity of the project area as a scenic resource can be defined as low to moderate, within the context of the sub-region. According to GYLA (2022) the project area is located within a landscape type considered to have a low value due to a minimal landscape that is generally negative in character with few, if any, valued features. Additionally, the landscape type is not sensitive to change in general. The following receptors and viewing areas identified in are potentially sensitive to the proposed development:

- High: Receptors of residential units immediately adjacent to the mine property
- Moderate: People travelling along the N11 and R518 road
- Low: People working or travelling to work in the project area (Mine and related service industries)

IMPACT SIGNIFICANCE RATINGS

Impacts have been rated with the assistance of specialists. The following is a summary of the moderate and high impacts without mitigation (WoM) and With Mitigation (WM). It should be noted that majority of the impacts were rated as low or negligible. The complete list of impacts is included in **Section 14**.

REASONS WHY THE ACTIVITY SHOULD BE AUTHORISED OR NOT

Please refer to **Section 23**. The findings of this BA&EMPr conclude that, provided that the recommended mitigation and management measures are implemented, there are no environmental flaws that, post the recommended mitigation, should prevent the project from continuing.

No	Activity	Potential Impact	Aspect affected	Without or With Mitigation	Nature	Significance	Significance
		Impact				Score	Magnitude
Terrestrial Biodiversity							
Operational and Maintenance Phase							
1	Operation and maintenance of the PV facility	Bird collisions with solar panels and/or transmission lines. PV panels and concentrating solar collectors could present a collision risk to bird and bat species. The extent and significance of these impacts are largely unknown and limited to a small number of studies. Birds and aquatic insects may mistake the flat surfaces of PV panels for water bodies and attempt to land on them. This can risk injury and may be detrimental to certain birds that cannot take off without a water body.	Avifauna	WOM	Negative	44	Moderate
				WM	Negative	28	Low
2	Operation and maintenance of the PV facility	Introduction of AIP species.	Fauna and Flora	WOM	Negative	52	Moderate
				WM	Negative	14	Negligible
3	Operation and maintenance of the PV facility	<ul style="list-style-type: none"> Ongoing loss of floral and faunal habitat beyond the footprint areas resulting from maintenance activities associated with the proposed Solar PV Areas due to 1) poor stormwater management, 2) poor fire management, 3) poor dust management, and 4) potential introduction of AIPs, resulting in altered vegetation communities surrounding footprint areas and loss of faunal food resources; 	Fauna and Flora	WOM	Negative	48	Moderate

No	Activity	Potential Impact	Aspect affected	Without or With Mitigation	Nature	Significance	Significance
		Impact				Score	Magnitude
		<ul style="list-style-type: none"> • Movement of in vehicles resulting in Collisions between operational vehicles and fauna; • Overexploitation through the removal and/or collection of indigenous floral and faunal species by operational and maintenance teams beyond the direct footprint area; and • Spillage/leakage of chemicals, fuel and oils from operational equipment leading to hydrocarbon ingress into the soils affecting plant growth (faunal habitat and food resources) and soil organisms. 		WM	Negative	22	Low
	Freshwater Ecosystem						
	Construction Phase						
4	Site clearing and set up prior to the commencement of construction activities: <ul style="list-style-type: none"> • Vegetation clearing in the development footprint; • .Movement of vehicles to access the footprint resulting in soil compaction; and 	<ul style="list-style-type: none"> • Reduced vegetation cover; • Smothering of the vegetation within regulated zones as a result of increased sediment leading to altered habitat; • Disturbance of soil leading to increased AIP proliferation; • Potential soil and stormwater contamination from oils as well as hydrocarbons from vehicles; 	Freshwater Ecology	WOM	Negative	60	Moderate

No	Activity	Potential Impact	Aspect affected	Without or With Mitigation	Nature	Significance	Significance
		Impact				Score	Magnitude
	<ul style="list-style-type: none"> Placement of contractor laydown and storage facilities 	<ul style="list-style-type: none"> Potential sedimentation of the preferential surface flow paths due to vehicle movement; Potential contamination of the preferential surface flow paths by leaks of oil/hydraulic fluid from equipment; and Smothering of vegetation through rock/soil stockpiling, and the possible creation of habitat for invasive or encroacher pioneer species. 		WM	Negative	28	Low
Soil, Land Use and Land Capability							
Construction Phase							
5	Site clearing and removal of vegetation as part of the construction of the proposed solar facility	Soil erosion: Loosening of soil due to removal of vegetation. Increased runoff, erosion and consequent loss of land capability in cleared areas	Land capability	WOM	Negative	60	Moderate
				WM	Negative	40	Low
6		Soil compaction: Potential frequent movement of digging machinery and construction vehicles within loose and exposed soils, leading to excessive soil compaction	Land capability	WOM	Negative	60	Moderate
				WM	Negative	40	Low
7		Soil contamination: spillage of petroleum hydrocarbons during construction of associated infrastructure. Disposal of hazardous and non-hazardous waste, including waste material spills and refuse deposits into the soil	Land capability	WOM	Negative	48	Moderate
				WM	Negative	40	Low
8		Loss of land capability	Land capability	WOM	Negative	60	Moderate
				WM	Negative	40	Low

No	Activity	Potential Impact	Aspect affected	Without or With Mitigation	Nature	Significance	Significance	
		Impact				Score	Magnitude	
Operational and Maintenance Phase								
9	Operation of the proposed and maintenance of the Solar PV facility and associated infrastructure	Soil Erosion: Constant disturbances of soils, resulting in risk of erosion	Land capability	WOM	Negative	60	Moderate	
				WM	Negative	32	Low	
10		Soil Compaction: Constant disturbances of soils, resulting in risk of compaction	Land capability	WOM	Negative	52	Moderate	
				WM	Negative	32	Low	
11		Soil contamination: Leaching of hydrocarbons chemicals into the soils during vehicular traffic, leading to alteration of the soil chemical status	Land capability	WOM	Negative	48	Moderate	
				WM	Negative	22	Low	
12		Land Capability: Loss of land capability	Land capability	WOM	Negative	65	High	
				WM	Negative	44	Moderate	
Closure and Post Closure Phase								
13		Dismantling of the solar PV facility and associated infrastructure	Soil Erosion: Loosening of soils due to removal of the solar PV facility. Increased runoff, erosion, and consequent loss of land capability in cleared areas.	Land capability	WOM	Negative	60	Moderate
					WM	Negative	32	Low
14			Soil Compaction: Movement of vehicles and machinery during the removal of the solar PV facility.	Land capability	WOM	Negative	60	Moderate
	WM				Negative	32	Low	

No	Activity	Potential Impact	Aspect affected	Without or With Mitigation	Nature	Significance	Significance
		Impact				Score	Magnitude
15		Soil contamination: Spillage of hydrocarbons resulting from leakages from demolition equipment/machinery and other chemical storage facilities, leading to soil contamination (soil chemical characteristics).	Land capability	WOM	Negative	56	Moderate
				WM	Negative	22	Low
16		Land Capability: Potentially poor solar PV removal strategy may result to lower infiltration rate, and consequently increased surface runoff. Increased soil erosion leading to permanent loss of soil resources	Land capability	WOM	Negative	65	High
				WM	Negative	48	Moderate
Socio-Economic							
Construction Phase							
17	Temporary increase in crime associated with the influx of people	Reduced level of security in and around the proposed facility	Socio-Economic	WOM	Negative	44	Moderate
				WM	Negative	14	Negligible
18	Deterioration of quality of life due to dust, noise, visual, and other environmental impacts	Temporary change to the sense of place	Socio-Economic	WOM	Negative	44	Moderate
				WM	Negative	14	Negligible
Operational Phase							
19				WOM	Positive	45	Moderate

No	Activity	Potential Impact	Aspect affected	Without or With Mitigation	Nature	Significance	Significance
		Impact				Score	Magnitude
	Long-term increase in production and GDP in the local economy	Improved household income and increased business sales in the local economy	Socio-Economic	WM	Positive	45	Moderate

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LIST OF ABBREVIATIONS

ABBREVIATION	DESCRIPTION
AC	Alternating Current
AIP	Alien Invasive Plants
BA	Basic Assessment
BIC	Bushveld Igneous Complex
BoQ	Bill of Quantities
CAPEX	Capital Expenditure
CBA	Critical Biodiversity Areas
CISPR	Comité International Spécial des Perturbations Radioélectriques
CSP	Concentrated Solar Power
DC	Direct Current
DEA	Department of Environmental Affairs
DEAT	Department of Environmental Affairs and Tourism
DFFE	Department of Forestry, Fisheries and the Environment
DM	District Municipality
DMRE	Department of Mineral Resources and Energy
DRDLR	Department of Rural Development and Land Reform
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EAPASA	Environmental Assessment Practitioners Association of South Africa
ECA	Environmental Conservation Act (Act 73 of 1989)
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMI	Electro Magnetic Interference
EMPR	Environmental Management Programme Report
EMPr	Environmental Management Programme
GG	Government Gazette
GHG	Greenhouse Gas
GIS	Geographical Information Systems

ABBREVIATION	DESCRIPTION
GLYA	Graham A Young Landscape Architect
GN	Government Notice
GNR	Government Notice Regulation
GPR	Ground Penetrating Radar
GRP	Grave Relocation Project/Process
GVA	Gross Value Added
Ha	Hectare
I&APs	Interested and Affected Parties
IAIAsa	International Association for Impact Assessment
IDP	Integrated Development Plan
IEC	International Electrotechnical Commission
IEM	Integrated Environmental Management
IPILRA	Interim Protection of Informal Land Rights Act (Act 31 of 1996)
IRP	Integrated Resource Plan
Ivanplats	Ivanplats (Pty) Ltd
IWMSA	Institute of Waste Management Southern Africa
IWUL	Integrated Water Use License
kg	Kilogram
kl	Kilolitre
km	Kilometre
kWh	Kilowatt-hour
kWp	Kilowatts peak
LED	Local Economic Development
LEDET	Limpopo Department of Economic Development, Environment and Tourism
LIHRA	Limpopo Heritage Resources Authority
LM	Local Municipality
LoM	Life of Mine
m	Metre
m ²	Square metre
m ³	Cubic metre
MMC	Mogalakwena Mining Communities

ABBREVIATION	DESCRIPTION
MLM	Mogalakwena Local Municipality
mm	Millimetre
MPRDA	Mineral and Petroleum Resources Development Act
MR	Mining Right
MVA	Megavolt-amperes
MW	Megawatt
NBA	National Biodiversity Assessment
NDP	National Development Plan
NEA	Not Economically Active
NEMA	National Environmental Management Act (Act 107 of 1998)
NEMAQA	National Environmental Management: Air Quality Act, 39 of 2004
NEMBA	National Environmental Management: Biodiversity Act (Act 10 of 2004)
NEMLAA4	National Environmental Management Law Amendment Act (Act 2 of 2022)
NEMPAA	National Environmental Management: Protected Areas Act, Act 57 of 2003
NEMWA	National Environmental Management: Waste Act (Act 59 of 2008)
NFA	National Forestry Act (Act 84 of 1998)
NGPF	New Growth Path Framework
NHRA	National Heritage Resources Act (Act 25 of 1999)
NWA	National Water Act (Act 36 of 1998)
OHL	Overhead Powerline
OMI	OMI Solutions (Pty) Ltd
OPEX	Operational Expenditure
PAIA	Promotion of Access to Information Act (Act 2 of 2000)
PAJA	Promotion of Administrative Justice Act (Act 3 of 2000)
PGMs	Platinum-Group Metals
POIA	Protection of Personal Information Act, 2013 (Act 4 of 2013)
PPP	Public Participation Process
PV	Photovoltaic
RFI	Radio Frequency Interference
RMDEC	Regional Mining Development and Environmental Communities
SAHRA	South African Heritage Resources Agency

ABBREVIATION	DESCRIPTION
SPLUMA	Spatial Planning and Land Use Management Act (Act 16 of 2013)
SPP	Solar PV Power
STS	Scientific Terrestrial Services
SUCA	Surface Use and Cooperation Agreements
TopCON	Tunnel Oxide Passivated Contact
TSF	Tailings Storage Facility
UNFCCC	United Nations Framework Convention on Climate Change
WAP	Working-Age population
WDM	Waterberg District Municipality
WISA	Water Institute of South Africa
WP	Wind Power
WRD	Waste Rock Dump
WRI	Weather Radar Installation
WUL	Water Use License
WULA	Water Use License Application
ZoR	Zone of Regulation
ZRC	Zimpande Research Collaborative

PART A

SCOPE OF ASSESSMENT AND BASIC ASSESSMENT REPORT

1 INTRODUCTION

Ivanplats (Pty) Ltd (Ivanplats), a subsidiary of Ivanhoe Mines, is a holder of an existing Mining Right (MR) granted by the Department of Mineral Resources and Energy (DMRE) in 2014 (DMRE Reference No: LP 30/5/2/2/1/10067 MR). The MR was issued for the development of an underground mine, namely the Platreef Mine, on the farms Macalacaskop 243 KR and Turfspruit 241 KR. The mine has a Life of Mine (LoM) of 30 years.

In an effort to reduce its carbon footprint and ensure continued electricity supply for the Platreef operations, Ivanplats proposes to develop a solar photovoltaic (PV) facility, with the associated electrical infrastructure, over three (3) identified areas namely Area 1, Area 2 and Area 3. The proposed solar facility will hereafter be referred to as the 'solar facility'. The solar facility development will be undertaken in a phased approach, commencing with the initial phase being a 3MW power supply from Area 2 and 2MW power supply from Area 3. In total these areas may possibly yield 7MW of electricity supply. Ivanplats plans to upgrade the solar facility to supply up to 19MW of electricity in the future.

OMI Solutions Pty Ltd (OMI) was appointed by Ivanplats to undertake the Environmental Authorisation (EA) application process for the proposed development of the solar facility. In accordance with the Environmental Impact Assessment (EIA) Regulations of 2014 (as amended) promulgated under the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), various activities are triggered under Listing Notice 1 and 3 (published in Government Notices (GN) R983 and GN R985, respectively). As such, a Basic Assessment (BA) process needs to be followed to facilitate the EA application.

This Final Basic Assessment and Environmental Management Programme Report (BA&EMPr) aims to provide mitigation measures and environmental specifications required for implementation during the Construction, Operational and Decommissioning phases of the proposed project.

2 CONTACT PERSON AND CORRESPONDENCE ADDRESS

2.1 DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER¹²

OMI Solutions (Pty) (Ltd) (OMI) assigned the environmental assessment practitioners listed in **Table 1** to undertake the required environmental authorisation process.

¹ Required as per the EIA regulations Appendix 2: 1. (a) details of- (i) details of-(i) the EAP who prepared the report; and (ii) the expertise of the EAP, including a curriculum vitae

² Environmental Assessment Practitioner, registered with Environmental Assessment Practitioners Association of South Africa (EAPASA)

Table 1: Project Team Details

Consultant Name	Designation	Email
Chantal Uys	Assistant Director Operations	chantal@omisolutions.co.za
Reneé Kruger	Assistant Director Environmental Licensing	renee@omisolutions.co.za
Nosipho Makaya	Environmental Assessment Practitioner	nosipho@omisolutions.co.za

2.2 EXPERTISE OF THE EAP

2.2.1 THE QUALIFICATIONS OF THE EAP

A summary of the EAP project team is provided in **Table 2** below, whilst the curricula vitae of the independent EAPs that have compiled this report are included in **ANNEXURE A**.

Table 2: Summary of the Details of the Team Who Compiled the Report

Name	Designation	Input into Project	Qualifications & Professional Registrations
Chantal Uys	Assistant Director Operations	Report writing, EAP review, specialist management, authority liaison, and input into public participation process	BHCS (Hons) Archaeology, Pretoria University Post Grad Certificate: Environmental Management, North West University Post Grad Certificate: Geographical Information Systems, University of Pretoria Reg. EAP (EAPASA): 2019/2017 IAISA Membership: 5608
Reneé Kruger	Assistant Director Environmental Licensing	Quality Assurance Review	M Environmental Management, North West University Pr.Sci.Nat. (SACNASP): 115667 Reg. EAP (EAPASA): 2019/854 Environmental Law Association Member IAISA Membership: 6444 IAISA NEC Member
Nosipho Makaya	Environmental Assessment Practitioner	Report writing, specialist report review, authority liaison, and facilitating public participation process	MSc Environmental Science, University of KwaZulu-Natal Cand. EAP (EAPASA): 2019/365 IAISA Membership: 4003 IWMSA Membership: 10120040

2.2.2 SUMMARY OF THE EAP'S PAST EXPERIENCE

A brief description of the EAP's project team experience is provided below. Additionally, a company profile with summary information of the OMI team's qualifications and experience is included in **ANNEXURE B**.

2.2.3 ASSISTANT DIRECTOR OPERATIONS

Chantal Uys is an Environmental Assessment Practitioner and has been working in the environmental management field since 2008. She has an Honours degree in Archaeology from the University of Pretoria; subsequent to this degree she completed qualifications in Geographical Information Systems (UP) and Environmental Management (NWU). She is experienced in the facilitation of Environmental Authorisation processes and the compilation of Environmental Management Programmes. Chantal is registered as an Environmental Assessment Practitioner with the Environmental Assessment Practitioners Association of South Africa (EAPASA). She is also a voluntary member of the International Association for Impact Assessment South Africa (IAIASa).

She has experience in various other environmental authorisation processes such as Mining Right Applications, Water Use Licensing, Waste Management Licensing and assisting with Atmospheric Emission Licence Applications. She is also experienced in Geographical Information Systems (GIS) Mapping, Environmental and Legal Compliance Audits, compiling Integrated Waste and Water Management Plans, public participation processes and project management. Her project experience is extensive in scope and covers all aspects of development from structures, roads, dams, bridges, bulk water and sewerage services to industrial, residential, and mining developments. She has project experience in South Africa as well as other African countries.

2.2.4 ASSISTANT DIRECTOR ENVIRONMENTAL LICENSING

Reneé Kruger has a Master's degree in Environmental Management from North-West University. Preceding this Degree, she obtained a BSc Honours Geography and Environmental Management and BSc in Geography and Zoology. She is registered as an Environmental Assessment Practitioner at EAPASA and registered as a Professional Natural Scientist with SACNASP. Reneé is also a voluntary member of the International Association for Impact Assessment South Africa (IAIASa). Her Master's thesis was based on the quality of EIA reports within the filling station sector out of her passion for quality EIA's for a sustainably operated environment.

She has over 15 years' experience working as an Environmental Assessment Practitioner conducting and implementing the Environmental Impact Assessment Process throughout all phases – specializing in residential, mine, industrial and commercial developments. Her experience also includes water and waste licence applications, integrated waste and water management plans and also assisting with atmospheric emissions licenses. She has extensive experience in conducting public participation processes and liaison with government departments. Furthermore, her experience is complemented with geographic information systems (GIS) skills, project management and various mining implementation projects.

2.2.5 ENVIRONMENTAL ASSESSMENT PRACTITIONER

Nosipho Makaya holds a Master's degree in Environmental Science from the University of KwaZulu-Natal; subsequent to obtaining this degree she completed qualifications in Geography and Environmental Management at the University of KwaZulu-Natal. She is currently registered as a Candidate Environmental Assessment Practitioner with the Environmental Assessment Practitioners Association of South Africa (EAPASA) and is a voluntary member of the International Association for Impact Assessment, South Africa (IAIASA) as well the Institute of Waste Management Southern Africa (IWMSA).

Nosipho has over 4 years' of applied research and consulting experience in the Integrated Environmental Management Field. She is experienced in the facilitation of Environmental Authorisation processes and the compilation of Basic Assessment and Scoping & Environmental Impact Reporting as well as Environmental Management Programme Reports. She also has experience in undertaking Water Use Licence Applications, Waste Management Licence Applications, Environmental Compliance Audits, compiling Integrated Water and Waste Management Plans, Watercourse Rehabilitation Plans, Stakeholder Engagements & Public Participation Process, GIS Mapping and Project Management. Her project

experience covers all aspects of development from Mining, Renewable Energy, Industrial and Residential developments.

3 DESCRIPTION OF THE PROPERTY³

3.1 LOCATION OF OVERALL ACTIVITY

The proposed solar facility (hereafter referred to as the “project area”) is located on portion 0 of the Farm Turfspruit 241 KR, within the MR area of the Ivanplats Platreef Mine, which is situated on the farms Turfspruit 241 KR and Macalacaskop 243 KR; and the Remaining Extent (RE) of farm Rietfontein 2 KS.

The project area is situated approximately 12 km north west of the town of Mokopane, within the Mogalakwena Local Municipality (MLM) which is located within the Waterberg District Municipality (WDM) of the Limpopo Province. The project area is situated within a peri-urban setting, surrounded by various villages namely, Ga-Magongoa located on the northern boundary area of the farm Turfspruit and Ga-Kgabadi located to the west. Large parts of the farm Macalacaskop are built up with the communities of Lekwalakala, Madika and Maroelereng. The Tshamahansi village is situated on the north eastern portion of the project area on the boundary between the farms Turfspruit and Rietfontein. The portion of the Tshamahansi village situated on the farm Rietfontein is also the only village on this farm. Details of the project area are presented in **Table 3** below.

Site photos taken from the centre of the project area in the (eight) 8 cardinal directions is presented in **Figure 4**, with the A3 size provided in **ANNEXURE Q**.

Table 3: Details of the Project Area

Farm Name:	Farm portions: Portion 0 of the Farm Turfspruit 241 KR
Application Area (ha):	Mining Right Area: Approximately 7 841.265 ha Proposed Solar Facility Area: Approximately 19.59 ha
Magisterial District:	Mogalakwena Local Municipality within the Waterberg District Municipality.
Distance and Direction from Nearest Town	The Ivanplats Platreef Mine is situated approximately 12 km north west of Mokopane along the N11 opposite the village of Tshamahansi in the Limpopo Province.
21-Digit Surveyor General Code for Each Farm Portion	Portion 0 of the Farm Turfspruit 241 KR <ul style="list-style-type: none"> • T0KR00000000024100000

Surface rights over the Farm Turfspruit 241 KR are owned by the South African Government and held in trust for the respective communities. Ivanplats entered into Surface Use and Cooperation Agreements (SUCAs) with the leadership of the following communities, amongst others, on whose land Ivanplats’ mining activities are taking place: For the purposes of this EA application, only the directly affected village (Tshamahansi) has been referred to herein (**Table 4**).

³ Required as per the EIA regulations Appendix 2: (b) the location of the activity, including-(i) the 21-digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name; (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;

Table 4: Relevant Surface Right Ownership

Portion and Farm Name	Surface Right Ownership as per SUCA	Date of Agreement
Portion 0 of the Farm Turfspruit 241 KR	Tshamahansi Village (comprised of Baloyi, Matjeke and Hlongwane communities).	1 April 2010

3.2 LOCALITY MAP⁴

The regional locality map is shown in **Figure 1**, while the 1:50 000 topographic locality map is shown in **Figure 2** and the relevant property map is shown in **Figure 3**. A3 size maps are provided in **ANNEXURE E**.

⁴ Required as per the EIA regulations Appendix 2 (c): a plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is-(i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;

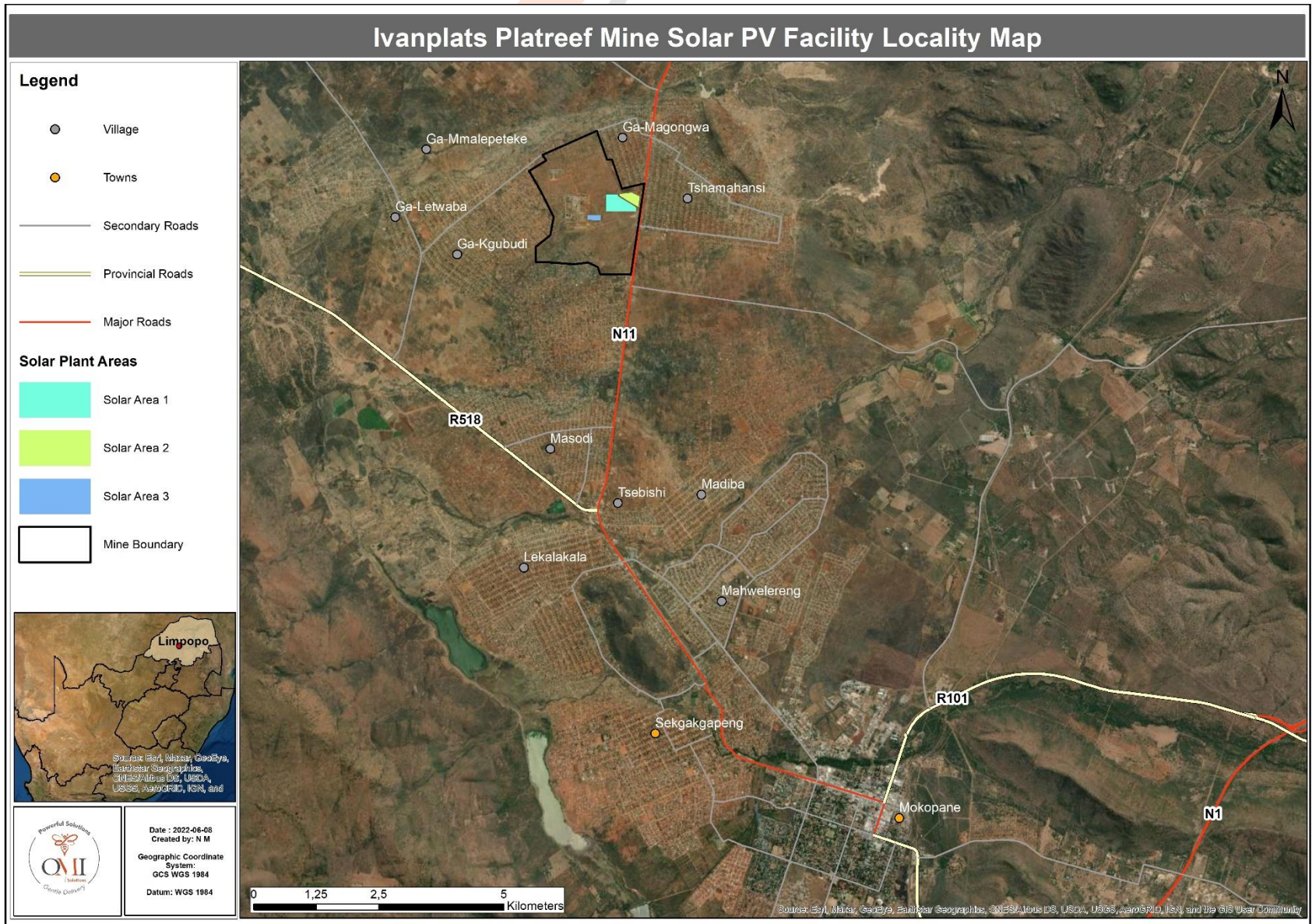


Figure 1: Regional Locality Map of the Proposed Solar PV Facility

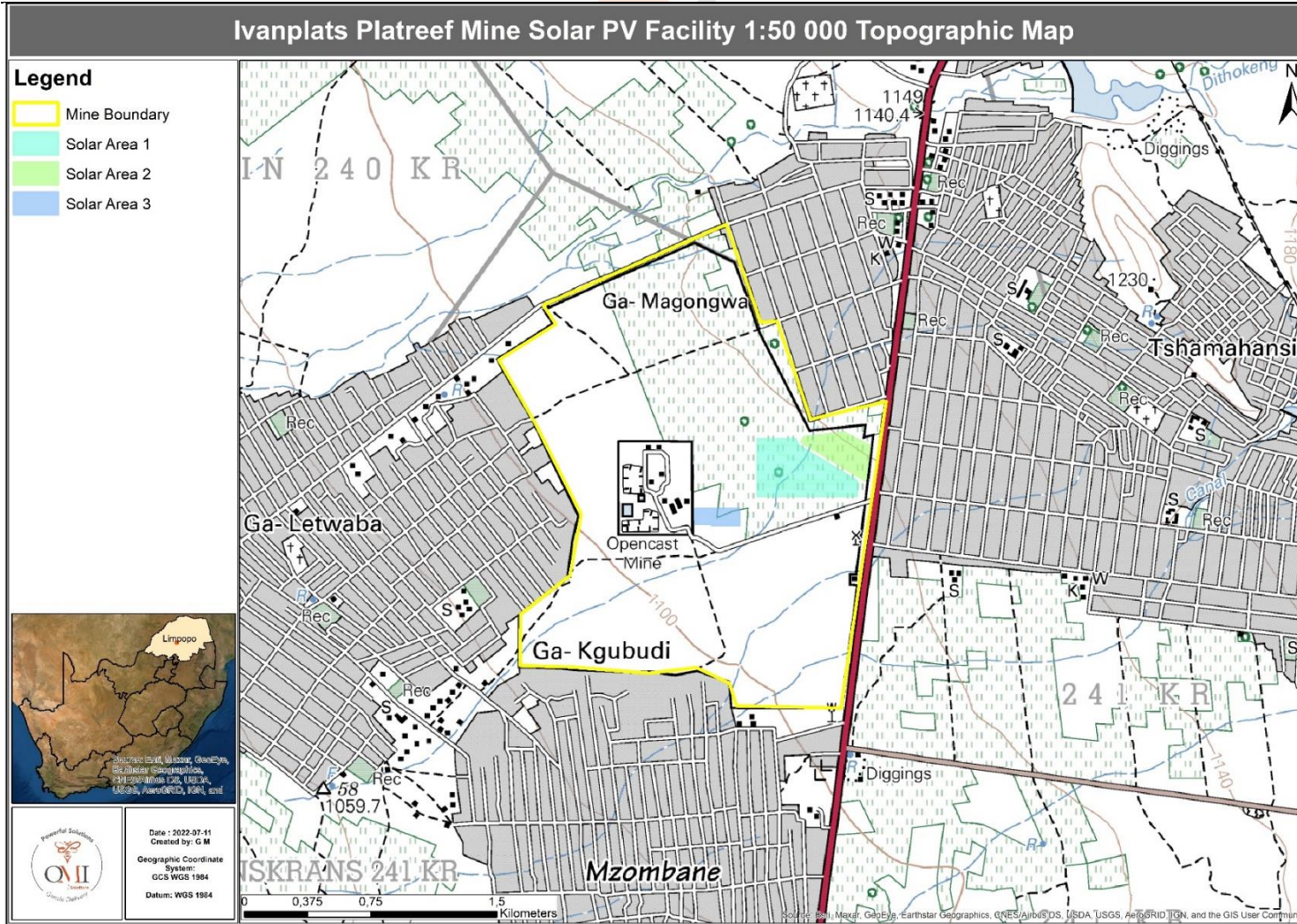


Figure 2: 1:50 000 Topographical Map of the Proposed Solar PV Facility⁵

⁵ Please note that the Ivanplats Platreef Mine is not an Opencast Mine as per the 1:50 000 topographical map but an underground mine

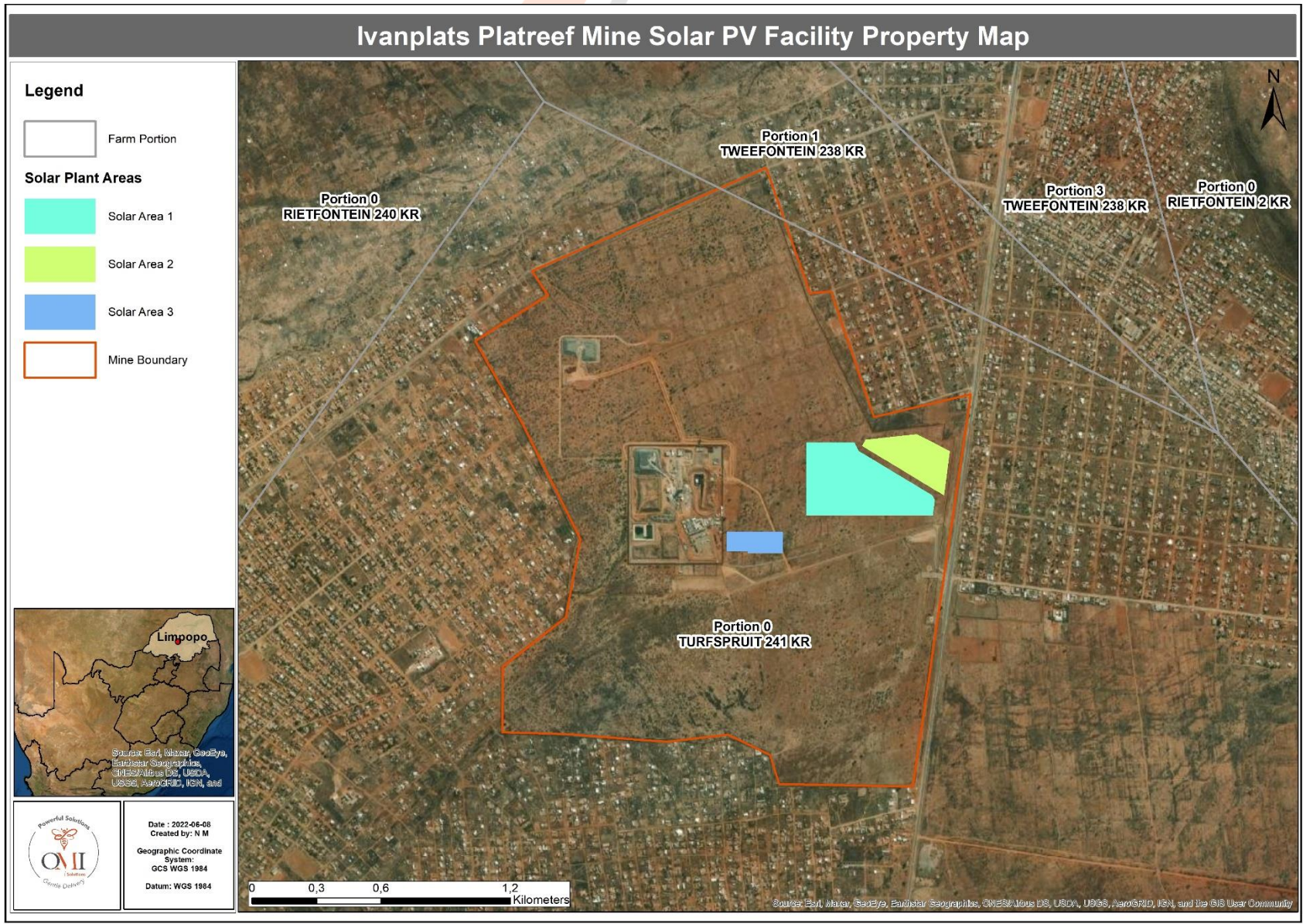


Figure 3: Property Map of the Proposed Solar PV Facility

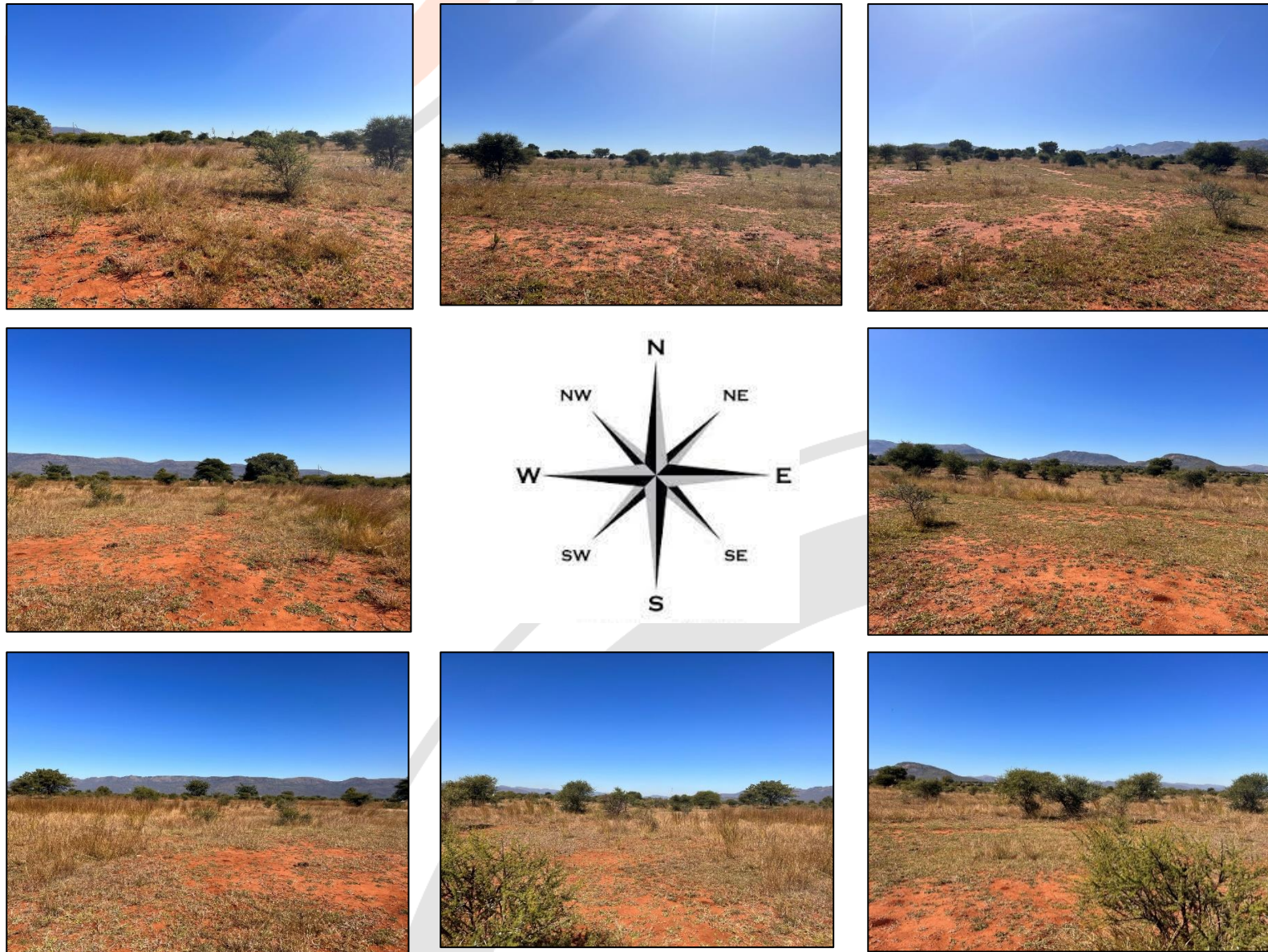


Figure 4: Photographs from the Centre Point of the Project Area In the 8 Cardinal Directions

4 DESCRIPTION OF THE SCOPE OF THE PROPOSED OVERALL ACTIVITY⁶

4.1 EXISTING AUTHORISATIONS

Ivanplats received its first EA granted by the Limpopo Department of Economic Development, Environment and Tourism (LEDET) on 27 June 2014. Since then, the following amendments have been issued:

- An amendment EA issued on 19 September 2014 (Ref. No.: 12/1/9/2-W32).
 - The amendment entailed allowing pipelines to cross wetlands and watercourses from the Tailing Storage Facility(ies) (TSFs);
 - The inclusion of the need for an annual inspection of the conveyor belt; and
 - Amendment to the wording of various authorisations.
- An amendment EA issued on 30 July 2015 (Ref. No.: 12/1/9/2-W32) in respect of the TSF to be located on the farm Rietfontein 2 KS.
- An amendment EA issued on 18 June 2018 (Ref. No.: LP 30/5/1/2/3/2/1 [10067] EM) in respect to the inclusion of a second shaft and associated infrastructure, as well as the amendment of the EMPr.
- Integrated Water Use Licence (IWUL) (Licence No: 07/A61G/GCJAIBF/6975) issued by the Department of Water and Sanitation (DWS) on 9 March 2017 and amended on 2 September 2021.
- A Waste Management License issued on 13 March 2015 (Ref No: 12/9/11/L1224/5) and amended on 07 November 2019.

4.2 REQUIRED AUTHORISATIONS

Before Ivanplats may commence with the commissioning of the proposed solar facility, the following EA and licence must be approved in accordance with the relevant national legislation:

- An application for EA in terms of the NEMA; and
- A Water Use Licence (WUL) in terms of the National Water Act, Act 36 of 1998 (NWA) for Section 21(c) & (i) water uses. It should be noted that the relevant water uses triggered by the proposed solar facility have been included in the application for the amendment of the existing IWUL.

4.3 LISTED AND SPECIFIED ACTIVITIES

Activities listed in the NEMA EIA Regulations, 2014 (as amended)⁷ Listing Notices 1-3,⁸ require authorisation prior to commencement of the activities. The Listed Activities which will require authorisation in terms of the NEMA for the proposed solar facility, are shown in **Table 5**.

⁶ Required as per the EIA regulations Appendix 2: (d) a description of the scope of the proposed activity, including (i) all listed and specified activities triggered; (ii) a description of the activities to be undertaken, including associated structures and infrastructure;

⁷ GN R982 of 4 December 2014 as amended by GN R326 of 7 April 2017, GN 706 of 13 July 2018, GN 599 of 29 May 2020 and GN 517 of 11 June 2021.

⁸ GN R983, GN R 984 and GN R985 in GG 38282 of 4 December 2014.

Table 5: Listed Activities Triggered In the 2014 NEMA EIA Regulations (As Amended)

Name of Activity	Aerial Extent of the Activity Ha or m ²	Applicable Listing Notice	Description of Listed Activity
19MW Solar PV Facility	19.59 ha	Activity 1 of Listing Notice 1 (GN R983 of 4 December 2014 as amended in GNR 517 of 11 June 2021)	<p>The development of facilities or infrastructure for the generation of electricity from a renewable resource where-</p> <ul style="list-style-type: none"> (i) the electricity output is more than 10 megawatts but less than 20 megawatts; or (ii) <u>the output is 10 megawatts or less but the total extent of the facility covers an area in excess of 1 hectare;</u> <p>excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs-</p> <ul style="list-style-type: none"> (a) within an urban area; or (b) on existing infrastructure.
	19.59 ha	Activity 12 of Listing Notice 1 (GN R983 of 4 December 2014 as amended in GNR 517 of 11 June 2021)	<p>The development of—</p> <ul style="list-style-type: none"> (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or (ii) <u>infrastructure or structures with a physical footprint of 100 square metres or more;</u> <p>where such development occurs—</p> <ul style="list-style-type: none"> (a) within a watercourse; (b) in front of a development setback; or (c) <u>if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; —</u> <p>excluding—</p>

Name of Activity	Aerial Extent of the Activity Ha or m ²	Applicable Listing Notice	Description of Listed Activity
			<p>(aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;</p> <p>(bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies;</p> <p>(cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies;</p> <p>(dd) where such development occurs within an urban area;</p> <p>(ee) where such development occurs within existing roads, road reserves or railway line reserves; or</p> <p>(ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared.</p>
	19.59 ha	Activity 67 of Listing Notice 1 (GN R983 of 4 December 2014 as amended in GNR 517 of 11 June 2021)	<p>Phased activities for all activities—</p> <p>(i) listed in this Notice, which commenced on or after the effective date of this Notice or similarly listed in any of the previous NEMA notices, which commenced on or after the effective date of such previous NEMA Notices; excluding the following activities listed in this Notice:</p> <p>17(iv)(a-d);</p> <p>17(v)(a-d);</p> <p>20;</p> <p>21;</p> <p>22;</p> <p>24(i);</p>

Name of Activity	Aerial Extent of the Activity Ha or m ²	Applicable Listing Notice	Description of Listed Activity
			29; 30; 31; 32; 34; 54(i)(a-d); 54(ii)(a-d); 54(iii)(a-d); 54(iv)(a-d); 54(v)(a-d); 55; 61; 64; and 65; or (ii) listed as activities 5, 7, 8(ii), 11, 13, 16, 27(i) or 27(ii) in Listing Notice 2 of 2014 or similarly listed in any of the previous NEMA notices, which commenced on or after the effective date of such previous NEMA Notices;
	19.59 ha	Activity 14 of Listing Notice 3 (GNR 985 of 4 December 2014 as amended in GNR 517 of 11 June 2021)	The development of- (i) dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 10 square metres; or (ii) <u>infrastructure or structures with a physical footprint of 10 square metres or more;</u> where such development occurs-

Name of Activity	Aerial Extent of the Activity Ha or m ²	Applicable Listing Notice	Description of Listed Activity
			<p>(a) within a watercourse;</p> <p>(b) in front of a development setback; or</p> <p>(c) <u>if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;</u></p> <p>excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.</p> <p>e. Limpopo</p> <p>i. Outside urban areas:</p> <p>(aa) A protected area identified in terms of NEMPAA, excluding conservancies;</p> <p>(bb) National Protected Area Expansion Strategy Focus areas;</p> <p>(cc) World Heritage Sites;</p> <p>(dd) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;</p> <p>(ee) Sites or areas identified in terms of an international convention;</p> <p>(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</p> <p>(gg) Core areas in biosphere reserves;</p> <p><u>(hh) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve;</u></p> <p>ii. Inside urban areas:</p>

Name of Activity	Aerial Extent of the Activity Ha or m ²	Applicable Listing Notice	Description of Listed Activity
			(aa) Areas zoned for use as public open space; or (bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority, zone for a conservation purpose;
Clearance of indigenous vegetation ⁹ for the solar facility and associated infrastructure	19.59 ha	Activity 27 of Listing Notice 1 (GN R983 of 4 December 2014 as amended in GNR 517 of 11 June 2021)	The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for- <ul style="list-style-type: none"> (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.
Overhead Powerline	11kV	Not listed	

⁹ Indigenous vegetation (as per the definition in NEMA) is: "vegetation occurring naturally within a defined area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years".

5 DESCRIPTION OF THE ACTIVITIES TO BE UNDERTAKEN

Ivanplats proposes to develop a 19MW solar facility and associated infrastructure within the Platreef Mine, located approximately 12 km north west of Mokopane along the N11 opposite the village of Tshamahansi in the Limpopo Province. In an effort to reduce its carbon footprint and ensure continued electricity supply for the Platreef operations, Ivanplats proposes to develop a solar facility, and the associated electrical infrastructure, over three (3) identified areas namely Area 1, Area 2 and Area 3 (**Figure 6**). The solar facility development will be undertaken in a phased approach, commencing with the initial phase being a 3MW power supply from Area 2 and 2MW power supply from Area 3. In total these areas may possibly yield 7MW of electricity supply. Ivanplats plans to upgrade the solar facility to supply up to 19MW of electricity in the near future. Construction is estimated to take approximately 10 months, with the operational phase being in line with the LoM.

Area 3 has been identified as a parking area and will have solar panels mounted on the roof of carports. Area 2 will comprise of fixed structures anchored to the ground and mounted with the latest N-type TopCON, bi-facial, double glass solar modules. In total, the solar facility will encompass an area of 19.59 hectares and will be used to generate power for private consumption at the mine operations.

An A3 size conceptual layout map of the proposed solar activities is provided in **ANNEXURE F**.

5.1 TECHNICAL DESCRIPTION

The main components of the solar PV facility will include the following:

- PV modules, which convert solar radiation into direct current (DC).
- The fixed mounting structures, which supports the PV modules.
- Central inverters, which convert DC from solar field to alternating current (AC).
- Power Transformers, which raise the voltage level from low to medium.
- Power Stations, which hold the necessary equipment to convert the DC power to AC.
- Platreef grid connection infrastructure - the solar facility will connect to the existing Platreef 8 megavolt-amperes (MVA) substation. The power corridor will comprise dual-circuit overhead powerlines (OHL), approximately 500 m in length, at a voltage level of 11kV, connecting from two (2) inverters.

The design specification of the solar PV facility is summarised in **Table 6** below:

Table 6: Summary of the solar plant design specifications

Platreef Solar PV Facility Panel Specifications	
Contracted Capacity (AC)	19MW
Cell	Mono
Weight per panel	31.8kg
Dimensions per panel	2278±2mm x 1134±2mm x 35±1mm
Number of cells	144 (6x24)
PV module type	N-type Tunnel Oxide Passivated Contact (TopCON), bi-facial, glass-glass solar modules
Number of modules	Approximately 37 200
Plant Transformer rating	18MVA/11kV

Platreef Solar PV Facility Panel Specifications

Plant grid interconnection voltage	11kV
Planned grid interconnection	Approximately 500 m 11kV OHL to existing 8MVA Substation

The structures that will be erected on Area 2 will be fixed structures. A preliminary design is provided in **Figure 5** and will be finalised based upon the soil conditions. The design may also change based on the final approved layout.

The solar panels that will be used for Area 3 are the same as for Area 2, but the mounting structures will vary somewhat from the initial design.

The fixed structures will establish the orientation and inclination of the modules, as well as the separation between the rows. The structures will be composed of the following elements:

- A mounting structure formed by different types of metallic profiles.
- Foundation elements for anchoring the structure to the ground.
- Clamping elements and screws to assemble the structure and for mounting the modules on the structure.
- Structural reinforcement elements.

The planned structures will be 6.4 m apart. This will leave ample space for vehicles to drive between the rows. A minimum height of 1.25 m at the lowest point will apply.

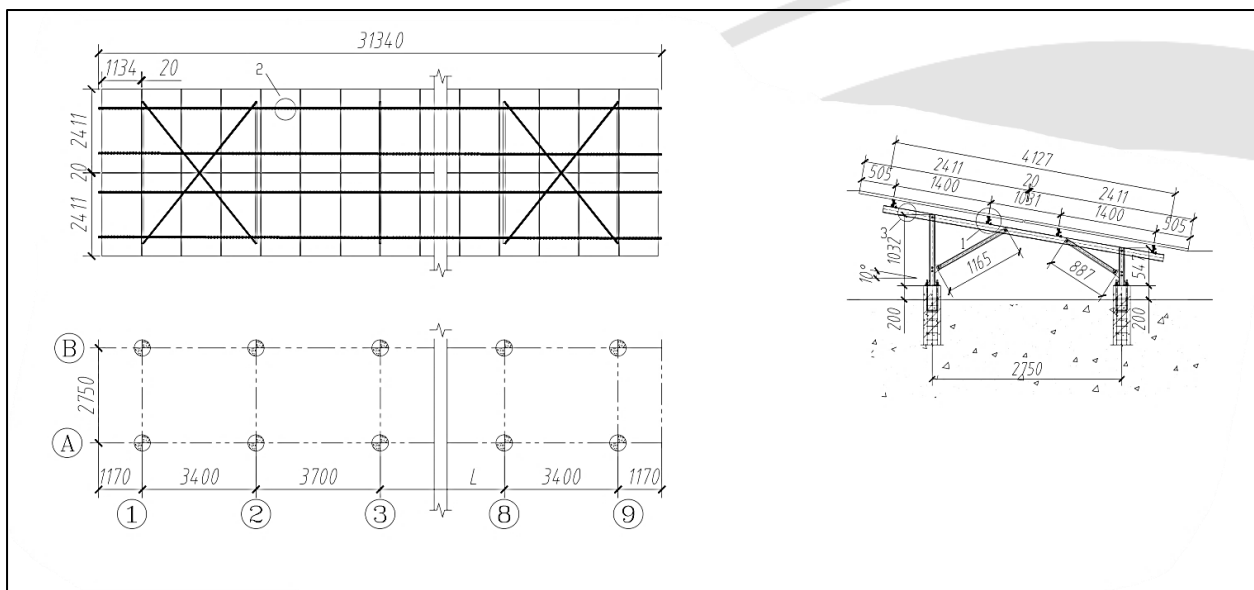


Figure 5: Basic Design of Fixed Structure (ABB South Africa (Pty) Ltd, 2022)

A conceptual layout drawing of the solar PV facility is provided in **ANNEXURE F**.

5.2 ASSOCIATED INFRASTRUCTURE

5.2.1 POWER SUPPLY

String Combiner Boxes

The string boxes collect the power generated by the DC array, connect the strings in parallel to the inverter, and provide electrical protection to the PV field. To match the number of inputs of the inverters, several parallel strings will be concentrated to function as a single circuit.

Additionally, a communication system will be installed to monitor the string current and voltage. The string boxes will be installed in a shaded area and shall be easily accessible to facilitate maintenance.

Cabling

The goal when calculating the characteristics of the electrical wiring is to minimise the cable lengths and sections. The sections are selected according to the International Electrotechnical Commission (IEC) 60364-5-52 and IEC 60502-2 standards. When selecting a cable cross section, the current carrying capacity, the voltage drop, and the short circuit current were considered. A summary of the selected cable sections and the respective installation method is shown below:

Table 7: Summary of selected cable sections and respective installation methods (ABB South Africa (Pty) Ltd, 2022)

Section	Conducting Material	Insulating Material	Installation Type
Strings to string box			
6 mm ²	Cu	XLPE	Fastened to structure
10 mm ²	Cu	XLPE	Fastened to structure
String box to Inverters			
185mm ²	Al	XLPE	Buried in trench
300mm ²	Al	XLPE	Buried in trench
PS to MV switchgears			
150mm ²	Al	XLPE	Buried in trench

Overhead Powerline

Two (2) inverters will be established at each solar area, from which an 11kV dual-circuit OHL, approximately 500 m in length, will be required to connect the proposed solar facility to the existing 8MVA substation on site. The proposed powerline routes are indicated as yellow lines in **Figure 6** below.

5.2.2 WATER PROVISION

The project will require water to facilitate both the construction and operational phases of the solar facility. Water will be sourced from the existing mine boreholes and/or treated wastewater and stored in water storage dams on site. During construction, a minimal amount of water may be required to install concrete slabs and footings to secure the tracking decks. It is estimated that approximately 10 kilolitres (KI) of water a week will be required to wash the solar panels during the operational phase. This equates to 520 m³ water per annum. Ivanplats will make use of water bowsers on site to transport water to the solar facility.

Construction and operational personnel will make use of on-site potable water for drinking and sanitation purposes.

5.2.3 SECURITY AND ACCESS

No new access roads are proposed for the facility. The facility will make use of those roads already authorised for the mine. Site access will be gained from the N11 running adjacent to the Platreef Mine.

A fence around the facility will be installed for security purposes. Platreef Mine plans to establish a control room which will serve the entire mine boundary, including the solar facility. Additionally, the mine will also have permanent security patrolling the site.

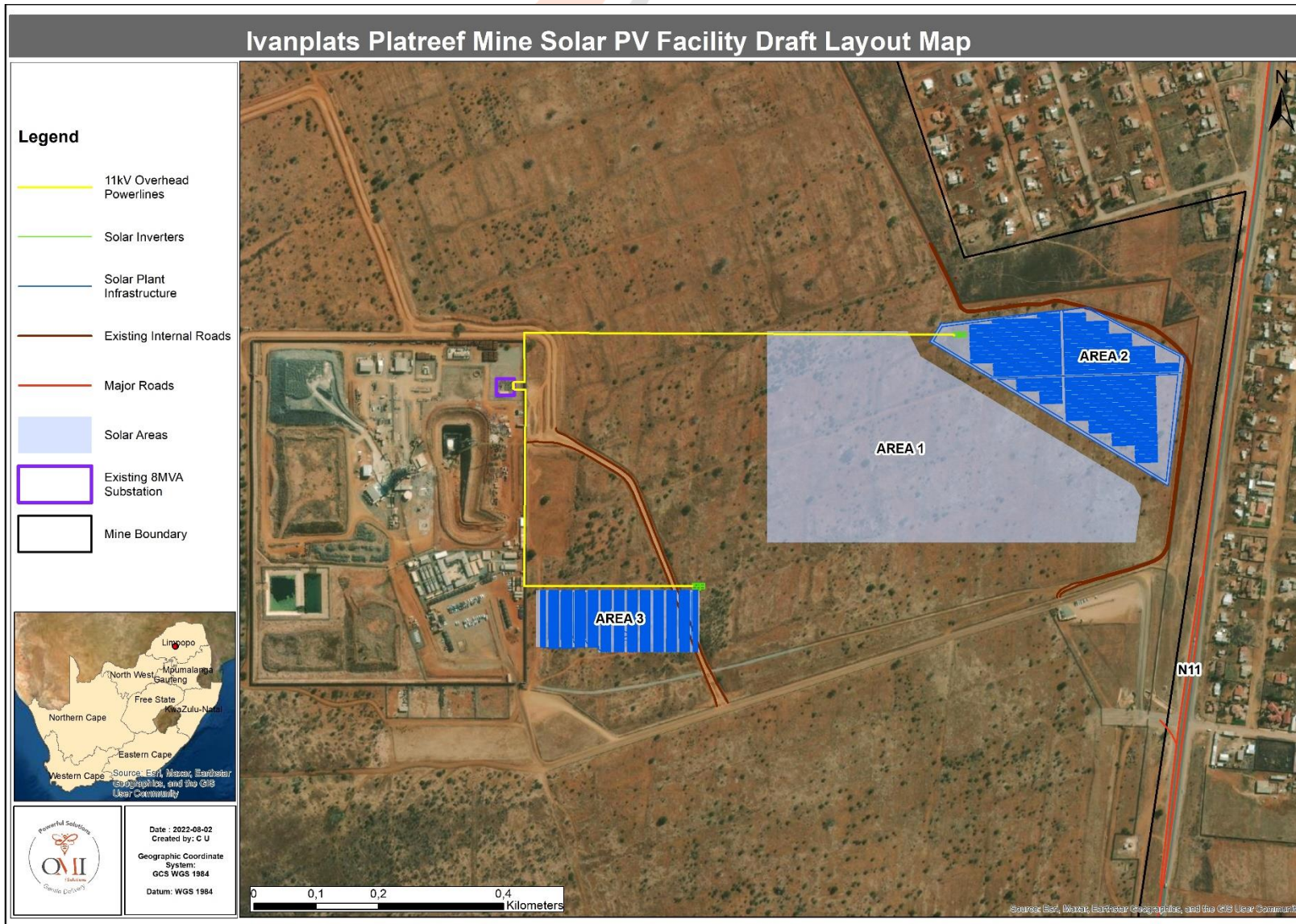


Figure 6: Conceptual Layout of the Proposed Solar PV Facility (Refer to ANNEXURE F for A3 Format)

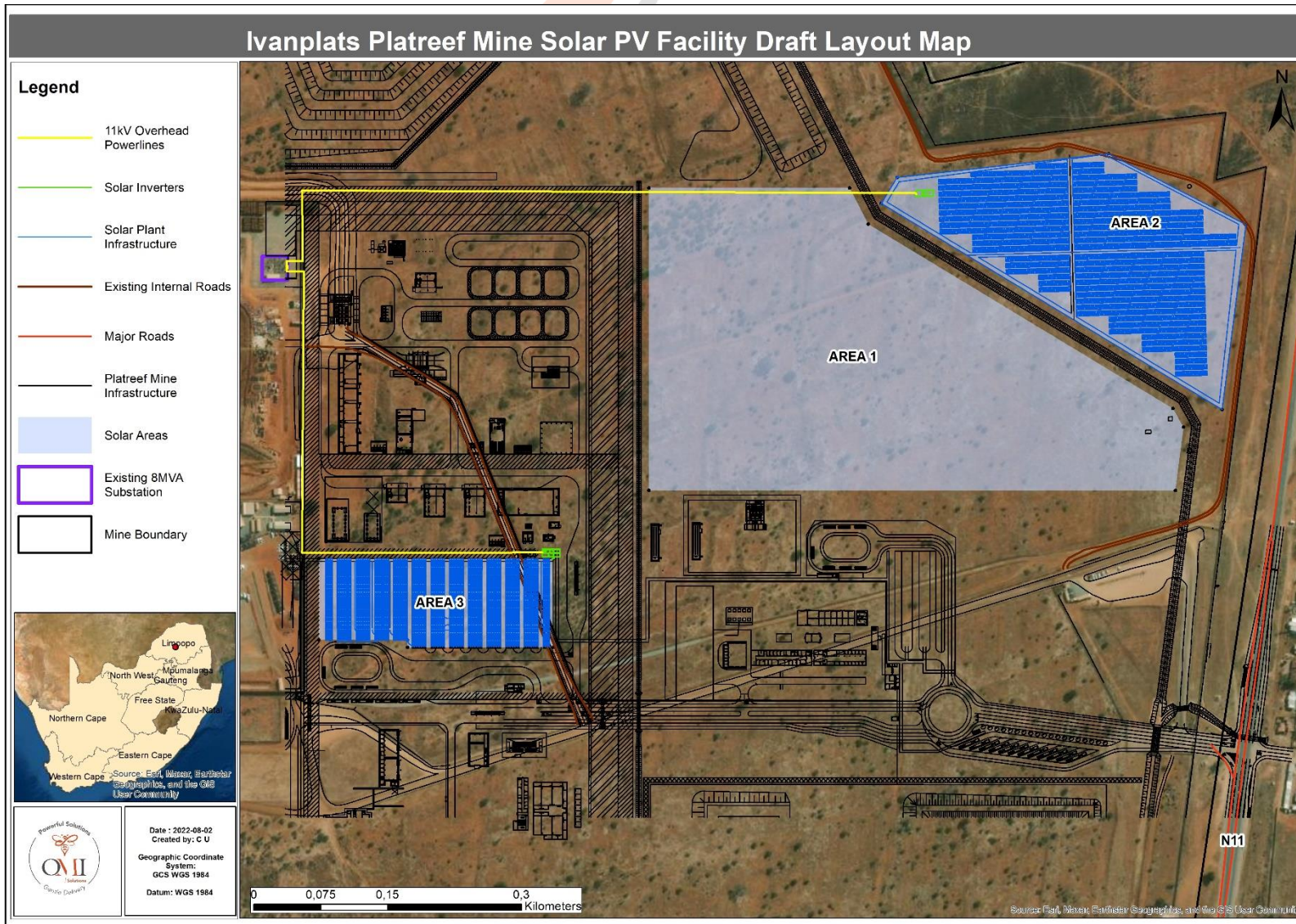


Figure 7: Conceptual Layout of the Proposed Solar PV Facility in relation to the Platreef Mine Infrastructure (Refer to ANNEXURE F for A3 Format)

6 POLICY AND LEGISLATIVE CONTEXT¹⁰

Table 8 summarises some of the important legislative requirements for this assessment:

Table 8: Legislative and Policy Context

Applicable Legislation and Guidelines Used to Compile the Report	Explanation of How It Has Been Applied
The Constitution of the Republic of South Africa (Act 108 of 1996)	This report was accordingly prepared, submitted and considered within the constitutional framework set by inter alia section 24 and 33 of the Constitution.
National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) <ul style="list-style-type: none"> • Environmental Impact Assessment (EIA) Regulations, 2014 (GN R982 of 2014, as amended in June 2021)¹¹ • EIA Regulations Listing Notice 1 of 2014 (GN R983 of 2014, as amended)¹² • EIA Regulations Listing Notice 2 of 2014 (GN R984 of 2014, as amended)¹³ • EIA Regulations Listing Notice 3 of 2014 (GN R985 of 2014, as amended)¹⁴ 	An application for Environmental Authorisation in line with the provisions contained in the EIA Regulations 2014 (as amended in 2017) was submitted to the Department of Mineral Resources and Energy: Limpopo Region (DMRE) on the 15 th of June 2022, in terms of section 24 of the NEMA for consideration. The activities specified above in Table 5 were identified as being applicable to the solar development. The need and desirability of the project is addressed in Section 7 . Specialist protocols have been applied in the respective specialist assessments. The Draft Basic Assessment and Environmental Management Report (BA&EMPr) was distributed for public review for a period of 30 days as part of the EIA process.

¹⁰ Required as per the EIA regulations Appendix 2 (e) a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process;

¹¹ GN R982 of 4 December 2014 as amended by GN R326 of 7 April 2017, GN 706 of 13 July 2018, GN 599 of 29 May 2020 and GN 517 of 11 June 2021.

¹² GN R983 in GG 38282 of 4 December 2014 as amended by GN R327 in GG 40772 of 7 April 2017, GN 706 in GG 41766 of 13 July 2018 and GN 517 in GG 44701 of 11 June 2021.

¹³ GN R984 in GG 38282 of 4 December 2014, as amended by GN R325 in 40772 of 7 April 2017 and GN 517 in GG 44701 of 11 June 2021.

¹⁴ GN R985 in GG 38282 of 4 December 2014, as amended by GN R324 in 40772 of 7 April 2017, GN 706 in GG 41766 of 13 July 2018 and GN 517 in GG 44701 of 11 June 2021.

Applicable Legislation and Guidelines Used to Compile the Report	Explanation of How It Has Been Applied
<ul style="list-style-type: none"> Financial Provisioning Regulations, 2015 (GN R1147 of 2015 as amended)¹⁵ DEA (2017), Guideline on Need and Desirability, Department of Environmental Affairs Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Section 25(5)(a) and (h) and 44 of the National Environmental Management Act, 1988, when applying for Environmental Authorisation (GN 320 of 2020)¹⁶ 	
<p>Department of Environmental Affairs, Pretoria, South Africa.</p> <ul style="list-style-type: none"> Department of Environmental Affairs (2017), Public Participation guideline in terms of NEMA EIA Regulations, Department of Environmental Affairs, Pretoria, South Africa. 	<p>Public participation was conducted according to Chapter 6 of the EIA Regulations 2014, as amended, as well as the DEA Public Participation guideline.</p> <p>The Draft Report was distributed for public review for a period of 30 days as part of the EIA process</p>
<ul style="list-style-type: none"> National Heritage Resources Act, 1999 (Act 25 of 1999) (NHRA) The World Heritage Convention Act, 1999 (Act 49 of 1999) 	<p>An Archaeological Impact Assessment was conducted for the Project; however, a Paleontological Impact Assessment was deemed not required for the project, due to the project areas falling within an insignificant palaeo-sensitivity zone and no paleontology assessments being required according to the SAHRIS palaeo-sensitivity map.</p>
<p>National Water Act, 1998 (Act 36 of 1998) (NWA)</p>	<p>Insofar as the undertaking of section 21 water uses is concerned, an application for a WUL for the solar facility as part of the IWUL amendment for the Platreef Mine will be submitted to the DWS, as per GN R267 of 2017.</p>

¹⁵ The *Regulations Pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations* published in GN R1147 in GG 39425 of 20 November 2015 as amended by GN 1314 in GG 40371 of 26 October 2016; GN R452 in GG 41584 of 20 April 2018; GN 991 in GG 41921 of 21 September 2018; GN 24 in GG 42956 of 17 January 2020; GN 495 in GG 44698 of 11 June 2021.

¹⁶ GN 320 in Government Gazette 43110 of 20 March 2020

Applicable Legislation and Guidelines Used to Compile the Report	Explanation of How It Has Been Applied
<ul style="list-style-type: none"> • Regulations on the use of water for mining and related activities aimed at the protection of water resources (GN 704 of 1999)¹⁷ • Water Use Licence Application and Appeals Regulations, 2017 (GN R267 of 2017)¹⁸ • Regulations regarding the safety of dams in terms of section 123(1) of the National Water Act, 1998 (GN R139 of 2012)¹⁹ • Regulations in terms of section 26 read in conjunction with section 12A for the erection, enlargement, operation and registration of water care works (GN R 2834 of 1985)²⁰ • General Authorisations <ul style="list-style-type: none"> ○ General Authorisation: 21(c) and (i) water use for the purpose of rehabilitating a wetland for conservation purposes (GN 1198 of 2009)²¹ ○ General Authorisation: 21(c) and (i) water uses (GN 509 of 2016)²² 	<p>The requirements of regulation GN704 will be adhered to with regards to the separation of clean and dirty water.</p>

¹⁷ GN 704 in GG 20119 of 4 June 1999.

¹⁸ GN R267 in GG 40713 of 24 March 2017.

¹⁹ GN R139 in GG 35062 of 24 February 2012.

²⁰ The regulations were published in GN R 2834 in GG 10048 of 27 December 1985 under the Water Act 54 of 1956 and are still applicable until such time as new regulations are promulgated under section 26 of the NWA.

²¹ GN 1198 in GG 32805 of 18 December 2009.

²² GN 509 in GG 40229 of 26 August 2016.

Applicable Legislation and Guidelines Used to Compile the Report	Explanation of How It Has Been Applied
<ul style="list-style-type: none"> ○ Revision of General Authorisation for the Taking and Storing of Water (GN 538 of 2016)²³ ○ Revision of General Authorisation in terms of section 39 of the National Water Act 36 of 1998 (GN 665 of 2013)²⁴ 	
<p>National Environmental Management: Biodiversity Act, 2004 (Act 39 of 2004) (NEM:BA)</p> <ul style="list-style-type: none"> • Threatened or Protected Species Regulations, 2007 (GN R152 of 2007)²⁵ • Alien and Invasive Species Regulations (GN R1020 of 2020)²⁶ • Alien and Invasive Species Lists, 2020 (GN 1003 of 2020)²⁷ <p>National Environmental Management: Protected Areas Act, 2003 (Act 57 of 2003)</p>	<p>The Terrestrial and Aquatic specialist assessments were guided by this Act and its regulations.</p>
<p>National Environmental Management: Air Quality Act, Act 39 of 2004 (NEMA:AQA)</p> <ul style="list-style-type: none"> • National Dust Control Regulations, 2013¹³ 	<p>The Act and its regulations will be heeded throughout the proposed solar facility construction and operation.</p>
<p>National Forest Act, 1998 (Act 84 of 1998) (NFA)</p> <ul style="list-style-type: none"> • Regulations under the National Forests Act 84 of 1998 (GN R466 of 2009) 	<p>Protected tree species have been confirmed within the project area and a protected tree permit will need to be applied for in terms of the NFA prior to any protected tree species being cut, disturbed, damaged or destroyed.</p>

²³ GN 538 in GG 40243 of 2 September 2016.

²⁴ GN 665 in GG 36820 of 6 September 2013.

²⁵ GN R152 in GG 29657 on 23 February 2007.

²⁶ GN R1020 in GG 43735 of 25 September 2020.

²⁷ GN 1003 in GG 43726 of 18 September 2020. Notice replaced the previous Alien and Invasive Species Lists (GN 864 in GG 40166 of 29 July 2016).

Applicable Legislation and Guidelines Used to Compile the Report	Explanation of How It Has Been Applied
Limpopo Environmental Management Act (Act No. 07 of 2003) (LEMA)	<p>Provides for permits to be issued in terms of Schedule 2 (Specially protected wild animals), 3 (Protected wild animals), 7 (Undesirable animals), 9 (Prohibited aquatics growths), 10 (Invertebrates), 11 (Specially protected plants) and 12 (Protected plants) of the Act to remove, relocate or destroy species listed in the above Schedules.</p> <p>Protected tree species have been confirmed within the project area and a protected tree permit will need to be applied prior to any protected tree species being cut, disturbed, damaged or destroyed.</p>
Noise Control Regulation (GN R154 of 1992) ²⁸	<p>The regulations will be heeded throughout the proposed solar facility's construction and operational phases.</p>
Mine Health and Safety Act, 1996 (Act 29 of 1996) <ul style="list-style-type: none"> • Mine Health and Safety Regulations (GNR 93 of 1997, as amended)²⁹ 	<p>The Act and its regulations will be heeded throughout the proposed solar facility's construction and operational phases.</p>
Limpopo Conservation Plan v.2 <ul style="list-style-type: none"> • According to the Limpopo C-Plan the PR area is located partially in an no Natural Areas Remaining. 	<p>The C-Plan was heeded during the compilation of this BA&EMPr.</p>
National Development Plan (NDP) 2011-2030 ^{30,31}	<p>The National Development Plan (NDP) 2030 aims to address South Africa's developmental challenges of poverty and inequality by 2030. The NDP 2030 seeks to ensure that half of all electricity generation capacity is provided by renewable resources. Key aspects deemed necessary to enhance social</p>

²⁸ GN R154 of January 1992.

²⁹ GN R93 in GG 17725 of 15 January 1997.

³⁰ National Planning Commission. 2011. The National Development Plan, Vision for 2030.

³¹ Government: <https://www.gov.za/issues/national-development-plan-2030>

Applicable Legislation and Guidelines Used to Compile the Report	Explanation of How It Has Been Applied
	<p>cohesion, reduce poverty and raise living standards include the creation of jobs and livelihoods as well as expanding infrastructure, amongst others.</p> <p>The proposed development is in alignment with the National Development Plan through its potential to create employment and its plans to develop infrastructure.</p>
<p>National Energy Act (Act No. 34 of 2008)</p>	<p>The National Energy Act has one of its key objectives, the promotion of the diversity of the supply of energy and its sources. As such, the Act directly references the importance of the renewable energy sector, with a mention of the solar energy sector. The Act highlights key aspects of renewable energy and its contribution to economic growth, which include fast-tracking poverty alleviation; diverse energy mix; increased generation and consumption of renewable energy and efficient energy generation, amongst others.</p> <p>The proposed development is in alignment with the National Energy Act through its potential to diversify energy sources, increase the generation and consumption of renewable energy as well as its contribution to efficient energy generation.</p>
<p>New Growth Path Framework (GPF) 2010³²</p>	<p>The New Growth Path Framework (NGPF) aims to ensure that jobs and decent work are at the centre of economic policy. The NGPF has identified several job drivers and priority sectors that should be focused on over the coming years. These include infrastructure investment; prioritising efforts to support employment in the main economic sectors as well as including the Green Economy, amongst others.</p> <p>The proposed development shows alignment to the New Growth Path regarding its aim to invest in infrastructure and the potential to increase employment within the Green Economy.</p>

³² Department of Economic Development. 2011. New Growth Path Framework.

Applicable Legislation and Guidelines Used to Compile the Report	Explanation of How It Has Been Applied
National White Paper on Renewable Energy ³³	This policy was heeded during the compilation of this BA&EMPr.
Integrated Resource Plan (2019) ³⁴	<p>The IRP 2019 recognises that whilst South Africa relies heavily on coal to meet its energy needs, the country is well endowed with renewable energy resources that offer sustainable alternatives to fossil fuels and therefore the country continues to pursue a diversified energy mix that reduces reliance on a single or a few primary energy sources (DMRE, 2019).</p> <p>Renewable technologies also present huge potential for the creation of new industries, job creation and emphasised across the value chain. The recent power cuts or increasingly severe load shedding events by Eskom have emphasised the need for additional power generation capacity in South Africa.</p> <p>There is a focus on moving towards increased generation from renewable energy sources. Due to South Africa’s electricity generation and supply system being overloaded, the demand for an increased and stable electricity supply is a priority. Solar energy plants are important for reducing the country’s overall environmental footprint from power generation and for directing a pathway towards sustainability.</p> <p>Section 7 describes the key considerations and actions that were taken into account for the proposed solar project.</p>
Limpopo Development Plan (LDP) 2015-2019 ³⁵	The Limpopo Development Plan (LDP), 2015 – 2019, is a reflection of the provinces’ provisions towards socio-economic development through the elimination of poverty, reduction of inequality and the improvement of the citizen’s quality of life as required by the NDP (Limpopo Provincial

³³ Department Of Minerals and Energy. White Paper on The Promotion of Renewable Energy and Clean Energy Development. Part One – Promotion of Renewable Energy. August 2002

³⁴ Department Of Minerals and Energy. Integrated Resource Plan (2019)

³⁵ Limpopo Provincial Government. 2015. Limpopo Development Plan (LDP) 2015 - 2019 . Limpopo Provincial government.

Applicable Legislation and Guidelines Used to Compile the Report	Explanation of How It Has Been Applied
	<p>Government, 2015). The plan's main objectives include the growth of economy, jobs, infrastructure and the improved standard and quality of life.</p> <p>The proposed development is fully aligned with the Limpopo Development Plan through its potential to create employment and improve standards of living (through employment and a green economy).</p>
<p>Limpopo Green Economy Plan, 2013</p>	<p>The Green Economy Plan is a strategy for local production and consumption in Limpopo, effective water and energy usage, and protection of both manmade and natural resources. It offers just solutions to resource depletion and economic marginalisation that are also fair to society and the environment. The key focus areas of the plan include clean energy and energy efficiency, resource conservation and management and green buildings and the built environment.</p> <p>The proposed development is in alignment with the Limpopo Green Economy plan through its contribution to green, renewable energy within the province.</p>
<p>Waterberg District Municipality Integrated Development Plan 2020/2021³⁶</p>	<p>The proposed development is aligned with the Waterberg DM IDP as it aligns with land management, local economic development promotion, and institutional transformation decisions within the IDP.</p>
<p>Waterberg DM Local Economic Development (LED) Strategy 2014³⁷</p>	<p>The proposed development is highly aligned objectives of the Waterberg DM LED as the development will contribute to increasing the standards of living, creating jobs, and contribute building sustainable development for the future.</p>
<p>Mogalakwena Local Municipality Integrated Development Plan (2022/23-2026/27)³⁸</p>	<p>According to the Mogalakwena Local Municipality (2022) (MLM) Integrated Development Plan (IDP), the local economy is contributed to by mining and agricultural activities. The municipality sees the need for solar energy to</p>

³⁶ Waterberg DM. 2019. IDP 2019/2020.

³⁷ Waterberg DM Local Economic Development (LED) Strategy. 2014.

³⁸ Mogalakwena Local Municipality. 2022. Mogalakwena Local Municipality Integrated Development Plan (2022/23-2026/27)

Applicable Legislation and Guidelines Used to Compile the Report	Explanation of How It Has Been Applied
	<p>supply the conventional electrical supply and has plans to include solar panels in all new municipal building plans in the medium to long term future. Additionally, the MLM intends to raise awareness of climate change adaptation, such as the use of solar power amongst others.</p> <p>The proposed solar facility development is therefore in line with the overall plans of the MLM towards a sustainable environment. This has been further considered within Section 7.</p>

7 NEED AND DESIRABILITY OF THE PROPOSED ACTIVITIES³⁹

The need and desirability of the proposed solar facility has been considered in line with the Department of Forestry, Fisheries and the Environment (DFFE) Integrated Environmental Management (IEM) Guidelines on Need and Desirability (GN 891 of 2014, as amended).

7.1 THE NEED OF THE PROPOSED ACTIVITY

South Africa is currently faced with an energy challenge which is manifesting in rising electricity tariffs combined with load shedding patterns that are increasingly being experienced. These challenges have had negative impacts on citizen's livelihoods and more particularly on businesses and industry. To address this challenge, as well as reduce its carbon foot, Ivanplats have proposed to develop a solar facility to ensure continued electrical supply for its Platreef Mine operations.

7.2 THE DESIRABILITY OF THE PROPOSED ACTIVITY

Over the past several years, with the increasing awareness of climate change impacts coupled with South Africa's strained grid, industry has begun playing its roles in efforts to reduce its carbon footprint towards a sustainable earth. Implementing solar PV generation capacity will result in improved availability of electrical supply and encourages going 'green' in terms of environmental considerations.

The typical energy supply in South Africa has been mainly through coal-fired power stations (DMRE, 2019), and it is noted that these resources have an impact on climate change. Solar energy on the other hand, provides an opportunity for greener energy through renewable energy. Implementing renewable energy reduces reliance on fossil fuels thus having an overall positive impact towards climate change. South Africa is one of the most solar energy rich countries in the world due to its position. According to SolarGISInfo⁴⁰, the average annual solar radiation in South Africa varies between 1500 kWh/m² and 2400 kWh/m², with the solar PV power potential ranging from 1300 and 2000 kWh/kWp, thus making it an ideal place for solar energy generation (**Figure 8**).

South Africa is a party to both the United Nations Framework Convention on Climate Change (UNFCCC) and its Kyoto Protocol, having acceded to the Convention in 1997 and ratified the Kyoto Protocol in 2002. South Africa is also a signatory of the Paris agreement, but not as yet ratified. The protocols above commit developed countries to reduce Greenhouse Gas (GHG) Emissions. The Paris agreement is a universal, legally binding international climate agreement, and sets out a global action plan for emission-cutting pledges known as "intended nationally determined contributions" (INDCs), to limit global warming to below 2°C or, if possible, below 1.5°C as agreed under the Copenhagen Accord (UNFCCC, 2015). This further reiterates the importance of developments such as the proposed solar PV facility for Platreef Mine.

According to the Limpopo Green Economy Plan (2013)³⁵, energy security serves a significant role in the implementation of the Limpopo Employment Growth and Development Plan. Limpopo has a great deal of potential to establish a complex of renewable energy sources. For instance, the province has ample land and favourable solar radiation for the construction of solar plants, and its geographic location will allow for the transmission and sale of energy to countries like Zimbabwe, Botswana. With the development of technology, the potential for further increasing generating capacity is limitless. Limpopo is known as a "hot-spot" for climate change, and its approach to the issue is to construct resilient communities through the use

³⁹ Required as per the EIA regulations Appendix 2: (f) a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location.

⁴⁰ <https://solargis.com/>

of the green economy such as the use of renewable energy. Limpopo's approach to climate change is consistent with that of South Africa. The country's approach is determined by its dedication to the Kyoto Protocol, which commits developed countries to reduce GHG emission, and the UNFCCC. Thus, in line with these protocols, Ivanplats is committed to being a mine of the future with efforts to reduce its carbon footprint and implementing green and clean energy, through developing the proposed Platreef solar facility to combat climate change. Moreover, Ivanplats has recently invested in the JSE-listed company RENERGEN which is a Renewable Energy organisation and are also implementing various policies to improve its Environmental, Social and Governance (ESG) Score.

The anticipated potential impacts of the proposed project can be seen as outweighing the negative impacts. The proposed project will potentially result in a loss of vegetation, some faunal biodiversity, loss of grazing land and potentially infringe on sensitive receptors along the N11 adjacent to the proposed site. It should be noted however that the habitat fragmentation and visual effects of the solar facility can be minimised and managed. Additionally, solar power will provide cumulative positive impacts on a local and regional scale. It will provide the Platreef Mine with continued electrical supply, thus enabling mining and production without possible interruptions from load shedding. It will provide some additional job opportunities as well ensuring continued employment for workers already employed by the mine. The proposed project can also result in skills transfer thus contributing positively to the local industry and Gross Domestic Product growth, and most importantly, contributing to a greener future through green energy. Moreover, as previously indicated in **Section 6**, the proposed solar PV facility is in alignment with the objectives of the various policies outlined in this section, such as creating jobs, prioritising efforts to support employment in the main economic sectors including green economy, providing efficient energy generation and to promote, enhance and develop technologies for the implementation of sustainable renewable energy, amongst others.

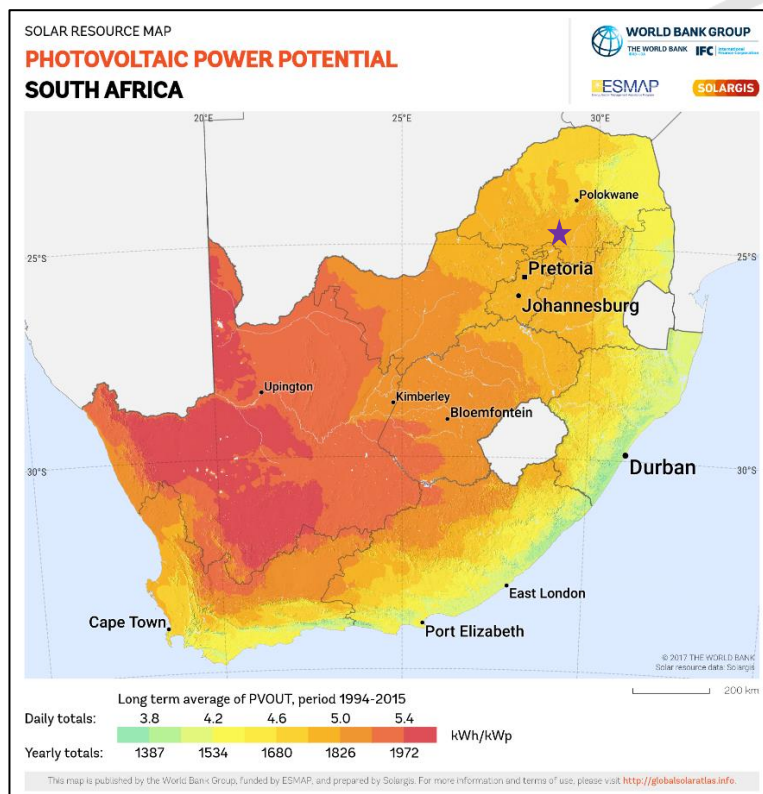


Figure 8: South Africa's Solar Photovoltaic Power Potential Map⁴¹

⁴¹ Source: <https://solargis.com/maps-and-gis-data/download/south-africa>

The proposed solar facility has also been evaluated against the criteria presented in the DFFE Guideline on Need and Desirability (DEA, Guideline on Need and Desirability, 2017) in **Table 9** below.

Table 9: Need and Desirability Questions

How will this development (and its separate elements/aspects) impact on the ecological integrity of the area?	Please explain
Please refer to Section 14.2.2 of this report for impacts on biodiversity (fauna and flora).	
How were the following ecological integrity considerations taken into account? :	
Threatened Ecosystems	Please explain
Please refer to Section 10.6.1 of this report.	
Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure	Please explain
Please refer to Section 9.10 of this report.	
Critical Biodiversity Areas (“CBAs”) and Ecological Support Areas (“ESAs”)	Please explain
The proposed development is located in ‘No Natural Areas Remaining’. Please refer to Section 10.6.1 of this report	
Conservation targets	Please explain
Please refer to Section 10.6.1 of this report	
Ecological drivers of the ecosystem	Please explain
Please refer to Section 10.6.1 of this report.	
Environmental Management Framework	Please explain
Please refer to Section 6 of this report.	
Spatial Development Framework (SDF)	Please explain
Please refer to Section 6 of this report.	
Global and international responsibilities relating to the environment (e.g., RAMSAR sites, Climate Change, etc.)	Please explain
<ul style="list-style-type: none"> • There are no RAMSAR wetlands on the site • South Africa is a party to both the United Nations Framework Convention on Climate Change (UNFCCC) and its Kyoto Protocol, having acceded to the Convention in 1997 and ratified the Kyoto Protocol in 2002. South Africa is also a signatory of the Paris agreement, but not as yet ratified. The protocols above commit developed countries to reduce GHG Emissions. The Paris agreement is a universal, legally binding international climate agreement, and sets out a global action plan for emission-cutting pledges known as “intended nationally determined contributions” (INDCs), to limit global warming to below 2°C or, if possible, below 1.5°C as agreed under the Copenhagen Accord (UNFCCC, 2015). This further reiterates the importance of developments such as the proposed solar PV facility for Platreef Mine. • Considering that the proposed project is renewable energy and is aimed at generating green and clean energy, Ivanplats has proposed this development with one of the objectives to reduce its carbon footprint, thus it is anticipated that the project will have a positive impact towards climate change. This is in alignment with South Africa’s goal to promote renewable energy development and become compliant with international treaties regarding climate change effects. 	
How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity? What measures were explored to firstly avoid these negative	Please explain

impacts, and where these negative impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?				
Please refer to Section 14.2.2 and Table 17 of this report for impacts on biodiversity.				
How will this development pollute and/or degrade the biophysical environment? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?		Please explain		
Please refer to Section 14.2.1 to Section 14.2.7 of this report for impacts on the biophysical environment as well as Table 22 for the mitigation measures proposed to avoid and reduce these impacts.				
What waste will be generated by this development? What measures were explored to firstly avoid waste and where waste could not be avoided altogether, what measures were explored to minimise, reuse and/or recycle the waste? What measures have been explored to safely treat and/or dispose of unavoidable waste?		Please explain		
Waste on the solar facility premises will be managed according to the existing mine waste management plan. Awareness training is performed to emphasise the concepts of minimising, reuse and/or recycle.				
How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?		Please explain		
Please refer to Section 28.1.2 of this report.				
How will this development use and/or impact on non-renewable natural resources? What measures were explored to ensure responsible and equitable use of the resources? How have the consequences of the depletion of the non-renewable natural resources been considered? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?		Please explain		
The project will be developed within an existing MR area. Please refer to the Section 8.1 , alternatives considered for the proposed development which looked at measures to assist with minimising the impacts.				
Please also refer to Section Refer to Section 10.5 and Section 14.2.3 for a description of and the potential impact on water resources.				
How will this development use and/or impact on renewable natural resources and the ecosystem of which they are part? Will the use of the resources and/or impact on the ecosystem jeopardise the integrity of the resource and/or system taking into account carrying capacity restrictions, limits of acceptable change, and thresholds? What measures were explored to firstly avoid the use of resources, or if avoidance is not possible, to minimise the use of resources? What measures were taken to ensure responsible and equitable use of the resources? What measures were explored to enhance positive impacts?		Please explain		
Please refer to previous response				
Does the proposed development exacerbate the increased dependency on increased use of resources to maintain economic growth or does it reduce resource dependency (i.e., de-materialised growth)?		YES	NO	Please explain
The natural resource dependency in terms of water will almost be negligible as the water demand for cleaning the solar panels is very low (520 m ³ per annum, when required). Ivanplats propose to use process water which would have been treated for the washing of the solar panels, thus keeping in line with the principles of water conservation.				
In terms of power, as this proposed project is a renewable energy development, the intention is to use solar energy to generate power for continued electrical supply to the Platreef operations. Thus, it is not anticipated that power will increase in this regard.				
Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there		YES	NO	Please explain

more important priorities for which the resources should be used (i.e., what are the opportunity costs of using these resources this proposed development alternative?)			
Please refer to the above response.			
Do the proposed location, type and scale of development promote a reduced dependency on resources?	YES	NO	Please explain
Please refer to the above response.			
How were a risk-averse and cautious approach applied in terms of ecological impacts	Please explain		
A risk analyses of the impacts identified was conducted to determine the significance of the impacts on the biophysical environment of the project area. Please refer to Section 14.3 of this report.			
What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?	Please explain		
Refer to Section 22 of this report.			
What is the level of risk associated with the limits of current knowledge?	Please explain		
Refer to Section 22 of this report.			
Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	Please explain		
A risk analyses of the impacts identified was conducted to determine the significance of the impacts on the biophysical environment of the project area. Please refer to Section 14.3 of this report.			
How will the ecological impacts resulting from this development impact on people's environmental right in terms following:			
Negative impacts: e.g., access to resources, opportunity costs, loss of amenity (e.g., open space), air and water quality impacts, nuisance (noise, odour, etc.), health impacts, visual impacts, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?	Please explain		
Impacts and risks identified including the nature, significance, consequence, extent, duration and probability are provided in Section 14.3			
Positive impacts: e.g., improved access to resources, improved amenity, improved air or water quality, etc. What measures were taken to enhance positive impacts?	Please explain		
Impacts and risks identified including the nature, significance, consequence, extent, duration and probability are provided in Section 14.3			
Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how the development's ecological impacts will result in socio-economic impacts (e.g., on livelihoods, loss of heritage site, opportunity costs, etc.)?	Please explain		
Please refer to Section 14.2 of this report.			
Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives/targets/considerations of the area?	Please explain		
Please refer to Section 14.2 of this report.			
Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the "best practicable environmental option (BPEO)" in terms of ecological considerations?	Please explain		
Please refer to Section 8 and Section 10.6 of this report.			
Describe the positive and negative cumulative ecological/biophysical impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and existing and other planned developments in the area?	Please explain		
Please refer to Section 14.2.8 of this report.			

8 ALTERNATIVES ASSESSMENT⁴²

The DFFE⁴³ guidelines for an Integrated Environmental Management (IEM) procedure requires that an environmental investigation considers feasible alternatives for any proposed development. Furthermore, the EIA Regulations (2014) (as amended) require that a number of alternatives for accomplishing the same objectives shall be considered.

In terms of the NEMA EIA Regulations 2014 (as amended), feasible alternatives are required to be considered as part of the environmental studies. An alternative in relation to a proposed activity refers to the different means of meeting the general purpose and requirements of the activity which may include alternatives to:

- The property on which or location where it is proposed to undertake the activity;
- The type of activity to be undertaken;
- The design or layout of the activity;
- The technology to be used in the activity;
- The operational aspects of the activity; and
- The option of not implementing the activity.

8.1 DETAILS OF THE ALTERNATIVES CONSIDERED

8.1.1 SITE ALTERNATIVES

Ivanplats is a holder of an MR for the Platreef Mine located near Mokopane, in the Limpopo Province. As part of the goal to reduce its carbon footprint and operate in a sustainable environment, and in alignment with the IRP, Ivanplats proposes to establish a 19MW solar facility within its existing Platreef Mine MR area. The solar plant is intended to supply the Platreef Mine with electricity for private consumption at the mine operations thereby reducing the burden on the constrained national grid.

Ivanplats considered various locations to establish the solar facility within the existing MR area as it is economically and environmentally unfeasible to establish the plant outside the existing MR area. The following site location alternatives were considered:

- Site Location Alternative 1: located north east of the Platreef Mine and is approximately 6.5 ha
- Site Location Alternative 2: located north of the Platreef Mine and is approximately 5 ha
- Site Location Alternative 3: located directly east of the Platreef Mine and is approximately 19.59 ha

The size of site location alternatives 1 and 2 areas combined are smaller than the 19.59 ha area required for the proposed 19MW solar facility and would only yield approximately 7MW power supply to the mine. There is also a 10 m perimeter berm proposed to the west of Alternative 1 and to the south of Alternative 2 which would cast shade onto the PV panels at certain times during the day and which would impact on the efficacy of the solar plants at these locations.

Both the above alternatives are also further away from the existing 8MVA substation on site which would result in a longer OHL than that which is required for Alternative 3, with a larger subsequent economic impact in terms of Capital Expenditure (CAPEX). Thus, neither of these two (2) sites were suitable for the

⁴² Required as per the EIA regulations Appendix 2 (g) a full description of the process followed to reach the proposed preferred activity, site and location of the development footprint within the site, including (i) details of all the alternatives considered

⁴³ At the time the Department of Environmental Affairs and Tourism (DEAT).

solar plant due to size, access and economic constraints. The preferred location Alternative 3 for the plant was chosen on the following basis:

- Within an approved MR area;
- It was not environmentally fatally flawed, albeit there may be some negative impacts, which can be mitigated provided that strict mitigation is implemented;
- The MR area is already constrained in terms of space; thus, the chosen location was the only viable location for the solar facility;
- Ivanplats also chose this site as the development can sustainably co-exist with the platinum mining activities and other infrastructure;
- The site is further away from the proposed perimeter berm and therefore there will not be subject to shade during the day ensuring optimal amounts of sun exposure for peak efficiency;
- The site is suitably large enough to provide the 19MW required to supply the mine.

Please refer to **Figure 9** and **Figure 10** for an indication of the site alternatives considered and the location of the perimeter berms.

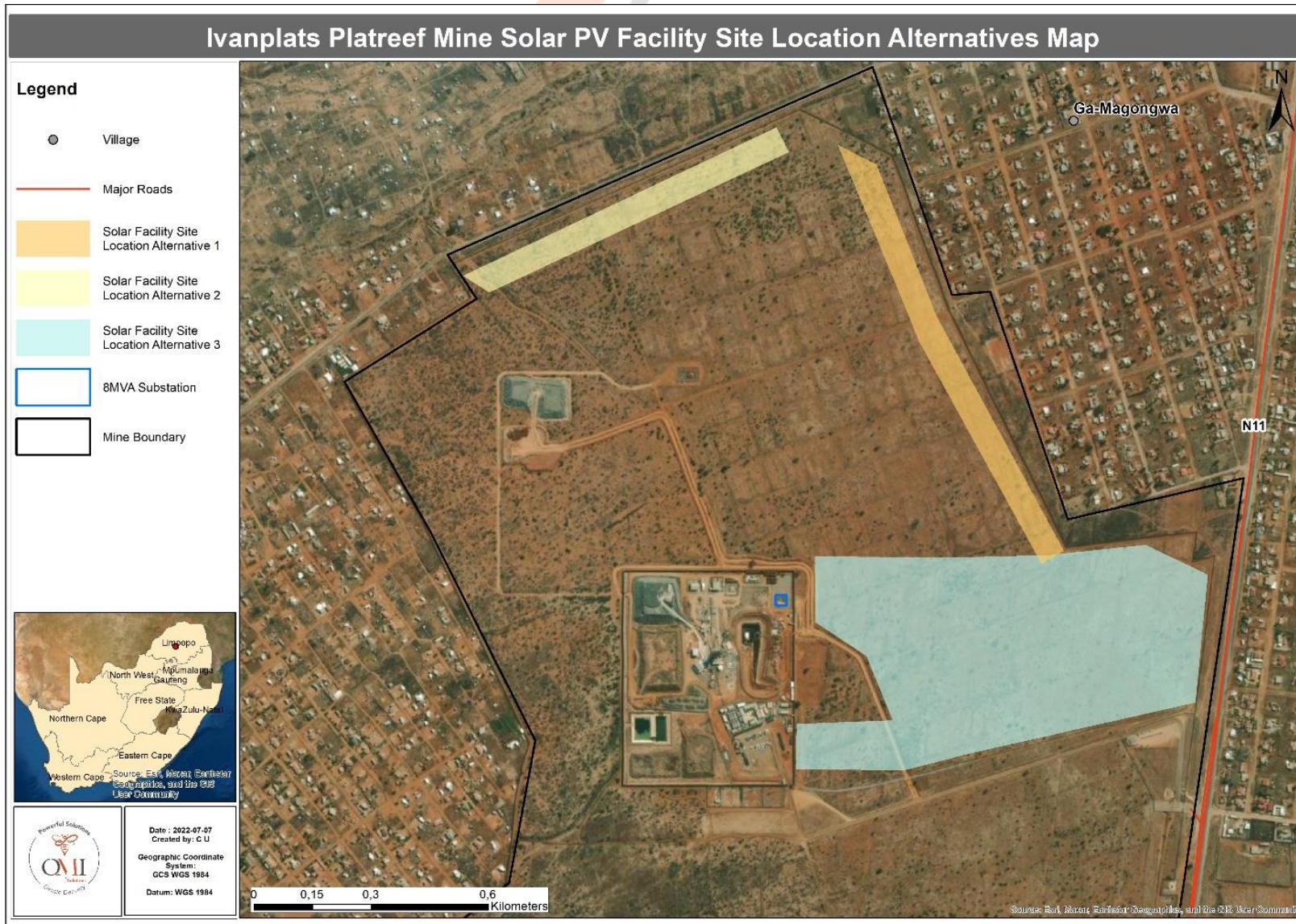


Figure 9: Site Location Alternatives Considered for the Development of the Solar PV Facility

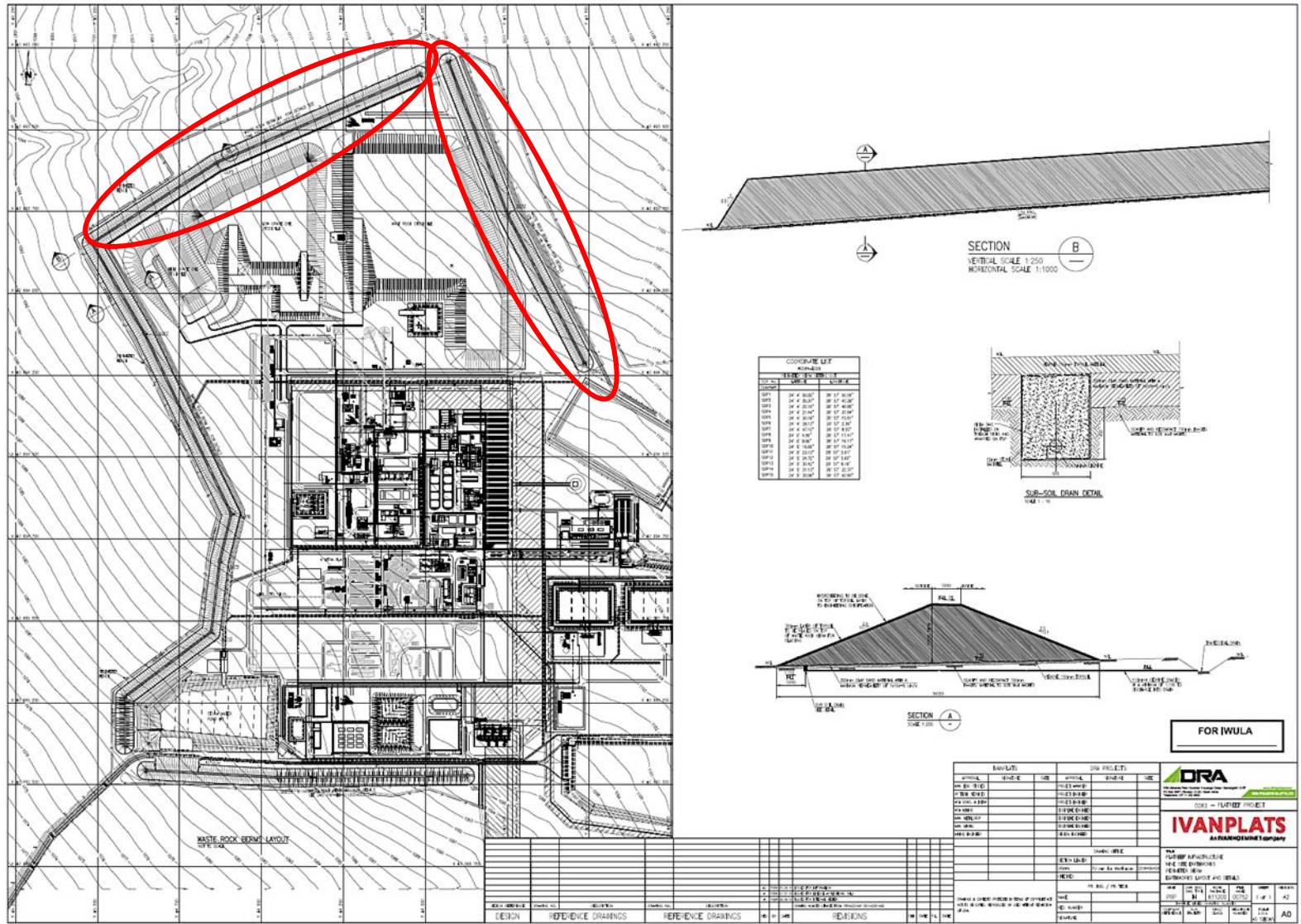


Figure 10: Platreef Mine Proposed Perimeter Berm West of Site Alternative 1 and South of Alternative 2 – Red Encirclements

8.1.2 DESIGN / LAYOUT ALTERNATIVES

The preferred site also informed the layout of the proposed solar facility by eliminating those sites that are not feasible to host the proposed infrastructure, and those areas less suitable for development due to environmental sensitivities, geotechnical concerns or other practical considerations.

In terms of the layout alternatives, the original layout (Layout Alternative 1) allowed for 4 solar areas with a combined area of 23.11 ha while Layout Alternative 2 only has 3 areas. The footprint of the original layout was reduced by the design engineers to limit the disturbance of natural areas and reduce negative impacts. As per the current mine plan, a carport is proposed to be constructed on Area 3 and therefore the solar panels will be placed on the carport's roof, thus further reducing the areas to be disturbed due to the solar facility development (17.48 ha vs 23.11 ha). The preferred Layout Alternative 2 comprises a solar facility with a footprint of 19.59 ha in total. Apart from the smaller footprint, all other impacts for the layout alternatives would be similar (impact on watercourses, visual impacts etc.).

Layout Alternative 1 and 2 are provided in **Figure 11** and **Figure 12**.

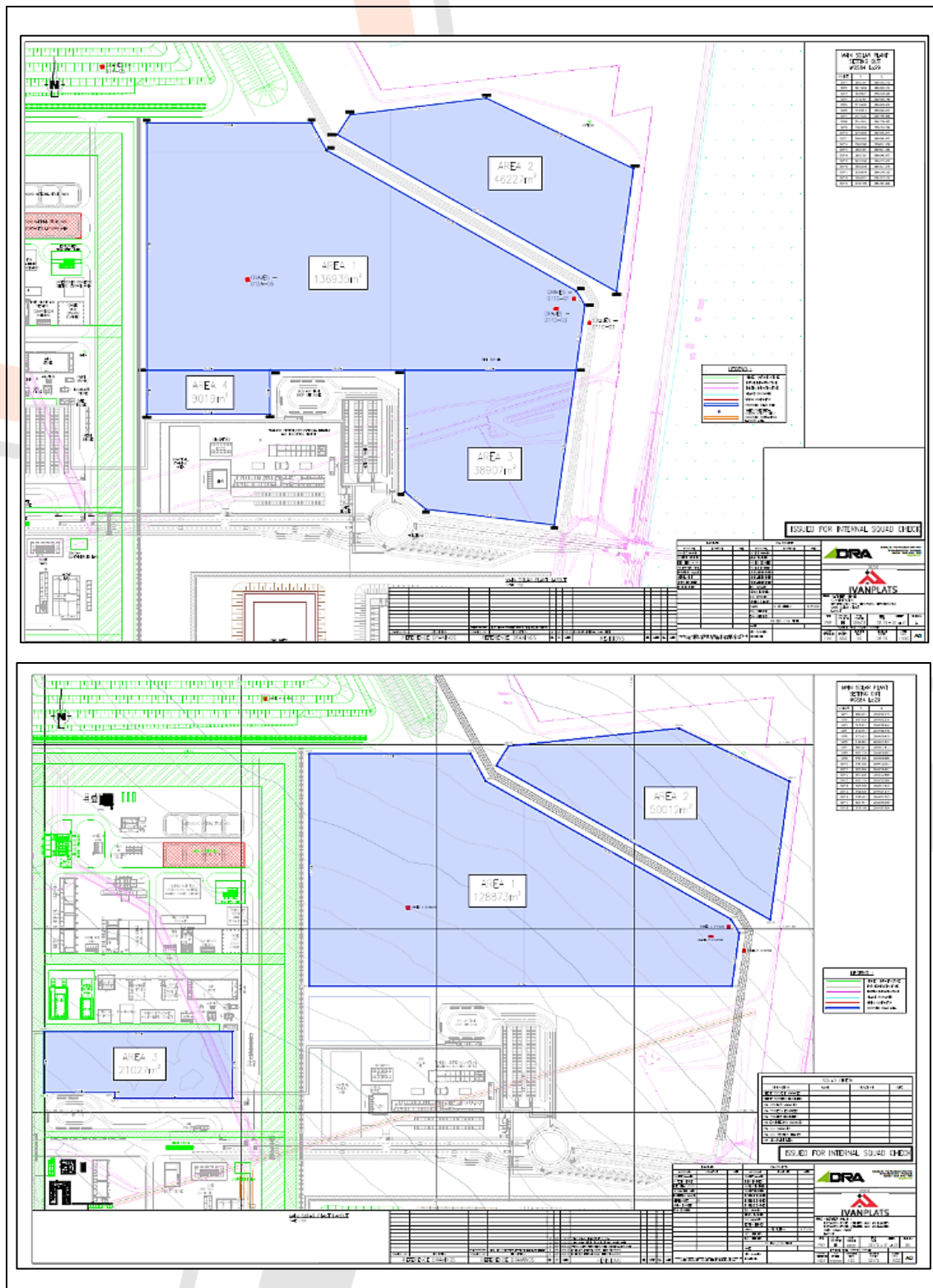


Figure 11: Original Proposed Solar Facility Layout (Layout Alternative 1) (top) and Preferred Layout (Layout Alternative 2) (bottom)

Potential alternatives to the powerline routes were also considered. It was decided that connection to the existing 8MVA substation on site would be the most feasible option at this stage until such time that the proposed new 3X40MVA substation has been constructed. The powerlines will tie into the existing services corridors proposed for the mine (indicated in green in **Figure 11** above). The location of the proposed

services corridors and existing 8MVA substation as well as the distance to the substation were key considerations taken into account in determining the powerline routes.

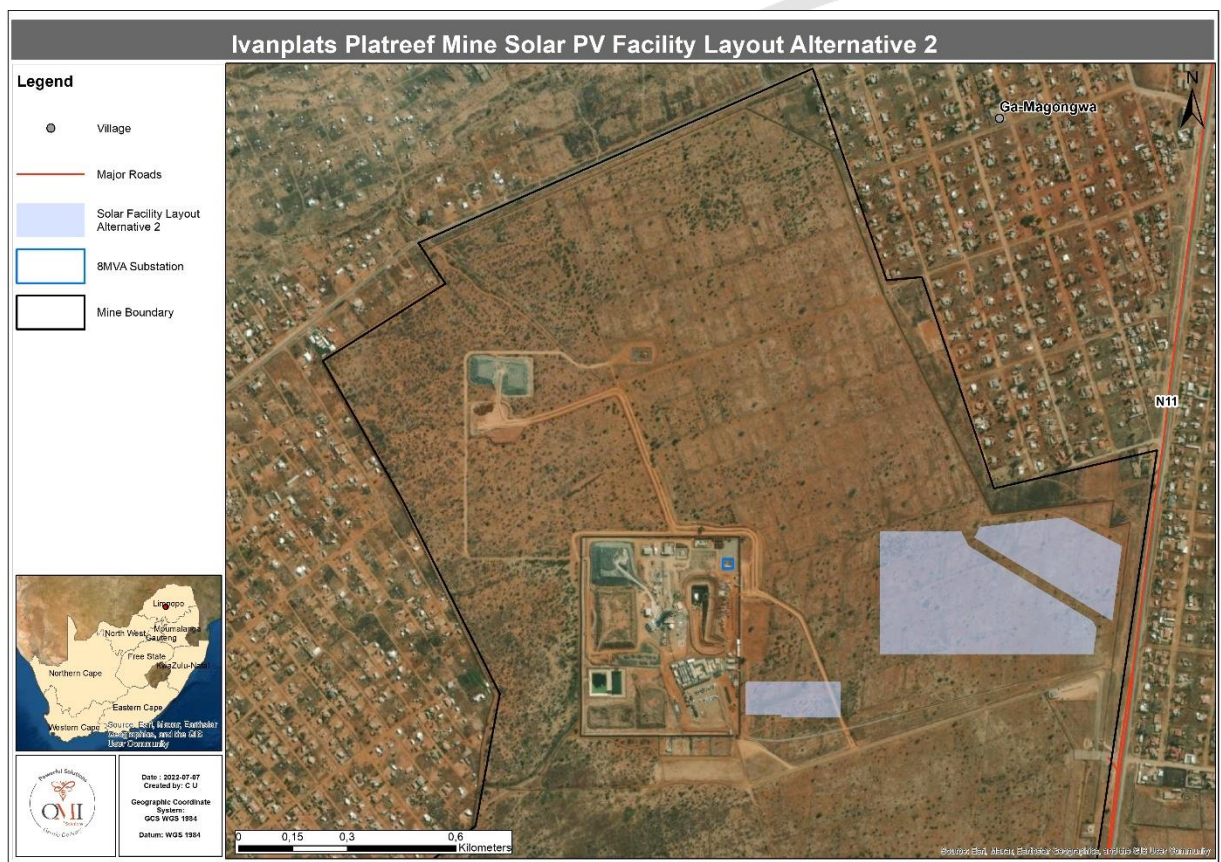
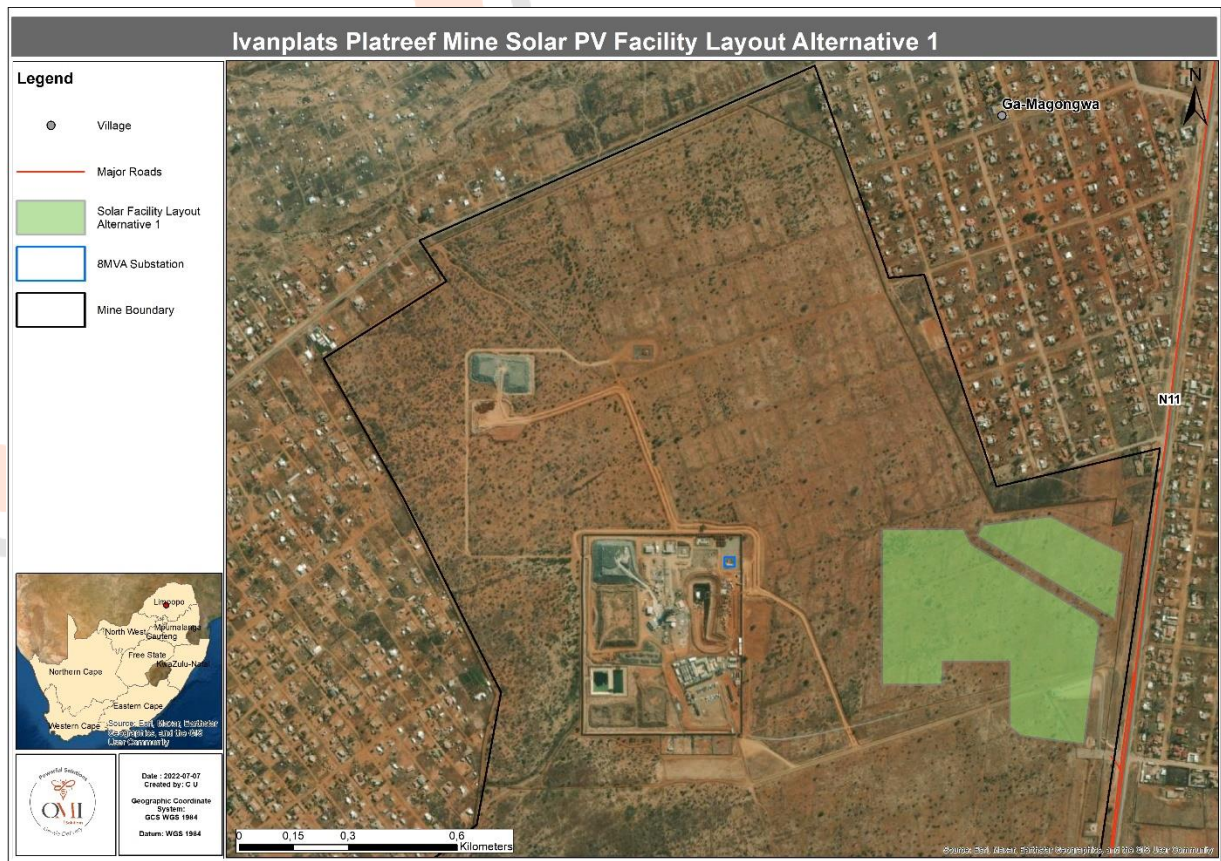


Figure 12: Layout Alternatives Considered for the Development of the Solar PV Facility

8.1.3 TECHNOLOGY ALTERNATIVES

The main aim of the proposed solar facility is to contribute electricity generation capacity to the Platreef Mine’s grid. In terms of the PV technology chosen, various technologies exist and have been considered by the applicant and engineering design team, to ensure the technology alternative presents the optimal solution.

- **Solar Photovoltaic Power:** The high irradiation values of the Limpopo Province make this area ideally suitable for the proposed solar facility – refer to **Figure 8**. The solar PV technology generally requires relatively low water requirements and provides a reliable source of power, and all the components can be recycled.
- **Concentrated Solar Power:** CSP technology requires large volumes of water, and this is a major constraint for this type of technology. Moreover, the size, visual impacts and water requirements in relation to the project area tend to render this alternative not feasible. The Platreef Mine is located in a water scarce area with surrounding communities in line of sight of the mine, and thus a CSP facility would have a much larger visual and water supply impact compared to the PV option.
- **Wind Energy:** Ivanplats has not considered the generation of electricity via wind power as it is believed that the climatic characteristics of the project area would render a wind energy facility not as efficient compared to a solar energy facility. This alternative was therefore not considered or evaluated further in this report.

Table 10 below provides a summary of the disadvantages and advantages of the renewable energy technologies considered above. Upon consideration of the alternatives, Solar PV Power (SPP) was considered as the preferred alternative with the use of the latest N-type TopCON, bi-facial, glass-glass solar modules, as these panels offer the lowest degradation and best efficiency.

Table 10: Renewable energy alternatives considered

Renewable Energy Technology	Advantage	Disadvantage
Solar PV Power (SPP) ⁴⁴	<ul style="list-style-type: none"> • Better economic performance than CSP • More cost effective than CSP meaning lower capital costs resulting in lower tariffs • Requires less water than CSP 	<ul style="list-style-type: none"> • Additional batteries required for storage • Without batteries, only supplies power during the daytime • Less efficient than wind turbines
Concentrated Solar Power (CSP) ⁴⁴	<ul style="list-style-type: none"> • Better electrical output than PV • CSP systems can store energy in batteries that can be tapped for energy on demand, which helps the systems more consistently meet local power demands, especially during peak usage times 	<ul style="list-style-type: none"> • Very water intensive • Higher negative visual impact than PV • Large area required for solar panels

⁴⁴ CES, 2021. PPC Dwaalboom Solar Park, Limpopo Draft Basic Assessment Report

Renewable Energy Technology	Advantage	Disadvantage
Wind Power (WP) ⁴⁵	<ul style="list-style-type: none"> Designed for utility scale Capable of supplying power any time of the day More efficient than SPP and CSP 	<ul style="list-style-type: none"> Higher negative visual impact than PV Requires too much space for most residential applications Requires more maintenance than solar panels Higher upfront cost than solar panels

8.1.4 OPERATIONAL ALTERNATIVES

In terms of operational alternatives, the option to use dry cleaning vs wet cleaning for the solar panels was investigated.

In general, a dry cleaning system is less effective compared to wet cleaning as the water involved in wet cleaning serves as a medium for dust particles to release⁴⁶. The robotic cleaners associated with dry cleaning systems also require electricity to operate which makes it more costly and less economically viable. Due to the relatively low volumes of water required to wash the panels, wet cleaning was identified as the preferred alternative at this stage. It must be noted that panels will not be cleaned on those days when it rains. The wet cleaning alternative will also provide for more job opportunities to be created. In future if wet cleaning becomes less economically viable, the dry cleaning alternative will be revisited.

8.1.5 “NO-GO” ALTERNATIVE

The assessment of the “no-go” alternative is a legal requirement according to NEMA and the EIA Regulations. In this scenario no development would take place. The environment would be left as is and the impact on the area and potential benefits would remain unchanged. The ‘no-go’ would therefore imply that the land would remain as per the status quo, undeveloped.

The entire project area is within the approved MR area of the Platreef Mine, which is largely open veld that is intermittently used for livestock grazing by the surrounding villages. It has been noted that this veld has been severely overgrazed, which has resulted in large stretches of bare ground. Grass species such as *Heteropogon contortus*, *Hyparrhenia hirta* and *Aristida congesta* were often dominant within the graminoid layer (a typical indicator of poor veld conditions) (Scientific Terrestrial Services, 2022). It was further noted that the preferential surface flow paths observed in the project area has been confirmed to be degraded and no longer functional.

In light of the above, it must be noted that the country’s continued power supply interruptions, particularly load shedding, have cumulative negative effects on industry and citizens’ livelihood. In the case of the Platreef Mine, if power supply to the mine is disrupted due to load shedding (or other power supply constraints), the increased cost of the mine having to use diesel-generated power affects the economic viability of the operations. The emissions from diesel generators also have an impact on the air quality of the project area. As the project is located in the Waterberg-Bojanala Air Quality Priority Area, all efforts should be made to avoid or reduce air quality impacts as far as possible. It is therefore beneficial for the

⁴⁵ <https://www.ecowatch.com/solar-vs-wind-power.html>

⁴⁶ <https://solarfunda.com/solar-panel-robotic-cleaning/#:~:text=Solar%20panel%20cleaning%20robots%20use,for%20dust%20particles%20to%20release.>

mine to have a reliable source of electricity generated from renewable resources. Moreover, when considering the environment, taking into account the poor veld conditions and the historical land use of the project area, it is highly unlikely that floral or faunal species of conservation concern will be able to establish viable populations (Scientific Terrestrial Services, 2022). Thus, not developing the proposed solar facility on the identified site, does not guarantee conservation of the site or its associated environmental sensitivities – the land falls within the MR area of Platreef Mine and is not being used for conservation purposes or managed as such. If not used for the proposed Solar PV Project, it is possible the land may be affected by continued overgrazing and mismanagement, potentially resulting in similar environmental impacts as the development proposal, but without implementation of necessary management measures as stipulated in the EMPr for this Project and without realising the same benefits as the development proposal.

Additionally, any positive benefits of the project will also not be realised, thus resulting in:

- No contribution from this project towards electricity generation from renewable energy technologies, to contribute towards Ivanplats' efforts to reduce its carbon footprint and to play its role in the fight against climate change;
- No increased job opportunities (however limited) or economic benefits associated with this project, thus the benefits derived from the proposed project would be foregone;
- Continued uncertainty of electricity supply to the mine, thus impacting on the mine's ability to continue mining and production, thus having a knock-on effect on the overall Platinum Group Metals (PGM) economy as well as reducing socio-economic benefits for the area and the country as a whole; and
- Loss of potential opportunity for the local community to manufacture the solar PV fixed mounting structures and thus the local economic benefit.

9 DETAILS OF THE PUBLIC PARTICIPATION PROCESS FOLLOWED⁴⁷

This section describes the public participation process (PPP) conducted in line with Chapter 6 of the Environmental Impact Assessment Regulations (EIA) Regulations (2014) (as amended). The process was conducted to ensure compliance with the requirements in terms of the National Environmental Management Act, 2002 (Act No. 28 of 2002) (as amended) (NEMA) and the EIA Regulations (2014) (as amended).

The PPP was conducted in line with the statutory requirements for public participation. The following legislation was considered when developing and implementing the PPP:

- Public Participation guideline in terms of NEMA;
- The EIA Regulations, 2014 (as amended);
- The Constitution of the Republic of South Africa, 1996;
- Protection of Personal Information Act, 2013 (Act 4 of 2013) (POPIA);
- Promotion of Access to Information Act, 2000 (Act 2 of 2000) (PAIA); and
- International good-practice guidelines for public participation and the Core Values of the International Association for Public Participation.

⁴⁷ Required as per the EIA regulations Appendix 2 (g) a full description of the process followed to reach the proposed preferred activity, site and location of the development footprint within the site, including (ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs

9.1 IDENTIFICATION OF STAKEHOLDERS

Ivanplats have an existing stakeholder database in its possession and thus to ensure a proper representation of all stakeholders, the existing stakeholder database was updated, and the following identification methods were used as part of the stakeholder identification and analysis process:

- Desktop and online research;
- Developing a list of relevant community authorities;
- Identifying the relevant ward councilors for the affected wards;
- Land claimants (if any);
- Consulting government departments relevant to the project;
- Stakeholders who respond to the publication of the newspaper advertisement;
- Stakeholders who respond to the distribution of project documentation; and
- Updating the stakeholder database from attendance registers from meetings.

A stakeholder database was compiled and the identified stakeholders and Interest and Affected Parties (I&APs) were engaged with throughout the following process:

9.2 LANDOWNER ENGAGEMENT/CONSENT

According to Regulation 39(2) of the EIA Regulations (GN R982 of 2014, as amended), the Applicant must obtain written consent from the landowner or person in control of the land which is included in the investigation.

Ivanplats hold SUCAs with various villages on whose land the mine is situated and are the rightful land claimants. These SUCAs are attached as **ANNEXURE H**.

9.3 SITE NOTICES

In order to inform surrounding communities and adjacent landowners of the proposed development, eight (8) notice boards (in accordance with regulation 41(2) (a) of the EIA Regulations 2014, as amended) were placed at key locations surrounding the MR area and at the entrance to the mine on 10 August 2022. Notices were placed in English, refer to **ANNEXURE G**.

The site notices provided an overview of the project and highlighted the applicable legislation, environmental authorisation/ permits applicable to the project. They also outlined the stakeholder engagement process to be followed and where relevant information could be obtained from. A locality map of the project site was included in the site notice. Details of the open day and how stakeholders can register as I&APS were included in the site notice. Pictures and co-ordinates of where the site notices were placed were also recorded in the the proof of site notice register. Refer to ANNEXURE G.

9.4 NEWSPAPER ADVERTISEMENT

An Advertisement notifying the public of the submission of the EA Application, as well as the process to be followed; and requesting I&APs to register their comments with the EAP, was placed, in English in the Daily Sun newspaper on Thursday, 11 August 2022, in accordance with regulation 41(2)(c) and (d) of the EIA Regulations of 2014 (as amended in 2021), refer to **ANNEXURE G**.

The advert included the following details:

- Brief project description.
- Legal framework and competent authority.

- How stakeholders can access the Draft BA&EMPr for public review and comment.
- The details of the open day.
- Process to register as I&APs.
- The contact details of the stakeholder engagement consultants.

9.5 DIRECT NOTIFICATION OF IDENTIFIED I&AP'S

The following identified stakeholders inter alia were directly informed of the proposed project via email and/or SMS and provided with Background Information Documents (BIDs):

- The owners and occupiers of land within the MR area;
- The owners and occupiers of land adjacent to the MR area;
- Waterberg District Municipality;
- Mogalakwena Local Municipality
- Mogalakwena Local Municipality: Ward Councillors and Traditional Councillors;
- Department of Forestry, Fisheries and the Environment (DFFE);
- Department of Agriculture, Forestry and Fisheries (DAFF);
- Department of Mineral Resources and Energy (DMRE)y: Limpopo Province
- Limpopo Economic Development, Environment and Tourism (LEDET)
- Limpopo Department: Agriculture, Rural Development and Land Reform (DRDLR)
- Department of Water and Sanitation (DWS): Limpopo Province;
- Limpopo Department of Cooperative Governance Human Settlements and Traditional Affairs (CoGHSTA);
- Limpopo Department Roads and Public Works;
- Limpopo Department of Health; (DoH)
- Limpopo Department of Social Development (DSD);
- Department of Roads & Transport: Limpopo Region (DRT);
- Department of Transport and Community Safety (DTCS);
- Roads Agency Limpopo SOC Ltd (RAL);
- South African Heritage Resources Agency (SAHRA);
- Limpopo Heritage Resources Authority (LIHRA);
- Limpopo Tourism Agency – Witvinger Nature Reserve;
- ESKOM;
- South African National Roads Agency SOC Ltd (SANRAL);
- Local headmen (Tshamahansi, Mosesetjane, Magongoa, Mozambane; Ga-Mokaba and Ga-Masodi communities etc.); and
- Persons and Organisations of Interest (Kopano Formation Committee, Mogalakwena Mining Communities, SANCO, Tshamahansi Civic Organisation).

In addition, hard copies of the BIDs were placed at the following locations:

- Mogalakwena Public Library;
- Somavugha Secondary School in Tshamahansi;
- Mosesana Baloyi Primary School in Tshamahansi;
- Nkgodi Siphungo Primary School in Ga-Magongwa;

- Lekwa Secondary School in Ga-Kgubudi;
- Mzombane Supermarket; and
- Senayo Liquor Restaurant.

BIDs were distributed in English. A copy of the BID together with the delivery register is provided in **ANNEXURE G**.

Comments received were responded to via email depending on the contact details provided and captured in a Comments and Responses Register (CRR), refer to **ANNEXURE G**.

9.6 OPPORTUNITY TO REVIEW AND COMMENT ON THE DRAFT BA&EMPr

The EIA Regulations 2014 (as amended) specify that the Draft BA&EMPr must be subjected to a public participation review process of at least 30 days, as such the Draft BA&EMPr was made available for review from the 11th of August 2022 to the 9th of September 2022. The project and availability of the Draft BA&EMPr was announced to the public as detailed in **Section 9.3**, **Section 9.4** and **Section 9.5**.

The Draft BA&EMPr was distributed for comment as follows:

- An electronic copy was made available on the OMI website
 - OMI Website Link: <https://omisolutions.co.za/public-review-projects/>
- A hard copy was also made available at the following venue:
 - Mogalakwena Public Library, Address: Chroompark, Mokopane, 0656

Identified organs of state and potential I&APs were notified of the availability of the Draft BA&EMPr via notification letters as per **Section 9.5**.

9.7 PUBLIC OPEN DAY

A public open day was held during the review period of the Draft BA&EMPr; to provide I&APs with the opportunity to raise issues and comments and ask specific questions in the presence of the relevant consultants on the project as well as to explain the authorisation process and associated timelines. The public open day was advertised in the Daily Sun newspaper as per **Section 9.4** above. All issues raised by the I&APs during the public open day are included to the CRR (**ANNEXURE G**). The public open day took place as follows:

- Friday the 26th of August 2022 at the Park Hotel (Corner Thabo Mbeki & Beitel Streets, Mokopane), during the following time slots:

Time Slots
09:00 to 10:00 am
10:30 to 11:30 am
12:00 to 13:00 pm
14:00 to 15:00 pm
15:30 to 16:30 pm
17:00 to 18:00 pm

9.8 FINAL REPORT

The Final BA&EMPr was updated following the public review period of the Draft BA&EMPr, to incorporate the comments received and issues raised by I&AP's. The Final BA&EMPr was submitted to the DMRE on/or before the 15th of September 2022.

All comments received from I&APs and organs of state and responses are included in this Final BA&EMPr submitted to the Competent Authority (CA), the DMRE. Any additional comments received will be forwarded to the DMRE (if received after the commenting period).

9.9 PROTECTION OF PERSONAL INFORMATION ACT 4 OF 2013

In compliance with the Protection of Personal Information Act (Act No. 4 of 26 November 2013) (POPIA), any personal information provided to OMI was exclusively used as part of the above public participation process and will therefore not be utilised for any other purpose, other than that for which it was provided. No additional copies will be made of documents containing personal information unless consent has been obtained from the owner of said information. Records of personal information will be retained no longer than reasonably required for lawful purposes. OMI's privacy statement is available to view on www.omisolutions.co.za.

9.10 SUMMARY OF ISSUES RAISED BY I&APS⁴⁸

The following comments, issues and questions relating to the Platreef Solar PV Project were raised during the public participation process for the project:

- The country is faced with an energy supply security challenge; we therefore should participate in efforts by companies like Ivanplats to get a new energy mix. The problems faced by Eskom are enormous and we need to bring additional capacity to the grid. I think our government is fully seized with the challenge. In conclusion, we support the application for the DMRE to authorise Ivanplats to proceed with the envisioned project. It will have positive spinoffs for jobs and training opportunities for young people as the majority of the population in Mosesetjane Village are involved in sorting of waste and related to energy.
- Will the solar facility provide power to the community or to the mine.
- Will the graves along the R518 be affected.
- Mention is made in the presentation that the mine is located in a water scarce area, yet the mine is dewatering.
- It would be a good idea for the public open day presentation to be presented at schools to educate learners on possible careers in the environmental sciences and promote career development under the youth.
- An objection to the application was raised as follows: The Mogalakwena Mining Communities (MMC) objects to this application as it is overridden by Section 4 and 7 of the National Environmental Management: Protected Areas Act, Act 57 of 2003 (NEMPAA), which prohibits any intentions to develop a formally protected area. Furthermore, it is noted that Ivanplats has met the prerequisite of obtaining the landowners' consents to submit this application. Under the NEMPAA, we expected the Regional Manager to reject the application.

Presuming that the Regional Manager has in fact issued a letter of acceptance for this application, we contend that the Regional Manager ought not to have done so prior to the exhaustion of the Section 54 process that is ongoing between Ivanplats and the MMC.

Lastly, we expect the Regional Manager to notify us that he has referred this objection to the Regional Mining Development and Environmental Committee (RMDEC) and that the Secretariat of the RMDEC will engage us.

- In line with the above objection, the following comments were raised, amongst others:
 - An application for mining rights submitted in 2013. [This objection was successful in that it resulted in the exclusion of mining at Portion 0 of Turfspruit as land contemplated in section 48(1) of the MPRDA (which is subject to section 48(1) of the NEMPAA, which in turn prohibits commercial mining in a formally protected area)].
 - An integrated application for amendment to the mining rights () and environmental authorization () in March 2016. [This objection was successful in that the application lapsed as it was not decided on within 107 days by the DMRE].
 - An application for the fourth amendment of the EA in October 2021. [The decision of the DMRE to approve the Final Scoping Report despite the objection to this application was appealed against based on the Promotion of Administrative Justice Act, Act 3 of 2000 (PAJA) and NEMA environmental management principles. This appeal is still adjudicated by the appeal authority - Minister Creecy of DFFE].

⁴⁸ Required as per the EIA regulations Appendix 2 (g) a full description of the process followed to reach the proposed preferred activity, site and location of the development footprint within the site, including (iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them

- The fenced-off area where Ivanplats is currently conducting commercial mining was in June 2013 proposed to be the location of its main surface infrastructure for its proposed underground mining, as per the attached sketch plan because, amongst other things, Ivanplats did not comply with the consultation and consent requirement prescribed under the Interim Protection of Informal Land Rights Act, Act 31 of 1996 (IPILRA) and consultation required under the NHRA. On 30 May 2014 the DMRE excluded the area in terms of section 54(1)(c) as land reserved in terms of these two laws. Your attention is drawn to the facts that:
 - The sites earmarked for the location of the solar plant comprises subsistence cultivation plots allocated to the residents of Ga-Magongoa village in terms of customary law. These customary land rights are directly recognised by and protected under the IPILRA, hence in the letter granting mining rights the words "protected areas" are expressly used.
 - The words were used also to protect informal graves identified in the area, including the graveyard of the Mphoshi family that is still in place within the earmarked area. Ivanplats cannot dispute that the grave is in place, as this would constitute disrespect for the Mphosi family cultural rights. This grave is protected under the NHRA, hence on 4 November 2014 the DMRE coined Ivanplats' responsibility to respect this protection by explicitly imposing Condition 23 in approving the EMPr. It was because of the existence of this and many other informal graves observed during the site inspection of the fenced-off area conducted on 18 December 2014 that on 24 December 2014 Ivanplats was directed to immediately stop mining in the area as such constitutes violation of Condition 23 of the EMPr.
 - Significantly, Ivanplats has during the applications for mining rights and water use licence ignored following due process set out in section 2(4) of the IPILRA pursuant to obtaining the consent of informal land rights holders (communal land rights holders; individual land rights holders). As a mining rights holder Ivanplats is in terms of section 25(2)(d) of the MPRDA obliged to comply with IPILRA, which is also a land use management authority under the Spatial Planning and Land Use Management Act, Act 16 of 2013 (SPLUMA). Accordingly, the land would be developed without the owners' consent (the Ndebele Vaaltyn Tribe as de facto owners and the Minister of Agriculture, Land Reform and Rural Development as nominal owner and public trustee) and without change in land used and thus illegally under SPLUMA.
 - It is noted that Ivanplats is still relying on a Surface Use and Co-operative Agreement (SUCA), which was struck down by both the DMRE (in 2012) and the Department of Rural Development and Land Reform (DRDLR) (in 2014, as per the attached letter from the national office). Significantly, Kgoshi L.V. Kekana and the four headmen falsely stated that they were authorized by the DRDLR to enter into this agreement. As already stated, Ivanplats failed to subsequently correct the situation by complying with the IPILRA.
 - Our contention is that IPILRA is protectionist legislation. Like the NEMPAA, it trumps the MPRDA and the NEMA.
 - Your consultancy firm should use its own independent legal advice or opinion before submitting a Final BA & EMPr.
 - In 2016 we successfully objected to an application for amendment of the mining rights which Ivanplats disguisedly submitted pursuant to include this excluded area into the mining rights area, in that the DMR failed to decide on the application within 107 days. On 22 May 2017, Ivanplats submitted an application in terms of Regulation 29 of the EIA Regulations for alignment of the NEMA EA and the MPRDA EMPr but mischievously included new activities such as storm water drain that was proposed for the first time in the 2016 application. This alignment application was also not decided within 107 days but significantly, it did not seek to amend Condition 23 of the EMPr and

as such the prohibition against mining in the area still stands as expressly stated in the approval letter dated 18 June 2018.

Ivanplats denies that it has ever applied for the amendment of the mining rights granted on 30 May 2014.

- Confirmation from the national office of the DRDLR that a senior traditional leader and traditional councils are not authorized to conclude surface use or lease agreements. They are also not authorized to consent to commercial development on communal and state land, noting that the lawful authority is IPILRA and that this legislation does not even feature the words senior traditional leader or traditional council.
- Consequently, the SUCA does not constitute legal consent of the informal land rights holders under the IPILRA and the State Land Lease and Disposal Policy.

Please refer to the CRR in **ANNEXURE G** for all the comments received during the public participation process and the EAP's responses thereto.

10 THE ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE DEVELOPMENT FOOTPRINT ALTERNATIVES⁴⁹

The following section provides baseline environmental attributes associated with the project area as undertaken by the relevant specialists appointed for the proposed project, as well as existing information provided by the applicant.

10.1 CLIMATE

The Platreef Mine is situated within an area that comprises average summer temperatures of 24.4°C, with February being the hottest month of the year. The warm season lasts for 6 months i.e., October to March. Average winter temperatures of 13.1°C in July. Precipitation is the lowest in July, with an average of 3 mm. Most of the precipitation occurs in January, averaging 115 mm (Digby Wells Environmental, 2021). The relative humidity did not vary that much throughout the year 2021 (around the 60% mark), except for the slight increase in July. Hence, winter was more humid (with relative humidity value of reaching 70%) (Digby Wells Environmental, 2021).

When considering the climate change risks of the overall mining right area, Graham (2021) indicates that hazards such as wildfires are predicted to be at high risk of occurrence in the project location, thus Ivanplats must investigate climate change adaptation strategies such as altering the physical design of mining operations or infrastructure, implementing business procedures, and altering operating patterns.

Furthermore, Graham (2021) states that in terms of greenhouse gas emissions, the bulk of the emissions impact of the Platreef Project will be electricity consumption and transportation of materials. It must be noted that this report is taking a Life Cycle Assessment (LCA) approach. However, considering that Ivanplats is proposing to develop a solar facility which is renewable energy, it is anticipated that this would reduce any cumulative impacts of greenhouse gas emissions.

10.2 GEOLOGY

The project area is located on the Northern Limb of the Bushveld Igneous Complex (BIC). The BIC intrudes onto the Transvaal Supergroup, forming a massive igneous province up to 7 km in thickness, extending

⁴⁹ Required as per the EIA regulations Appendix 2 (g) a full description of the process followed to reach the proposed preferred activity, site and location of the development footprint within the site, including (iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;

over 60 000 km². The BIC is the world's largest layered intrusion and the world's largest source of platinum (Cawthorn, 1999). The BIC is divided into four exposed sections, known as the Eastern, Western, Northern and Southern Limbs. A fifth section, the Bethal Limb, is located under younger sedimentary cover and does not out crop.

Typically, the BIC consists of a mafic–ultramafic layered suite, a granite suite, and a package of predominantly felsic volcanic rocks. Emplacement of the complex appears to have been rapid, with both intrusive and extrusive rocks dated to about 2 057 Ma (Harmer, 2000 cited in Kinnaird et al., 2005).

10.3 TOPOGRAPHY AND DRAINAGE

A topographical and visual assessment was undertaken by Digby Wells in 2013 and in 2016. The project area falls within the Limpopo River Catchment Area with the perennial Mogalakwena River flowing along the western boundary. Floodplains occur along the Mogalakwena River on the south-western boundary of the project area with several non-perennial streams flowing in a westerly direction through the project area. The project area is situated within the Mogalakwena River valley. Mountainous areas run to the east and west of the project area. The project area is relatively flat except for the mountainous area in the north-eastern corner and several isolated ridges. The land within the project area is mainly used for agricultural activities and livestock.

The topographical model indicates that the elevation of the project area increases from 1 028 metres above mean sea level (mamsl.) in the Mogalakwena River floodplain in the south-western corner to 1 747 mamsl. on the ridges in the north-eastern corner of the project area. The majority of the project area has gentle slopes of less than 2.8°. Slopes of between 2.9° and 8.5° occur near the base of the ridges in the north-east of the project area. Moderate slopes of between 8.6° and 16.6° occur at the foot of the ridges. The steepest slopes occur on the ridges and range between 16.7° and 56.6°.

The slope aspect / direction of the project area is generally in a westerly and south-westerly direction towards the Mogalakwena River. Slopes of various other directions occur in isolated areas along the river valleys and on the ridges.

10.4 SOIL TYPE AND LAND CAPABILITY

The majority of the soils within the project area are dominated by the soils of the Nkonkoni/Vaalbos formation and to a lesser extent soils of the Witbank formation. The entire solar PV areas 1 and 2 are comprised of the Nkonkoni/Vaalbos soil formation, whereas the solar PV area 3 site comprises soils of the Nkonkoni/Vaalbos and Witbank formations.

The identified Nkonkoni/Vaalbos soil formation are of moderate (Class III) land capability, and suitable for arable agricultural land use with restrictions. Therefore, these soils are considered able to make a moderate contribution to agricultural productivity on a regional and national scale. Additionally, land potential is categorised as L3, meaning it is of infrequent and/or moderate limitations due to soil, slope, temperatures or rainfall. Appropriate contour protection must be implemented and inspected. The Witbank soil formation has very poor (class VIII) land capability due to the significant disturbance that has occurred as a result of mining activities. This has led to the long-term alteration of the soil physical chemical properties such that these soils are no longer viable for agriculture. These soils are therefore not considered to make a significant contribution to agricultural productivity, even on a local scale. **Table 11** below presents the dominant soil forms and the respective land capability as well as areal extent expressed as hectares as well as percentages. Maps showing the relevant soil form, land capability and land potential are provided in **Figure 13**, **Figure 14**, and **Figure 15** respectively.

Table 11: Identified Soil Forms Within the Project Area and the Respective Land Capability

Soil Form	Land Capability	Area (ha)	Percentage (%)
Nkonkoni/Vaalbos	Arable (Class III)	18.55	94.7
Witbank	Wilderness (Class VIII)	1.03	5.3
Total Enclosed Area		19.58	100

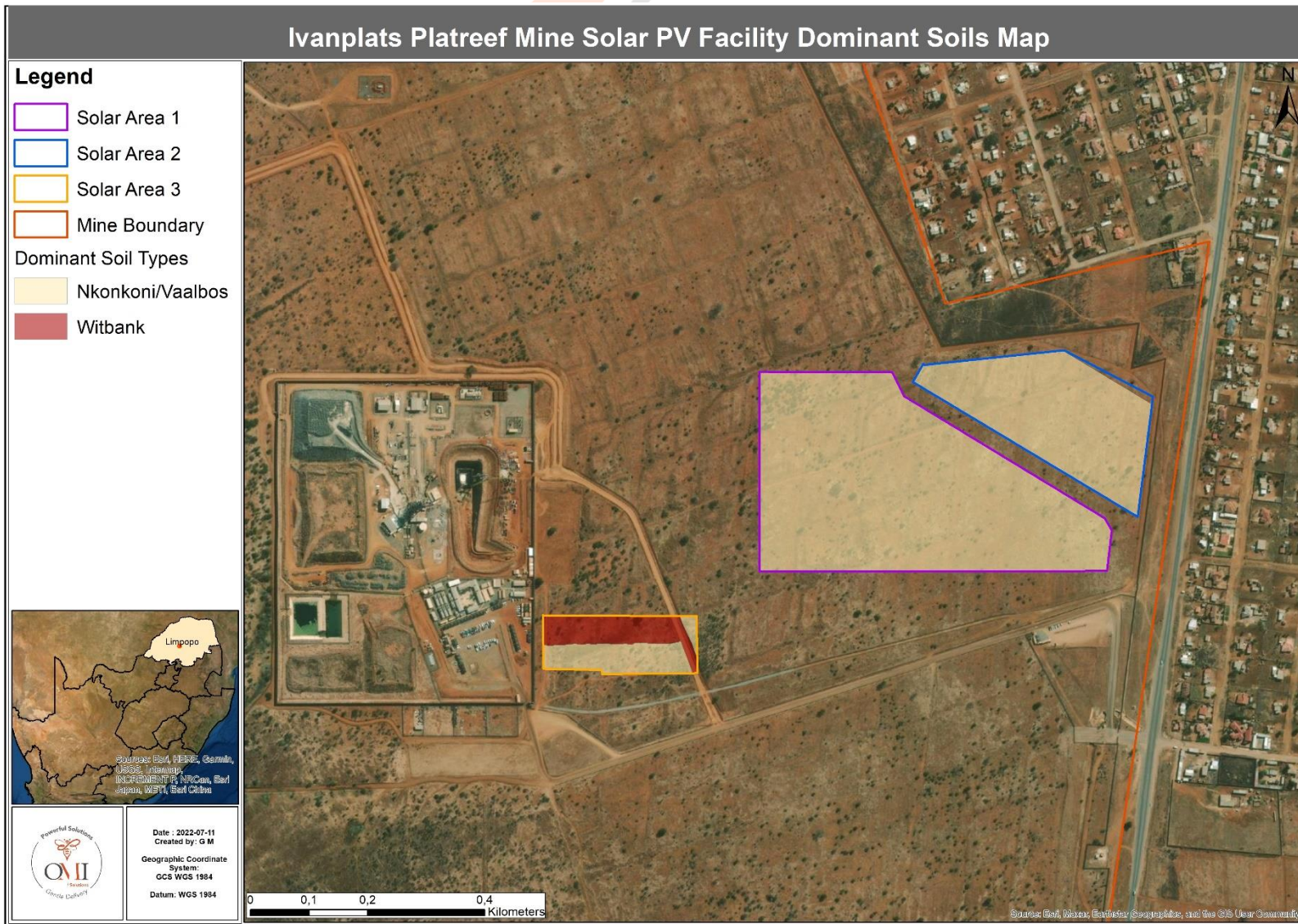


Figure 13: Map Showing the Dominant Soil Forms within the Proposed Solar PV Facility Area

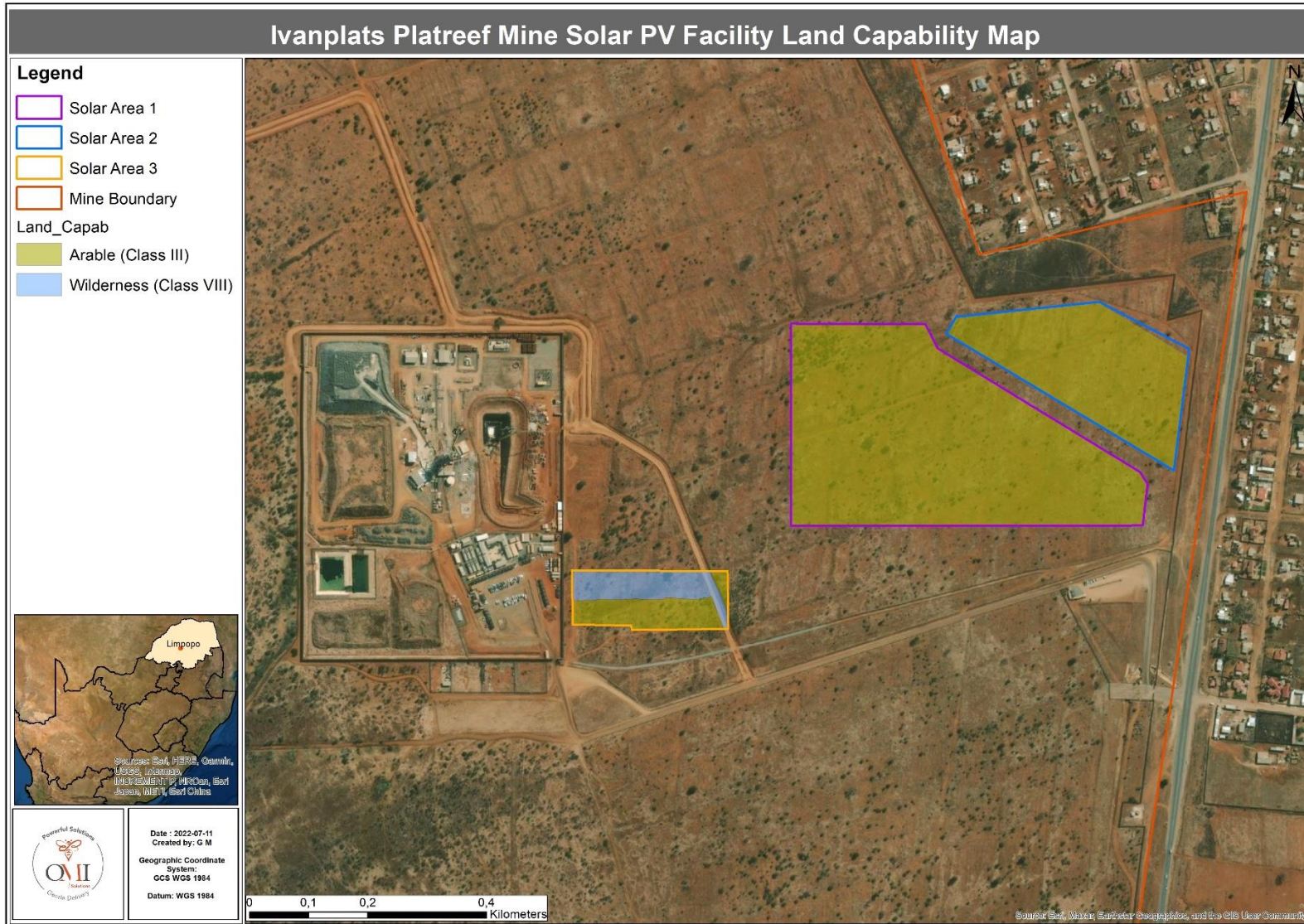


Figure 14: Map Showing the Land Capability Within the Proposed Solar PV Facility Area

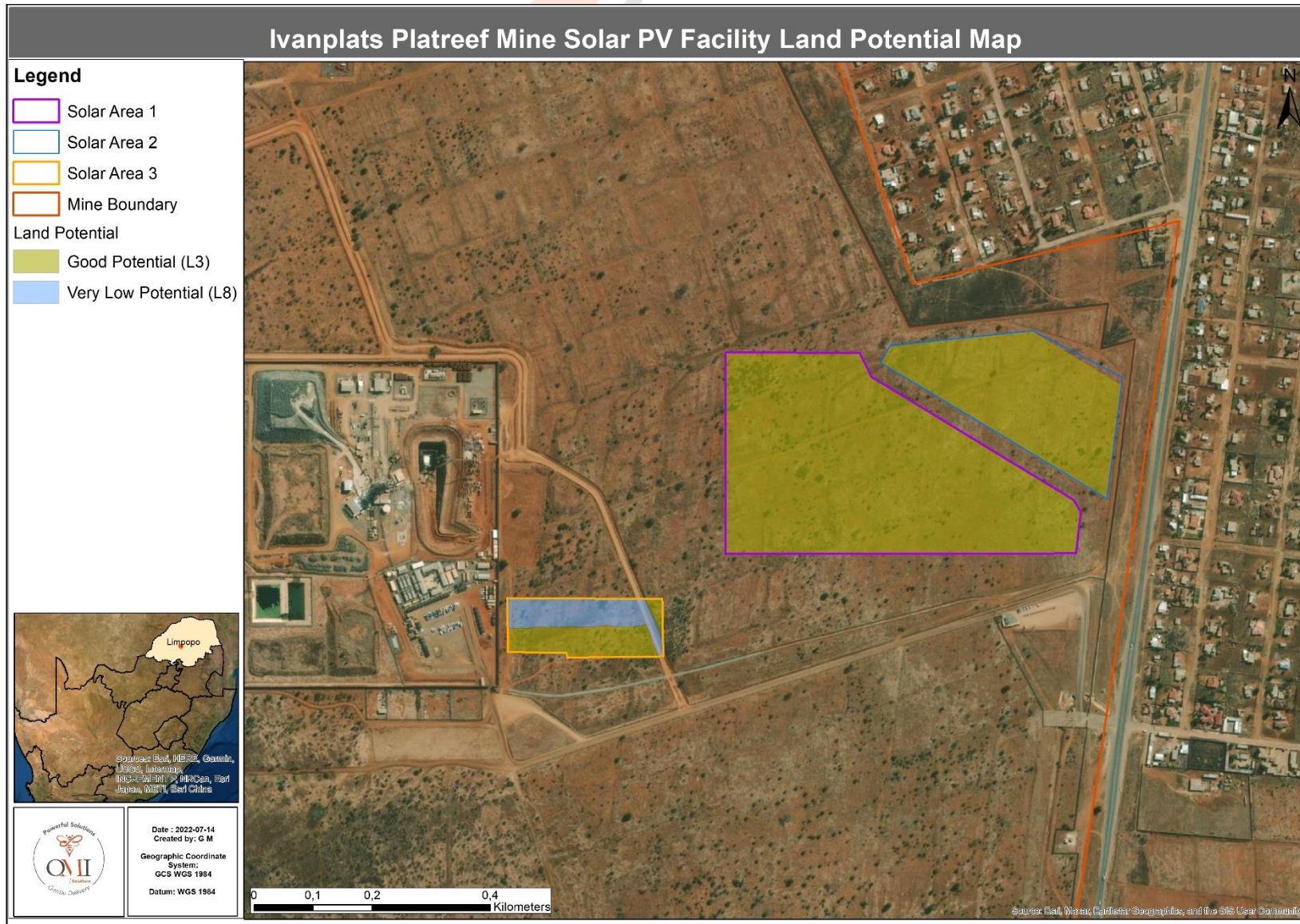


Figure 15: Map Showing the Land Potential Within the Proposed Solar PV Facility Area

10.5 SURFACE WATER

10.5.1 WATER MANAGEMENT AREA

The project area is situated in the catchment area of the Mogalakwena River and the quaternary catchments A61F and A61G, with the Limpopo Water Management Area (WMA). The proposed solar facility is located within the A61G quaternary catchment indicated in **Figure 16**. A61F is drained by the Rooisloot and A61G by the Mogalakwena River. The project area is located approximately 7 km west of the Mogalakwena River. The Nyl River is the headwaters of the Mogalakwena River and flows in a north easterly direction from Modimolle located in the headwaters of the Nyl River, towards Mokopane. At Mokopane, the Nyl River becomes the Mogalakwena River and turns to flow in a north westerly direction pass Mokopane and the project area (Digby Wells Environmental, 2021).

The Mogalakwena River flows approximately 5 km to the west of the project area and ultimately flows into the Limpopo River. The sub-catchment drainage of the Mogalakwena River is characterised by the presence of non-perennial streams, vleis and wetlands along its drainage course on both the Turfspruit and Macalacaskop farms. The Sterk River is a major tributary of the Mogalakwena River and joins the Mogalakwena River from the west some 30 km below the project area. The Doorndraai Dam, located on the Sterk River is the main water supply dam for Mokopane.

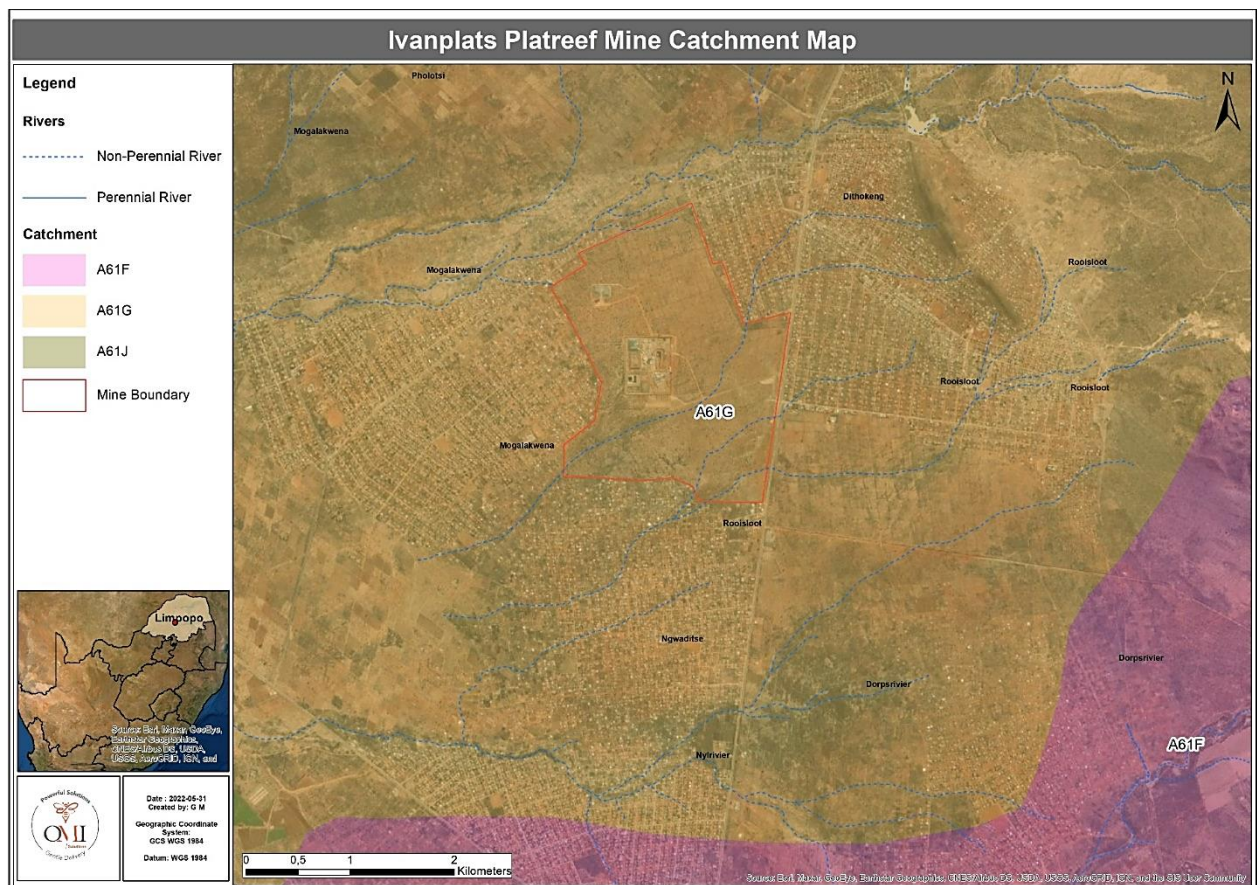


Figure 16: Map Showing Quaternary Catchments in Relation to the Project Area

10.5.2 FRESHWATER FEATURES

10.5.2.1 DESKTOP ASSESSMENT

From a desktop perspective, the following assessment is noted for the project area:

- No rivers, natural wetlands, and/or artificial wetlands were indicated by the National Freshwater Ecosystem Priority Areas (NFEPA) or National Biodiversity assessment (NBA) Database to be within the proposed solar facility area or its associated investigation area.
- The proposed solar facility does not fall within a Strategic Water Source Areas of South Africa (SWSA).
- For the aquatic biodiversity theme in terms of GN 320, the proposed solar facility is considered to have an overall low aquatic sensitivity.

10.5.2.2 WATERCOURSE DELINEATION

According to Scientific Terrestrial Services (2022a) no watercourses from an ecological perspective were identified within the solar facility development footprint or its associated 500 m investigation area. This site observation confirms the Screening Tool results and the desktop investigation findings. The 1:50 000 topographical maps from 2014 (**Figure 2**) for the 2428 BB Quarter Degree Square (QDS), however, identified preferential surface flow paths within the investigation area (**Figure 17**). During the site assessment, these were found to no longer be functional, and the linear features no longer existed within the landscape due to the land-use in the area. Where these preferential surface flow paths previously existed, there are isolated patches of damp red soil similar to soils throughout the rest of the investigation area.

10.5.2.3 APPLICABLE ZONE OF REGULATION

The following Zone of Regulation (ZoR) is applicable to the preferential surface flow paths **Figure 18**:

- A 32 m (NEMA) ZoR in accordance with NEMA.

Solar Area 3 falls outside the 32 m (NEMA) ZoR and marginally encroaches on the 100 m (GN 509) ZoR regulated zone but is not traversed by any preferential surface flow paths. Although the proposed Solar Area 1 and Solar Area 2 development footprint areas fall within the 32 m (NEMA) ZoR and are within the 100 m (GN 509) ZoR of the preferential surface flow paths (**Figure 18**), the proposed solar facility poses a low risk to these preferential surface flow paths as these have over the years been degraded and thus are no longer extant or functional from an ecological perspective. However, should these areas be developed, cognisance should be taken of the flood lines as referenced in the Digby Wells Surface Water Assessment report for the Platreef Mine (December 2021 # IVA6895)⁵⁰ which may potentially affect the preferential surface flow paths.

Ivanplats proposes to construct a diversion channel to divert water around the mine and solar areas and construct a cut-off drain diverting all stormwater flows to an attenuation dam at the south-eastern corner of the mine. From here the water will be controlled and discharged at the south-western corner of the site via a storm water channel to the Mogalakwena River system downstream to the south. The water use licensing for this diversion will be applied for with the relevant authorities.

⁵⁰ Digby Wells Environmental. 2021. Surface Water Assessment for the Proposed Additional Infrastructure at the Platreef Mine in Limpopo Province, South Africa. Surface Water Impact Assessment Report. #IVA6895. December 2021.

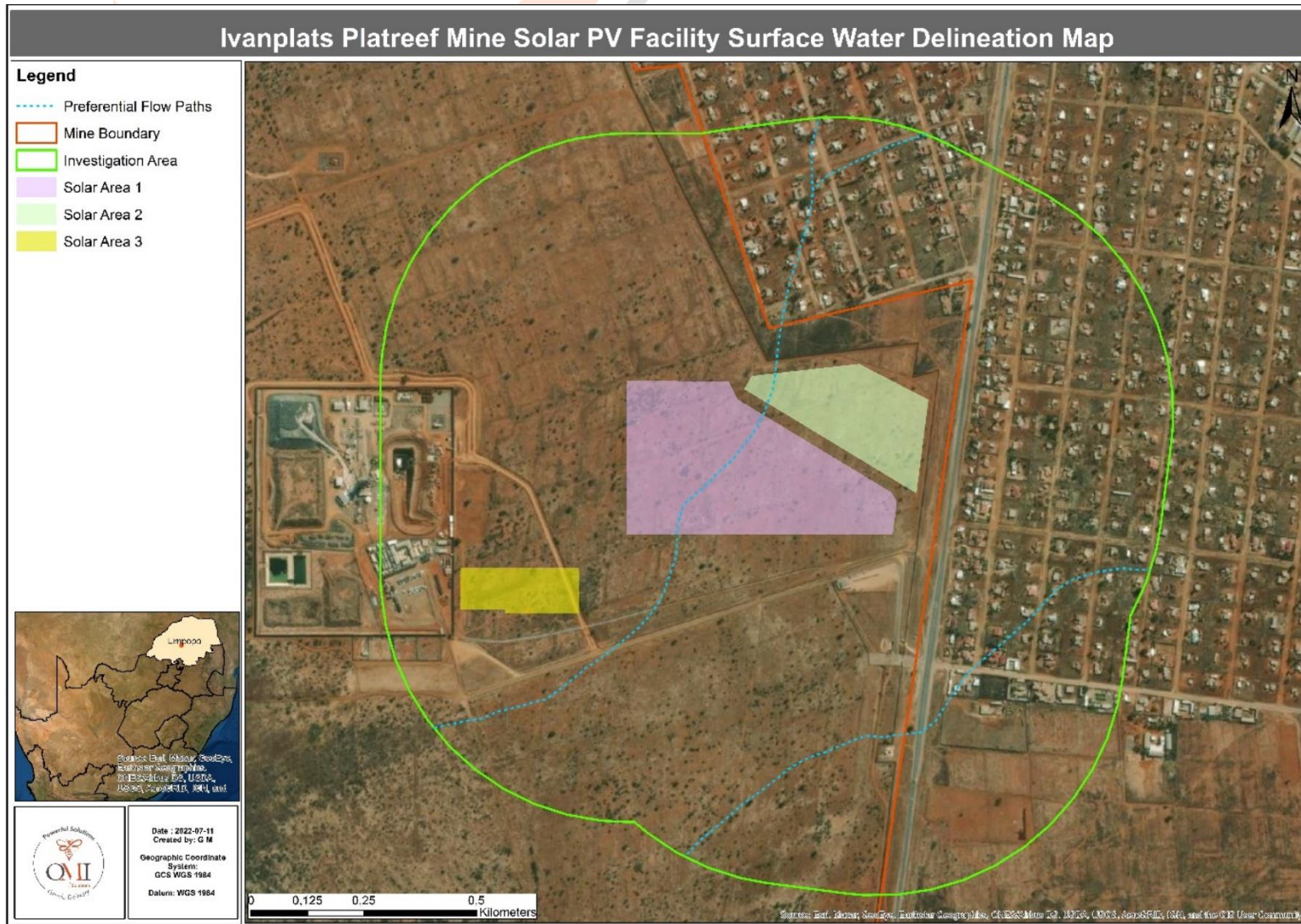


Figure 17: Identified Preferential Flow Paths Within the Investigation Area, based on the 2014 Topographic Map and Depicted on Digital Satellite Imagery

10.6 BIODIVERSITY (FLORA AND FAUNA)

Scientific Terrestrial Services (STS) (Scientific Terrestrial Services, 2022) compiled a compliance statement for the proposed solar facility as the DFFE Environmental Screening Tool indicated a low Plant and Animal sensitivity for the project area. As part of the compliance statement, STS undertook a field investigation on 25 May 2022 to ground truth the desktop findings. The following sections provide findings of the Plant and Animal sensitivities.

10.6.1 DESKTOP ASSESSMENT

From a desktop perspective, the following assessment is noted for the project area:

- The project area is in the Savanna Biome and the Central Bushveld Bioregion. The associated vegetation type is the Makhado Sweet Bushveld (SVcb 20) vegetation type. According to the 2018 National Vegetation Map (SANBI 2018a) as well as the National Biodiversity Assessment (SANBI 2018b), this vegetation type has a Least Concern (LC) ecosystem threat status and is poorly protected (**Figure 19**).
- According to the South African Protected and Conservation Areas Database (SAPAD) (2021 Q4) and the National Protected Areas Expansion Strategy (NPAES) (2010) datasets, the project area is not within any protected areas, although the Witvinger Nature Reserve and the Limpopo Central Bushveld NPAES Focus Area are present within 10 km of the site (**Figure 20**).
- According to the Limpopo Conservation Plan (2018 dataset), the project area is mapped in an area where there is No Natural Habitat Remaining (**Figure 21**).

10.6.2 FIELD INVESTIGATION

Field survey results indicate that the project area largely comprises open bushveld where the habitat is in a secondary state of succession (referred to as “Secondary Grassland” in the 2013 Digby Wells Environmental report). Approximately half of Solar Area 3, however, has already undergone vegetation clearance⁵¹. Historically, the project area was associated with an agricultural land use, which is likely the reason for the “Low” sensitivity produced by the screening tool report.

Active cultivation appears to have ceased prior to 2012 and as such the vegetation is still considered indigenous vegetation⁵² (as per the definition in the NEMA Listing Notices). The exact time of cultivation ceasing in the project area is unknown, however, following the precautionary principle, it is assumed that no disturbance of topsoil took place within the past ten years and thus the vegetation can be classified as indigenous vegetation.

⁵¹ Clearance of Indigenous Vegetation Explanatory Document. May 2017: Clearance is referred to as “Ploughing of land, bulldozing of an area, eradication or removal of vegetation cover with chemicals, amongst others, constitutes clearance of vegetation, provided that this will result in the vegetation being eliminated, removed or eradicated.”

⁵² “Indigenous vegetation: refers to vegetation consisting of indigenous plant species occurring naturally in an area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding 10 years.”

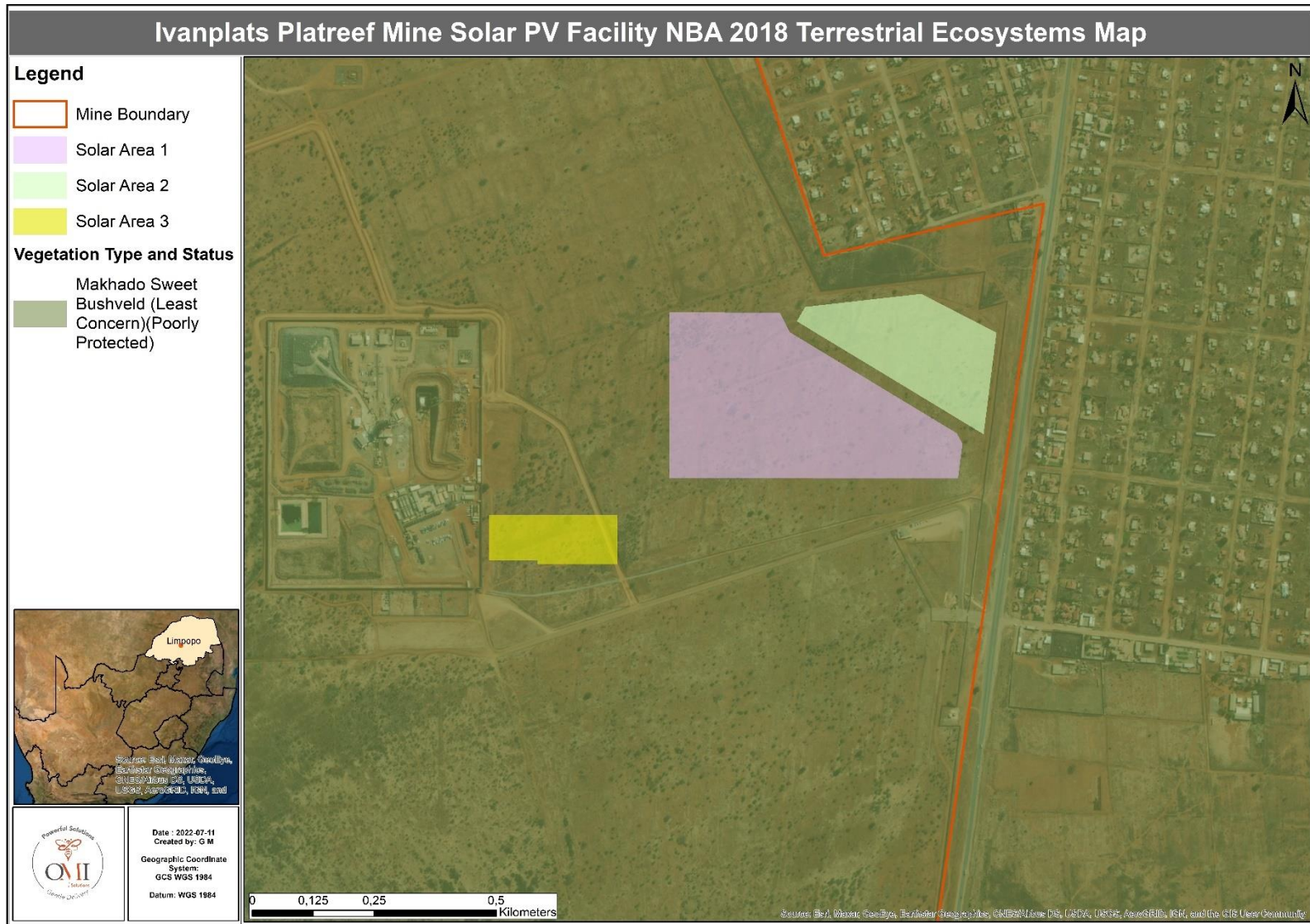


Figure 19: Map Showing National Biodiversity Terrestrial Ecosystems (2018)

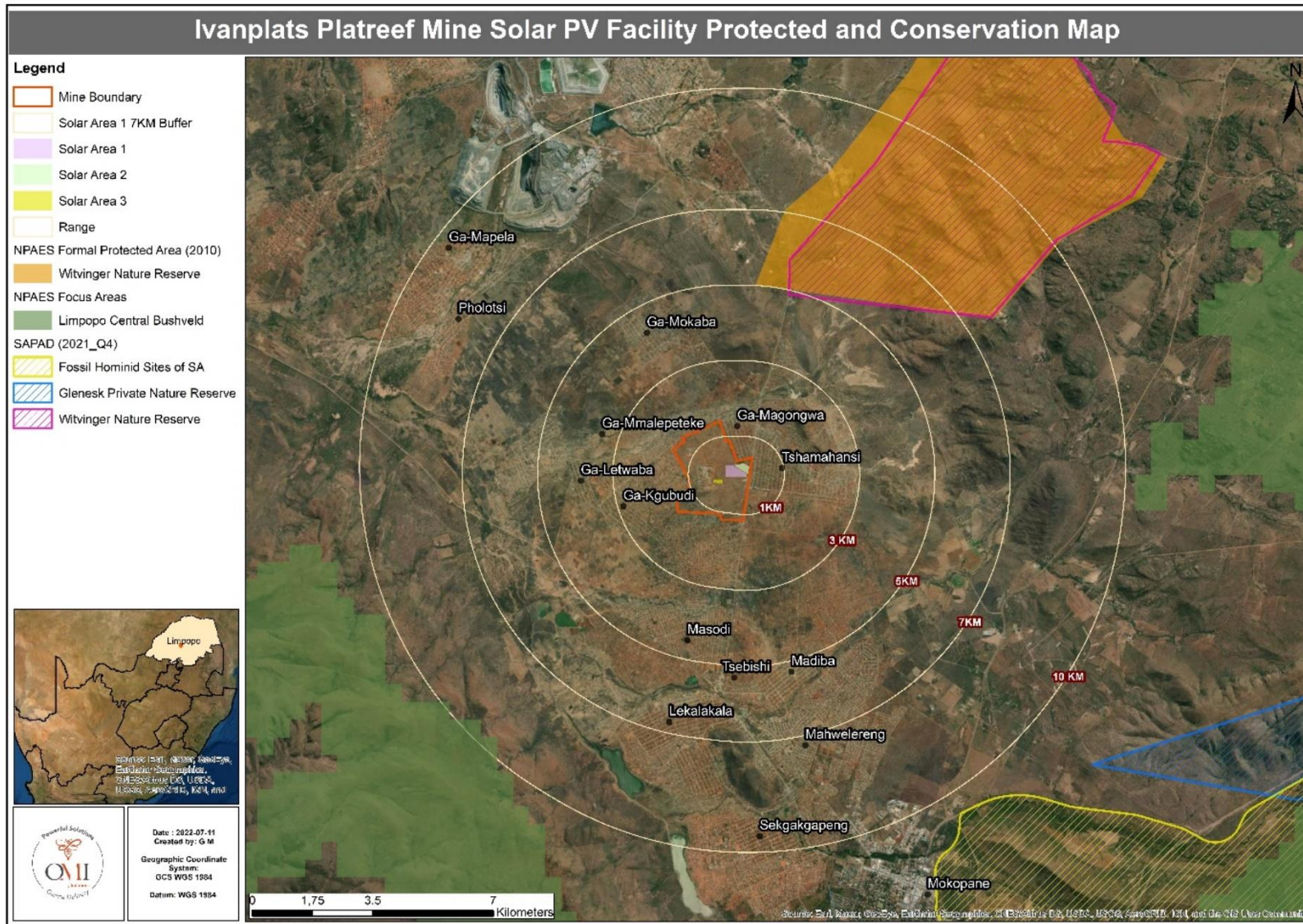


Figure 20: Map Showing the Protected and Conservation Areas (Various Databases)

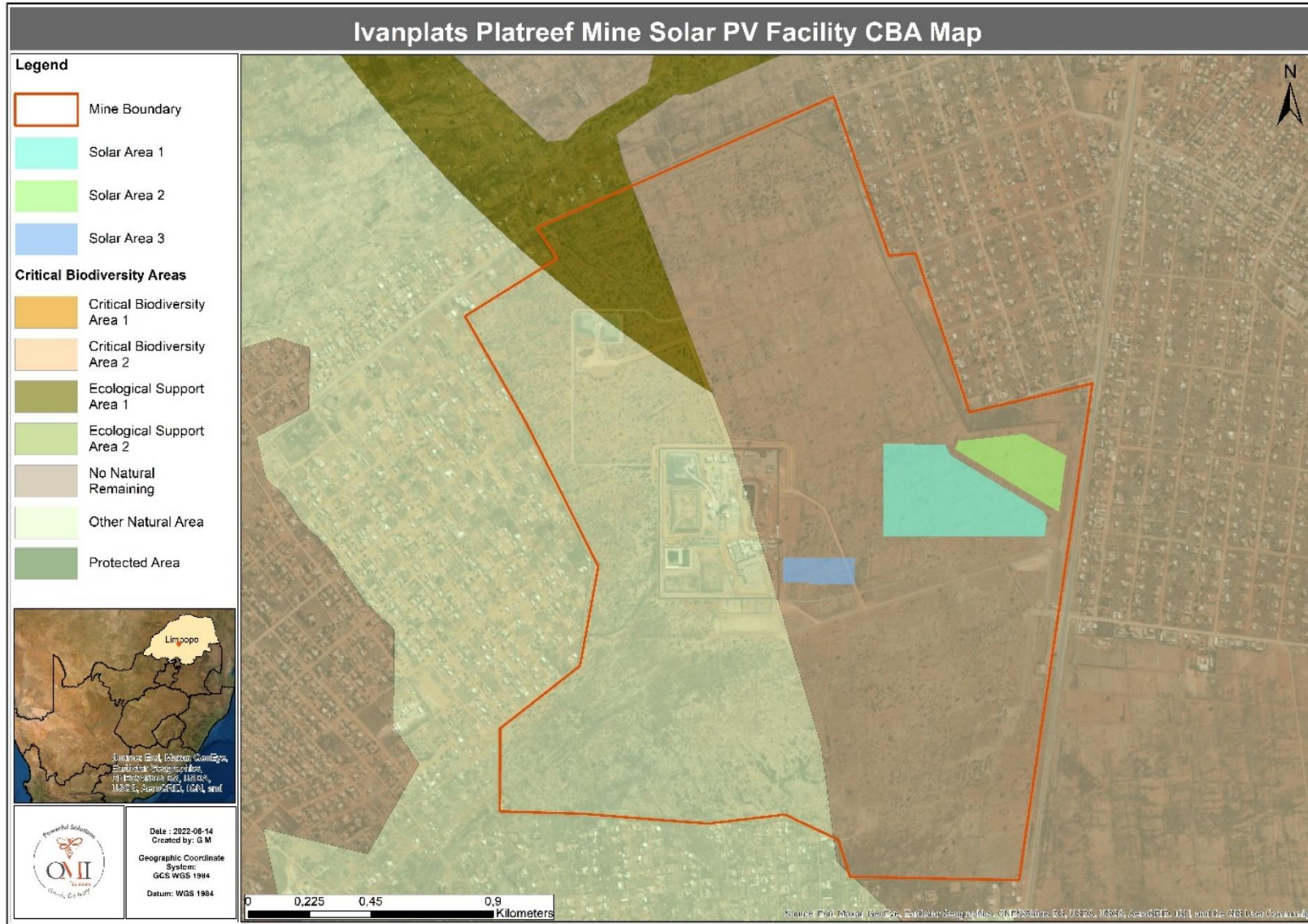


Figure 21: Map Showing the Limpopo Conservation Plan in Relation to the Solar PV Facility

10.6.2.1 FLORAL AND FAUNAL HABITAT

Currently, the habitat in the project area is over utilised by livestock (e.g., cattle) which has resulted in large stretches of bare ground. As is typical for historically cultivated lands, the vegetation communities were homogenous and overall, the habitat was sparsely vegetated. Grass species such as *Heteropogon contortus*, *Hyparrhenia hirta* and *Aristida congesta* were often dominant within the graminoid layer (a typical indicator of poor veld conditions).

Thorn trees were sparsely scattered throughout the project area, interspersed with isolated occurrences of broad-leaf species such as *Ziziphus mucronata* and the National Forestry Act (NFA)-protected *Combretum imberbe* and *Sclerocarya birrea subsp. caffra*. Forbs were largely absent.

Alien and invasive plant (AIP) species were restricted to areas of anthropogenic disturbances such as along roads, fences, and historic structures.

Taking into account the presence of poor veld conditions and the historical land use of the project area, it is highly unlikely that floral or faunal species of conservation concern will be able to establish viable populations.

Due to the largely lacking vegetation cover, the project area does not provide ideal habitat or food sources to support a diversity of faunal assemblages. The tree component provides perching and nesting habitat for several, albeit common, avifaunal species, and with the seasonal flowers attracting common invertebrates. The project area was noted to be associated with moderate harvester termite (common and widespread species) activity collecting remnant plant material from the cow dung due to lack of vegetation resources. Smaller common rodent species are likely to utilise the habitat in the project area, whereas larger mammals are less likely to reside (or move through) the project area due to high levels of anthropogenic activities, fences, and possible hunting of such species by local communities.

There is a relatively large number of *Lepus saxatilis* (Scrub hare, LC) within the project area which likely make use of the fenced-off area as refuge from the local communities. Previous assessments have noted the presence of four protected fauna species in the area, namely *Pelea capreolus* (Grey Rhebok), *Heterohyrax brucei* (Yellow-spot Dassie), *Mycteria ibis* (Yellowbilled Stork) and *Platalea alba* (African Spoonbill). These species were, however, found in the more sensitive areas where ridge habitat and bushveld are still intact. From a faunal perspective, the presence of faunal species of conservation concern within the study area is unlikely given the level of anthropogenic disturbances and the notable lack of suitable habitat.

10.7 SOCIO-ECONOMIC ENVIRONMENT

10.7.1 REGIONAL CONTEXT

The Platreef MR area, which the solar PV facility is proposed, is located in the Limpopo Province and falls within the jurisdiction of the Waterberg District Municipality (WDM) within the Mogalakwena Local Municipality (MLM). The main town of the MLM is Mokopane, which is located approximately 50 km south-west of Polokwane, the capital of the Limpopo Province.

For the purposes of the Socio-Economic Impact Assessment of this proposed project, (Urban-Econ , 2022) have identified the MLM as the primary project area and will form basis of the socio-economic environment in the context of the proposed solar PV facility.

10.7.2 POPULATION DEMOGRAPHIC PROFILE, CRIME PROFILE AND BASIC SERVICES

10.7.2.1 POPULATION DEMOGRAPHIC PROFILE

The MLM recorded an annual average population growth rate of 0.9% per annum between 2015 and 2021. The overall population is approximately 342 684 people, with a total of 87 266 households. A greater proportion of the population in the LM is comprised of females who make up 54% of the total population as shown in the **Figure 22** below. The MLM constitutes approximately 46% of the WDM population, thus having the highest population in the district. Furthermore, approximately 44% of the total households in the WDM are in the MLM. The average household size in MLM is 3.9 people per household, which is slightly higher than the national average of 3.6 people per household.

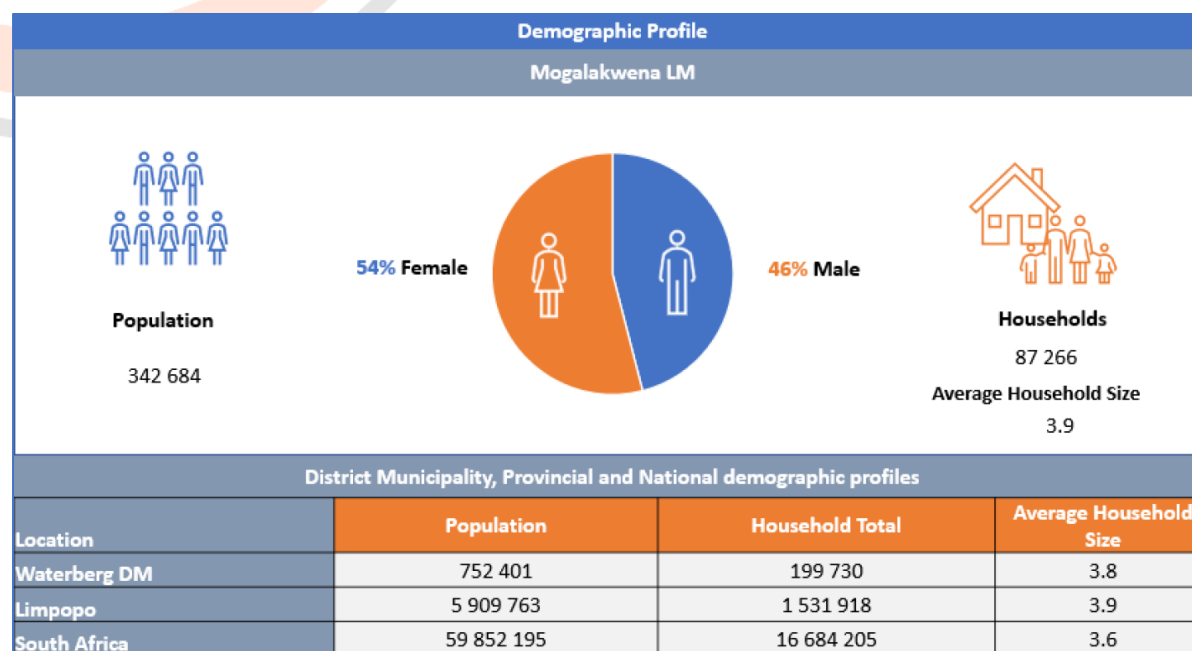


Figure 22: Population Demographics (Quantec , 2021)

10.7.2.2 CRIME PROFILE

In terms of the crime levels with the MLM, the crime categories with the highest crime level include community-reported serious crime, assault, theft, drug-related crimes, and burglaries (Mogalakwena Local Municipality, 2022). The most prevalent crimes in Mokopane are community-reported serious crimes and drug related crimes. MLM experienced an increase in crime rates from 2017-2020. Over the reviewed period, the LM saw its highest crime levels in 2020 and its lowest crime levels in 2017. The COVID-19 pandemic, which had stringent national lockdown regulations and led to some individuals losing their jobs or income, may have also contributed to the crime levels reported in 2020. Crime, safety and security are among the local municipality's priorities in their local strategic documents, planned improvements to the provision of basic services and infrastructure such as street lighting are envisaged to assist with crime reduction in the area.

10.7.2.3 ACCESS TO BASIC SERVICES

According to Quantec (2021) approximately 41.48% of the households in the MLM have access to piped water within their yards, while 28.78% of the households use a community stand for their water supply. The rest of the population's water is accessed from taps within their dwellings, water tankers, boreholes, and even other sources such as rainwater tanks, rivers/streams, and water vendors. In terms of access to energy, approximately 89.54% of the LMs households have access to electricity, which is provided

by Eskom, while the rest of the households use other sources such as candles, gas and paraffin (Quantec , 2021). With regards to sanitation, approximately 27.72% of the LM's households have access to flushing toilets with a sewage system. The majority of the LMs households take care of their own refuse disposal, while the municipality only removes about 25% of the community's refuse weekly (Quantec , 2021).

As of 2020, 89.3% of the MLM houses are brick structured dwellings on separate yards; 2.7% are informal dwellings; 1,1% are traditional dwellings, almost 0.5% are flats, complexes, and backyard dwellings (Quantec , 2021). This shows that over 90% of the households live in formal dwellings. Nonetheless, the LM experiences challenges in the provision of adequate housing, some of these challenges include:

- Insufficient land for development;
- The LM is not authorised to perform housing delivery; and
- The lack of an Integrated Human Settlement Plan or Housing Plan for future planning.

The above suggests that the LM is underdeveloped and that the standards of living are fairly low. The proposed solar PV facility's development is unlikely to improve the LM's access to basic services. However, it may slightly improve the municipality's capacity to provide these services through its contribution to the local economy.

10.7.3 INCOME AND EDUCATION LEVELS

10.7.3.1 HOUSEHOLD INCOME

According to StatsSA (2016) the average disposable income of households in MLM equated to R9 976 per month, in 2017, which was slightly below the average monthly household disposable income in the province but only two-thirds of the average monthly disposable income observed in South Africa. The average disposable income of the LM can be attributed to the large share of households that did not earn an income in 2011 as can be seen in **Table 12**.

Table 12: MLM Household Income % 2011 (StatSA, 2012)

Annual Household Income	Percentage (%)
No Income	15.40
R1 – R4 800	5.20
R4 801 – R9 600	10.60
R9 601 – R19 600	23.10
R19 601 – R38 200	22.10
R38 201 – R76 400	10.20
R76 401 – R153 800	6.40
R153 801 – R307 600	4.40
R307 601 +	2.50

10.7.3.2 EDUCATION LEVELS

Figure 23 below is used to illustrate the level of education obtained by the residents of MLM. As can be seen, the majority of residents' education levels are recorded as "other/unspecified/NA", while the

second-highest percentage of individuals has completed at least Grade 12 of formal education. Less than 0.4 % of the residents have higher education degrees, such as Master's or Doctorate degrees, and about 23,5% of residents have no formal education. Low educational levels tend to be linked to low-skilled labour, and in MLM, the low levels of education can be linked to the high number of lower-income brackets, which further suggests that the general population is poor (Mogalakwena Local Municipality, 2022).

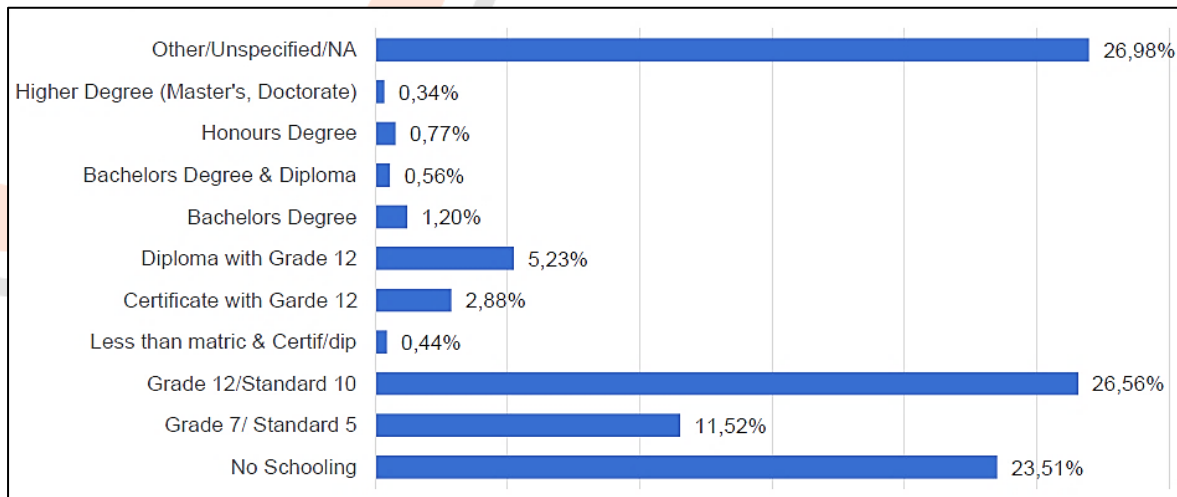


Figure 23: Education Levels in MLM (Quantec , 2021)

10.7.4 LABOUR ENFORCEMENT AND EMPLOYMENT STRUCTURE

The MLM employs approximately 7% of the WDM's employed population. As of 2020, the working-age population (WAP) constituted 56.9% of the MLM's total population, which translates into 194 987 people. **Figure 24** illustrates the labour force profile, in which over half of the WAP is not economically active (NEA) while just under a third of the WAP is employed. About 18% (\pm 35098 individuals) of the WAP is unemployed while about 7% (\pm 13649 individuals) are employed in the informal sector. Only a small portion the LM's work at jobs which require high skills (5%) while the rest of the working population works low semi-skilled jobs.

The tertiary sector is the highest employer in the Mogalakwena area, constituting 78.7% of the employed population. This again confirms the service-orientated nature of the economy. Mining, on the other hand, is the smallest employer in the area, accounting for 1% of the total employment. The low levels of education in MLM, are likely the reason the residents find it difficult to get employment.

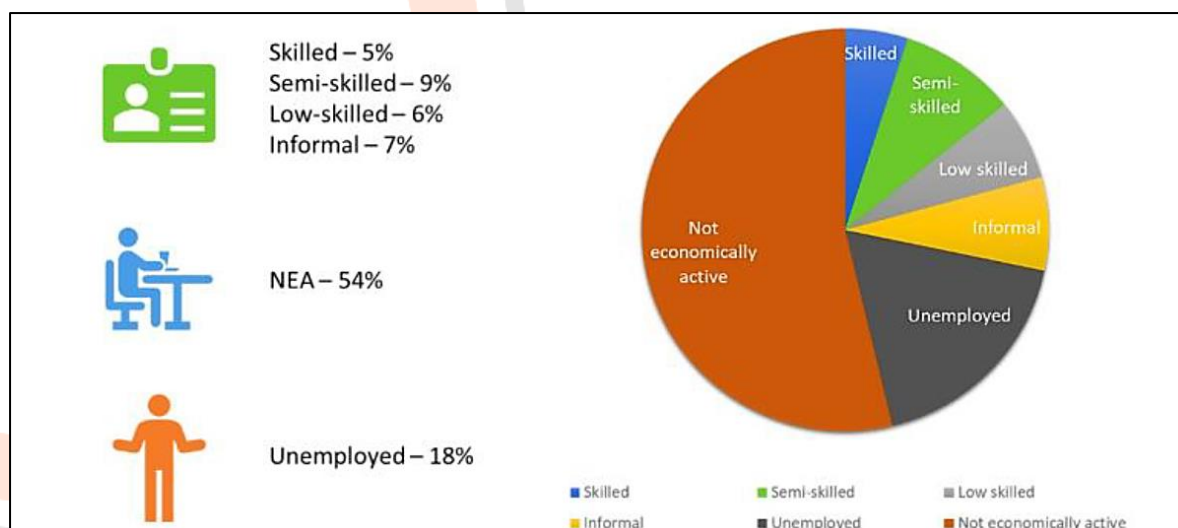


Figure 24: MLM Labour Force Profile (Quantec, 2021)

10.7.5 ECONOMIC PROFILE

The Gross Value Added (GVA) of the MLM was valued at R15 120.16 million at constant prices for 2020. This constitutes approximately 16.69% of the total GVA for the WDM, making it the second-largest contributor to the DM, following Thabazimbi LM. The economic profile of Mogalakwena LM is dominated by the tertiary industry, with the highest contributing sectors comprising wholesale and retail trade, finance and business services, and government services, as shown in the **Table 13** below.

Table 13: Municipality Contributions to the WDM and Limpopo Province (Quantec, 2021)

Area / Economy 2022	GVA	GVA Contribution	
	R (millions)	Limpopo	WDM
Limpopo Province	350 311.38	100%	
WDM	90 583.08	25.86%	100%
Thabazimbi LM	49 385.60	14.10%	54.52%
Lephalale LM	12 571.33	3.59%	13.38%
Mookgopong LM	2 551.08	0.73%	2.82%
Modimolle LM	5 507.66	1.57%	6.08%
Bela-Bela LM	5 447.24	1.55%	6.01%
Mogalakwena LM	15 120.16	4.32%	16.69%

As can be seen in **Table 14**, the biggest contributor to MLM's GVA is the general government sector (25,7%). This is followed by the Wholesale and retail trade, catering, and accommodation contributing almost 23% of the LM's GVA. The lowest contributing sector in the LM is Electricity, gas, and water sectors contributing only 1.7% which translates to R152.3 million. The proposed development is expected to contribute to the LM's general GVA, the extent of its contribution will be discussed further in Chapter 5.

Table 14: Sector Contributions to the MLM Economy

MLM Economic Sectors	GVA (R millions)	Contribution
Agriculture, forestry, and fishing	163.2	1.84%
Mining and quarrying	651.3	7.4%
Manufacturing	337.6	3.8%
Electricity, gas and water	152.3	1.7%
Construction	353.3	4.0%
Wholesale, retail trade, catering and accommodation	2 011.9	22.7%
Transport, storage and communication	560.3	6.3%
Finance, insurance, real estate and business services	1 847.0	20.9%
General government	2 277.9	25.7%
Community, social and personal services	500.4	5.7%
Total	8 855.3	100%

Urban-Econ calculated based on (Quantec , 2021)

10.8 HERITAGE AND ARCHAEOLOGICAL ASPECTS

10.8.1 HERITAGE LANDSCAPE

The project area is situated in a landscape well-known for its Iron Age Farmer and Colonial Period frontier zones. As such, literature shows evidence of an archaeological heritage that spans from the Early Stone Age to the Later Iron Age and the region bears significance historically as a frontier between hunter-gatherers and European explorers and settlers (Heritage Management Consulting , 2022).

The larger landscape around Mokopane holds a rich history and, besides for the commercially driven heritage assessments previously undertaken in the project area, no particular reference to archaeological sites or features of heritage potential were recorded during an examination of literature specifically related to the Platreef Solar Project area (Heritage Management Consulting , 2022).

10.8.2 HERITAGE RESOURCES

A number of Heritage Specialist Assessment Reports were conducted for the Platreef Mining Project and associated developments by Digby Wells Environmental in 2013⁵³, PGS Heritage in 2015⁵⁴ and

⁵³ Nel et al., 2013. Heritage Impact Assessment for the Proposed Platreef Mining Project on the farms Bultongfontein 866 LR, Turfspruit 241 KR, Macalacaskop 243 KR and Rietfontein 2 KS in Mokopane, Limpopo Province. Digby Wells Environmental

⁵⁴ Nienaber, W.C. 2015. Consolidated report on the Assessment of reported grave localities at Platreef by means of Ground Penetrating Radar (GPR) and archaeological test excavation during 2015. Ivanhoe Mines: Platreef Project FARM Turfspruit 241 KR, Mokopane, Limpopo


2016^{55, 56}, Van Der Walt and Hutten in 2015⁵⁷ as well as various Ground Penetrating Radar (GPR) by PGS Heritage. These studies identified a range of heritage resources in the mining project area and a number of burial sites were documented within the footprint of the proposed Platreef Solar Project area. Some of these sites were assessed and further investigated.

Each of the heritage reports assigned unique site codes to the burial sites and it should be noted that Ivanplats, in conjunction with heritage specialists inventoried identified heritage resources with its own site numbers to e.g., "011_01" or "013_04".

As noted above, the Heritage Impact Assessments for the Platreef Mining Project located a number of graves, and in addition, various families from surrounding communities indicated the locations of graves and potential burial sites in the project area. PGS Heritage embarked on a systematic grave relocation project and the first phase of relocations (Phase 1 and Phase 1.5) was concluded in 2017. The following phase (Phase 2) was concluded in 2021 after a period of community disputes. Single actions from Phase 2 remains, pending engagements and consultations with the surrounding communities and families which are on-going according to PGS Heritage records.

Based on available literary evidence and some site observations, the following burial site status is presented for the project footprint area (Heritage Management Consulting , 2022).




Table 15: Overview of Current State of Burial Sites and Observations Made




Site code	View of Current State of Site Within Footprint of the Proposed Solar PV Facility (June 2022)	Observation
011_01		Described by Digby Wells Environmental as an "Undetermined amount of graves within burial ground" located within a fence, was relocated successfully by PGS Heritage according to PGS records.

⁵⁵ Nienaber, C. 2016. Report on the Assessment of reported grave localities at Platreef by means of Ground Penetrating Radar (GPR) during January 2016 Ivanhoe Mines: Platreef Project Farm Turfspruit 241 KR, Mokopane, Limpopo. PGS Heritage

⁵⁶ Nienaber, W.C. 2016. Ivanhoe Mines: Platreef Project – Planned Community Centre Site. Farm Turfspruit 241 KR, Mokopane, Limpopo. Ground Penetrating Radar (GPR) Survey for graves Revision 1. Unpublished report: PGS Heritage

⁵⁷ Van Der Walt and Hutten, 2015. Report on test excavations of two possible graves for the Ivanhoe Mines: Platreef Project, FARM Turfspruit 241 KR, Mokopane, Limpopo

Site code	View of Current State of Site Within Footprint of the Proposed Solar PV Facility (June 2022)	Observation
011C-01		<p>Described by Digby Wells Environmental as “1 grave within burial ground” located within a fence, was further investigated by means of GPR sampling conducted by PGS Heritage where an anomaly was flagged and marked for future investigation. Later investigations found no evidence of a burial site, according to PGS records.</p>
011C-02		<p>Assumedly not captured by Digby Wells Environmental and described as an “undetermined amount of graves within burial ground”. The site was further investigated by means of GPR sampling conducted by PGS Heritage where an anomaly was flagged and marked for future investigation. Later investigations found no evidence of a burial site, according to PGS records.</p>
011C-03		<p>Assumedly not captured by Digby Wells Environmental and described as an “undetermined amount of graves within burial ground” located within a fence, was further investigated by means of GPR sampling conducted by PGS Heritage. An anomaly was flagged and marked for future investigation. Later investigations found no evidence of a burial site, according to PGS records.</p>
012A-01	<p>Not applicable</p>	<p>Described by Digby Wells Environmental as an “Undetermined amount of graves within burial ground” located within a fence, was further investigated by means of GPR sampling conducted by PGS Heritage where an anomaly was flagged and marked for future investigation. PGS embarked on a number of grave relocations and exploratory excavations and the relocation of this burial site was completed successfully according to PGS records.</p>

Site code	View of Current State of Site Within Footprint of the Proposed Solar PV Facility (June 2022)	Observation
012A-05		<p>Described by Digby Wells Environmental as an “Undetermined amount of graves within burial ground” located within a fence, was further investigated by means of GPR sampling conducted by PGS Heritage. An anomaly was flagged and marked for future investigation. It was recommended that test excavation as part of the grave relocation process be conducted to confirm whether the observed anomaly was a grave. Later investigations proved to be inconclusive and further exploratory actions is required for this site, according to PGS records.</p>
013_01		<p>Described by Digby Wells Environmental as “3 graves within burial ground” was relocated successfully according to PGS Heritage records.</p>
013_04	<p>Not applicable</p>	<p>Described by Digby Wells Environmental as “3 graves within burial ground” located within a fence was relocated successfully according to PGS Heritage records.</p>
023_01		<p>Described by Digby Wells Environmental as “1 grave within burial ground” located within a fence was further investigated by means of GPR sampling conducted by PGS Heritage. An anomaly was flagged and marked for future investigation. It was recommended that test excavation as part of the grave relocation process be conducted to confirm whether the observed anomaly was a grave. Later investigations found no evidence of a burial site, according to PGS records.</p>

Site code	View of Current State of Site Within Footprint of the Proposed Solar PV Facility (June 2022)	Observation
Site "PLR70"	Not applicable	Not included in the Ivanplats or Digby Wells Environmental site inventories, was sampled by means of GPR by PGS Heritage where the survey found anomalies not consistent with graves and no further action was recommended.

10.9 VISUAL AESTHETICS

10.9.1 LANDSCAPE CHARACTER

Within the 5 km zone of potential influence of the project area, the landscape is characterised by primarily flat to gently sloping plains towards the west and the Mogalakwena River valley, which flows past the western extreme of the project area. South of the project area is the Rooisloot drainage line, which is part of the Mogalakwena River system. The plains are contained between two mountainous areas east and west of the Project site but outside the solar PV facility area. A small ridge line and associated natural hills occur in the north eastern sector of the solar PV facility area.

It is also noted that the original landscape, Makhado Sweet Bushveld contained a short and shrubby bushveld with a poorly developed grass layer, has been completely devastated throughout the project area by dense urbanisation, mining activities and poor farming methods. In summary the solar PV facility area can be divided into the following landscape types:

- Natural hills in the north and north east;
- Cultivated subsistent farming lands in the southwest, north west, central and south central;
- Dense urban development dominating and scattered across all sectors of the project area; and
- Mining infrastructure associated with the Platreef Mine in the centre of the project area and into which the proposed Project is proposed to be developed.

Various view sites were identified within the 5 km zone of potential influence, from which the proposed solar PV facility can be visible. These view sites are shown in **Figure 25** to **Figure 27** in relation to the landscape character of the project area.



Figure 25: Photos Showing the Landscape Character from the Identified View Sites 1 to 4 (GYLA, 2022)



Figure 26: Photos Showing the Landscape Character from the Identified View Sites 5 to 8 (GYLA, 2022)



Figure 27: Photos Showing the Landscape Character from the Identified View Sites 5 to 8 (GYLA, 2022)

10.9.2 SENSE OF PLACE

According to Lynch (1992), a sense of place is the extent to which a person can recognise or recall a place as being distinct from other places - as having a vivid, unique, or at least particular, character of its own. The sense of place for the project area derives from the local landscape described above and the impact that urban, farming and mining activities have had on the original landscape.

The domination of dense urban housing and subsistence farming, impacts the greatest on the senses, although as is observed in **Figure 25** to view sites 9 and 10 in **Figure 26**, the ever-present backdrop of mountains mitigates the negative effects associated with dense urban environments. This is also the case with the mining activities, specifically from elevated viewpoints as seen in **Figure 26**.

10.9.3 VISUAL RESOURCE

The value of the visual resource and its associated scenic quality are derived from the landscape and land use characteristics described above. The sensitivity of the project area as a scenic resource can be defined as low to moderate, within the context of the sub-region. The criteria and ratings used to derive the value of the visual resource is appended in Appendix A of the Visual Impact Assessment (**ANNEXURE L**).

The project area exhibits a mixed character with some positive characteristics, but there is evidence of major alteration and degradation of the original and existing natural features, resulting in a major impact on the scenic quality of the area. According to GYLA (2022) the project area is located within a landscape type considered to have a low value due to a minimal landscape that is generally negative in character with few, if any, valued features. Additionally, the landscape type is not sensitive to change in general.

10.9.4 VISUAL RECEPTORS AND SENSITIVE VIEWERS

Visual receptors include people living in, working, visiting, or travelling through the project area on the N11 and R518 public roads. The proposed solar PV facility is on a portion of the Platreef Mine infrastructure area and is adjacent to the N11 national road (immediately east of the sites) and residential areas surrounding the site. The following receptors and viewing areas identified in are potentially sensitive to the proposed development:

- High: Receptors of residential units immediately adjacent to the mine property
 - Communities where the development results in changes in the landscape setting or valued views enjoyed by the community.
 - Occupiers of residential properties with views affected by the development.
- Moderate: People travelling along the N11 and R518 road
 - People travelling through or past the affected landscape in cars or other transport routes.
- Low: People working or travelling to work in the project area (Mine and related service industries)
 - Visitors and people working within the project area and travelling along local roads whose attention may be focused on their work or activity and who therefore may be potentially less susceptible to changes in the view.

10.10 RADIO-FREQUENCY AND ELECTROMAGNETIC INTERFERENCE ASPECTS

The DFFE Screening Tool indicated that the project area is situated within a medium sensitivity area in terms of the Radio Frequency Interference (RFI) theme. This means that there is a possibility that the proposed solar facility may interfere with existing electrical equipment or electrical infrastructure.

According to ITC Servivces, (2022) the findings of the RFI assessment indicate that there is a Weather Radar Installation (WRI) between 30 km and 60 km from the proposed project area (**Figure 28**). A literature study reveals that there will be no interference from the solar facility to the surrounding medium RFI sensitive area as the solar facility inverters comply to CISPR 11 class A specification.



Figure 28: Possible Location of the WRI (Left) and Relative Distance Between the Platreef Mine and the WRI (57Km) (ITC Servivces, 2022)

11 DESCRIPTION OF THE CURRENT LAND USES⁵⁸

The current land use activities within the proposed areas are primarily open veld often used for grazing. The land uses in the immediate vicinity of the project area include residential areas along with mining and related activities (Zimpande Research Collaborative, 2022). Livestock overgrazing and trampling has also contributed to erosion in freshwater systems and drainage lines (Digby Wells Environmental, 2021). The establishment of AIPs has resulted in a loss of vegetation integrity due to the decrease in biodiversity associated with the land uses (Scientific Terrestrial Services, 2022).

12 DESCRIPTION OF SPECIFIC ENVIRONMENTAL FEATURES AND INFRASTRUCTURE ON THE SITE⁵⁹

Sensitive landscapes in terms of the above definition are discussed in more detail in **Section 9.10** and shown in **Figure 29** and include:

- Nature conservation or ecologically sensitive areas – indigenous plant communities (particularly rare communities or forests), wetlands, rivers, river banks, lakes, islands, lagoons, estuaries, reefs, inter-tidal zones, beaches and habitats of rare animal species;
- Unstable physical environments, such as unstable soil and geo-technically unstable areas;
- Important nature reserves – river systems, groundwater systems, high potential agricultural land;
- Sites of special scientific interest;

⁵⁸ Required as per the EIA regulations Appendix 2 (g) a full description of the process followed to reach the proposed preferred activity, site and location of the development footprint within the site, including (iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;

⁵⁹ Required as per the Appendix 2 (g) of the EIA Regulations, 2014 (as amended): a full description of the process followed to reach the proposed preferred activity, site, and location of the development footprint within the site, including (iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;

- Sites of social significance or interest – including sites of archaeological, historic, cultural spiritual or religious importance and burial sites; and
- Green belts or public open spaces in municipal areas.

It should be noted that the project area has low sensitivities in terms of its terrestrial and aquatic biodiversity. It is acknowledged that the agricultural sensitivity of the study is deemed high, as per the DFFE screening tool due to the land being used for agricultural purposes, with overgrazing being observed. Taking into account the presence of poor veld conditions and the historical land use of the project area, it is highly unlikely that floral or faunal species of conservation concern will be able to establish viable populations. Moreover, due to the largely lacking vegetation cover, the project area does not provide ideal habitat or food sources to support a diversity of faunal assemblages. No wetlands are present in the project area; however, preferential surface flow paths were observed in the project area. The freshwater ecologist has confirmed these systems to be degraded and no longer functional.

It is also noted that although the project area previously had heritage resources (graves) these have since been relocated, thus indicating a low sensitivity for heritage resources as well.

The maps provided in **Figure 29** below show overlays of the ecological and land use features in proximity to the project area. It should be re-iterated that the solar facility areas are located on an approved MR area, covering a footprint of less than 20 ha.

13 ENVIRONMENTAL AND CURRENT LAND USE MAP

The current land use activities within the proposed areas are primarily open veld often used for grazing. The land uses in the immediate vicinity of the project area include residential areas along with mining and related activities (Zimpande Research Collaborative, 2022). Livestock overgrazing and trampling has also contributed to erosion in freshwater systems and drainage lines (Digby Wells Environmental, 2021). The establishment of Alien Invasive Plants (AIPs) has resulted in a loss of vegetation integrity due to the decrease in biodiversity associated with the land uses (Scientific Terrestrial Services, 2022).

The map in **Figure 29** shows both the proposed environmental sensitivities as well as the current land uses relevant to the proposed project.

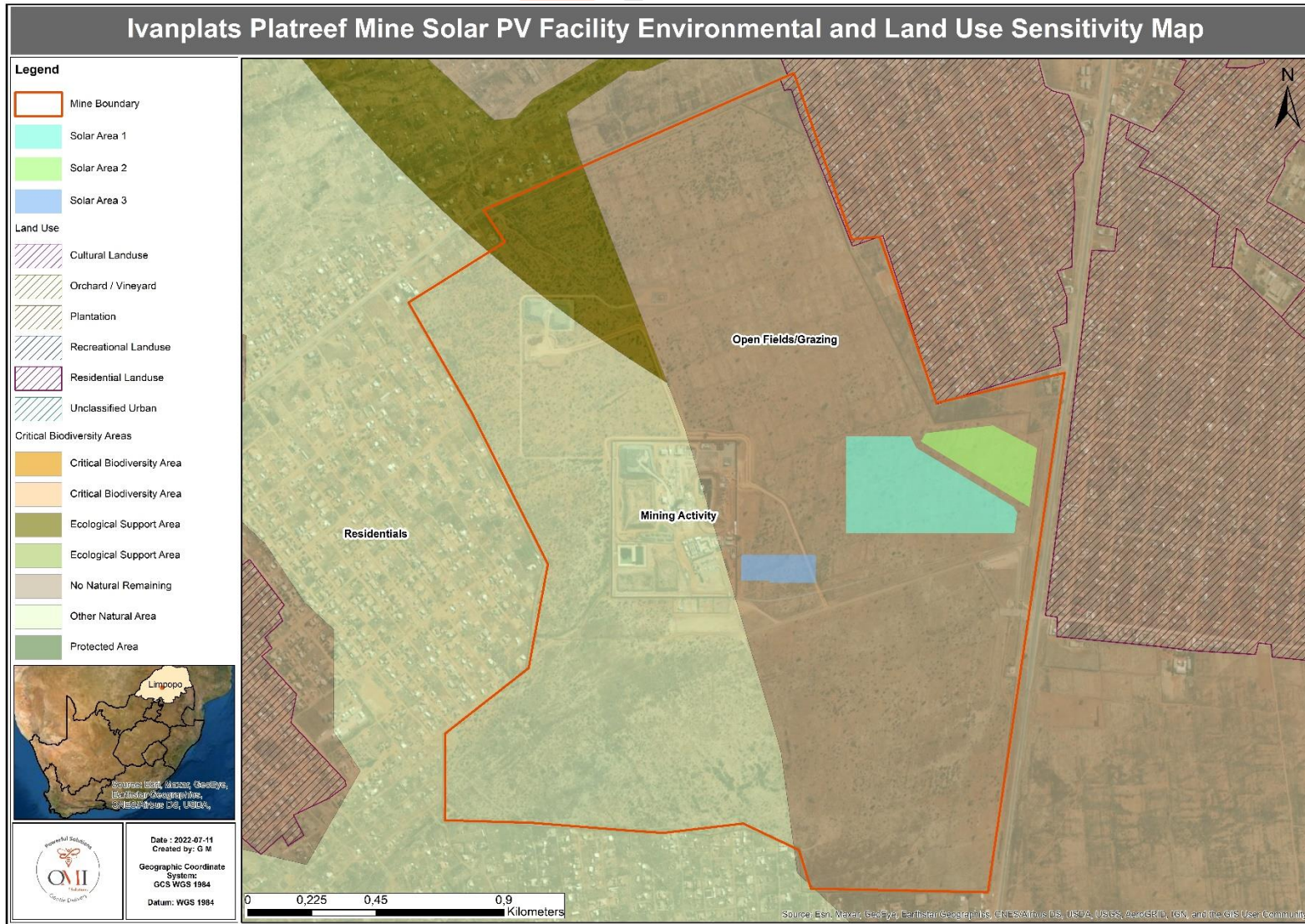


Figure 29: Map showing Environmental Sensitivities and Surface Land Use of the Proposed Solar PV Facility Area

14 IMPACTS AND RISKS IDENTIFIED INCLUDING THE NATURE, SIGNIFICANCE, CONSEQUENCE, EXTENT, DURATION AND PROBABILITY OF THE IMPACTS, INCLUDING THE DEGREE TO WHICH THESE IMPACTS⁶⁰

14.1 METHODOLOGY USED IN DETERMINING THE SIGNIFICANCE OF ENVIRONMENTAL IMPACTS

The EIA 2014 Regulations (as amended) promulgated in terms of Sections 24 (5), 24(m) and 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (as amended) (NEMA), require that all identified potential impacts associated with the project be assessed in terms of their overall potential significance on the natural, social and economic environments. The criteria identified in the EIA Regulations (2014) include the following:

- Nature of the impact;
- Extent of the impact;
- Duration of the impact
- Probability of the impact occurring;
- Degree to which impact can be reversed;
- Degree to which impact may cause irreplaceable loss of resources;
- Degree to which the impact can be mitigated; and
- Cumulative impacts.

The significance of the aspects/impacts of the process will be rated by using a matrix derived from Plomp (2004) and adapted to some extent to fit this process. These matrices use the consequence and the likelihood of the different aspects and associated impacts to determine the significance of the impacts.

Table 16: Definitions of Factors Used to Determine Impact Significance

Aspect	Description	Weight
Probability: This describes the likelihood of the impact actually occurring.		
Improbable:	The possibility of the impact occurring is very low, due to the circumstances, design or experience.	1
Probable:	There is a probability that the impact will occur to the extent that provision must be made therefore.	2
Highly Probable:	It is most likely that the impact will occur at some stage of the development.	4
Definite:	The impact will take place regardless of any prevention plans, and there can only be relied on mitigatory actions or contingency plans to contain the effect.	5
Duration: The lifetime of the impact		

⁶⁰ Required as per the EIA regulations Appendix 2 (g) a full description of the process followed to reach the proposed preferred activity, site and location of the development footprint within the site, including (v) the impacts and risks which have informed the identification of each alternative, including the nature, significance, consequence, extent, duration and probability of such identified impacts, including the degree to which these impacts (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated

Aspect	Description	Weight
Short term:	The impact will either disappear with mitigation or will be mitigated through natural processes in a time span shorter than any of the phases.	1
Medium term:	The impact will last up to the end of the phases, whereafter it will be negated.	3
Long term:	The impact will last for the entire operational phase of the project but will be mitigated by direct human action or by natural processes thereafter.	4
Permanent:	Impact that will be non-transitory. Mitigation either by man or natural processes will not occur in such a way or in such a time span that the impact can be considered transient.	5
Scale: The physical and spatial size of the impact		
Local:	The impacted area extends only as far as the activity, e.g., footprint	1
Site:	The impact could affect the whole, or a measurable portion of the above-mentioned properties.	2
Regional:	The impact could affect the area including the neighbouring residential areas.	3
Magnitude/Severity: Does the impact destroy the environment or alter its function.		
Low:	The impact alters the affected environment in such a way that natural processes are not affected.	2
Medium:	The affected environment is altered, but functions and processes continue in a modified way.	6
High:	Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.	8
Significance: This is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. <i>Calculated as = Sum (Duration, Scale, Magnitude) x Probability</i>		
Negligible:	The impact is non-existent or unsubstantial and is of no or little importance to any stakeholder and can be ignored.	<20
Low:	The impact is limited in extent, has low to medium intensity; whatever its probability of occurrence is, the impact will not have a material effect on the decision and is likely to require management intervention with increased costs.	<40
Moderate:	The impact is of importance to one or more stakeholders, and its intensity will be medium or high; therefore, the impact may materially affect the decision, and management intervention will be required.	<60
High:	The impact could render development options controversial or the project unacceptable if it cannot be reduced to acceptable levels; and/or the cost of management intervention will be a significant factor in mitigation.	>60

14.1.1 IMPACT MITIGATION HIERARCHY

The Impact Mitigation Hierarchy is a tool which is used reiteratively throughout a project lifecycle to avoid impacts and, if unavoidable, minimise and mitigate such impacts whilst maximising positive effects, with the purpose of maintaining the interdependent sustainability requirements for biophysical system integrity and basic human well-being, avoiding inappropriate trade-offs that result in the loss of essential ecosystem functioning. The first tier considers how to avoid the impact entirely and is considered early in the project lifecycle to allow for alternatives to be considered. The impacts which cannot be avoided should be minimised, reduced or rectified in a manner which will achieve sustainability objectives and targets. If impacts cannot be avoided, minimised, reduced (over time), or rectified, consideration can be given to the implementation of offsets, depending on the significance of such impacts. Offsets are therefore only to be used in exceptional circumstances to compensate for residual impacts caused by development projects, whether these are unavoidable societal impacts, harm to ecosystem functioning or the loss of biodiversity.

However, the consideration of offsets is only appropriate if an impact mitigation hierarchy approach has been followed in the assessment and management of impacts. The need for offsets must also be evaluated against the achievement of sustainability objectives, indicators and targets. A proposed offset should be stated explicitly, and reasoned motivations should be provided in support of the application of offsets to inform decision-making (DEA, 2014).

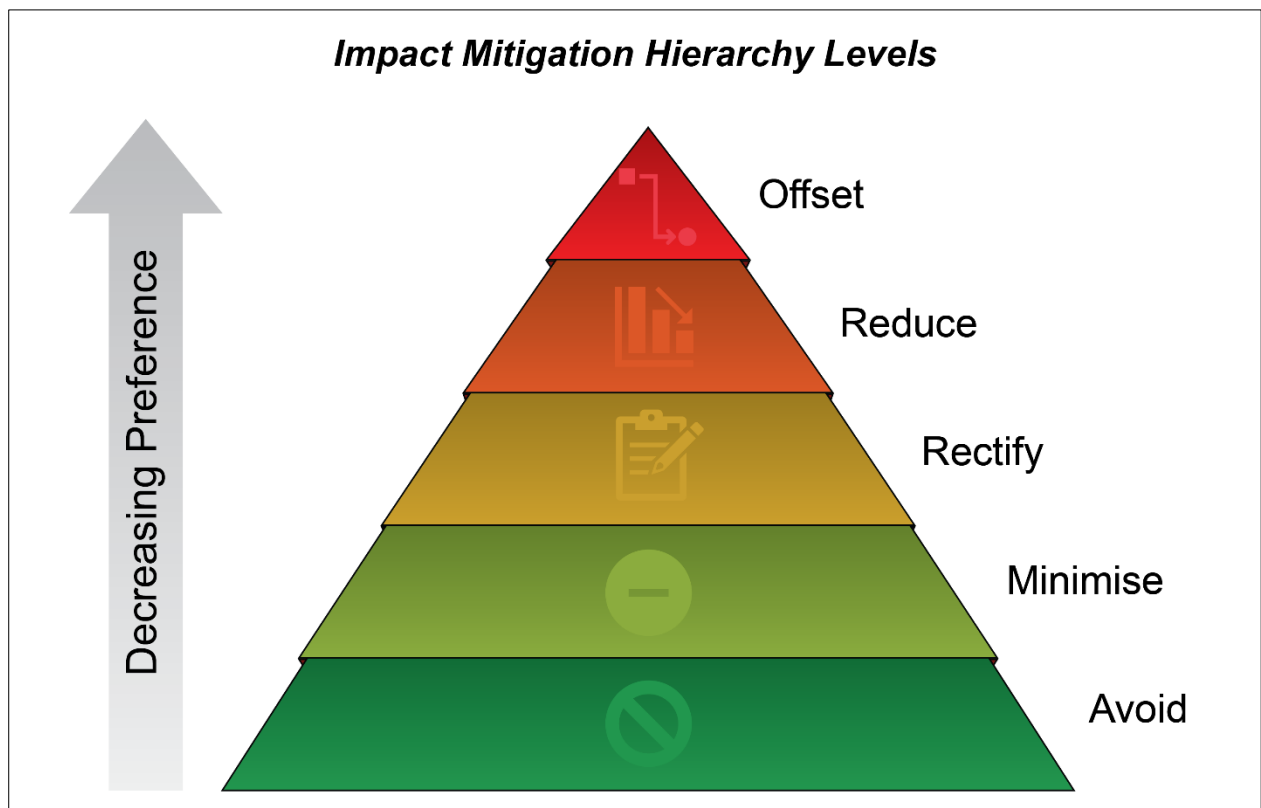


Figure 30: Levels of the Impact Mitigation Hierarchy

14.2 THE POSITIVE AND NEGATIVE IMPACTS THAT THE PROPOSED ACTIVITY (IN TERMS OF THE INITIAL SITE LAYOUT) AND ALTERNATIVES WILL HAVE ON THE ENVIRONMENT AND THE COMMUNITY THAT MAY BE AFFECTED.

14.2.1 IMPACTS ON LAND USE AND SOIL POTENTIAL

The anticipated impacts to soil resources, land use and land capability during both the construction and operational phases of the project are as follows:

Soil erosion: The proposed development footprint is located on flat terrain, which may decrease the erosion hazard. Most of the soils occurring within the project area are susceptible to soil erosion due to the apedal structure of the soils. The soils will become more susceptible to erosion during the construction phase once the vegetation has been cleared and exposed to wind and storm water. This will most likely lead to the reduced soil fertility status of soils and potentially loss of valuable arable land.

The severity of this impact is anticipated to be Moderate for most of the soils and with the appropriate mitigation measures the significance of this impact may be low

Soil compaction: Heavy equipment traffic during construction and activities is anticipated to cause soil compaction. The soils associated with the project area will be most impacted due to their sandy loam nature. The impact significance can be low, should the proposed activities be restricted to access roads, vehicle hard stand areas and equipment and machinery laydown areas. Soil compaction will potentially lead to:

- Increased bulk density and soil strength, reduced aeration and lower infiltration rate;
- Consequently, it lowers future crop performance via stunted aboveground growth coupled with reduced root growth;
- Destroyed soil structure, causing it to become more massive (platy) with fewer natural voids with a high possibility of soil crusting. This situation can lead to stunted, drought-stressed crops because of restricted water and nutrient uptake, which results in reduced crop yields; and
- Soil biodiversity is also influenced by reduced soil aeration. Severe soil compaction may cause reduced microbial biomass. Soil compaction may not influence the quality, but the distribution of macro fauna that is vital for soil structure including earthworms due to reduction in large pores. Thus, reducing the soil habitat for fauna and flora and leading to the deterioration of soil quality over time.

Soil contamination: Contamination sources are mostly unpredictable and often occur as incidental spills or leaks during both the construction and operational phase. Thus, all the identified soils are considered equally predisposed to potential contamination. The significance of soil contamination is high for all identified soils without mitigation, largely depending on the nature, volume and/or concentration of the contaminant of concern as well as the rate at which contaminants are transported by water in the soil. If the management protocols are not well managed this will more likely lead to contaminants leaching into the soil and thus potentially rendering the soil sterile. reducing the yield potential of soils.

Loss of agricultural land capability: The overall potential loss of agricultural land capability is anticipated to be moderate because of the footprint area (<20 ha), stripping or loosening of topsoil and site clearing will potentially result in loss of fertile topsoil and soil erosion within the project area.

Considering the agricultural potential of the soils, the level of disturbance, the footprint area (<20 ha) and the ongoing grazing taking place at the time of site assessment, the loss from a soil and land capability point of view is anticipated to be of Moderate significance. This also takes into account the pressure on adjacent areas for grazing once the land is cleared of vegetation. Thus, the proposed activities may potentially have a negative impact on agricultural production for the local communities which rely on the piece of land for grazing.

14.2.2 IMPACTS ON FLORA AND FAUNAL BIODIVERSITY

The findings of the site inspection confirm the Screening Tool outcome of Low Sensitivity for the Terrestrial Biodiversity Theme. No features of significant biodiversity importance were confirmed during the site inspection. Given the overall low sensitivity of the project area from a floral, faunal, avifaunal, and terrestrial biodiversity perspective, together with the low likelihood of species of conservation concern being present in the project area, the direct impacts and associated edge effects arising from activities for the proposed solar PV facility are anticipated to be low given that adequate mitigation measures are implemented.

14.2.3 IMPACT ON FRESHWATER ECOSYSTEM

During the field assessment conducted on the 26th of May 2022, no watercourses from an ecological perspective were identified within the proposed solar facility or its associated 500 m investigation area. Historical imagery dating to pre-2016 and topographical maps from 2014 indicated the presence of preferential surface flow paths within the investigation area and these were found during the field assessment to have been degraded and no longer functional due to anthropogenic activities (most notably agriculture). The preferential surface flow paths are not watercourses from an ecological perspective but may be considered watercourses if they are subject to flood lines as per the definition of watercourses in the National Water Act.

Due to due to vegetation clearing, movement of vehicles, potential infilling and contamination during the construction and operational/maintenance phases of the project, the following potential ecological risks on the preferential surface flow paths were considered:

- Impacts on the hydrology and sediment balance of the preferential surface flow paths;
- Impacts on water quality; and
- Proliferation of alien and invasive plant species.

Based on the location of the proposed Solar Area 3 site, direct impacts are not anticipated, and edge effects associated with the activities are considered negligible since the area only marginally encroaches on the 100 m ZoR in terms of GN509 and is located well outside the 32 m ZoR in terms of the NEMA. The proposed Solar Area 1 and 2 also pose a low quantum of risk to the preferential surface flow paths, since the ecological integrity of the preferential flow paths indicated by the topographic map have been severely compromised to the point where the flow paths are no longer discernible.

The risk posed by the solar facility site to the preferential surface flow paths is expected to be of 'Moderate' significance for Solar Area 1 and 2 due to the legal implications of being within regulated zones, potential for contamination of water and soils, and for the loss of vegetation. This risk significance can be adjusted to a "Low" with mitigation measures and with consideration that the preferential surface flow paths are no longer functional. The risk posed by proposed Solar Area 3, the panels of which are proposed to be mounted on the roof of carports is expected to be of "Low" significance due to the site being on already transformed land.

14.2.4 IMPACTS ON SOCIO-ECONOMIC ENVIRONMENT

The following potential socio-economic impacts are anticipated during the construction and operational phases of the proposed solar PV facility, based on the knowledge of the potentially affected socio-economic environment.

14.2.4.1 CONSTRUCTION PHASE

Stimulation of the economy: The proposed construction of the solar PV facility will be associated with multiple capital expenditures. Such expenses typically include the transportation and construction of PV modules, the connection of electricity and grids, foundations, civil engineering, and the construction of supporting structures. If goods and services are procured locally, that is within South Africa, this will increase the production of the respective industries. This will, in turn, have a positive impact on the national economy and the economies of the municipalities where inputs are procured.

It is anticipated that the proposed development will include an approximate R266 000 000 in investments. Some of this is expected to be spent in South Africa, which will resultantly stimulate the national economy, although for a temporary period during the construction of the solar PV facility.

The size of the MLM's economy was estimated at R15 120.16 million in 2020. The proposed development will positively contribute to the local economy especially if the material required is sourced locally. However, if current businesses may not be able to supply in the required products and services, they are likely to benefit from subcontracting opportunities, consumer expenditure of the construction crew, and an increase in income of locals who are directly employed in the construction activities or who benefit from the project through local procurement.

Creation of employment: The construction of the proposed solar PV facility and associated infrastructure will require the temporary employment of construction workers, foremen, and engineers on site. The number of employees will vary for different phases in which the facility will be built. However, it is estimated that about 65 people will be employed during the construction phase. Considering the current skills profile of the local municipality, a good portion of these jobs are likely to be filled by people from the local communities. This project will thus contribute to increasing employment opportunities in the local municipality for a temporary period. Employment of the individuals, albeit temporary, will increase their household income, improve their standard of living, and benefit their families. In addition to those benefitting from direct employment created at the project, various multiplier effects will assist in temporarily supporting existing jobs in the businesses offering services and goods that will be procured during construction activities. The increased temporary income earned by these businesses will stimulate consumption spending, creating another round of multiplier effects.

Temporary change in sense of place: There will likely be a temporary change to the sense of place during the construction phase of the proposed solar PV due to the influx of people in the area and as well the general construction activities. The activities from the construction are expected to cause general disturbances such as noise, dust and traffic could negatively impact the neighbouring residents and schools within proximity to the development.

14.2.4.2 OPERATIONAL PHASE

Stimulation of local economy: The operational period of the proposed solar PV facility is likely to be the same as the mine's operating period/Life of Mine (LoM), which is 30 years. During this period, the solar PV facility will have expenses such as salaries and wages of the plant's employees, general operating expenses, and maintenance costs. These operating expenses are estimated to be approximately R820 000.00 per annum. The operations of the facility will make some contribution to the growth of the local economy as it will stimulate the demand for other sectors' services and goods such as water, transportation, and trade.

Creation of employment and increased household income: The operation of the solar facility and associated infrastructure will require functional and maintenance employees. It is envisaged that approximately three (3) persons will be employed during the 30 years in which the proposed solar facility will be operational. This includes the people that will be employed for cleaning purposes and a person who will oversee the security control room. The employment of the three individuals for the entire operational period will increase their household income, improve their standard of living, and benefit their families.

Reduced Strain on municipal service: The development is a 19MW solar PV facility and is proposed effort to reduce the mine's carbon footprint and ensure continued electricity supply. The proposed project, albeit relatively small, will contribute toward a green economy and reduce the strain on municipal electricity services. Furthermore, due to the taxes and rates that will be paid by the project to the municipality, the revenue of the latter will be increased, thus allowing it to improve the service delivery in other areas. The layout alternatives and technology alternatives will not affect the capacity of the solar facility; thus, all alternatives are equally preferred.

Loss of property: An influx of workers to the area during the construction phase may result in stock theft and burglaries in the communities surrounding the mine, especially the community less than a km away

from the proposed site. The number of workers and duration of construction will not be affected by the layout alternatives or technology alternatives; thus, all alternatives are equally preferred.

Change in sense of place:

There will likely be a temporary change to the sense of place during the operational phase of the proposed solar PV facility due to visual impacts caused by the solar facility. Residents of the surrounding communities will be able to see the facility. According to GYLA (2022) however, given that only a small section of the PV arrays would be visible and would mostly appear as dark blue or blackish colour; and that glare would occur infrequently because the panels are made to retain light, the effect on glare sensitive receptors along the N11 and properties immediately north and east of the sites, is considered low and would not contribute significantly to the visual impact of the Project.

14.2.4.3 DECOMMISSIONING PHASE

Stimulation of the Economy: The decommissioning of one of the Ivanplats Solar Facility would generate a temporary increase in stimulation to the local economy through the creation of employment opportunities. When the plan is disassembled, labour will be needed, and materials and services will need to be purchased, which will help stimulate the economy. Although the decommissioning phase will have smaller socio-economic impacts when compared to those for the construction phase, the impacts will be similar. Therefore, the decommissioning phase will have an impact both on the temporary stimulation of the economy as well as the temporary creation of jobs. The impact is expected to be smaller for both due to there being a lower demand for materials and labour

Creation of employment: as discussed above, during the decommissioning phase, the activity will demand labour. The amount of labour demanded will be less than the construction phase as well as for a shorter duration than that of the construction phase.

14.2.5 IMPACTS ON HERITAGE RESOURCES

Of the ten (10) burial sites previously identified by Heritage specialist within the footprint of the proposed solar PV facility, four (4) of the burial sites have been relocated successfully while another four (4) of the identified burial sites which had anomalies and were later investigated were found not to be burial sites. One (1) burial site (Site 012A-05) which was described as an “undetermined amount of graves within burial ground” located within a fence was further investigated however the investigations proved to be inconclusive and further exploratory actions is required. Additionally, another burial site (Site “PLR70”) was not included in the Ivanplats or Digby Wells Environmental site inventories, but was sampled by means of GPR by PGS Heritage where the survey found anomalies not consistent with graves and no further action was recommended.

At this stage, it cannot be confirmed whether the latter two (2) burial sites exist nor the potential impact thereof, particularly Site 012A-05 as GPR scans proved to be inconclusive, as such various recommendations were proposed in the Heritage Memo compiled by Heritage Management Consulting (2022), which include implementing the chance find procedure. These recommendations are detailed in **Table 18** and **Table 22** of this report.

14.2.6 IMPACT ON VISUAL ENVIRONMENT

The following visual impacts are anticipated for the proposed project:

Visibility: Visual impacts will be caused by activities and infrastructure in both Project phases, i.e., construction and operational. Activities associated with the Project will be visible to varying degrees from varying distances around the Project sites, which indicated the viewshed for each of the Project areas as well as the combined effect of the three sites. During the construction phase, the Project's visibility will be influenced due to the preparatory activities, primarily earthworks and building works. During the operational

phase, the visibility of the Project will be caused by the established solar PV arrays and associated infrastructure.

Visibility of Project components, however, is contained to the areas immediately adjacent the sites, specifically a 1,0km stretch of the N11 where it is immediately adjacent the solar PV arrays and for residential properties east and directly north of the proposed sites. This is due to the flat terrain and the screening effect that existing and proposed residential and mining structures will have on views from the surrounding areas. The sites will be visible from some of the elevated residential areas north and east of the site, however, this would be at distances of 2,4 km and 1,8 km respectively. It is noted that Solar Area 3, proposed above car ports, would not be visible from most viewing points as they would be screened by existing and proposed mine infrastructure or be screened from view by the solar PV arrays in Solar Areas 1 and 2.

The primary visual envelope, where open or partially obstructed views of the solar PV arrays would occur, is contained to residential areas (Ga-Magongwa) the immediate north and east (Tshamahansi), and travellers along the N11 immediately east of the sites. However, due to the flat nature of the landscape and the prevalence of existing structures, views from south and west of the mine's infrastructure area, will mostly be blocked or partially screened. Most sensitive viewing areas in the project area, would therefore not be affected by the proposed Project.

Visual intrusion and exposure: In the case of unmitigated visual impacts of the PV arrays on the sensitive viewers, the project components will appear in sensitive foreground views (up to 800 m from the nearest PV arrays) immediately north and east of the site, with the potential for moderate visual intrusion and exposure. The existing fence along the mine's boundary has a mitigating effect on views to the arrays. It does not completely screen the arrays from the receptor, but it does 'filter' their presence to a degree.

The PV arrays would also appear in the middle-ground (i.e., up to 3,0 km) of views north and east of the sites. However, at this distance and because the Visual Absorption Capacity (VAC) is high for the area, visual intrusion/exposure is rated low for these areas. For the remainder of the project area, visual intrusion/exposure is considered low to negligible, i.e., has a minimal to insignificant effect on key views and the visual quality and sense of place of the landscape and contrasts minimally with the patterns or cultural elements that define the structure of the landscape.

Glint and glare: Due to the low angle of the viewer relative to the solar PV arrays, a line of the PV arrays would be visible in any given view, i.e., the full extent of the solar park would never be visible in foreground views. Also, the time that the PV arrays would glare is limited to times of the day when the sun is low in the sky (either early morning or late afternoon) and on those days when the climatic conditions are aligned to produce glare. Research in published guidance studies shows that the intensity of solar reflections from solar panels is equal to or less than that of water. It also indicates that reflections from solar panels are significantly less intense than a variety of other reflective surfaces, which are common in an outdoor environment (Appendix A: Pager Power 2020:40). Also, the 'filtering' effect of the existing fence would mitigate glare should it occur.

Given that only a small section of the PV arrays would be visible and would mostly appear as dark blue or blackish colour; and that glare would occur infrequently, the effect on glare sensitive receptors along the N11 and in properties immediately north and east of the sites, is considered low and would not contribute significantly to the visual impact of the Project.

Night lighting: Any negative effect of night lighting caused by the Project would be seen against the lights of existing and proposed mining infrastructure and the glow of the urban areas. Night lights would, therefore, not be particularly detrimental to the sensitive viewers described above. However, lights could add to the adverse cumulative effects of the night-time effect cause by existing and proposed mining infrastructure.

14.2.7 IMPACT ON NEARBY WEATHER RADAR INFRASTRUCTURE

The Weather Radar installation identified by the DFFE screening tool is approximately 57 km away from the proposed Platreef solar facility, which is much further away than the prescribed clearance zones of up to 152.4 m. Pathloss of 175.6dB over this distance is high enough for the solar facility to have no significant RFI or EMI impact on the electrical infrastructure at the Weather Radar installation. The received power at the Weather Radar station is approximately -215.8dBm. According to the coverage data generated in Radio Mobile, the receivers at the Weather Radar will not be desensitised by the proposed solar facility.

14.2.8 CUMULATIVE IMPACTS

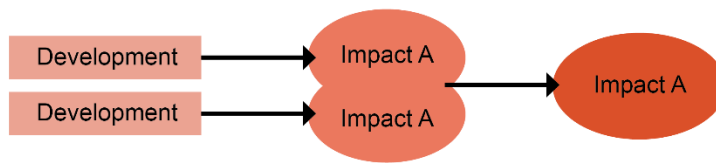
According to the International Finance Corporation (IFC) standards the following objectives need to be met in a cumulative assessment:

- Assess the potential impacts and risks of a proposed development over time, in the context of potential effects from other developments and natural environmental and social external drivers on a chosen environmental and social attribute.
- Verify that the proposed development's cumulative social and environmental impacts and risks will not exceed a threshold that could compromise the sustainability or viability of selected environmental and social attributes.
- Confirm that the proposed development's value and feasibility are not limited by cumulative social and environmental effects.
- Support the development of governance structures for making decisions and managing cumulative impacts at the appropriate geographic scale (e.g., Air-shed, river catchment, town, regional landscape).
- Ensure that the concerns of affected communities about the cumulative impacts of a proposed development are identified, documented, and addressed.
- Manage potential reputation risks.

A cumulative impact may result from an additive impact, i.e. where it adds to the impact which is caused by other similar impacts or an interactive impact that is where a cumulative impact is caused by different impacts that combine to form a new kind of impact. Interactive impacts may either be countervailing (net adverse cumulative impact is less than the sum of the individual impacts) or synergistic (net adverse cumulative impact is greater than the sum of the individual impacts).

The cumulative impacts are assessed by taking into account the current monitoring and baseline assessment that include the projects that are in close proximity. From there the mine impacts was simulated on top of the current impacts. Two types of Cumulative impacts as explained below (**Figure 31**) in are evaluated and rated in this report.

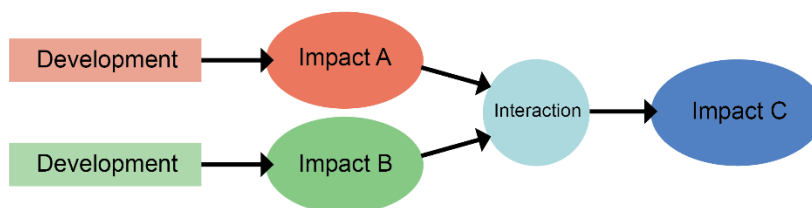
Impact:



Impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project. For example:

- Incremental noise from a number of separate developments;
- Combined effect of individual impacts, e.g. noise, dust and visual, from one development on a particular receptor;
- Several developments with insignificant impact individually but which together have a cumulative effect, e.g. development of a golf course may have an insignificant impact, but when considered with several nearby gold courses there could be a significant cumulative impact on local ecology and landscape.

In-combination:



The reactions between impacts whether between the impacts of just one project or between the impacts of other projects in the area. For example:

- A chemical plant producing two streams of waste that are individually acceptable but react in combination producing highly significant levels of pollution;
- Emissions to air from one project reacting with emissions from an existing development;
- Two major developments being constructed adjacent to one another and during overlapping time periods will have many interactive impacts, from land use issues to construction and operational noise.



Figure 31: Illustration of cumulative impact prediction methods

The assessment of cumulative impacts on a study area is complex; especially if many of the impacts occur on a much wider scale than the site being assessed and evaluated. It is often difficult to determine at which point the accumulation of many small impacts reaches the point of an undesired or unintended cumulative impact that should be avoided or mitigated. There are often factors which are uncertain when potential cumulative impacts are identified.

14.2.8.1 CUMULATIVE SOIL, LAND USE AND LAND CAPABILITY IMPACTS

Considering the given potential of the soils, the level of disturbance and the grazing taking place at the time of site assessment, the loss from a soil and land capability point of view is anticipated to be of Moderate significance. This also takes into account the pressure on adjacent areas for grazing once the land is cleared of vegetation. Thus, the proposed activities may potentially have a negative impact on agricultural production on a local and regional and scale. The protection of agricultural resources should be prioritised as far as practically possible while considering the need for sustainable development and the need for conversion to greener energy production in South Africa.

14.2.8.2 CUMULATIVE SOCIO-ECONOMIC IMPACTS

Stimulation of the economy: Mines are moving more toward renewable energy sources; thus, it is highly likely that if projects are approved by the authorities, the demand for goods and services required for the construction of similar facilities would grow. On one hand, this would supply sufficient economies of scale

and thus open opportunities for the establishment of new businesses in the local area, specifically in the sectors that are not well developed in the local economy. On the other hand, it might put pressure on certain local industries, which products are required in the construction and that are usually sourced from nearby areas due to high transportation costs. Appropriate planning with respect to the activities and preliminary investigation into the local supply capabilities should mitigate this impact. Therefore, the cumulative impact during the construction phase of the proposed solar PV facility is rated as moderate positive.

Moreover, the proposed development creates opportunities for achievement of sufficient economies of scale to establish new businesses in the local economies that would supply goods and services required for the operation and maintenance of the facilities that are currently unavailable in the area; this would contribute to the local economies' growth and development. The cumulative impact for this development during the operational and maintenance phase is expected to remain moderate positive. For the decommissioning phase, it is expected that the cumulative impact remains a very low positive.

Creation of employment: There is an opportunity to upgrade and improve skills levels in the area considering the envisaged increase of renewable energy activities in the country and province. The cumulative impact during the construction phase is expected to be moderate positive. Additionally, improved living standards of the, directly and indirectly, affected households are expected during the operational and maintenance phase and this is expected to remain a positive impact. For the decommissioning phase, it is expected that the cumulative impact remains a very low positive.

Loss of property: During the construction phase of the project, the cumulative impact is expected to remain a very low negative, considering that the mine has already been established on the site.

14.2.8.3 CUMULATIVE VISUAL IMPACTS

The cumulative impact of the project is moderate as the negative effect (low to insignificant) will not add to the predicted moderate negative visual impact of the Platreef Mine as rated in Digby Wells (2022). The intervisibility of the Project along with the mine infrastructure, would over time, result in the nature and character of the study being impacted in a manner commensurate with the anticipated moderate negative impact of the proposed Platreef Mine. The combined effect of approved, pending and proposed developments would have a moderate impact on the sense of study and character of the landscape's baseline.

The significance of the cumulative impact of the Project, the Mine and the landscape, on the visual environment during their operational phases is assessed to have a moderate magnitude over the long-term with an unmitigated regional impact extending beyond the site (to at least 5,0 km beyond the site boundaries) and is assessed to be moderate.

14.3 ASSESSMENT OF EACH IDENTIFIED POTENTIALLY SIGNIFICANT IMPACT AND RISK

The impact assessment matrix is included below as **Table 17**.

Table 17: Impact Assessment Table

No	Activity	Potential Impact	Aspect affected	Without or With Mitigation	Nature	Probability	Probability	Duration	Duration	Scale	Scale	Magnitude/ Severity	Magnitude/ Severity	Significance	Significance	Potential for Residual Risk
		Impact				Magnitude	Score	Magnitude	Score	Magnitude	Score	Magnitude	Score	Score	Magnitude	
Terrestrial Biodiversity																
Construction Phase																
1	Construction of PV facilities	<ul style="list-style-type: none"> Habitat loss (fauna and flora) through clearance or displacement, requiring removal of vegetation and surface grading across the footprint areas. This may cause habitat loss, degradation, and fragmentation - leading to a reduction in floral and faunal species richness and density; and Inadequate design of proposed footprint areas, including poorly planned placement of infrastructure associated with the proposed project, resulting in potential loss of floral and faunal habitat beyond the planned footprints, and a decline in floral and faunal diversity. 	Fauna and Flora	WOM	Negative	Definite	5	Permanent	5	Local	1	Low	2	40	Low	No
				WM	Negative	Definite	5	Long term	4	Local	1	Low	2	35	Low	
2	Construction of PV facilities	<p>Poorly managed edge effects:</p> <ul style="list-style-type: none"> Introduction of AIPs during construction activities; Ineffective rehabilitation of compacted areas, bare soils, or eroded areas leading to ongoing proliferation of AIP species in disturbed areas and subsequent spread to surrounding natural areas altering both floral and faunal habitat; Poorly implemented dust management resulting in adverse impacts to flora; Potential inadequate design of stormwater management and erosion control, resulting in increased risk of erosion and loss faunal and floral habitat; and Potential fragmentation of natural habitat by transport vehicles not using designated roads. 	Fauna and Flora	WOM	Negative	Highly Probable	4	Medium term	3	Regional	3	Low	2	32	Low	No
				WM	Negative	Probable	2	Short term	1	Local	1	Low	2	8	Negligible	
3	Construction of PV facilities	<ul style="list-style-type: none"> Failure to undertake a walkdown of the authorised footprint during which floral SCC and protected floral species (NFA trees) are searched for and marked, resulting in potentially unnecessary loss of NFA-trees; and Failure to comply with national legislation regarding permit applications for the removal, 	Protected Flora (NFA-protected trees)	WOM	Negative	Definite	5	Permanent	5	Local	1	Low	2	40	Low	No
				WM	Negative	Definite	5	Long term	4	Local	1	Low	2	35	Low	

No	Activity	Potential Impact	Aspect affected	Without or With Mitigation	Nature	Probability	Probability	Duration	Duration	Scale	Scale	Magnitude/ Severity	Magnitude/ Severity	Significance	Significance	Potential for Residual Risk
		Impact				Magnitude	Score	Magnitude	Score	Magnitude	Score	Magnitude	Score	Score	Magnitude	
		destruction, and/or relocation of NFA-protected floral species within footprint areas, resulting in unlawful destruction/removal of protected species within the footprint areas.														
Operational and Maintenance Phase																
4	Operation and maintenance of the PV facility	Bird collisions with solar panels and/or transmission lines. PV panels and concentrating solar collectors could present a collision risk to bird and bat species. The extent and significance of these impacts are largely unknown and limited to a small number of studies. Birds and aquatic insects may mistake the flat surfaces of PV panels for water bodies and attempt to land on them. This can risk injury and may be detrimental to certain birds that cannot take off without a water body.	Avifauna	WOM	Negative	Highly Probable	4	Medium term	3	Site	2	Medium	6	44	Moderate	No
				WM	Negative	Highly Probable	4	Medium term	3	Site	2	Low	2	28	Low	
5	Operation and maintenance of the PV facility	Introduction of AIP species.	Fauna and Flora	WOM	Negative	Highly Probable	4	Long term	4	Regional	3	Medium	6	52	Moderate	Yes
				WM	Negative	Probable	2	Medium term	3	Site	2	Low	2	14	Negligible	No
6	Operation and maintenance of the PV facility	<ul style="list-style-type: none"> Ongoing loss of floral and faunal habitat beyond the footprint areas resulting from maintenance activities associated with the proposed solar PV Areas due to 1) poor stormwater management, 2) poor fire management, 3) poor dust management, and 4) potential introduction of AIPs, resulting in altered vegetation communities surrounding footprint areas and loss of faunal food resources; Movement of in vehicles resulting in Collisions between operational vehicles and fauna; Overexploitation through the removal and/or collection of indigenous floral and faunal species by operational and maintenance teams beyond the direct footprint area; and Spillage/leakage of chemicals, fuel and oils from operational equipment leading to hydrocarbon ingress into the soils affecting plant growth (faunal habitat and food resources) and soil organisms. 	Fauna and Flora	WOM	Negative	Highly Probable	4	Long term	4	Site	2	Medium	6	48	Moderate	Yes
				WM	Negative	Probable	2	Medium term	3	Site	2	Medium	6	22	Low	No
7	Operation and maintenance of the PV facility	Barrier effects, i.e., dispersal corridors altered / impaired due to long-term fragmentation of the remaining natural	Fauna and Flora	WOM	Negative	Probable	2	Long term	4	Regional	3	Medium	6	26	Low	No

No	Activity	Potential Impact	Aspect affected	Without or With Mitigation	Nature	Probability	Probability	Duration	Duration	Scale	Scale	Magnitude/ Severity	Magnitude/ Severity	Significance	Significance	Potential for Residual Risk
		Impact				Magnitude	Score	Magnitude	Score	Magnitude	Score	Magnitude	Score	Score	Magnitude	
		habitat in the project area and surrounds, resulting in the loss of dispersal trajectories, reduction to ecological integrity of the area, compromised ecological functions on a local scale.		WM	Negative	Probable	2	Short term	1	Site	2	Low	2	10	Negligible	
Freshwater Ecosystem																
Construction Phase																
8	<p>Site clearing and set up prior to the commencement of construction activities:</p> <ul style="list-style-type: none"> Vegetation clearing in the development footprint; Movement of vehicles to access the footprint resulting in soil compaction; and Placement of contractor laydown and storage facilities 	<ul style="list-style-type: none"> Reduced vegetation cover; Smothering of the vegetation within regulated zones as a result of increased sediment leading to altered habitat; Disturbance of soil leading to increased AIP proliferation; Potential soil and stormwater contamination from oils as well as hydrocarbons from vehicles; Potential sedimentation of the preferential surface flow paths due to vehicle movement; Potential contamination of the preferential surface flow paths by leaks of oil/hydraulic fluid from equipment; and Smothering of vegetation through rock/soil stockpiling, and the possible creation of habitat for invasive or encroacher pioneer species. 	Freshwater Ecology	WOM	Negative	Definite	5	Permanent	5	Local	1	Medium	6	60	Moderate	No
				WM	Negative	Highly Probable	4	Long term	4	Local	1	Low	2	28	Low	
9	<p>Potential impacts on the preferential surface flow paths' hydrology:</p> <ul style="list-style-type: none"> Potential infilling of the preferential flow paths due to the construction activities and associated excavations and stockpiles; and Hydrocarbon leakage into the preferential surface flow paths 	<ul style="list-style-type: none"> Potential sedimentation of the preferential surface flow paths due to vehicle movement; Potential contamination of the preferential surface flow paths by leaks of oil/hydraulic fluid from equipment; and Smothering of vegetation through rock/soil stockpiling, and the possible creation of habitat for invasive or encroacher pioneer species. 	Freshwater Ecology	WOM	Negative	Definite	5	Long term	4	Local	1	Low	2	35	Low	No
				WM	Negative	Highly Probable	4	Medium term	3	Local	1	Low	2	24	Low	
10	<p>Potential impacts on the preferential surface flow paths' geomorphology due to potential construction of the proposed solar PV facility components within the identified preferential surface flow paths</p>	Disturbance to the surrounding preferential surface flow paths, leading to increased erosion, AIP proliferation and loss of freshwater ecosystem habitat.	Freshwater Ecology	WOM	Negative	Definite	5	Long term	4	Local	1	Low	2	35	Low	
				WM	Negative	Highly Probable	4	Medium term	3	Local	1	Low	2	24	Low	
11	<p>Potential impacts on the preferential surface flow paths' water quality due to potential contamination of the preferential flow paths due to leakages and construction</p>	Potential for deteriorated water quality, including increased likelihood of dust generation and turbidity during mounting of support structures.	Freshwater Ecology	WOM	Negative	Highly Probable	4	Long term	4	Local	1	Low	2	28	Low	
				WM	Negative	Probable	2	Medium term	3	Local	1	Low	2	12	Negligible	
Construction of Solar Areas 1 & 2 - Ground mounted panels																

No	Activity	Potential Impact	Aspect affected	Without or With Mitigation	Nature	Probability	Probability	Duration	Duration	Scale	Scale	Magnitude/ Severity	Magnitude/ Severity	Significance	Significance	Potential for Residual Risk
		Impact				Magnitude	Score	Magnitude	Score	Magnitude	Score	Magnitude	Score	Score	Magnitude	
12	Activities associated with the construction and installation of the solar PV facility infrastructure: <ul style="list-style-type: none"> Regular movement of vehicles on access roads including the potential excavation of soil to facilitate foundations for mounting and installation of solar panels and mounting of rods into foundations and associated transmission lines; Soil disturbance and vegetation clearing for construction; Vehicles, construction machinery, and personnel access to facilitate mounting of solar panels and associated construction; Potential excavation and stockpiling of soils for panels and pedestals; and Potential concrete works to fill pedestal excavations 	<ul style="list-style-type: none"> Removal of vegetation within the development footprint; Disturbances to the soil within the footprint leading to an altered habitat and potential alien proliferation; Altered runoff patterns as a result of excavations and concrete, leading to increased erosion; Potential for deteriorated water quality, including increased likelihood of dust generation and turbidity into proximal waterbodies; and Potential physical obstruction of habitat to biota from the surface infrastructure component of the proposed development. 	Freshwater Ecology	WOM	Negative	Definite	5	Permanent	5	Local	1	Low	2	40	Low	No
				WM	Negative	Definite	5	Long term	4	Local	1	Low	2	35	Low	
Construction of Solar Areas 3 - Roof mounted panels																
13	Activities associated with the construction and installation of the solar PV facility infrastructure including the mounting of panels on roofs of carparks: <ul style="list-style-type: none"> Regular movement of vehicles on access roads including the potential excavation of soil to facilitate foundations for mounting and installation of solar panels and mounting of rods into foundations and associated transmission lines; Soil disturbance and vegetation clearing for construction; Vehicles, construction machinery, and personnel access to facilitate mounting of solar panels and associated construction; Potential excavation and stockpiling of soils for panels and pedestals; and Potential concrete works to fill pedestal excavations 	<ul style="list-style-type: none"> Removal of vegetation within the development footprint; Disturbances to the soil within the footprint leading to an altered habitat and potential alien proliferation; Altered runoff patterns as a result of excavations and concrete, leading to increased erosion; Potential for deteriorated water quality, including increased likelihood of dust generation and turbidity into proximal waterbodies; and Potential physical obstruction of habitat to biota from the surface infrastructure component of the proposed development. 	Freshwater Ecosystem	WOM	Negative	Definite	5	Permanent	5	Local	1	Low	2	40	Low	No
				WM	Negative	Definite	5	Long term	4	Local	1	Low	2	35	Low	
Operational and Maintenance Phase																
14	Operations associated with the maintenance of the solar PV facility infrastructure and fencing: <ul style="list-style-type: none"> Potential indiscriminate movement of vehicles in proximity to the identified preferential surface flow paths with risks of sediment and hydrocarbons entering the preferential flow paths via runoff 	<ul style="list-style-type: none"> Disturbance to the soil, vegetation, biota and potentially water quality as a result of periodic maintenance activities; Potential spillage and ingress of hydrocarbons from maintenance vehicles; and Increased sedimentation, runoff and turbidity as a result of reduced vegetation cover of the adjacent preferential surface flow paths. 	Freshwater Ecosystem	WOM	Negative	Definite	5	Medium term	3	Local	1	Low	2	30	Low	No
				WM	Negative	Highly Probable	4	Short term	1	Local	1	Low	2	16	Negligible	
15	Operation and maintenance of the overhead powerlines and associated infrastructure: <ul style="list-style-type: none"> Potential indiscriminate movement of maintenance vehicles within proximity to the preferential surface flow paths from the proposed area; and 	<ul style="list-style-type: none"> Disturbance to soil and ongoing erosion as a result of periodic maintenance activities; and Altered water quality (if surface water is present) as a result of increased availability of pollutants. 	Freshwater Ecology	WOM	Negative	Highly Probable	4	Medium term	3	Local	1	Low	2	24	Low	No
				WM	Negative	Probable	2	Short term	1	Local	1	Low	2	8	Negligible	

No	Activity	Potential Impact	Aspect affected	Without or With Mitigation	Nature	Probability	Probability	Duration	Duration	Scale	Scale	Magnitude/ Severity	Magnitude/ Severity	Significance	Significance	Potential for Residual Risk	
		Impact				Magnitude	Score	Magnitude	Score	Magnitude	Score	Magnitude	Score	Score	Magnitude		
		<ul style="list-style-type: none"> Increased risk of sedimentation and/or hydrocarbons entering the identified features via stormwater runoff from the access roads 															
Soil, Land Use and Land Capability																	
Construction Phase																	
16	Site clearing and removal of vegetation as part of the construction of the proposed solar facility	Soil erosion: Loosening of soil due to removal of vegetation. Increased runoff, erosion and consequent loss of land capability in cleared areas	Land capability	WOM	Negative	Definite	5	Long term	4	Site	2	Medium	6	60	Moderate	No	
				WM	Negative	Highly Probable	4	Short term	2	Site	2	Medium	6	40	Low	No	
17			Soil compaction: Potential frequent movement of digging machinery and construction vehicles within loose and exposed soils, leading to excessive soil compaction	Land capability	WOM	Negative	Definite	5	Long term	4	Site	2	Medium	6	60	Moderate	No
					WM	Negative	Probable	4	Short term	2	Site	2	Medium	6	40	Low	No
18			Soil contamination: spillage of petroleum hydrocarbons during construction of associated infrastructure. Disposal of hazardous and non-hazardous waste, including waste material spills and refuse deposits into the soil	Land capability	WOM	Negative	Highly Probable	4	Long term	4	Site	2	Medium	6	48	Moderate	No
					WM	Negative	Highly Probable	4	Short term	2	Site	2	Medium	6	40	Low	No
19			Loss of land capability	Land capability	WOM	Negative	Definite	5	Permanent	4	Site	2	Medium	6	60	Moderate	Yes
					WM	Negative	Highly Probable	4	Medium term	3	Site	2	Medium	5	40	Low	Yes
Operational and Maintenance Phase																	
20		Operation of the proposed and maintenance of the solar PV facility and associated infrastructure	Soil Erosion: Constant disturbances of soils, resulting in risk of erosion	Land capability	WOM	Negative	Definite	5	Long term	4	Site	2	Medium	6	60	Moderate	No
					WM	Negative	Highly Probable	4	Short term	1	Local	1	Medium	6	32	Low	No
21			Soil Compaction: Constant disturbances of soils, resulting in risk of compaction	Land capability	WOM	Negative	Highly Probable	4	Long term	4	Local	1	High	8	52	Moderate	No
					WM	Negative	Highly Probable	4	Short term	1	Local	1	Medium	6	32	Low	No
22			Soil contamination: Leaching of hydrocarbons chemicals into the soils during vehicular traffic, leading to alteration of the soil chemical status	Land capability	WOM	Negative	Highly Probable	4	Long term	4	Site	2	Medium	6	48	Moderate	No
					WM	Negative	Probable	2	Medium term	3	Site	2	Medium	6	22	Low	No
23			Land Capability: Loss of land capability	Land capability	WOM	Negative	Definite	5	Permanent	5	Site	2	Medium	6	65	High	No
					WM	Negative	Highly Probable	4	Medium term	3	Site	2	Medium	6	44	Moderate	No
Closure and Post Closure Phase																	
24	Dismantling of the Solar PV facility and associated infrastructure		Soil Erosion: Loosening of soils due to removal of the solar PV facility. Increased runoff, erosion, and consequent loss of land capability in cleared areas.	Land capability	WOM	Negative	Definite	5	Long term	4	Site	2	Medium	6	60	Moderate	No
					WM	Negative	Highly Probable	4	Short term	1	Local	1	Medium	6	32	Low	No
25		Soil Compaction: Movement of vehicles and machinery	Land capability	WOM	Negative	Definite	5	Long term	4	Site	2	Medium	6	60	Moderate	Yes	

No	Activity	Potential Impact	Aspect affected	Without or With Mitigation	Nature	Probability	Probability	Duration	Duration	Scale	Scale	Magnitude/ Severity	Magnitude/ Severity	Significance	Significance	Potential for Residual Risk
		Impact				Magnitude	Score	Magnitude	Score	Magnitude	Score	Magnitude	Score	Score	Magnitude	
26		during the removal of the solar PV facility.	Land capability	WM	Negative	Highly Probable	4	Short term	1	Local	1	Medium	6	32	Low	No
		Soil contamination: Spillage of hydrocarbons resulting from leakages from demolition equipment/machinery and other chemical storage facilities, leading to soil contamination (soil chemical characteristics).		WOM	Negative	Highly Probable	4	Long term	4	Site	2	High	8	56	Moderate	No
		Land Capability: Potentially poor solar PV removal strategy may result to lower infiltration rate, and consequently increased surface runoff. Increased soil erosion leading to permanent loss of soil resources		WM	Negative	Probable	2	Medium term	3	Site	2	Medium	6	22	Low	No
27		Land Capability: Potentially poor solar PV removal strategy may result to lower infiltration rate, and consequently increased surface runoff. Increased soil erosion leading to permanent loss of soil resources	Land capability	WOM	Negative	Definite	5	Medium term	3	Site	2	High	8	65	High	Yes
				WM	Negative	Highly Probable	4	Long term	4	Site	2	Medium	6	48	Moderate	No
Socio-Economic																
Construction Phase																
28	Temporary increase in production and GDP in the local economy	Improved household income and increased business sales in the local economy	Socio-Economic	WOM	Positive	Definite	5	Medium term	3	Regional	3	Low	2	40	Low	No
				WM	Positive	Definite	5	Medium term	3	Regional	3	Low	2	40	Low	No
29	Creation of temporary employment opportunities on-site	Improved income of households whose members are employed on the project	Socio-Economic	WOM	Positive	Definite	5	Medium term	3	Regional	3	Low	2	40	Low	No
				WM	Positive	Definite	5	Medium term	3	Regional	3	Low	2	40	Low	No
30	Temporary increase in crime associated with the influx of people	Reduced level of security in and around the proposed facility	Socio-Economic	WOM	Negative	Highly Probable	4	Medium term	3	Site	2	Medium	6	44	Moderate	No
				WM	Negative	Probable	2	Medium term	3	Site	2	Low	2	14	Negligible	No
31	Deterioration of quality of life due to dust, noise, visual, and other environmental impacts	Temporary change to the sense of place	Socio-Economic	WOM	Negative	Highly Probable	4	Medium term	3	Site	2	Medium	6	44	Moderate	No
				WM	Negative	Probable	2	Medium term	3	Site	2	Low	2	14	Negligible	No
Operational Phase																
32	Long-term increase in production and GDP in the local economy	Improved household income and increased business sales in the local economy	Socio-Economic	WOM	Positive	Definite	5	Long term	4	Regional	3	Low	2	45	Moderate	No
				WM	Positive	Definite	5	Long term	4	Regional	3	Low	2	45	Moderate	No
33	Creation of permanent employment opportunities in the local and regional economy	Improved income of households whose members are employed on the project	Socio-Economic	WOM	Positive	Definite	5	Long term	4	Site	2	Low	2	40	Low	No
				WM	Positive	Definite	5	Long term	4	Site	2	Low	2	40	Low	No
34	Deterioration of quality of life in the area and environmental impacts	Change in Sense of Place	Socio-Economic	WOM	Negative	Probable	2	Long term	4	Site	2	Medium	6	24	Low	No
				WM	Negative	Probable	2	Long term	4	Site	2	Low	2	16	Negligible	No
35	Reduced strain on municipal electricity	Reduced carbon footprint	Environmental	WOM	Positive	Definite	5	Long term	4	Local	1	Low	2	35	Low	None

No	Activity	Potential Impact	Aspect affected	Without or With Mitigation	Nature	Probability	Probability	Duration	Duration	Scale	Scale	Magnitude/ Severity	Magnitude/ Severity	Significance	Significance	Potential for Residual Risk
		Impact				Magnitude	Score	Magnitude	Score	Magnitude	Score	Magnitude	Score	Score	Magnitude	
				WM	Positive	Definite	5	Long term	4	Local	1	Low	2	35	Low	None
	Decommissioning phase															
36	Temporary increase in production and GDP in the local economy	Improved household income and increased business sales in the local economy	Economic	WOM	Positive	Highly Probable	4	Medium term	3	Regional	3	Low	2	32	Low	No
				WM	Positive	Highly Probable	4	Medium term	3	Regional	3	Low	2	32	Low	No
37	Creation of permanent employment opportunities in the local and regional economy	Improved income of households whose members are employed on the project	Socio-Economic	WOM	Positive	Highly Probable	4	Medium term	3	Regional	3	Low	2	32	Low	No
				WM	Positive	Highly Probable	4	Medium term	3	Regional	3	Low	2	32	Low	No
	Visual															
	Construction Phase															
38	Preparation of earthworks for the solar PV array areas: Areas 1 and 2	<ul style="list-style-type: none"> Topsoil stripping, exposure of soils to wind causing dust. The exposure of earth results in the altering of the visual quality and sense of place of the development areas; and Visual dusts plumes. 	Visual Aspects	WOM	Negative	Probable	2	Short term	1	Regional	3	Low	2	12	Negligible	No
				WM	Negative	Probable	2	Short term	1	Regional	3	Low	2	12	Negligible	No
39	<ul style="list-style-type: none"> Construction of the solar PV array structures and placement of the panels All activities associated with the construction of the arrays and the 11kV overhead power line and the movement of vehicles 	The alteration of visual quality and sense of place of areas around the project sites and the subsequent impact on sensitive receptor areas	Visual Aspects	WOM	Negative	Probable	2	Short term	1	Regional	3	Low	2	12	Negligible	No
				WM	Negative	Probable	2	Short term	1	Regional	3	Low	2	12	Negligible	No
40	Security, operational and moving vehicle lights	Night light pollution	Visual Aspects	WOM	Negative	Probable	2	Short term	1	Regional	3	Low	2	12	Negligible	No
				WM	Negative	Probable	2	Short term	1	Regional	3	Low	2	12	Negligible	No
	Operational Phase															
41	All activities and infrastructure associated with the operation of the solar PV facility	The alteration of visual quality and sense of place of areas around the project sites and the subsequent impact on sensitive receptor areas	Visual Aspects	WOM	Negative	Highly Probable	4	Long term	4	Regional	3	Low	2	36	Low	No
				WM	Negative	Probable	2	Long term	4	Regional	3	Low	2	18	Negligible	No
42	Security and operational lights	Night light pollution	Visual Aspects	WOM	Negative	Probable	2	Short term	1	Regional	3	Low	2	12	Negligible	No
				WM	Negative	Probable	2	Short term	1	Regional	3	Low	2	12	Negligible	No
	Closure and Post-Closure Phase															
43	Removal of all infrastructure	<ul style="list-style-type: none"> The alteration of visual quality and sense of place of areas around the project sites and the subsequent impact on sensitive receptor areas; and Visual dust plumes. 	Visual Aspects	WOM	Negative	Probable	2	Short term	1	Regional	3	Low	2	12	Negligible	No
				WM	Negative	Probable	2	Short term	1	Regional	3	Low	2	12	Negligible	No
44	Rehabilitation of all areas associated with the solar PV facility	The alteration of visual quality and sense of place of areas around the project sites and the subsequent impact on sensitive receptor areas	Visual Aspects	WOM	Negative	Probable	2	Short term	1	Regional	3	Low	2	12	Negligible	No
				WM	Negative	Probable	2	Short term	1	Regional	3	Low	2	12	Negligible	No
45	Ongoing management of rehabilitated areas until established	The alteration of visual quality and sense of place of areas around the	Visual Aspects	WOM	Positive	Probable	2	Short term	1	Local	1	Low	2	8	Negligible	No

No	Activity	Potential Impact	Aspect affected	Without or With Mitigation	Nature	Probability	Probability	Duration	Duration	Scale	Scale	Magnitude/ Severity	Magnitude/ Severity	Significance	Significance	Potential for Residual Risk
		Impact				Magnitude	Score	Magnitude	Score	Magnitude	Score	Magnitude	Score	Score	Magnitude	
		project sites and the subsequent impact on sensitive receptor areas		WM	Positive	Probable	2	Short term	1	Local	1	Low	2	8	Negligible	No
	Heritage															
46	Construction and operation of the solar PV facility	Potential impact to heritage resources	Heritage and Archaeological Resources	WOM						N/A						N/A
				WM						N/A						N/A

14.4 THE POSSIBLE MITIGATION MEASURES THAT COULD BE APPLIED AND THE LEVEL OF RISK⁶¹

The proposed mitigation measures are listed below in **Table 22**.

15 MOTIVATION WHERE NO ALTERNATIVE SITES WERE CONSIDERED⁶²

Refer to **Section 8** for alternatives considered.

16 STATEMENT MOTIVATING THE ALTERNATIVE DEVELOPMENT LOCATION WITHIN THE OVERALL SITE⁶³

Refer to **Section 8** for alternatives considered.

17 FULL DESCRIPTION OF THE PROCESS UNDERTAKEN TO IDENTIFY, ASSESS AND RANK THE IMPACTS AND RISKS THE ACTIVITY WILL IMPOSE ON THE PREFERRED SITE (IN RESPECT OF THE FINAL SITE LAYOUT PLAN) THROUGH THE LIFE OF THE ACTIVITY

Refer to the methodology in **Section 14.1**.

18 SUMMARY OF SPECIALIST REPORTS

Please refer to **Table 18** for a summary of the specialist recommendations.

⁶¹ Required as per the EIA regulations Appendix 2 (g) a full description of the process followed to reach the proposed preferred activity, site and location of the development footprint within the site, including (viii) the possible mitigation measures that could be applied and level of residual risk

⁶² Required as per the EIA regulations Appendix 2 (g) a full description of the process followed to reach the proposed preferred activity, site and location of the development footprint within the site, including (x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such

⁶³ Required as per the EIA regulations Appendix 2 (g) a full description of the process followed to reach the proposed preferred activity, site and location of the development footprint within the site, including (xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity

Table 18: Summary of Specialist Recommendations

List of Studies Undertaken	Recommendations of Specialist Reports	Specialist Recommendations Included in Report	Section of Report where Specialist Recommendations have been Included
<p>Terrestrial Biodiversity Assessment ANNEXURE K</p>	<p>To mitigate against any potential impacts during the construction and operation phases, the following is recommended:</p> <ul style="list-style-type: none"> • A site walkdown is required where all NFA-protected tree species (i.e., <i>Combretum imberbe</i> and <i>Sclerocarya birrea</i> subsp. <i>caffra</i>) will be marked and permit applications applied for the removal of these species. • Where possible, if protected trees occur in between the PV panels, it is recommended that the species not be removed. • Bonnox type fences be used and culverts (approx. 30 cm in diameter) be placed every 100 m to ensure smaller mammals can move out of the path of construction activities to safe areas. Where a species occurs in high abundances, such as <i>Lepus saxatilis</i> (Scub hare). • Revegetating temporary-use and lay down areas as soon as reasonably practicable after construction activities are complete. Make use of indigenous and non-invasive species for landscaping and rehabilitation works (where this is envisioned). Make use of soil, mulch and vegetation debris from vegetation clearance (that contain natural seed stock) to facilitate natural revegetation of disturbed areas, where this is reasonably practicable • Implement measures to reduce reflection effects. An example from the IUCN Guidelines (Bennun et al. 2021) includes the use of parabolic (curved) mirrors instead of flat heliostats to reduce the likelihood of skyward reflection to minimise potential bird collisions; • Adjusting the tilt of mirrored surfaces and solar panels when in standby mode to reduce risk of collisions and/or solar flux injuries (Jenkins et al. 2017)10; and • Outdoor lighting associated with the Solar Areas must be minimised to lower the risk of attracting birds, insects, and bats (Jenkins et al. 2017). 	<p>Yes</p>	<p>Table 22</p>

List of Studies Undertaken	Recommendations of Specialist Reports	Specialist Recommendations Included in Report	Section of Report where Specialist Recommendations have been Included
	<ul style="list-style-type: none"> Ongoing AIP monitoring and clearing/control should take place throughout the construction phase, and the boundary fences should be regularly checked for AIP proliferation to prevent spread to surrounding areas during the operational phases. 		
<p>Freshwater Assessment ANNEXURE J</p>	<p>Although the preferential surfaced flow path were indicated in the topographic maps, these were found to be have been degraded and no longer functional due to anthropogenic activities (most notably agriculture). The systems however, may be subject to floodlines and thus can be defined as watercourses that enjoy protection in terms of the National Water Act, 1998 (Act No. 36 of 1998). Thus the following recommendation have been propsoed in line with best practice:</p> <ul style="list-style-type: none"> Existing roads must be used as much as possible to gain access to the development footprint area in order to limit edge effects, erosion and sedimentation of the identified watercourses during the construction phase (although unlikely to impact given the current state of the preferential surface flow paths within the development footprint); The contractor must retain as much indigenous vegetation as much as possible during construction and rehabilitate residual open spaces; Fresh concrete and cement mortar should not be mixed within watercourses and their respective regulated zones; Mixing of cement may be done within the development footprint but may not be mixed on bare soil, and must be within a lined, bound or bunded portable mixer. Consideration must be taken to use ready mix concrete; Stormwater runoff from the internal roads should be monitored, to ensure no erosion occurs and that all water is diffusely spread across the landscape. If erosion or preferential flow paths are detected, the areas should be rehabilitated (erosion gullies infilled) and revegetated to aid in dispersing the flow of water from the roads into the surrounding landscape; 	<p>Yes</p>	<p>Table 22</p>

List of Studies Undertaken	Recommendations of Specialist Reports	Specialist Recommendations Included in Report	Section of Report where Specialist Recommendations have been Included
	<ul style="list-style-type: none"> Stormwater generated within the project area must be suitably managed according to a site-specific stormwater management plan. No water may be directly released from the proposed solar facility into the identified watercourses but must rather be suitably managed and released diffusely into the landscape. It is highly recommended that the stormwater management plan for the proposed solar facility be consulted in this regard. 		
<p>Soil, Land Use and Land Capability Assessment ANNEXURE H</p>	<p>Following the assessment and the identified potential impacts as the result of the proposed development; the key recommendations and rehabilitation measures can be summarised as follows:</p> <ul style="list-style-type: none"> The footprint of the proposed solar facility must be clearly demarcated to restrict vegetation clearing activities within the infrastructure footprint; The possibility for any agricultural (i.e., grazing) activity concurrently with solar generation should be further investigated; The solar project footprint should be vegetated with grass underneath the panels which can potentially be used to feed the livestock of the local community during the operational phase. Clean water with only biodegradable detergents should be used to clean the panels to limit any soil contamination that might occur; Post-removal of the solar PV, the site must be rehabilitated (compacted areas ripped, topsoil re-instated and the area vegetated with indigenous seed mix); and Use of heavy machinery should be avoided as far as possible to minimise further soil compaction during final rehabilitation. 	<p>Yes</p>	<p>Table 22</p>
<p>Heritage Assessment ANNEXURE N</p>	<p>The following general recommendations are made with regards to the Platreef Solar Project area in terms of heritage occurrences:</p> <ul style="list-style-type: none"> Since GPR scans and later investigations of Site 012A-05 proved to be inconclusive, further exploratory actions is required for this site. Here, the nature and context of the 	<p>Yes</p>	<p>Table 22</p>

List of Studies Undertaken	Recommendations of Specialist Reports	Specialist Recommendations Included in Report	Section of Report where Specialist Recommendations have been Included
	<p>features at the site should be tested by means of test excavations as part of the grave relocation process in order to confirm without a doubt whether the site contains human remains and burials.</p> <ul style="list-style-type: none"> • Relevant families should be informed and consulted about the proposed activities which could affect any potential graves in the project area. • Agreements and Memoranda of Understanding (MOU) with communities and representatives who by tradition might have an interest in the graves regarding the future of such sites should at all times be in place and observed. • A careful watching brief monitoring process is recommended whereby ground clearing and earth moving activities are monitored on a regular basis in order to detect possible impact on heritage resources. Earth-moving crews and contractors should be made aware of the past existence of human burials and the potential of previously undetected graves occurring in the project area. • Should any subsurface paleontological, archaeological or historical material or heritage resources be exposed during construction activities, all activities should be suspended and the archaeological specialist should be notified immediately. • It should be reiterated that any grave relocation measures should be undertaken by a qualified archaeologist with proved experience in the removal and relocation of human remains in accordance with relevant legislation, permitting, statutory permissions and subject to any local and regional provisions and laws and by-laws. A full social consultation process should occur in conjunction with the mitigation of cemeteries and burials. <p>It should be stated that this Memorandum cannot serve as statutory approval for the project and the project HIA processes as well as the contents of this memorandum should be subjected to final review and comment from the Limpopo Heritage Resources Authority (LIHRA) and the South African Heritage Resources Agency (SAHRA) Burial Ground and Graves Unit (BGG Unit) as commenting authorities.</p>		

List of Studies Undertaken	Recommendations of Specialist Reports	Specialist Recommendations Included in Report	Section of Report where Specialist Recommendations have been Included
<p>Socio-Economic Assessment ANNEXURE M</p>	<p>The following is recommended to mitigate any potential impacts to the socio-economic environment, where feasible:</p> <ul style="list-style-type: none"> • Employ local residents and communities, where possible. This is anticipated to be beneficial considering the high unemployment rate observed in the local municipality • It is recommended to increase the employment opportunities created in the local communities, where feasible • Employ labour-intensive methods in construction and decommissioning phase, where feasible • Utilise local suppliers for goods and services, where possible. 	<p>Yes</p>	<p>Table 22</p>
<p>Visual Assessment ANNEXURE L</p>	<p>The following actions are recommended:</p> <ul style="list-style-type: none"> • Specifications with regards to the placement of construction camps (if required), as well as a site plan of the construction camp, indicating waste areas, storage areas and placement of ablution facilities, should be included in the EMPr. These areas should either be screened or positioned in areas where they would be less visible from nearby residence and the N11 main road • Plant clumps of indigenous evergreen trees (species to be confirmed by the project ecologist) along the eastern and northern edges of solar PV Areas 1 and 2. The trees along the northern edge should extend from the north east corner of Area 2 to the earth proposed berm at the north eastern corner of Area 1. The tree screen will only become effective after 5 – 10 years of growth, when the impact of the PV arrays can be reduced over time • Encourage the installation of the proposed 10 m high berm around the mine’s infrastructure areas 	<p>Yes</p>	<p>Table 22</p>

List of Studies Undertaken	Recommendations of Specialist Reports	Specialist Recommendations Included in Report	Section of Report where Specialist Recommendations have been Included
	<ul style="list-style-type: none"> • Paint all structures (structural support for the arrays) with colours that reflect and compliment the colours of the surrounding landscape. Shiny metals should be avoided • Install light fixtures that provide precisely directed illumination to reduce light "spillage" beyond the immediate surrounds of the site i.e. lights are to be aimed away from adjacent farmsteads areas, specifically west and north of the Project site. • Minimise the number of light fixtures to the bare minimum, including security lighting. • Avoid high pole top security lighting along the periphery of the site and use only lights activated on illegal entry to the site. 		
<p>Radio Frequency Interference ANNEXURE O</p>	<p>The Weather Radar installation identified by the DFFE screening tool is approximately 57 km away from nearest proposed PV site, which is much further away than the clearance zones. Pathloss of 175.6dB over this distance is high enough for the PV farm to have no significant RFI or EMI impact on the electrical infrastructure at the Weather Radar installation. The receivers at the Weather Radar will not be desensitised by any of the proposed solar facility.</p>	<p>Yes</p>	<p>Table 22</p>

19 ENVIRONMENTAL IMPACT STATEMENT

19.1 SUMMARY OF THE KEY FINDINGS OF THE ENVIRONMENTAL IMPACT ASSESSMENT

The impacts evident from the detailed impact assessment are included in **Section 14**. All the impacts identified can be considered of moderate or low significance apart from the following impacts which are of high significance:

- Loss of land capability; and
- Increased surface run-off resulting in increased soil erosion and permanent loss of soil resources.

With the implementation of the proposed mitigation management measures, the above impacts can however be reduced to moderate significance. All of the other identified impacts can be suitably mitigated to low and negligible significance with no residual risk, apart from a loss of land capability during the construction phase of the project. The identified soil forms are of moderate (Class III) land capability, and suitable for arable agricultural land use with restrictions. The overall impact of the proposed solar facility development on land capability and land potential is anticipated to be high to moderate prior to mitigation and moderate to low after mitigation.

It should be noted that the proposed solar PV facility falls within the approved Platreef Mine MR Area which is to be developed. To this effect, the mine has previously received environmental authorisation for the construction of an attenuation pond over the area being proposed for the solar PV facility. It is however recommended that the mine investigates the opportunity for agricultural or grazing activities to take place concurrently with solar generation over these areas.

The positive impact of the proposed solar PV facility are as follows:

- Increased household income and increased business sales in the local economy during all the project phases; and
- Improved income of households where members are employed on the project during all the project phases.

The above positive benefits are of low and moderate significance depending on the phase of the project. Overall, the findings from the impact assessment conclude that, provided that the recommended mitigation and management measures are implemented, there are no fatal flaws that prevent the proposed project from proceeding. In order to achieve appropriate environmental management standards and ensure that the findings of this assessment are implemented through practical measures, the recommendations from this BA&EMPr will need to be implemented by Ivanplats. The implementation of this BA&EMPr is considered to be fundamental in achieving the appropriate environmental management standards as detailed for this project.

19.2 FINAL SITE MAP

A layout map is included in **ANNEXURE F**.

19.3 SUMMARY OF THE POSITIVE AND NEGATIVE IMPLICATIONS AND RISKS OF THE PROPOSED ACTIVITY AND IDENTIFIED ALTERNATIVES

Refer to **Section 14.2**.

19.4 PROPOSED IMPACT MANAGEMENT OUTCOMES FOR INCLUSION IN THE EMPr

The management measures and specialist recommendations referred to should form part of the EMPr as well as for inclusion as conditions of authorisation.

Specialist management measures as well as the significance of the impacts prior and post mitigation are provided in **Table 17** and **Table 22** and contained in the respective studies.

20 FINAL PROPOSED ALTERNATIVES

The alternatives have been addressed in **Section 8**. The final alternatives have been specified and include the following:

- Site Location Alternative 3 is preferred
- Layout Alternative 2 as presented in **Section 5** is preferred.
- The preferred technology alternative is SPP.
- Wet cleaning of the solar panels is preferred.
- Development of the solar PV facility is the preferred as opposed to the “no-go” alternative, until such time that the facility can be decommissioned.

21 ASPECTS FOR INCLUSION AS CONDITIONS OF AUTHORISATION

The mitigation measures as specified within **Table 22** of the EMPr are to be included in the Environmental Authorisation.

Specialist recommendations which could be included as conditions of authorisation have been discussed in **Table 18**.

22 DESCRIPTION OF ANY ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE

OMI Solutions has exercised due care in reviewing the information supplied by Ivanplats. Whilst OMI Solutions has compared key data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the data supplied by Ivanplats.

Opinions presented in this report apply to the information about the project site and the proposed project as it existed at the time of OMI Solutions investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this report, about which OMI Solutions had no prior knowledge nor had the opportunity to evaluate.

All the data and information supplied to OMI Solutions is assumed to be accurate and reflective of the current condition of the focus area. It is assumed that the baseline information was scrutinised and used to explain the environmental profile is accurate.

The assumptions, uncertainties and gaps will be discussed per discipline for the various specialist inputs:

22.1 TERRESTRIAL BIODIVERSITY

The following assumptions and limitations are applicable to this compliance statement:

- It is assumed that all third-party information used (e.g., GIS data and satellite imagery) is correct at the time of generating this report;

- The survey was restricted to a single season (autumn). Undertaking additional surveys for the purposes of this compliance statement is not considered necessary, especially with past studies available; and
- Access to the project area was not restricted and data collected during the field survey is deemed adequate for the purposes of this report.

22.2 FRESHWATER ASSESSMENT

The following assumptions and limitations are applicable to this compliance statement:

- The watercourse field delineation and assessment were undertaken on the 26th of May 2022, was confined to the proposed solar PV facility area and did not include the neighbouring and adjacent properties. No watercourses were identified within either the project area or within 500 m thereof during the site assessment. Therefore, the watercourses depicted in this report are based on the topographic map lines as no discernible features could be identified on site and no wetland features or features with riparian characteristics were observed;
- The field assessment undertaken did not include confirmation and gathering of data to inform the Present Ecological State (PES) and Ecological Importance and Sensitivity (EIS) scores since the watercourses were confirmed to no longer be present and functional, however, the field assessment was conducted to inform the DWS risk assessment;
- With regards to data sources used to provide background information on the sensitivity of the assessed areas, it is important to note that although all data sources provide useful and often verifiable, high-quality data, the various databases used do not always provide an entirely accurate indication of the proposed solar facility's actual site characteristics at the scale required to inform the environmental authorisation processes; and
- With ecology being dynamic and complex, certain aspects (some of which may be important) may have been overlooked. A more reliable assessment of the biota would require seasonal sampling, with sampling being undertaken under both low and high rainfall conditions. However, it is expected that the activities have been accurately assessed and considered, based on the field observations.

22.3 SOIL, LAND USE AND LAND CAPABILITY

For the purpose of this assessment, the following assumptions are applicable:

- The soil survey conducted as part of the land capability assessment was confined within the project area outline. Consideration was however given to adjacent agricultural activities; and
- Since soils occur in a continuum with infinite variances, it is often problematic to classify any given soils as one form, or another. For this reason, the classifications presented in this report are based on the "best fit" to the soil classification system of South Africa

22.4 SOCIO-ECONOMIC ASSESSMENT

The following assumptions and limitations are applicable to this assessment:

- Project-related information supplied by the environmental practitioner and the client for the analysis is assumed to be reasonably accurate;
- The secondary data sources used to compile the socio-economic baseline (demographics, dynamics of the economy), although not exhaustive, can be viewed as being indicative of broad trends within the project area;
- The identification of possible impacts was based on the project team's experience with similar studies in the past and the existing desktop-level knowledge of the socio-economic environment;
- Secondary data that will be used are sourced from Stats SA and Quantec, which may include data from the 2011 Census that may not have been updated since; and

- If some of these assumptions and limitations are found to be potentially hampering the process, these issues will be addressed to ensure an accurate and reliable socio-economic impact assessment. Any further issues or red flags will also be identified in the policy review in the next chapter.

22.5 VISUAL ASSESSMENT

The following assumptions and limitations have been considered in this assessment:

- The description of project components is limited to what has been supplied to the author prior to the date of completion of this report;
- The accuracy of the viewshed analysis depends on the quality of the input digital surface model (DSM). Readily available digital contours for the area are limited to 20 m contours. The contours have been interpolated down to 1 m intervals to get better accuracy. However, these types of viewshed investigations (using readily available GIS software and terrain contours only) are limited in their accuracy due to their inability to incorporate vegetation information. To be more accurate at predicting absolute visibility, the analysis would require “a 3D model of a tree/plant and a layer indicating the spatial distribution and density of vegetation on the landscape” (Llobera 2007:799) and buffering all existing buildings, structures and infrastructure. The possibility of indicating both the spatial and density distribution of tree/plants, and the three-dimensional model representing vegetation and all structures, is currently not available to the author. Therefore, on-site observations are critical;
- Site photos taken in the winter and do not necessarily reflect the complete landscape character of the area as experienced through all seasons. During the site visit the weather was partly cloudy, with moderate haze conditions; and
- The public participation process had not been completed at the time of writing the report; however, based on the context of the development (i.e., that it is set in a developing mine with its associated infrastructure) and a general understanding of the public's concern for visual issues, it is assumed that sensitivities would be low.

22.6 RADIO FREQUENCY INTERFERENCE ASSESSMENT

The following assumptions are applicable:

- As the project is still in early planning stage, no technology partner has been selected yet. It is therefore assumed that the inverters to be used will comply to CISPR 11 Class A. Receiver sensitivities, inside the indicated medium sensitivity areas, are assumed.
- It is assumed that the inverters that will be used comply to CISPR11 Class A specification. (57 dB μ V/m @ 3m which relates to an EIRP of -38.16dBm).

23 REASONED OPINION AS TO WHETHER THE PROPOSED ACTIVITY SHOULD OR SHOULD NOT BE AUTHORISED

23.1 REASONS WHY THE ACTIVITY SHOULD BE AUTHORISED OR NOT

Please refer to **Section 19.1**. The findings of this assessment conclude that, provided that the recommended mitigation and management measures are implemented, there are no environmental flaws which subject to inclusion of the recommended mitigation measures, should prevent the project from continuing.

24 CONDITIONS THAT MUST BE INCLUDED IN THE AUTHORISATION

24.1 SPECIFIC CONDITIONS TO BE INCLUDED INTO THE COMPILATION AND APPROVAL OF EMPr

Please refer to **Section 21** for conditions to be included in the approval.

24.2 REHABILITATION REQUIREMENTS

The Annual Planned Rehabilitation for the solar PV facility will allow for the following –

- Erosion prevention and remediation.
- Remediation of compacted soil.
- Stormwater management.
- Alien invasive eradication.
- Vegetation establishment.
- Dust control management.

The proposed rehabilitation activities to be undertaken annually are illustrated in **Figure 32**, below.

Annual Planned Rehabilitation Activities



Figure 32: Proposed rehabilitation activities to be undertaken annually

The detailed list of recommended management activities which, if followed, will assist Ivanplats in achieving its closure objectives for final rehabilitation, decommissioning and closure. These recommended management activities will ensure avoidance, rehabilitation, and management of potential risks and impacts. A high-level summary of these is listed in **Table 19**.

Table 19: Actions for Final Rehabilitation, Decommissioning and Closure

Action	Impacts to Manage	Link to Mine Plan	Assumptions	Schedule Drivers
Scarify and Seed	Alien invasive plants	Monitor and remove invasive plants continuously	Surrounding landowners do not control their alien invasive plants	Poor holistic land management
Allow for revegetation to successfully establish	Erosion and Dust	During rainy and windy months this may be a problem	Wind and rain will increase the risk of both erosion and dust during different seasons	Poor storm water management and control, poor dust prevention methods
Fencing & Security	Theft and Vandalism	Security must remain for at least 5 years	Fencing is stolen and squatting becomes a risk	Poverty and Political Unrest

The typical post closure period would vary between 2 to 3 years, however this could be longer, as it is dependent on:

- Climate variations, extreme droughts and or flooding would prolong the post closure rehabilitation period.
- Theft and political unrest.
- Rate of successful plant growth establishment; and
- Whether alien invasive eradication is under control.

25 PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED

The proposed (LoM) will be 30 years. Therefore, decommissioning will commence in Year 31, followed by final rehabilitation. After which there will be an Aftercare & Maintenance period for approximately 2 to 3 years. Thus the environmental authorisation will be required for the LoM as well as the Aftercare & Maintenance period.

26 FINANCIAL PROVISION

26.1 EXPLAIN HOW THE AFORESAID AMOUNT WAS DERIVED

The Financial Provisioning has been compiled to present the Financial Provisioning for the current situation at Platreef Mine for the solar PV facility. The Financial Provisioning Report, 2022 is included in **ANNEXURE P**.

The National Environmental Management Law Amendment Act No. 02 of 2022, (NEMLAA4) published in Government Gazette 46602, was promulgated on 24 June 2022, this Act provides clarity on what is to be audited in relation to Financial Provisioning⁶⁴. Whereas, the Financial Provisioning (FP) Regulations, 2015

⁶⁴ On the 24 June 2022 the National Environmental Management Law Amendment Act No. 02 of 2022, dubbed NEMLAA4 was promulgated. This Act provides clarity on what is to be audited in relation to Financial Provisioning, with the substitution of section 24P of Act 107 of 1998, as amended by section 7 of Act 25 of 2014. The applicant, holder of an environmental authorisation, holder or holder of an old order right must provide financial provision for progressive rehabilitation, mitigation, decommissioning, closure

(as amended)⁶⁵, as published in Government Notice Regulation 1147 (GNR 1147) in Government Gazette 39425 dated 20 November 2015, (hereafter referred to as the GNR 1147 FP regulations), are regulations to the National Environmental Management (NEMA) (Act 107 of 1998, as amended) ⁶⁶, which gives guidance to the holder of a mining right or prospecting right in respect to what should be included as part of the annual FP update.

The FP report is written in compliance to both NEMLAA4 and to the GNR 1147 FP regulations of NEMA. The date for a holder of an environmental authorisation and/or a holder of a mining right to comply to NEMLAA4 is still to be determined by the President, whereas in terms of the transitional provisions a mining right holder will be required to ensure compliance to the GNR 1147 FP regulations for their operations by 19 September 2023⁶⁷. Compliance to NEMLAA4 is deemed necessary as this activity may receive an EA, and as such an EA will in due course be required to comply to NEMLAA4. Compliance to GNR 1147 is deemed necessary as this proposed activity falls within an existing Mining Right footprint and shall support existing mining activities, and as such, Ivanplats, the mining right holder, will be required to ensure compliance to the GNR 1147 FP regulations for their operations by 19 September 2023⁶⁸.

26.2 DESCRIBE THE CLOSURE OBJECTIVES AND THE EXTENT TO WHICH THEY HAVE BEEN ALIGNED TO THE BASELINE ENVIRONMENT DESCRIBED UNDER REGULATION 22 (2) (D) AS DESCRIBED IN 2.4 HEREIN

As stated in the (ENVASS, 2021) FP annual report update, the closure vision is an aspirational description of what will be achieved with the Ivanplats mine closure, compatible with regulatory requirements. The vision incorporates an overview of the envisioned post closure land use, linked to the domain-specific closure principles and objectives. Ivanplats aims to obtain a sustainable stable post-mining land capability which is not significantly different from that which existed pre-mining, where health and safety is not significantly compromised and where long-term impacts on the environment are minimised. Therefore, the proposed closure vision for this proposed project will be aligned to the boarder broader vision that Ivanplats has for their existing operations. The closure objectives and goals are highlighted as follows (**Figure 33**):

and post-closure activities, including the pumping and treatment of extraneous and polluted water, where relevant, to ensure the mitigation and rehabilitation of adverse environmental impacts, including latent environmental impacts.

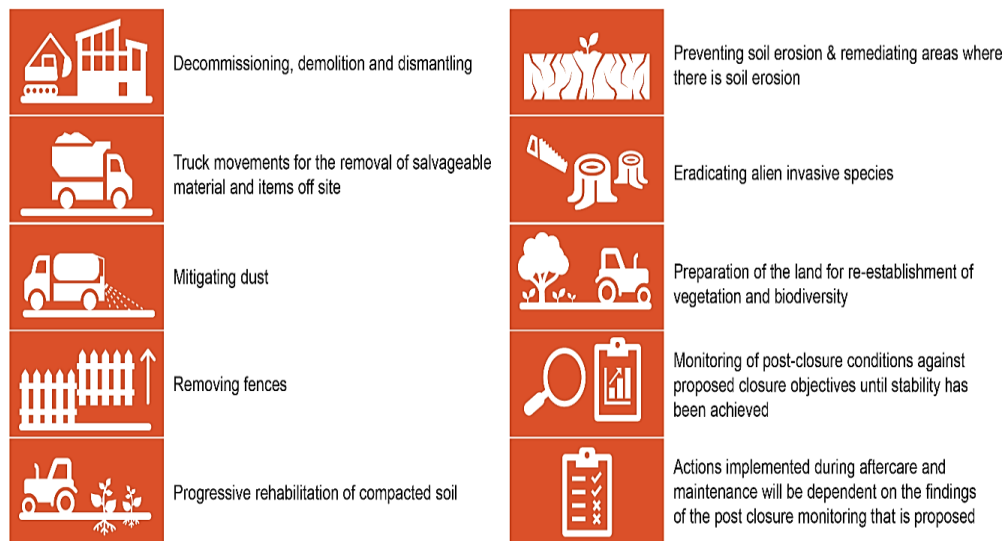
⁶⁵ The *Regulations Pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations* published in Government Notice (GN) Regulations (R)1147 in Government Gazette (GG) 39425 of 20 November 2015 as amended by GN 1314 in GG 40371 of 26 October 2016; GN R452 in GG 41584 of 20 April 2018; GN 991 in GG 41921 of 21 September 2018; GN 24 in GG 42956 of 17 January 2020; GN 495 in GG 44698 of 11 June 2021; and GN 2087 in GG 46378 of 19 May 2022. These regulations pertain to all aspects of the financial provision for prospecting, exploration, mining or production operations under section 44(aE), (aF), (aG), (aH) read with sections 24(5)(b)(ix), 24(5)(d), 24N, 24P and 24R of the National Environmental Management Act, 1998 (Act No. 107 of 1998).

⁶⁶ As per NEMLAA4 the following changes have been made to NEMA: Substitution of section 24P of Act 107 of 1998, as amended by section 7 of Act 25 of 2014, Insertion of section 24PA in Act 107 of 1998, Amendment of section 24R of Act 107 of 1998, as amended by section 8 of Act 25 of 2014

⁶⁷ The Minister of Forestry, Fisheries and the Environment has amended the transitional arrangements in the National Environmental Management Act (NEMA) Financial Provisioning Regulations, 2015 (FP Regs), for the fourth time on 19 May 2022. Holders of rights and/or permits operating in the mining industry (who applied for them before 20 November 2015) now have until 19 September 2023 to transition to the NEMA regime.

⁶⁸ The Minister of Forestry, Fisheries and the Environment has amended the transitional arrangements in the National Environmental Management Act (NEMA) Financial Provisioning Regulations, 2015 (FP Regs), for the fourth time on 19 May 2022. Holders of rights and/or permits operating in the mining industry (who applied for them before 20 November 2015) now have until 19 September 2023 to transition to the NEMA regime.

Recommended Closure Objectives for all Proposed Activities



*Closure activities can take place over a period of three years



Figure 33: Recommended Closure Objectives

26.3 CONFIRM SPECIFICALLY THAT THE ENVIRONMENTAL OBJECTIVES IN RELATION TO CLOSURE HAVE BEEN CONSULTED WITH LANDOWNER AND INTERESTED AND AFFECTED PARTIES

The environmental objectives in relation to closure will be made available to all registered I&APs for comment. All comments received will be appended to this report.

26.4 PROVIDE A REHABILITATION PLAN THAT DESCRIBES AND SHOWS THE SCALE AND AERIAL EXTENT OF THE MAIN MINING ACTIVITIES, INCLUDING THE ANTICIPATED MINING AREA AT THE TIME OF CLOSURE

Refer to ANNEXURE P.

26.5 EXPLAIN WHY IT CAN BE CONFIRMED THAT THE REHABILITATION PLAN IS COMPATIBLE WITH THE CLOSURE OBJECTIVES

The rehabilitation plan will be compiled in accordance with the objectives and goals according to GNR 1147 of the National Environmental Management Act, 1988 (Act No. 107 of 1998) (NEMA). Refer to **Section 26.2**.

26.6 CALCULATE AND STATE THE QUANTUM OF THE FINANCIAL PROVISION REQUIRED TO MANAGE AND REHABILITATE THE ENVIRONMENT IN ACCORDANCE WITH THE APPLICABLE GUIDELINE

The estimated closure cost was calculated from the Bill of Quantities (BoQ) prepared by registered quantity surveyors. The rates used were taken from the published Steel and Engineering Industries Federation of Southern Africa (SEIFSA) and Consumer Price Index (CPI) indices. SEIFSA rates apply to all engineering-related items, such as rental of construction equipment, demolition and civil works. CPI rates where necessary apply to retail items such as purchasing of seed and topsoil, and assumptions are applied to

rates and quantities used for post closure monitoring, aftercare & maintenance. The rates utilised for the Estimates are based on quoted rates received from the market in 2022.

26.6.1 COSTS PER ACTIVITY OR INFRASTRUCTURE

The summary below (**Table 20**) pertains to the unscheduled and scheduled closure costs for the proposed infrastructure, monitoring and maintenance costs associated with the solar facility project. In this case, the years are indicated as Year 1 through Year 4, the former being commencement once the necessary approvals have been received, and the latter being the estimated end of life of the proposed solar PV plant.

Table 20: Unscheduled and Scheduled Financial Provisioning

Description	Unscheduled	Unscheduled	Scheduled
	Area 2 as @ Year 1	Area 2 & 3 as @ Year 2	Area 1,2 & 3 as @ Year 4
Decommissioning, Demolition & Dismantling	R 742 551.31	R 2 887 699.56	R 4 125 285.08
Heavy Concrete - Bases, etc	R -	R -	R -
Steelwork (M)	R 6 609.41	R 25 703.24	R 36 718.92
Fencing, 2.0m high	R 29 451.47	R 114 533.50	R 163 619.28
Cabling	R 372 246.81	R 1 447 626.50	R 2 068 037.86
Heavy Concrete - Bases, etc	R 21 121.16	R 82 137.84	R 117 339.77
Steel container, 12 x 3m	R 2 770.81	R 10 775.38	R 15 393.40
Steelwork (L)	R 1 964.46	R 7 639.58	R 10 913.68
Light Concrete - Surface beds	R 1 090.27	R 4 239.95	R 6 057.07
Sheeting (R)	R 1 296.92	R 5 043.57	R 7 205.10
Transport to e-waste dump facility in Polokwane	R 270 000.00	R 1 050 000.00	R 1 500 000.00
Disposal Fee	R 36 000.00	R 140 000.00	R 200 000.00
Progressive rehabilitation, mitigation & provision of residual impacts	R 52 020.00	R 202 300.00	R 289 000.00
Progressive eradication of alien invasive species	R 21 600.00	R 84 000.00	R 120 000.00
Progressive rehabilitation of compacted soil	R 13 500.00	R 52 500.00	R 75 000.00
Progressive rehabilitation of soil erosion	R 7 200.00	R 28 000.00	R 40 000.00
Progressive mitigation of dust	R 9 720.00	R 37 800.00	R 54 000.00
Closure	R 295 254.91	R 1 148 213.56	R 1 640 305.08
Top soil from stockpile within 1.5km - 300mm thick	R 196 836.61	R 765 475.70	R 1 093 536.72
Re-vegetation preparation and seeding	R 98 418.30	R 382 737.85	R 546 768.36
Post closure monitoring, aftercare & maintenance	R 147 240.00	R 572 600.00	R 818 000.00
Monitoring (dust levels, alien invasive encroachment, vegetation establishment)	R 43 200.00	R 168 000.00	R 240 000.00
Aftercare & Maintenance (2 to 3 years)	R 104 040.00	R 404 600.00	R 578 000.00
Sub-total:	R 1 237 066.23	R 4 810 813.11	R 6 872 590.16
Contingency at 25%	R 309 266.56	R 1 202 703.28	R 1 718 147.54
P&G's at 12%	R 148 447.95	R 577 297.57	R 824 710.82
Total	R 1 694 780.73	R 6 590 813.96	R 9 415 448.52
Vat at 15%	R 254 217.11	R 988 622.09	R 1 412 317.28
Grand Total	R 1 948 997.84	R 7 579 436.06	R 10 827 765.80

26.7 CONFIRM THAT THE FINANCIAL PROVISION WILL BE PROVIDED AS DETERMINED

The financial provision will be provided for in the form of a bank guarantee upon approval of the project by Ivaplats.

27 DEVIATIONS FROM THE APPROVED SCOPING REPORT AND PLAN OF STUDY

27.1 DEVIATIONS FROM THE METHODOLOGY USED IN DETERMINING THE SIGNIFICANCE OF POTENTIAL ENVIRONMENTAL IMPACTS AND RISKS

No deviations have taken place.

27.2 MOTIVATION FOR THE DEVIATION

Not applicable.

28 OTHER INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

28.1 COMPLIANCE WITH THE PROVISIONS OF SECTIONS 24(4)(A) AND (B) READ WITH SECTION 24 (3) (A) AND (7) OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998) THE EIA REPORT MUST INCLUDE THE

28.1.1 IMPACT ON THE SOCIO-ECONOMIC CONDITIONS OF ANY DIRECTLY AFFECTED PERSON

The summary table below (**Table 21**) shows that most socio-economic impacts are rated low positive to medium positive pre-mitigation and post-mitigation apart. Those impacts that have been rated low negative pre-mitigation, are anticipated to be negligible post-mitigation. The project is expected to bring considerable advantages to the local and regional economy during the construction and operational phases due to local employment creation and an increase in social spending (including taxes and local economic development funds).

Table 21: Summary of socio-economic impacts

Socio-economic Impact	Phase	Significance of Impact	
		Pre-mitigation	Post-mitigation
Stimulation of the economy	Construction	Low positive	Low positive
Creation of employment	Construction	Low positive	Low positive
Temporary change in sense of place	Construction	Moderate negative	Negligible
Stimulation of the economy during operations	Operational	Moderate positive	Moderate positive
Creation of employment and increased Household Income	Operational	Low positive	Low positive
Reduced strain on municipal services	Operational	Low positive	Low positive
Loss of property	Operational	Moderate negative	Negligible
Change in sense of place	Operational	Low negative	Negligible
Stimulation of the economy during decommissioning	Decommissioning	Low positive	Lows positive
Creation of employment during decommissioning	Decommissioning	Low positive	Lows positive
Impact on economy – No-go alternative	N/A	Negligible	

28.1.2 IMPACT ON ANY NATIONAL ESTATE REFERRED TO IN SECTION 3(2) OF THE NATIONAL HERITAGE RESOURCES ACT

Of the ten (10) burial sites previously identified by Heritage specialist within the footprint of the proposed solar PV facility, four (4) of the burial sites have been relocated successfully while another four (4) of the identified burial sites which had anomalies and were later investigated were found not to be burial sites. One (1) burial site (Site 012A-05) which was described as an “undetermined amount of graves within burial ground” located within a fence was further investigated however the investigations proved to be inconclusive and further exploratory action is required. Additionally, another burial site (Site“PLR70”), which was not included in the Ivanplats or Digby Wells Environmental site inventories, was sampled by means of GPR by

PGS Heritage where the survey found anomalies not consistent with graves and no further action was recommended.

A this stage it cannot be confirmed whether the latter two (2) burial sites exist nor the potential impact thereof. Particularly Site 012A-05, as GPR scans proved to be inconclusive; as such various recommendations were proposed in the Heritage Memo undertaken by Heritage Management Consulting (2022), which include implementing the chance find procedure. These recommendations are detailed in **Table 18** and **Table 22** of this report.

It should be stated that this Memorandum cannot serve as statutory approval for the project and the project HIA processes as well as the contents of this memorandum should be subjected to final review and comment from the LIHRA and the SAHRA Burial Ground and Graves Unit (BGG Unit) as commenting authorities.

28.1.3 OTHER MATTERS REQUIRED IN TERMS OF SECTIONS 24(4)(A) AND (B) OF THE ACT.

Please refer to **Section 8** where alternatives are discussed.

29 UNDERTAKING

The signed undertaking is included in **Section 37** of Part B and is valid for both the Basic Assessment (Part A) and the Environmental Management Programme (Part B).

PART B

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

30 DETAILS OF THE EAP

OMI Solutions (Pty) (Ltd) (OMI) assigned the environmental assessment practitioners listed in **Table 1** to undertake the required environmental authorisation process.

30.1 EXPERTISE OF THE EAP

A summary of the EAP project team is provided in **Table 2**, whilst the curricula vitae of the independent EAPs that have compiled this report are included in **ANNEXURE A**. A company profile with summary information of the OMI team's qualifications and experience is included in **ANNEXURE B**.

31 DESCRIPTION OF THE ASPECTS OF THE ACTIVITY

An overview map of all the activities is provided in **Section 4.3** with an A3 size being provided in **ANNEXURE F**.

31.1 EXISTING AUTHORISATIONS

Ivanplats received its first EA granted by the Limpopo Department of Economic Development, Environment and Tourism (LEDET) was on 27 June 2014. Since then, the following amendments have been issued:

- An amendment EA issued on 19 September 2014 (Ref. No.: 12/1/9/2-W32);
- An amendment EA issued on 30 July 2015 (Ref. No.: 12/1/9/2-W32); and
- An amendment EA issued on 18 June 2018 (Ref. No.: LP 30/5/1/2/3/2/1 [10067] EM), as well as the amendment of the Environmental Management Programme (EMPr).
- Integrated Water Use Licence: 07/A61G/GCJAIBF/6975 issued by the Department of Water and Sanitation (DWS) on 2 September 2021.
- A Waste Management License issued on 13 March 2015 (Ref No: 12/9/11/L1224/5) and amended on 07 November 2019.

31.2 REQUIRED AUTHORISATIONS

Before Ivanplats may commence with proposed project the following environmental authorisation must be approved in accordance with the relevant national legislation:

- An integrated application for Environmental Authorisation (EA) in terms of the National Environmental Management Act No. 107 of 1998 (NEMA).
- A Water Use Licence (WUL) in terms of the National Water Act, Act 36 of 1998 (NWA) for Section 21(c) & (i) water uses. It should be noted that the relevant water uses triggered by the proposed solar facility have been included in the application for the amendment of the existing IWUL.

31.3 LISTED AND SPECIFIED ACTIVITIES

The Listed Activities which will require authorisation are shown in **Table 5**.

32 COMPOSITE MAP

Please refer to **ANNEXURE F** of this report.

33 DESCRIPTION OF IMPACT MANAGEMENT OBJECTIVES INCLUDING MANAGEMENT STATEMENT

33.1 DETERMINATION OF CLOSURE OBJECTIVES

Rehabilitation will be done for the solar facility as per closure objectives indicated in **Section 26.2**. These have been assessed in the 2022 FP in **ANNEXURE P**.

33.2 WATER USE

33.2.1 VOLUMES AND RATE OF WATER USE REQUIRED FOR THE OPERATION

The project will require water to facilitate both the construction and operational phases of the solar facility. Water will be sourced from the existing mine boreholes and/or treated wastewater and stored in water storage dams on site. During construction, a minimal amount of water may be required to install concrete slabs and footings to secure the tracking decks. It is estimated that approximately 10 kilolitre (kl) of water a week will be required to wash the solar panels during the operational phase. This equates to 520 m³ per annum. Ivanplats will make use of water bowsers on site to transport water to the solar facility. Construction and operational personnel will make use of on-site potable water for drinking and sanitation purposes.

Water will be sourced from the mine's existing boreholes and/or treated wastewater licenced under the WUL 07/A61G/GCJAIBF/6975.

33.2.2 HAS A WATER USE LICENCE HAS BEEN APPLIED FOR?

Ivanplats holds a WUL licence 07/A61G/GCJAIBF/6975 which was issued on 9 March 2017 and amended on 2 September 2021. The mine is in the process of applying for an amendment of the WUL and will include section 21 (c) and (i) water use activities for the solar facility being in proximity to a drainage line, which will require diverting.

34 IMPACTS TO BE MITIGATED IN THEIR RESPECTIVE PHASES

Please refer to **Table 22** below for an overview of mitigation measures proposed for the anticipated potential impacts.

Table 22: Management measures

No	Activity	Potential Impact	Aspect affected	Management Measures	Management Objective	Mitigation Effect	Compliance with Standards (where applicable)
		Impact					
	Terrestrial Biodiversity						
	Construction Phase						
1	Construction of PV facilities	<ul style="list-style-type: none"> Habitat loss (fauna and flora) through clearance or displacement, requiring removal of vegetation and surface grading across the footprint areas. This may cause habitat loss, degradation, and fragmentation - leading to a reduction in floral and faunal species richness and density. Inadequate design of proposed footprint areas, including poorly planned placement of infrastructure associated with the proposed project, resulting in potential loss of floral and faunal habitat beyond the planned footprints, and a decline in floral and faunal diversity. 	Fauna and Flora	<ul style="list-style-type: none"> Ensure adequate design of PV facility; Develop a rehabilitation plan that will promote habitat reinstatement in disturbed areas and allow for increased habitat connectivity during the operation and maintenance phase of the project; All footprint areas should remain as small as possible, and the boundaries of the footprint areas must be clearly defined so to ensure that all activities remain within defined footprint areas; It must be ensured that, as far as possible, all proposed infrastructure, including temporary infrastructure, is placed outside of natural habitat; Access roads must be kept to existing roads to reduce fragmentation of natural habitat outside of the authorised footprint; Avoid soil sealing (i.e., the destruction or covering of the ground by an impermeable material). Ensure that a vegetation layer is maintained below PV panels to promote soil health, vegetation establishment, reduced habitat fragmentation, and resources for fauna. In this regard, where a vegetation layer is maintained below and between the PV panels, use of indigenous plants from the reference vegetation type is recommended for best biodiversity outcomes; Revegetating temporary-use and lay down areas as soon as reasonably practicable after construction activities are complete. Make use of indigenous and non-invasive species for landscaping and rehabilitation works (where this is envisioned). Make use of soil, mulch and vegetation debris from vegetation clearance (that contain natural seed stock) to facilitate natural revegetation of disturbed areas, where this is reasonably practicable; No dumping of litter, rubble or cleared vegetation on site should be allowed. Infrastructure and rubble removed as a result of the construction activities should be disposed of at an appropriate registered dump site away from the development footprint; and Waste disposal containers and bins should be provided during the construction phase for all construction rubble and general waste. 	Reduce vegetation clearance and habitat loss & fragmentation	Can be avoided, managed or mitigated	<ul style="list-style-type: none"> > The Constitution of the Republic of South Africa, 19961; > The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA); > The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA); > Government Gazette 45421 dated 10 May 2019 as it relates to the Department of Forestry, Fisheries and the Environment (DFFE)'s (previously the Department of Environmental Affairs (DEA)) national environmental screening report required with an application for EA as identified in regulation 16(1)(v) of EIA Regulations, 2014, as amended: <ul style="list-style-type: none"> o Government Notice (GN) No. 320 Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity as published in Government Gazette 43110 dated 20 March 2020; o GN No. 1150 Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Plant and Terrestrial Animal Species as published in Government Gazette 43855 dated 30 October 2020; > The Limpopo Environmental Management Act, 2003 (Act No.7 of 2003) (LEMA).
2	Construction of PV facilities	<p>Poorly managed edge effects:</p> <ul style="list-style-type: none"> Introduction of AIPs during construction activities; Ineffective rehabilitation of compacted areas, bare soils, or eroded areas leading to ongoing proliferation of AIP species in disturbed areas and subsequent spread to surrounding natural areas altering both floral and faunal habitat; Poorly implemented dust management resulting in adverse impacts to flora; Potential inadequate design of stormwater management and erosion control, resulting in increased risk of erosion and loss faunal and floral habitat; and Potential fragmentation of natural habitat by transport vehicles not using designated roads. 	Fauna and Flora	<ul style="list-style-type: none"> Removal of alien invasive species should preferably commence during the planning phase and continue throughout all project phases. AIPs should be cleared within the construction footprints before any vegetation clearing activities commence, and discarded separately from natural vegetation cuttings, thereby ensuring that no AIP propagules are spread with construction rubble or with native vegetation, or soils contaminated with AIP seeds during the construction phase; An AIP Management/Control Plan should be implemented by a qualified professional. No uncertified chemical use for AIP control may take place. All required Personal Protective Equipment (PPE) to be used during chemical and mechanical AIP clearing and control; Alien vegetation that is removed must not be allowed to lay on unprotected ground as seeds might disperse upon it. All cleared plant material to be disposed of at a licensed waste facility which complies with legal standards. Alternatively, at the very least, the disposal of alien vegetation must be in demarcated areas away from potential sources of spread; and Edge effects arising from proposed activities, such as soil compaction, erosion and/or stormwater must be strictly managed; 	AIP Control	Can be avoided, managed or mitigated	<ul style="list-style-type: none"> o GN No. 1150 Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Plant and Terrestrial Animal Species as published in Government Gazette 43855 dated 30 October 2020; > The Limpopo Environmental Management Act, 2003 (Act No.7 of 2003) (LEMA).

No	Activity	Potential Impact	Aspect affected	Management Measures	Management Objective	Mitigation Effect	Compliance with Standards (where applicable)
		Impact					
3	Construction of PV facilities	<ul style="list-style-type: none"> Failure to undertake a walkdown of the authorised footprint during which floral SCC and protected floral species (NFA trees) are searched for and marked, resulting in potentially unnecessary loss of NFA-trees; and Failure to comply with national legislation regarding permit applications for the removal, destruction, and/or relocation of NFA-protected floral species within footprint areas, resulting in unlawful destruction/removal of protected species within the footprint areas. 	Protected Flora (NFA-protected trees)	<ul style="list-style-type: none"> Prior to site clearing, a site walkdown is required where all NFA-protected tree species (i.e., <i>Combretum imberbe</i> and <i>Sclerocarya birrea</i> subsp. <i>caffra</i>) will be marked and permit applications applied for the removal of these species; Permits should be obtained from DFFE; and Where possible, if protected trees occur in between the PV panels, it is recommended that the species not be removed. 	Protection of flora, specifically protected tree species	Can be avoided, managed or mitigated	
	Operational and Maintenance Phase						
4	Operation and maintenance of the PV facility	Bird collisions with solar panels and/or transmission lines. PV panels and concentrating solar collectors could present a collision risk to bird and bat species. The extent and significance of these impacts are largely unknown and limited to a small number of studies. Birds and aquatic insects may mistake the flat surfaces of PV panels for water bodies and attempt to land on them. This can risk injury and may be detrimental to certain birds that cannot take off without a water body.	Avifauna	<ul style="list-style-type: none"> Implement measures to reduce reflection effects. An example from the IUCN Guidelines (Bennun et al. 2021) includes the use of parabolic (curved) mirrors instead of flat heliostats to reduce the likelihood of skyward reflection to minimise potential bird collisions; Adjusting the tilt of mirrored surfaces and solar panels when in standby mode to reduce risk of collisions and/or solar flux injuries (Jenkins et al. 2017); and Outdoor lighting associated with the Solar Areas must be minimised to lower the risk of attracting birds, insects, and bats (Jenkins et al. 2017). 	Control reflection effects to protect avifauna, bats and insects	Can be avoided, managed or mitigated	<ul style="list-style-type: none"> > The Constitution of the Republic of South Africa, 1996; > The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA); > The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA); > Government Gazette 45421 dated 10 May 2019 as it relates to the Department of Forestry, Fisheries and the Environment (DFFE)'s (previously the Department of Environmental Affairs (DEA)) national environmental screening report required with an application for EA as identified in regulation 16(1)(v) of EIA Regulations, 2014, as amended: <ul style="list-style-type: none"> o Government Notice (GN) No. 320 Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity as published in Government Gazette 43110 dated 20 March 2020; o GN No. 1150 Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Plant and Terrestrial Animal Species as published in Government Gazette 43855 dated 30 October 2020; > The Limpopo Environmental Management Act, 2003 (Act No.7 of 2003) (LEMA).
5	Operation and maintenance of the PV facility	Introduction of AIP species.	Fauna and Flora	<ul style="list-style-type: none"> AIP species' proliferation, which may affect adjacent untransformed areas, need to be strictly managed. Specific mention in this regard is made of listed invasive species as per the NEMBA Alien species lists, 2020, in line with the NEMBA Alien and Invasive Species Regulations (2020) – species listed under category 1b and 2 were noted on site. Ongoing AIP monitoring and clearing/control should take place throughout the construction phase, and the boundary fences should be regularly checked for AIP proliferation to prevent spread to surrounding areas during the operational phases; and An alien vegetation control plan is recommended. In this regard, it is recommended that the mine's existing Biodiversity Management Plan and Alien Invasive Management Action Plan be updated to include the solar facility area. 	AIP Control	Can be avoided, managed or mitigated	
6	Operation and maintenance of the PV facility	<ul style="list-style-type: none"> Ongoing loss of floral and faunal habitat beyond the footprint areas resulting from maintenance activities associated with the proposed solar PV Areas due to 1) poor stormwater management, 2) poor fire management, 3) poor dust management, and 4) potential introduction of AIPs, resulting in altered vegetation communities surrounding footprint areas and loss of faunal food resources; Movement of in vehicles resulting in Collisions between operational vehicles and fauna; Overexploitation through the removal and/or collection of indigenous floral and faunal species by operational and maintenance teams beyond the direct footprint area; and Spillage/leakage of chemicals, fuel and oils from operational equipment leading to hydrocarbon ingress into the soils affecting plant growth (faunal habitat and food resources) and soil organisms. 	Fauna and Flora	<ul style="list-style-type: none"> Manage all edge effects or indirect disturbances stemming from operational and maintenance activities: a) Implement erosion control measures where necessary to ensure that further habitat loss does not occur; b) Any waste or toxic spills from vehicles or mining infrastructure must be dealt with immediately in accordance with the waste management plan /emergency incident procedure/ spill procedure ; c) No uncontrolled or unsanctioned fires are allowed. Manage fires with e.g., fire breaks; d) Stormwater management must be sound; and e) Implement dust management where necessary; At all times, ensure that sound environmental management is in place during the operational and maintenance phase; No collection of indigenous plants must be allowed outside of the footprint areas (especially not NFA-protected trees) and, where possible, the poaching/hunting of animals by operational and maintenance staff in the surrounding bushveld habitat must be prohibited; No vegetation clearance or vehicle movement should occur outside of the operational footprint area unless authorised; Ensure that existing roads are used as far as possible and that limited development of new roads occurs; and Drivers to be made aware through sign boards and or / safety inductions that faunal species will still be moving around and through the study area and that they need to keep an eye out and avoid any species crossing or basking (reptiles) on the roads. 	Prevent habitat loss Stormwater management Dust management Protection of fauna and flora	Can be avoided, managed or mitigated	

No	Activity	Potential Impact	Aspect affected	Management Measures	Management Objective	Mitigation Effect	Compliance with Standards (where applicable)
		Impact					
7	Operation and maintenance of the PV facility	Barrier effects, i.e., dispersal corridors altered / impaired due to long-term fragmentation of the remaining natural habitat in the project area and surrounds, resulting in the loss of dispersal trajectories, reduction to ecological integrity of the area, compromised ecological functions on a local scale.	Fauna and Flora	<ul style="list-style-type: none"> Maintain vegetation corridors between the PV panels. Contributing towards conserving the regional genetic diversity of plants in these areas must be ensured through revegetating with indigenous species from the area. AIP control in revegetated sections must take place. By using native seeds/propagules and plants that are suitable for the site and that have been collected from within a defined source region, it is possible to reduce loss of regional plant genetic diversity; During construction and operational and maintenance phases, it is recommended that bonnox type fences be used and culverts (approx. 30 cm in diameter) be placed every 100 m to ensure smaller mammals can move out of the path of construction activities to safe areas; Where a species occurs in high abundances, such as <i>Lepus saxatilis</i> (Scrub hare), it is anticipated that they will move out on their own during construction activities; however, should the proponent wish to capture and relocate these species to a safe area outside of the proposed footprint, the following LEMA conditions apply: LEMA section 35. Catching of Wild and Alien animals. — 1) No person may without a permit operate as a wildlife translocator. 2) Subsection (1) does not apply to the owner of land who catches wild or alien animals on his or her own land. 3) No person may without a permit catch specially protected wild animals, protected wild animals, game and nonindigenous wild animals. 4) Subsection (3) does not apply to any person assisting the holder of a permit on the instruction of the permit holder. 5) No person may catch a wild or alien animal on land of which that person is not the owner, except with the written permission of the owner of the land. 6) For the purposes of this section "catch" includes— a) the construction of a pitfall, trap cage, capture boma or holding pen; or b) the possession, erection or handling of any snare, trap, gin, net, bird-lime, bow and arrow, set gun, poison or similar device, means or method, on any land on which any wild or alien animal is found or is likely to be found. 	Prevent habitat fragmentation AIP Control Protect fauna	Can be avoided, managed or mitigated	
	Freshwater Ecosystem						
	Construction Phase						
8	Site clearing and set up prior to the commencement of construction activities: Vegetation clearing in the development footprint; <ul style="list-style-type: none"> Movement of vehicles to access the footprint resulting in soil compaction; and Placement of contractor laydown and storage facilities 	<ul style="list-style-type: none"> Reduced vegetation cover; Smothering of the vegetation within regulated zones as a result of increased sediment leading to altered habitat; Disturbance of soil leading to increased AIP proliferation; Potential soil and stormwater contamination from oils as well as hydrocarbons from vehicles; Potential sedimentation of the preferential surface flow paths due to vehicle movement; Potential contamination of the preferential surface flow paths by leaks of oil/hydraulic fluid from equipment; and Smothering of vegetation through rock/soil stockpiling, and the possible creation of habitat for invasive or encroacher pioneer species. 	Freshwater Ecology	<ul style="list-style-type: none"> Retain as much indigenous vegetation as possible during construction; Existing roads must be used as much as possible to gain access to the development footprint area in order to limit edge effects, erosion and sedimentation of the identified preferential surface flow paths during the construction phase (although unlikely to impact given the current state of the preferential surface flow paths within the development footprint); and Contractor laydown areas, refuelling stations, and material storage facilities should remain outside the preferential surface flow paths and respective regulation zones. 	Reduce vegetation clearance Prevent erosion Prevent pollution of surface flow paths	Can be avoided, managed or mitigated	<ul style="list-style-type: none"> > The Constitution of the Republic of South Africa, 19964; > The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA); > The National Water Act, 1998 (Act No. 36 of 1998) (NWA); > Government Notice 509 (GN 509) as published in the Government Gazette 40229 of 2016 as it relates to the National Water Act, 1998 (Act No. 36 of 1998); > The Limpopo Environmental Management Act, 2003 (Act No.7 of 2003) (LEMA).

No	Activity	Potential Impact	Aspect affected	Management Measures	Management Objective	Mitigation Effect	Compliance with Standards (where applicable)
		Impact					
9	<p>Potential impacts on the preferential surface flow paths' hydrology:</p> <ul style="list-style-type: none"> Potential infilling of the preferential flow paths due to the construction activities and associated excavations and stockpiles; and Hydrocarbon leakage into the preferential surface flow paths 	<ul style="list-style-type: none"> Potential sedimentation of the preferential surface flow paths due to vehicle movement; Potential contamination of the preferential surface flow paths by leaks of oil/hydraulic fluid from equipment; and Smothering of vegetation through rock/soil stockpiling, and the possible creation of habitat for invasive or encroacher pioneer species. 	Freshwater Ecology	<p>The solar PV facility development is expected to pose a low quantum risk to these preferential surface flow paths as they have already been degraded due to land use and the development is considered to pose a low quantum of risk to preferential surface flow paths. Nevertheless, the mitigation measures applicable to Activity 8 are applicable to this activity and must be implemented.</p>	<p>Reduce vegetation clearance Prevent erosion Prevent pollution of surface flow paths</p>	<p>Can be avoided, managed or mitigated</p>	
10	<p>Potential impacts on the preferential surface flow paths' geomorphology due to potential construction of the proposed solar PV facility components within the identified preferential surface flow paths</p>	<p>Disturbance to the surrounding preferential surface flow paths, leading to increased erosion, AIP proliferation and loss of freshwater ecosystem habitat.</p>	Freshwater Ecology				
11	<p>Potential impacts on the preferential surface flow paths' water quality due to potential contamination of the preferential flow paths due to leakages and construction</p>	<p>Potential for deteriorated water quality, including increased likelihood of dust generation and turbidity during mounting of support structures.</p>	Freshwater Ecology				
	Construction of Solar Areas 1 & 2 - Ground mounted panels						
12	<p>Activities associated with the construction and installation of the solar PV facility infrastructure:</p> <ul style="list-style-type: none"> Regular movement of vehicles on access roads including the potential excavation of soil to facilitate foundations for mounting and installation of solar panels and mounting of rods into foundations and associated transmission lines; Soil disturbance and vegetation clearing for construction; Vehicles, construction machinery, and personnel access to facilitate mounting of solar panels and associated construction; Potential excavation and stockpiling of soils for panels and pedestals; and Potential concrete works to fill pedestal excavations 	<ul style="list-style-type: none"> Removal of vegetation within the development footprint; Disturbances to the soil within the footprint leading to an altered habitat and potential alien proliferation; Altered runoff patterns as a result of excavations and concrete, leading to increased erosion; Potential for deteriorated water quality, including increased likelihood of dust generation and turbidity into proximal waterbodies; and Potential physical obstruction of habitat to biota from the surface infrastructure component of the proposed development. 	Freshwater Ecology	<ul style="list-style-type: none"> The preferential surface flow paths are no longer functional and therefore the development is considered to pose a low quantum of risk to preferential surface flow paths. Nevertheless, the following mitigation measures must be implemented: <ul style="list-style-type: none"> Construction vehicles must utilise existing roads and approved access roads to gain access to the development footprint area to limit edge effects; The contractor must retain as much indigenous vegetation as much as possible during construction and rehabilitate residual open spaces; Excavated stockpiles should remain within the designated development footprint or be removed to stockpile facilities and disposed of; and Concrete and cement-related mortars have high alkalinity which can dramatically affect and contaminate both soil and water. The following recommendations must be adhered to: <ul style="list-style-type: none"> Appropriate handling and disposal to minimise or eliminate discharges into the preferential surface flow paths; Fresh concrete and cement mortar should not be mixed within preferential surface flow paths and their respective regulated zones; Mixing of cement may be done within the development footprint but may not be mixed on bare soil, and must be within a lined, bound or banded portable mixer; Consideration must be taken to use ready mix concrete; No mixed concrete shall be deposited directly onto the ground. A batter board or other suitable platform/mixing tray is to be provided onto which any mixed concrete can be deposited whilst it awaits placing; Cement bags must be disposed of in the demarcated hazardous waste receptacles and the used bags must be suitably disposed of; and Spilled or excess concrete must be disposed of at a suitable landfill site. 	<p>Reduce vegetation clearance Prevent water and soil pollution</p>	<p>Can be avoided, managed or mitigated</p>	

No	Activity	Potential Impact	Aspect affected	Management Measures	Management Objective	Mitigation Effect	Compliance with Standards (where applicable)
		Impact					
13	<p>Construction of Solar Areas 3 - Roof mounted panels</p> <p>Activities associated with the construction and installation of the solar PV facility infrastructure including the mounting of panels on roofs of carports:</p> <ul style="list-style-type: none"> Regular movement of vehicles on access roads including the potential excavation of soil to facilitate foundations for mounting and installation of solar panels and mounting of rods into foundations and associated transmission lines; Soil disturbance and vegetation clearing for construction; Vehicles, construction machinery, and personnel access to facilitate mounting of solar panels and associated construction; Potential excavation and stockpiling of soils for panels and pedestals; and Potential concrete works to fill pedestal excavations 	<ul style="list-style-type: none"> Removal of vegetation within the development footprint; Disturbances to the soil within the footprint leading to an altered habitat and potential alien proliferation; Altered runoff patterns as a result of excavations and concrete, leading to increased erosion; Potential for deteriorated water quality, including increased likelihood of dust generation and turbidity into proximal waterbodies; and Potential physical obstruction of habitat to biota from the surface infrastructure component of the proposed development. 	Freshwater Ecosystem	<ul style="list-style-type: none"> The panels on Solar Area 3 will be mounted on existing carports and therefore will pose a much lower impact than Solar Areas 1 and 2 due to the decreased footprint and method of construction. Nevertheless, the following mitigation measures must be implemented: Excavated stockpiles should remain within the designated development footprint or be removed to stockpile facilities and disposed of; and Mitigation measures stipulated for Activities 9 to 13 above apply. 	Reduce vegetation clearance Prevent water and soil pollution	Can be avoided, managed or mitigated	
	Operational and Maintenance Phase						
14	<p>Operations associated with the maintenance of the solar PV facility infrastructure and fencing:</p> <ul style="list-style-type: none"> Potential indiscriminate movement of vehicles in proximity to the identified preferential surface flow paths with risks of sediment and hydrocarbons entering the preferential flow paths via runoff 	<ul style="list-style-type: none"> Disturbance to the soil, vegetation, biota and potentially water quality as a result of periodic maintenance activities; Potential spillage and ingress of hydrocarbons from maintenance vehicles; and Increased sedimentation, runoff and turbidity as a result of reduced vegetation cover of the adjacent preferential surface flow paths. 	Freshwater Ecosystem	<ul style="list-style-type: none"> Regular inspection of the area surrounding the surface infrastructure (proposed PV facility and associated access roads) should occur to monitor the establishment of vegetation, prevent the establishment of alien and invasive vegetation species, and their potential spread into surrounding areas; Stormwater runoff from the internal roads should be monitored, to ensure no erosion occurs and that all water is diffusely spread across the landscape. If erosion or preferential flow paths are detected, the areas should be rehabilitated (erosion gullies infilled) and revegetated to aid in dispersing the flow of water from the roads into the surrounding landscape; Stormwater generated within the project area must be suitably managed according to a site-specific stormwater management plan. No water may be directly released from the proposed PV facility into the identified preferential surface flow paths but must rather be suitably managed and released diffusely into the landscape. It is highly recommended that the stormwater management plan for the proposed PV facility be consulted in this regard; If repair activities to the infrastructure components are required, the mitigation measures as per that of the construction phase must be implemented; and Any erosion or gully formation must be identified on an ongoing basis and re-profiled and revegetated accordingly. 	AIP Control Stormwater management	Can be avoided, managed or mitigated	<ul style="list-style-type: none"> > The Constitution of the Republic of South Africa, 19964; > The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA); > The National Water Act, 1998 (Act No. 36 of 1998) (NWA); > Government Notice 509 (GN 509) as published in the Government Gazette 40229 of 2016 as it relates to the National Water Act, 1998 (Act No. 36 of 1998); > The Limpopo Environmental Management Act, 2003 (Act No.7 of 2003) (LEMA).

No	Activity	Potential Impact	Aspect affected	Management Measures	Management Objective	Mitigation Effect	Compliance with Standards (where applicable)
		Impact					
15	<p>Operation and maintenance of the overhead powerlines and associated infrastructure:</p> <ul style="list-style-type: none"> Potential indiscriminate movement of maintenance vehicles within proximity to the preferential surface flow paths from the proposed area; and Increased risk of sedimentation and/or hydrocarbons entering the identified features via stormwater runoff from the access roads 	<ul style="list-style-type: none"> Disturbance to soil and ongoing erosion as a result of periodic maintenance activities; and Altered water quality (if surface water is present) as a result of increased availability of pollutants. 	Freshwater Ecology	<ul style="list-style-type: none"> Maintenance vehicles must make use of dedicated access roads and no indiscriminate movement in the identified features may be permitted; During periodic maintenance activities of the powerline, monitoring for erosion should be undertaken; Should erosion be noted, the area must be rehabilitated by infilling the erosion gully and revegetation thereof with suitable indigenous vegetation; Monitoring for the establishment of alien and invasive vegetation species must be undertaken. Should alien and invasive plant species be identified, they must be removed and disposed of as per an alien and invasive species control plan and the area must be revegetated with suitable indigenous vegetation. 	Erosion control AIP control	Can be avoided, managed or mitigated	
	Soil, Land Use and Land Capability						
	Construction Phase						
16	Site clearing and removal of vegetation as part of the construction of the proposed solar facility	Soil erosion: Loosening of soil due to removal of vegetation. Increased runoff, erosion and consequent loss of land capability in cleared areas	Land capability	<ul style="list-style-type: none"> Activity should be limited to area of disturbance; The footprint of the proposed solar PV area must be clearly demarcated to restrict vegetation clearing activities within the infrastructure footprint; Moisture control will be necessary on large bare areas during dry season construction, to reduce the frequency and amount of dust suspended in the ambient air; The mine should implement adequate wet suppression techniques to limit dust release; Regulated speed limits of 40km/hr must be maintained on gravel roads to minimize dust generation; All disturbed areas adjacent to the project infrastructural areas can be re-vegetated with an indigenous grass mix, if necessary, to re-establish a protective cover, to minimise soil erosion and dust emission; All vehicular traffic should be restricted to the existing service roads and the selected road servitude as far as practically possible; Compacted soils adjacent to the mining and associated infrastructure footprint should be lightly ripped to at least 25 cm below ground surface to alleviate compaction prior to re-vegetation; Regular monitoring of site activities and machinery must be undertaken to identify spills or leaks; A spill prevention and emergency spill response plan, as well as dust suppression, and fire prevention plans must be developed and be implemented; Withdraw equipment for maintenance if change in emission characteristics is noticeable; and Spill kits (such as spill-sorb or a similar type of product) must be kept on site and used to clean up hydrocarbon spills in the event that they should occur. 	Minimise soil erosion associated with the proposed surface infrastructure	Can be avoided, managed or mitigated	National Environmental Management Act (NEMA), National Environmental Management Biodiversity Act NEMBA, (Conservation of Agricultural Resources Act (CARA), National Water Act (NWA)
17		Soil compaction: Potential frequent movement of digging machinery and construction vehicles within lose and exposed soils, leading to excessive soil compaction	Land capability		Avoid soil compaction	Can be avoided, managed or mitigated	National Environmental Management Act (NEMA), National Environmental Management Biodiversity Act NEMBA, (Conservation of Agricultural Resources Act (CARA), National Water Act (NWA)
18		Soil contamination: spillage of petroleum hydrocarbons during construction of associated infrastructure. Disposal of hazardous and non-hazardous waste, including waste material spills and refuse deposits into the soil	Land capability		Storage of waste to reduce any ground or surface water pollution	Can be avoided, managed or mitigated	National Environmental Management Act (NEMA), National Environmental Management Biodiversity Act NEMBA, (Conservation of Agricultural Resources Act (CARA), National Water Act (NWA)
19		Loss of land capability	Land capability		Minimise the loss of land capability	Can be avoided, managed or mitigated	National Environmental Management Act (NEMA), National Environmental Management Biodiversity Act NEMBA, (Conservation of Agricultural Resources Act (CARA), National Water Act (NWA)
	Operational and Maintenance Phase						
20	Operation of the proposed and maintenance of the solar PV facility and associated infrastructure	Soil Erosion: Constant disturbances of soils, resulting in risk of erosion	Land capability	<ul style="list-style-type: none"> Moisture control will be necessary on large bare areas during the dry season operational phase, to reduce the frequency and amount of dust suspended in the ambient air; The mine should implement adequate wet suppression techniques to limit dust release; 	Minimise soil erosion associated with the proposed surface infrastructure	Can be avoided, managed or mitigated	National Environmental Management Act (NEMA), National Environmental Management Biodiversity Act NEMBA, (Conservation of Agricultural

No	Activity	Potential Impact	Aspect affected	Management Measures	Management Objective	Mitigation Effect	Compliance with Standards (where applicable)
		Impact					
21		Soil Compaction: Constant disturbances of soils, resulting in risk of compaction	Land capability	<ul style="list-style-type: none"> Regulated speed limits of 40km/hr must be maintained on gravel roads to minimize dust generation; All disturbed areas adjacent to the solar PV areas can be re-vegetated with an indigenous grass mix, if necessary, to re-establish a protective cover, to minimise soil erosion and dust emission; All vehicular traffic should be restricted to the existing service roads and the selected road servitude as far as practically possible; Regular monitoring of site activities and machinery must be undertaken to identify spills or leaks; A spill prevention and emergency spill response plan, as well as dust suppression, and fire prevention plans must be developed and be implemented; Withdraw equipment for maintenance if change in emission characteristics is noticeable; and Spill kits (such as spill-sorb or a similar type of product) must be kept on site and used to clean up hydrocarbon spills in the event that they should occur. 	Avoid soil compaction	May cause irreplaceable loss of resources Can be avoided, managed or mitigated	Resources Act (CARA), National Water Act (NWA) National Environmental Management Act (NEMA), National Environmental Management Biodiversity Act NEMBA, (Conservation of Agricultural Resources Act (CARA), National Water Act (NWA)
22		Soil contamination: Leaching of hydrocarbons chemicals into the soils during vehicular traffic, leading to alteration of the soil chemical status.	Land capability		Storage of waste to reduce any ground or surface water pollution	Can be avoided, managed or mitigated	National Environmental Management Act (NEMA), National Environmental Management Biodiversity Act NEMBA, (Conservation of Agricultural Resources Act (CARA), National Water Act (NWA)
23		Land Capability: Loss of land capability	Land capability		Minimise the loss of land capability	Can be avoided, managed or mitigated	National Environmental Management Act (NEMA), National Environmental Management Biodiversity Act NEMBA, (Conservation of Agricultural Resources Act (CARA), National Water Act (NWA)
Closure and Post Closure Phase							
24	Dismantling of the Solar PV facility and associated infrastructure	Soil Erosion: Loosening of soils due to removal of the solar PV facility. Increased runoff, erosion, and consequent loss of land capability in cleared areas.	Land capability	<ul style="list-style-type: none"> The contractor(s) appointed for the removal of infrastructure activities must commit to the disposal of materials at registered sites; Salvageable materials may be sold to interested parties where these are not hazardous; Post-removal of the solar PV, the site must be rehabilitated (compacted areas ripped, topsoil re-instated and the area vegetated with indigenous seed mix); The footprint should be ripped to alleviate compaction; Stored topsoil should be replaced and the footprint graded to a smooth surface; Post-rehabilitation monitoring should be considered; Removal activities should be limited to area of disturbance; The footprint of the proposed infrastructure area must be clearly demarcated to restrict vegetation clearing activities within the infrastructure footprint; Moisture control will be necessary on large bare areas during dry season decommissioning activities, in order to reduce the frequency and amount of dust suspended in the ambient air; The mine should implement adequate wet suppression techniques to limit dust release; Regulated speed limits of 40km/hr must be maintained on gravel roads to minimize dust generation; 	Minimise soil erosion associated with the proposed surface infrastructure	Can be avoided, managed or mitigated	National Environmental Management Act (NEMA), National Environmental Management Biodiversity Act NEMBA, (Conservation of Agricultural Resources Act (CARA), National Water Act (NWA)
25		Soil Compaction: Movement of vehicles and machinery during the removal of the solar PV facility.	Land capability		Avoid soil compaction	Can be avoided, managed or mitigated	National Environmental Management Act (NEMA), National Environmental Management Biodiversity Act NEMBA, (Conservation of Agricultural Resources Act (CARA), National Water Act (NWA)
26		Soil contamination: Spillage of hydrocarbons resulting from leakages from demolition equipment/machinery and other chemical storage facilities, leading to soil contamination (soil chemical characteristics).	Land capability		Storage of waste to reduce any ground or surface water pollution	Can be avoided, managed or mitigated	National Environmental Management Act (NEMA), National Environmental Management Biodiversity Act NEMBA, (Conservation of Agricultural Resources Act (CARA), National Water Act (NWA)

No	Activity	Potential Impact	Aspect affected	Management Measures	Management Objective	Mitigation Effect	Compliance with Standards (where applicable)
		Impact					
27		Land Capability: Potentially poor solar PV removal strategy may result to lower infiltration rate, and consequently increased surface runoff. Increased soil erosion leading to permanent loss of soil resources	Land capability	<ul style="list-style-type: none"> All disturbed areas adjacent to the project infrastructural areas can be re-vegetated with an indigenous grass mix, if necessary, to re-establish a protective cover, to minimise soil erosion and dust emission; Compacted soils adjacent to the mining and associated infrastructure footprint should be lightly ripped to at least 25 cm below ground surface to alleviate compaction prior to re-vegetation; All vehicular traffic should be restricted to the existing service roads and the selected road servitude as far as practically possible; Regular monitoring of site activities and machinery must be undertaken to identify spills or leaks; Withdraw equipment for maintenance if change in emission characteristics is noticeable; Spill kits (such as spill-sorb or a similar type of product) must be kept on site and used to clean up hydrocarbon spills in the event that they should occur. 	Minimise the loss of land capability	Can be avoided, managed or mitigated	National Environmental Management Act (NEMA), National Environmental Management Biodiversity Act NEMBA, (Conservation of Agricultural Resources Act (CARA), National Water Act (NWA)
Socio-Economic							
Construction Phase							
28	Temporary increase in production and GDP in the local economy	Improved household income and increased business sales in the local economy	Socio-Economic	<p>To optimise the stimulation of the local economy through direct, indirect and induced effects, the following should be applied where possible:</p> <ul style="list-style-type: none"> Procure construction materials, goods, and products from local and domestic suppliers if feasible; and Employ local contractors where possible. 	The proposed mitigation measures will possibly increase the positive impact on the local economy	Can be avoided, managed or mitigated	National Development Plan (NDP) 2030, 2012 New Growth Path Framework (NGPF), 2010 Limpopo Development Plan (LDP) 2015-2019 Waterberg District Municipality Final Annual Report 2019/20 Waterberg DM IDP 2020/2021 Waterberg DM Local Economic Development Mogalakwena Local Municipality Integrated Development Plan (IDP) Review 2020/21
29	Creation of temporary employment opportunities on-site	Improved income of households whose members are employed on the project	Socio-Economic	<p>The following is recommended to increase the employment opportunities created in the local communities, where feasible:</p> <ul style="list-style-type: none"> Employ labour-intensive methods in construction, where feasible; Employ local residents and communities, where possible; and Utilise local suppliers, where possible. 	The proposed mitigation measures will possibly increase the positive impact on the local economy	Can be avoided, managed or mitigated	National Development Plan (NDP) 2030, 2012 New Growth Path Framework (NGPF), 2010 Limpopo Development Plan (LDP) 2015-2019 Waterberg District Municipality Final Annual Report 2019/20 Waterberg DM IDP 2020/2021 Waterberg DM Local Economic Development Mogalakwena Local Municipality Integrated Development Plan (IDP) Review 2020/21
30	Temporary increase in crime associated with the influx of people	Reduced level of security in and around the proposed facility	Socio-Economic	<p>The following mitigations are advised to be instituted to minimise and possibly eliminate the impact altogether:</p> <ul style="list-style-type: none"> Ensure proper fencing and security to monitor the fence is in place; Maximise job creation and allocation to locals as far as practically possible; Recruitment of workers should be planned in advance and should not take place on-site. This will reduce the probability of work seekers loitering in the area surrounding the project sites; and Hire additional security personnel during the construction period. 	Decrease level of crime associated with new developments	Can be avoided, managed or mitigated	National Development Plan (NDP) 2030, 2012 New Growth Path Framework (NGPF), 2010 Limpopo Development Plan (LDP) 2015-2019 Waterberg District Municipality Final Annual Report 2019/20 Waterberg DM IDP 2020/2021 Waterberg DM Local Economic Development Mogalakwena Local Municipality Integrated Development Plan (IDP) Review 2020/21

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		Impact					
31	Deterioration of quality of life due to dust, noise, visual, and other environmental impacts	Temporary change to the sense of place	Socio-Economic	Recommendations and mitigation measures provided in the Visual Impact Assessment, Soils and Land Capability Assessment and Freshwater Ecology Assessment must be adhered to.	Reduced probability of deterioration of quality of life	Can be avoided, managed or mitigated	National Development Plan (NDP) 2030, 2012 New Growth Path Framework (NGPF), 2010 Limpopo Development Plan (LDP) 2015-2019 Waterberg District Municipality Final Annual Report 2019/20 Waterberg DM IDP 2020/2021 Waterberg DM Local Economic Development Mogalakwena Local Municipality Integrated Development Plan (IDP) Review 2020/21
	Operational Phase						
32	Long-term increase in production and GDP in the local economy	Improved household income and increased business sales in the local economy	Socio-Economic	Where feasible, procure goods and services required for the operation of the plant from the local economy	Stimulate growth of local economy	Can be avoided, managed or mitigated	National Development Plan (NDP) 2030, 2012 New Growth Path Framework (NGPF), 2010 Limpopo Development Plan (LDP) 2015-2019 Waterberg District Municipality Final Annual Report 2019/20 Waterberg DM IDP 2020/2021 Waterberg DM Local Economic Development Mogalakwena Local Municipality Integrated Development Plan (IDP) Review 2020/21
33	Creation of permanent employment opportunities in the local and regional economy	Improved income of households whose members are employed on the project	Socio-Economic	Where feasible, aim to fill all the positions with labour from the local community.	Stimulate growth of local economy	Can be avoided, managed or mitigated	National Development Plan (NDP) 2030, 2012 New Growth Path Framework (NGPF), 2010 Limpopo Development Plan (LDP) 2015-2019 Waterberg District Municipality Final Annual Report 2019/20 Waterberg DM IDP 2020/2021 Waterberg DM Local Economic Development Mogalakwena Local Municipality Integrated Development Plan (IDP) Review 2020/21
34	Deterioration of quality of life in the area and environmental impacts	Change in Sense of Place	Socio-Economic	Ensure that the solar panels used are placed in a manner that the light reflecting from the panels does not distract or impair drivers on the national road directly next to the proposed development.	Ensure the community in proximity to the proposed development and users of the N11 are not affected by light glares from the solar panels.	Can be avoided, managed or mitigated	National Development Plan (NDP) 2030, 2012 New Growth Path Framework (NGPF), 2010 Limpopo Development Plan (LDP) 2015-2019 Waterberg District Municipality Final Annual Report 2019/20 Waterberg DM IDP 2020/2021 Waterberg DM Local Economic Development Mogalakwena Local Municipality Integrated Development Plan (IDP) Review 2020/21

No	Activity	Potential Impact	Aspect affected	Management Measures	Management Objective	Mitigation Effect	Compliance with Standards (where applicable)
		Impact					
35	Reduced strain on municipal electricity	Reduced carbon footprint	Environmental	No mitigation measures are proposed	N/A	Can be reversed	National Development Plan (NDP) 2030, 2012 New Growth Path Framework (NGPF), 2010 Limpopo Development Plan (LDP) 2015-2019 Waterberg District Municipality Final Annual Report 2019/20 Waterberg DM IDP 2020/2021 Waterberg DM Local Economic Development Mogalakwena Local Municipality Integrated Development Plan (IDP) Review 2020/21
	Decommissioning phase						
36	Temporary increase in production and GDP in the local economy	Improved household income and increased business sales in the local economy	Economic	No mitigation measures are proposed	Stimulate growth of local economy	Can be avoided, managed or mitigated	National Development Plan (NDP) 2030, 2012 New Growth Path Framework (NGPF), 2010 Limpopo Development Plan (LDP) 2015-2019 Waterberg District Municipality Final Annual Report 2019/20 Waterberg DM IDP 2020/2021 Waterberg DM Local Economic Development Mogalakwena Local Municipality Integrated Development Plan (IDP) Review 2020/21
37	Creation of permanent employment opportunities in the local and regional economy	Improved income of households whose members are employed on the project	Socio-Economic	The following is recommended to increase the employment opportunities created in the local communities, where feasible: <ul style="list-style-type: none"> • Employ labour-intensive methods in the decommissioning phase, where feasible; and • Employ local residents and communities, where possible. 	Stimulate growth of local economy	Can be avoided, managed or mitigated	National Development Plan (NDP) 2030, 2012 New Growth Path Framework (NGPF), 2010 Limpopo Development Plan (LDP) 2015-2019 Waterberg District Municipality Final Annual Report 2019/20 Waterberg DM IDP 2020/2021 Waterberg DM Local Economic Development Mogalakwena Local Municipality Integrated Development Plan (IDP) Review 2020/22
	Visual						
	Construction Phase						
38	Preparation of earthworks for the solar PV array areas: Areas 1 and 2	* Topsoil stripping, exposure of soils to wind causing dust. The exposure of earth results in the altering of the visual quality and sense of place of the development areas. * Visual dusts plumes	Visual Aspects	<ul style="list-style-type: none"> • The minimum amount of existing vegetation and topsoil should be removed; *Construction camp (if required) should either be screened or positioned in areas where it would be less visible from nearby residence and the N11 main road; • Construction activities should be limited to between 08:00 and 17:00 or in conjunction with the ECO; • Earthworks should be executed so that only the footprint and a small 'construction buffer zone' around the proposed activities (internal roads, foundations for the array structures, inverters) are exposed; 	Minimise visual aesthetic impacts to sensitive receptors	Can be avoided, managed or mitigated	NEMA, Act. No. 28 of 1998 Western Cape Department of Environmental Affairs & Development Planning: Guideline for Involving Visual and Aesthetic Specialists in EIA Processes Edition 1 (CSIR, 2005)

No	Activity	Potential Impact	Aspect affected	Management Measures	Management Objective	Mitigation Effect	Compliance with Standards (where applicable)
		Impact					
39	<ul style="list-style-type: none"> Construction of the solar PV array structures and placement of the panels. All activities associated with the construction of the arrays and the 11kV overhead power line and the movement of vehicles 	The alteration of visual quality and sense of place of areas around the project sites and the subsequent impact on sensitive receptor areas	Visual Aspects	<ul style="list-style-type: none"> Disturbed soil must be exposed for the minimum time possible once cleared of vegetation to avoid prolonged exposure to wind and water erosion and to minimise dust generation; Building or waste material discarded should be undertaken at an authorised location, which should not be within any sensitive areas; Paint all structures (structural support for the arrays) with colours that reflect and compliment the colours of the surrounding landscape. Shiny metals should be avoided; During construction, temporary fences surrounding the material storage yards and laydown areas should be covered with 'shack' cloth (khaki coloured) or shade cloth; Install light fixtures that provide precisely directed illumination to reduce light "spillage" beyond the immediate surrounds of the site i.e., lights are to be aimed away from adjacent residential areas, specifically west and north of the Project site; Minimize the number of light fixtures to the bare minimum, including security lighting; and Avoid high pole top security lighting along the periphery of the site and use only lights activated on illegal entry to the site. 	Minimise visual aesthetic impacts to sensitive receptors	Can be avoided, managed or mitigated	NEMA, Act. No. 28 of 1998 Western Cape Department of Environmental Affairs & Development Planning: Guideline for Involving Visual and Aesthetic Specialists in EIA Processes Edition 1 (CSIR, 2005)
40	Security, operational and moving vehicle lights	Night light pollution	Visual Aspects	<ul style="list-style-type: none"> Minimize the number of light fixtures to the bare minimum, including security lighting; and Avoid high pole top security lighting along the periphery of the site and use only lights activated on illegal entry to the site. 	Minimise visual aesthetic impacts to sensitive receptors	Can be avoided, managed or mitigated	NEMA, Act. No. 28 of 1998 Western Cape Department of Environmental Affairs & Development Planning: Guideline for Involving Visual and Aesthetic Specialists in EIA Processes Edition 1 (CSIR, 2005)
Operational Phase							
41	All activities and infrastructure associated with the operation of the solar PV facility	The alteration of visual quality and sense of place of areas around the project sites and the subsequent impact on sensitive receptor areas	Visual Aspects	<ul style="list-style-type: none"> Building or waste material discarded should be undertaken at an authorised location, which should not be within any sensitive areas; Install light fixtures that provide precisely directed illumination to reduce light "spillage" beyond the immediate surrounds of the site i.e., lights are to be aimed away from adjacent residential areas, specifically west and north of the Project site; Minimize the number of light fixtures to the bare minimum, including security lighting; Avoid high pole top security lighting along the periphery of the site and use only lights activated on illegal entry to the site; As a glint and glare analysis is not required for the Project, it is recommended that residents in the area are encouraged to report any glare to the owner/operator of the Project via the existing grievance mechanisms employed at the mine. The date and time of day should be recorded. On the days and times (if any) when issues were experienced, the angle that the panels face should be redirected to eliminate glare, for the duration of the period that issues were being experienced. Plant clumps of indigenous evergreen trees along the northern edges of solar PV Areas 1 and 2. These trees should extend from the north east corner of Area 2 to the proposed perimeter berm at the north eastern corner of Area 1. The tree screen will only become effective after 5 – 10 years of growth, but will reduce the impact of the PV arrays over time; Encourage the installation of the proposed 10m high perimeter berm around the mine's infrastructure areas. 	Minimise visual aesthetic impacts to sensitive receptors	Can be avoided, managed or mitigated	NEMA, Act. No. 28 of 1998 Western Cape Department of Environmental Affairs & Development Planning: Guideline for Involving Visual and Aesthetic Specialists in EIA Processes Edition 1 (CSIR, 2005)
42	Security and operational lights	Night light pollution	Visual Aspects	<ul style="list-style-type: none"> Plant clumps of indigenous evergreen trees along the northern edges of solar PV Areas 1 and 2. These trees should extend from the north east corner of Area 2 to the proposed perimeter berm at the north eastern corner of Area 1. The tree screen will only become effective after 5 – 10 years of growth, but will reduce the impact of the PV arrays over time; Encourage the installation of the proposed 10m high perimeter berm around the mine's infrastructure areas. 	Minimise visual aesthetic impacts to sensitive receptors	Can be avoided, managed or mitigated	NEMA, Act. No. 28 of 1998 Western Cape Department of Environmental Affairs & Development Planning: Guideline for Involving Visual and Aesthetic Specialists in EIA Processes Edition 1 (CSIR, 2005)
Closure and Post-Closure Phase							
43	Removal of all infrastructure	<ul style="list-style-type: none"> The alteration of visual quality and sense of place of areas around the project sites and the subsequent impact on sensitive receptor areas Visual dust plumes 	Visual Aspects	<ul style="list-style-type: none"> The minimum amount of existing vegetation and topsoil should be removed; Salvage yard (if required) should either be screened or positioned in areas where it would be less visible from nearby residence and the N11 main road; Disturbed bare soil must be exposed for the minimum time possible to avoid prolonged exposure to wind and water erosion and to minimise dust generation; Disturbed areas should be rehabilitated and monitored until such time that vegetation has re-established; Building or waste material discarded should be undertaken at an authorised location, which should not be within any sensitive areas; 	Minimise visual aesthetic impacts to sensitive receptors	Can be avoided, managed or mitigated	NEMA, Act. No. 28 of 1998 Western Cape Department of Environmental Affairs & Development Planning: Guideline for Involving Visual and Aesthetic Specialists in EIA Processes Edition 1 (CSIR, 2005)

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		Impact					
44	Rehabilitation of all areas associated with the solar PV facility	The alteration of visual quality and sense of place of areas around the project sites and the subsequent impact on sensitive receptor areas	Visual Aspects	<ul style="list-style-type: none"> During decommissioning, temporary fences surrounding the material storage yards and laydown areas should be covered with 'shack' cloth (khaki coloured) or shade cloth. 	Minimise visual aesthetic impacts to sensitive receptors	Can be avoided, managed or mitigated	NEMA, Act. No. 28 of 1998 Western Cape Department of Environmental Affairs & Development Planning: Guideline for Involving Visual and Aesthetic Specialists in EIA Processes Edition 1 (CSIR, 2005)
45	Ongoing management of rehabilitated areas until established	The alteration of visual quality and sense of place of areas around the project sites and the subsequent impact on sensitive receptor areas	Visual Aspects				NEMA, Act. No. 28 of 1998 Western Cape Department of Environmental Affairs & Development Planning: Guideline for Involving Visual and Aesthetic Specialists in EIA Processes Edition 1 (CSIR, 2005)
Heritage							
46	Construction and operation of the solar PV facility	Potential impact to heritage resources	Heritage and Archaeological Resources	<ul style="list-style-type: none"> Grave sites are located within the greater Platreef Mine boundary of which 4 grave sites are located within the proposed solar areas. Several of these graves have been mitigated through so-called "Phase 2 HRM processes" such as grave relocation. Should the graves to be impacted by the proposed solar facility not have been relocated, a Grave Relocation Process (GRP) in compliance with Section 36 of the National Heritage Resources Act, 1999 (Act No. 25 of 1999), should be followed. No further impact to the cultural heritage landscape, given the nature of the proposed activities and the location of identified heritage resources in relation to the proposed Project infrastructure, are envisaged. Since GPR scans and later investigations of Site 012A-05 proved to be inconclusive, further exploratory actions is required for this site. Here, the nature and context of the features at the site should be tested by means of test excavations as part of the grave relocation process in order to confirm without a doubt whether the site contains human remains and burials. Relevant families should be informed and consulted about the proposed activities which could affect any potential graves in the project area. Agreements and Memoranda of Understanding (MOU) with communities and representatives who by tradition might have an interest in the graves regarding the future of such sites should at all times be in place and observed. A careful watching brief monitoring process is recommended whereby ground clearing and earth moving activities are monitored on a regular basis in order to detect possible impact on heritage resources. Earth-moving crews and contractors should be made aware of the past existence of human burials and the potential of previously undetected graves occurring in the project area. Should any subsurface paleontological, archaeological or historical material or heritage resources be exposed during construction activities, all activities should be suspended, and the archaeological specialist should be notified immediately. It should be reiterated that any grave relocation measures should be undertaken by a qualified archaeologist with proved experience in the removal and relocation of human remains in accordance with relevant legislation, permitting, statutory permissions and subject to any local and regional provisions and laws and by-laws. A full social consultation process should occur in conjunction with the mitigation of cemeteries and burials. 	N/A	N/A	National Heritage Resources Act, 1999 (Act No. 25 of 1999)

35 FINANCIAL PROVISION

35.1 DETERMINATION OF THE AMOUNT OF FINANCIAL PROVISION

Refer to comments made within **Section 26**.

35.1.1 DESCRIBE THE CLOSURE OBJECTIVES AND THE EXTENT TO WHICH THEY HAVE BEEN ALIGNED TO THE BASELINE ENVIRONMENT DESCRIBED UNDER REGULATION 22 (2) (D) AS DESCRIBED IN 2.4 HEREIN

Refer to comments made within **Section 26**.

35.1.2 CONFIRM SPECIFICALLY THAT THE ENVIRONMENTAL OBJECTIVES IN RELATION TO CLOSURE HAVE BEEN CONSULTED WITH LANDOWNER AND INTERESTED AND AFFECTED PARTIES

Refer to comments made within **Section 26**.

35.1.3 PROVIDE A REHABILITATION PLAN THAT DESCRIBES AND SHOWS THE SCALE AND AERIAL EXTENT OF THE MAIN MINING ACTIVITIES, INCLUDING THE ANTICIPATED MINING AREA AT THE TIME OF CLOSURE

Refer to comments made within **Section 26**.

35.1.4 EXPLAIN WHY IT CAN BE CONFIRMED THAT THE REHABILITATION PLAN IS COMPATIBLE WITH THE CLOSURE OBJECTIVES.

Refer to comments made within **Section 26**.

35.2 CONFIRM THAT THIS AMOUNT CAN BE PROVIDED FOR FROM OPERATING EXPENDITURE

The amount will be made available as a bank guarantee as done in previous years and updated as required.

36 MECHANISMS FOR MONITORING COMPLIANCE WITH AND PERFORMANCE ASSESSMENT AGAINST THE ENVIRONMENTAL MANAGEMENT PROGRAMME AND REPORTING THEREON

36.1 DETAILED MONITORING PROGRAMMES AS DESCRIBED FOR ACTIVITIES

36.1.1 SOIL AND EROSION MONITORING PROGRAMME

Soil monitoring will involve the inspection of soil which has been disturbed, compacted, contaminated or eroded. Soil monitoring will assist in determining where soils have not been sufficiently rehabilitated.

Where soils have been contaminated by the spillage of hydrocarbons, monitoring must take place on a weekly basis for at least four (4) weeks or until the soil is considered sufficiently rehabilitated. Soil samples should be taken and submitted to a laboratory to test for contaminant content if it is considered necessary.

Soil monitoring should be undertaken during the following periods:

- After areas have been rehabilitated;
- After remediation of soils which have been contaminated by spillages during the construction and operational phases; and

- After the closure and decommissioning phase.

Monitor and Manage soil contamination in accordance with procedures for the existing mine operations.

Areas requiring re-vegetation should be monitored for signs of erosion. In addition, all of the following areas should also be monitored for soil erosion:

- All stormwater discharge points; and
- All clean water diversion discharge points.

Monitoring activities should consist of fixed-point photography, as well as a walk-through surveys to observe for signs of erosion in the field. Monitoring should be done as specified and at the end of the rainy season. Any erosion damage observed should be repaired immediately.

36.1.2 SURFACE MONITORING PROGRAMME

In line with the existing WUL and best practice.

36.1.3 HERITAGE MONITORING PROGRAM

No specific heritage monitoring program is prescribed. However, should any heritage remains be discovered during any phase of the development, a heritage specialist should be consulted immediately.

36.1.4 AIR/DUST MONITORING PROGRAM

In line with the mine's dust suppression programme.

36.2 ENVIRONMENTAL MONITORING AND AUDITING

The Department of Environmental Affairs and Tourism defines environmental auditing as “a process whereby an organisation's environmental performance is tested against its environmental policies and objectives.” Monitoring and auditing are an essential environmental management tool which is used to assess, evaluate and manage environmental and sustainability issues.

In order to ensure that the objectives of sustainable development and integrated environmental management are met and in order to obtain data which can inform continuous improvement of environmental practices at the site (adaptive management), monitoring, auditing and reporting will be essential components of the operations.

Monitoring and management actions associated with the project are contained in **Section 36.1** and **Table 22** of this report as well as in the various specialist reports associated with this project. This section provides a summary of the critical monitoring aspects per specific environmental field.

36.3 GENERAL MONITORING AND MANAGEMENT

The appointment of a suitably qualified on-site Environmental Control Officer (ECO) is essential to the successful implementation and management of this project, although this role can be fulfilled by the Safety Health and Environment (SHE) Representative. The ECO will be responsible for the implementation of the EMPr, applicable environmental legislation and any stipulations/conditions set by the relevant competent authorities (including but not limited to the DMRE and DWS). An ECO should conduct formal monthly site inspections and conduct an internal annual audit during all the phases of the development.

An external Environmental Auditor should also be appointed to conduct annual audits for the duration of the project. The auditor should monitor the success and effective implementation of the environmental management measures stipulated in the EMPr, applicable legislation, and any conditions set by the

competent authorities. Following the audit, the auditor should submit a report to the competent authorities documenting the success/failure of the implementation of the management measures at the operations.

The above internal and external audits can be combined with those required for the mine as per the existing authorisations listed in **Section 31.1**, where possible.

36.4 SPECIFIC MONITORING REQUIREMENTS

Monitoring of the development (both on site and where appropriate in the surrounding environments) should be considered a high priority and should be conducted in accordance with the relevant specialist recommendations as summarised below:

36.4.1 MONITORING PROTOCOL

It is essential that during the implementation and operational phase of the development that the monitoring of certain elements is carried out to ensure compliance with regulatory bodies. A monitoring protocol will be required. The monitoring only includes those activities identified in the EMPr and excludes any monitoring that should take place according to the water use license and compliance in terms of the existing WUL.

Refer to **Section 36.1** for the specific monitoring programs to be implemented.

36.4.2 MONITORING REQUIREMENTS AND RECORD KEEPING

To ensure that the procedures outlined throughout the EMPr are implemented effectively, it will be necessary to monitor the implementation of the EMPr and evaluate the success of achieving the objectives listed in the EMPr. To ensure that all personnel on site are aware of their obligation to protect the environment, induction training will also include environmental awareness.

The audit procedure will include an annual compliance audit conducted by the ECO. Where the objectives of the EMPr are not being met the reasons will be determined and remedial action or variation to the tasks will be recommended. Major residual effects shall be documented in a Non-Conformance Report, during the remaining phases of the project. Follow-up audits will be conducted as per the audit protocol in the **Section 36.4.3**.

36.4.2.1 IMPLEMENTATION PHASE

The following monitoring needs to be conducted:

- The current monitoring data will provide sufficient baseline data for comparison against future monitoring results of the activities; and
- Monitoring should commence as soon as construction starts in order to ensure recent data for comparison against the operational phase.

36.4.2.2 OPERATIONAL PHASE

Please refer to **Section 36.1** and any monitoring as prescribed by the WUL being applied for in relation to water uses within the solar facility areas.

36.4.3 AUDIT PROTOCOL

It is essential that during all the phases of the development, the monitoring and auditing of certain elements are carried out to ensure compliance with regulatory bodies. An Audit Protocol for both the construction phase and operational phase will be required. The auditing only includes those activities identified in the EMPr and excludes any auditing that should take place according to the water use license or any other legislative authorisation process if and when they will be authorised.

The following audits need to be completed (valid for this EMPr):

- EMPr compliance (continuously): to be checked by an on-site ECO, SHEQ representative or EM;
- EMPr compliance (on annual basis): to be checked by an independent ECO, SHEQ representative or EM.

36.4.4 ENVIRONMENTAL INCIDENTS

An environmental incident is defined as any unplanned event that results in actual or potential damage to the environment, whether of a serious or non-serious nature. An incident may involve non-conformance with environmental legal requirements, the requirements of the EMPr, or contravention of written or verbal orders given by the ECO or relevant authority.

All details regarding Environmental Incidents and procedures have been described within **Section 36.4.5** below and should be handled accordingly.

36.4.5 PENALTIES AND FINES FOR NON-COMPLIANCE OR MISCONDUCT

This EMPr forms part of the contract agreement between the Client and the Principal contractor. As such, non-compliance with conditions of the EMPr will amount to a breach of contract. Penalties will be issued directly to the contractor by the applicant in the event of non-compliance to the EMPr specifications. The issuing of a penalty will be preceded by a verbal warning by the applicant, as well as strict instruction in at least one monthly ECO report to rectify the situation. The ECO and applicant will communicate with regards to realistic timeframes for possible rectification of the contravention, and possible consequences of continued non-compliance to the EMPr.

Penalties incurred do not preclude prosecution under any other law. Cost of rehabilitation and/or repair of environmental resources that were harmed by the actions of the contractor, if such actions were in contravention of the specifications of the EMPr will be borne by the contractor himself. Penalties may be issued over and above such costs. The repair or rehabilitation of any environmental damage caused by non-compliance with the EMPr cannot be claimed in the Contract Bill, nor can any extension of time be claimed for such works. Penalty amounts shall be deducted from Certificate payments made to the Contractor.

The following categories of non-compliance are an indication of the severity of the contravention, and the fine or penalty amounts may be adjusted depending on the seriousness of the infringement:

- Category One: Acts of non-compliance that are unsightly, a nuisance or disruptive to adjacent landowners, existing communities, tourists or persons passing through the area.
- Category Two: Acts of non-compliance that cause minor environmental impact or localized disturbance.
- Category Three: Acts of non-compliance that affect significant environmental impact extending beyond point source.
- Category Four: Acts of non-compliance that result in major environmental impact affecting large areas, site character, protected species or conservation areas.

36.4.6 ENVIRONMENTAL AWARENESS PLAN

Environmental awareness training is critical for two primary reasons:

- The workforce must understand how they can play a role in achieving the objectives specified in the EMPr; and
- The workforce must understand their obligations in terms of the implementation of the EMPr and adherence to environmental-legislative requirements.

Environmental awareness is aimed at ensuring that employees, contractors, subcontractors and other relevant parties are aware of and able to meet their environmental commitments. This plan is to be updated on a yearly basis during the phases of the project in light of operational changes, learning experiences and identified training needs.

All full-time staff and contractors are required to attend an induction session when they start, which session should include environmental aspects.

It is, therefore, recommended that the ECO/EM be involved in induction training. The induction sessions may be modified/adapted based on the audience attending the specific session, and should ensure that all employees gain a suitable understanding of:

- Environmental requirements of the project, and how these will be implemented and monitored;
- Including each Employee's responsibilities with respect to environmental issues;
- Contents and commitments of the EMPr, including no-go areas, employees conduct, pollution prevention (prohibitions against littering, unauthorised fires, loud music, entry to adjacent properties, road conduct, etc.);
- Environmentally sensitive areas on and around the development sites, including why these are deemed important and how these are to be managed. Employees will also be made aware of protected trees found on the site and how these are to be conserved, as well as alien invasive species potentially found on the site and how these should be managed; and
- Incident identification, remediation and reporting requirements: what constitutes an environmental incident (spillages, fire, etc.) and how to react when such an incident occurs.

Environmental training will not be restricted to induction training sessions alone but will be conducted on an on-going basis throughout the lifecycle of the project as and when required. Records are to be kept of the type of training given (matters discussed and by whom), date on which training was given and the attendees of each training session.

As the solar facility will be developed within the existing MR area, the mine's Environmental Emergency Response Plan and Emergency Preparedness Plan should be implemented at the solar facility.

36.4.6.1 RESPONSIBLE PERSONS

Compliance with the emergency response plan and ensuring individual safety will be the responsibility of all employees and contractors on the mine. Record keeping, investigation and management of emergencies will be the responsibility of the following persons:

- Mine Manager;
- Environmental Management Representative - this includes the SHE managers and officers; and
- Site Manager(s).

36.4.6.2 DEFINING AN ENVIRONMENTAL RESPONSE PLAN

Environmental emergencies occur over the short term and require an immediate response. A mine, as part of its management tools, especially if it is ISO 9000 and ISO 14001 compliant, should have an Environmental Emergency Response Plan. The plan should be disseminated to all employees and contractors and in the event of an emergency, it should be consulted.

The Environmental Emergency Response Plan should be made available with the Emergency Preparedness Plan and placed where it will be easily viewed. The Emergency Response Plan should contain a list of procedures, evacuation routes and a list of emergency contact numbers.

If an environmental emergency has the potential to affect surrounding communities, they should be alerted via alarm signals or contacted in person. The surrounding community will be informed of the potential dangers and emergencies that exist, and the actions to be taken in such emergencies.

Communication is vital in an emergency and thus communication devices, such as mobile phones, two-way radios, pagers or telephones, must be placed on the mine. A checklist of emergency response units must be consulted, and the relevant units notified.

The checklist includes:

- Fire department;
- Police;
- Emergency health services such as ambulances, paramedic teams, poisons centres;
- Hospitals, both local and further afield, for specialist care;
- Public health authorities;
- Environmental agencies, especially those responsible for air, water and waste issues;
- Other industrial facilities in the vicinity with emergency response facilities;
- Public works and highway departments, port and airport authorities; and
- Public information authorities and media organisations.

36.4.6.3 PROCESS FOR IDENTIFYING ENVIRONMENTAL EMERGENCY PROCEDURES

The process that will be used to identify emergency situations at the solar facility will be conducted in terms of an Aspects Register and may include the following emergencies:

- Safety risks associated with the solar facility including Inverters;
- Hydrocarbon Spill (diesel, oil, grease, etc.); and
- Veld Fires.

The necessary actions required, as well as the responsible person for ensuring that the actions are followed through and the reporting requirements are adhered to, to ensure effective and efficient response to each of the environmental emergency situations listed above are set out in this procedure.

36.4.6.4 MOST LIKELY POTENTIAL ENVIRONMENTAL EMERGENCIES

The following define the most likely potential environmental emergencies:

- Accidents;
- Fires;
- A major hydrocarbon spill or leak; and
- Explosions.

36.4.6.5 ACCIDENTS

In the case of a medical accident or problem, refer to the mine's Emergency Preparedness Plan.

36.4.7 INDICATE THE FREQUENCY OF THE SUBMISSION OF THE PERFORMANCE ASSESSMENT REPORT

Biennial (every two years) performance assessment reports are recommended. Refer to details on Auditing procedures (**Section 36.4.3**).

36.4.8 MANNER IN WHICH RISKS WILL BE DEALT WITH IN ORDER TO AVOID POLLUTION OR THE DEGRADATION OF THE ENVIRONMENT

Refer to **Table 22** for the recommended mitigation measures to limit environmental impacts. A suitable risk matrix may be used to evaluate operational risks during any stage of the development. Ensure compliance with all existing procedures and that they are updated.

36.5 SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

The Immediate Closure Provision, as calculated, will be updated yearly as part of the annual liability assessment required by the MPRDA and GN R1147 in terms of the NEMA, once operations commence. The Final Rehabilitation plan will need to be formalised as soon as Closure planning commences. The decommissioning of the infrastructure (solar facility and associated infrastructure) should also be addressed adequately.

37 UNDERTAKING

The EAP herewith confirms

- the correctness of the information provided in the reports
- the inclusion of comments and inputs from stakeholders and I&APs ;
- the inclusion of inputs and recommendations from the specialist reports where relevant; and
- the acceptability of the project in relation to the finding of the assessment and level of mitigation proposed;

37.1 UNDERTAKING REGARDING CORRECTNESS OF INFORMATION

I, Chantal Uys, herewith undertake that the information provided in the foregoing report is correct, and that the comments and inputs from stakeholders and Interested and Affected parties have been correctly recorded in the report.

Signature of the EAP

15 September
2022

37.2 UNDERTAKING REGARDING LEVEL OF AGREEMENT

I, Chantal Uys, herewith undertake that the information provided in the foregoing report is correct, and that the level of agreement with interested and Affected Parties and stakeholders has been correctly recorded and reported herein.

Signature of the EAP

15 September
2022

38 REFERENCES

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