



D7: Socio-Economic Impact Assessment



**MULTI-PURPOSE
BUSINESS SOLUTIONS**

**Socio-Economic Impact Assessment
Carpe Diem North Solar project on Farm Varkenslaagte 119/5,
Merafong City, Gauteng**



Consultative Report
prepared by Dr Jonathan Bloom
for Legacy Environmental Management Consulting

September 2024, updated June 2025



Executive Summary

JUWI Renewable Energies (Pty) Ltd proposes to develop the approximately 290 ha Carpe Diem North property as an independent Solar Photovoltaic Plant (SPP) with an electricity generation capacity of up to 150 MW, developed in two 75 MW sections that share all associated bulk infrastructure, as well as the on-site SPP substation. The proposed site is near Carletonville in the Merafong City Municipality, West Rand District of Gauteng.

A key factor in the feasibility assessment of a Solar facility is the tariff that NERSA is prepared to pay for the electricity generated by the operator of the solar power plant (SPP). An agreement is concluded with the landowner to lease a portion of the facility for a period that equates to the economic life of the PV Plant. The large capital outlay for the PV panels and the direct and indirect infrastructure costs can only be justified by the tariff obtained for the electricity and the minimum required return for the investors in the project.

It is clear from National, Provincial, District and Local legislation, policies, strategies and action programmes that targets have been set to achieve a greater energy output from renewable energy sources. There is growing pressure on the stable and reliable provision of electricity generation throughout the country, and Eskom's inability to guarantee a constant supply requires investment in alternative and renewable energy sources. The proposed Carpe Diem North Solar project will support the efforts to explore alternative and renewable sources of electricity. The proposed Carpe Diem North SPP aligns with several provincial policies and strategic frameworks that emphasise the need for green energy to combat climate change and support and stimulate economic development in the Gauteng Province. Several Climate Change Adaptation and Mitigation Interventions related to renewable energy were proposed for the West Rand DM, including solar parks that will feed electricity into the National Grid, utilising solar energy in residential areas and industry, and promoting the development of "green technology/energy." Incremental implementation of the Smart City Concept. The proposed Carpe Diem North Solar project supports these objectives by promoting the development of renewable energy plants. The proposed SPP addresses several renewable energy priorities identified by the Merafong City Local Municipality, which is already investigating a Bioenergy Agro-Industrial Park that will generate solar energy.

Summary of impacts

The different socio-economic impacts associated with the proposed Carpe Diem North Solar project and their respective significance after implementing mitigation measures proposed by the relevant specialists (i.e. the **residual impact**) are summarised below. The **Cumulative** impact refers to the impact of the Preferred Alternative when considered together with other renewable energy projects within 30 km of the proposed site. This includes the proposed 300 MWp Carletonville SPP and 150 MWp Carpe Diem South SPP within 5 km of the Carpe Diem North site.

The significance of the impacts after mitigation can be summarised as follows:

Nature of the Impact	Carpe Diem North	Cumulative
Construction		
Nuisance factors (dust and noise)	Low (-)	Medium (-)
Influx of job seekers	Low (-)	Medium (-)
Construction workers – local communities	Low (-)	Medium (-)
Increase in local crime	Low (-)	Medium (-)
Local economic income and employment	Moderate (+)	Medium-High (+)
Operations		
Provision of renewable energy	Moderate (+)	High (+)
Sense of place	Low (-)	Moderate (-)
Increase in local crime	Low (-)	Low (-)



Nature of the Impact	Carpe Diem North	Cumulative
Surrounding property values	Low (+)	Medium (+)
New employment opportunities	Low (+)	Medium (+)
Direct spending	Moderate (+)	Medium-High (+)

Potential positive impacts

Several benefits are associated with the proposed Carpe Diem North Solar project:

- Once operational, the proposed Solar PV Plant will **produce up to 150 MWp of renewable energy**, which can be delivered to Eskom or the local area. Combined with other renewable energy facilities in the area, it could reduce the local economy's dependence on expensive electricity provided by Eskom.
- **Job creation:** The project could sustain about 8 208 (direct, indirect and induced) employment opportunities during construction, whereafter some of these jobs will start to taper away. This number is based on the estimated project cost during construction (CAPEX), which includes off-site expenditures on goods, services, and other related items. If only on-site employment during construction is considered, 425 to 520 employment opportunities could be sustained throughout the construction period.

Between 59 and 72 job opportunities could be created during operations, represented by 21 to 26 skilled persons and 38 to 46 unskilled employment opportunities. The recruitment process must promote gender equality, with a focus on employing women wherever possible.

- **Contribution towards economic income:** During the construction phase, an estimated R2,1 billion could generate R5,69 billion in new business sales, referred to as the production (or output) that creates demand for business activity over the construction period. The increase in production output could add R1,82 billion (net of the import leakage) to the GGP of Gauteng during the construction period. As a result of the job opportunities created through the proposed interventions, household incomes from job opportunities could increase by R1,55 billion during construction.

Between R714 million and R873 million is likely to accrue as direct operational spending over the first ten years from the commencement of operations. A 35% local content, i.e., payments made for services rendered by suppliers in Gauteng, could reach approximately R250 million after ten years using a lower bound, and R306 million over the same period for an upper bound. If 50% of the anticipated operational cost accrues to local suppliers as defined, R357 million and R436 million in direct operational expenses could accrue in terms of a lower and upper bound, respectively.

Over the 20 years envisaged for the facility's useful life, almost R718 million could accrue to local suppliers based on a lower bound and a 35% local content requirement. Due to the backwards and intersectoral linkages, an additional R614 million could be generated for the Gauteng economy. Based on the higher bound, a 50% take-up of local content suggests a multiplied increase of R2,33 billion in GVA for the Gauteng economy.

- **Real estate values of surrounding land:** Since the Carletonville area has become a hotspot for solar PV plants, there may be a demand for land parcels to be developed, which would increase the perceived property value.

Potential negative impacts

The following potential negative impacts have been identified:

- **Sense of place (operations):** The solar panels and associated infrastructure will impact the sense of place for sensitive receptors within 3 km of the proposed development site. However, the area is home to extensive mining operations that have already changed the sense of place from rural to industrial.
- **Dust and noise (construction):** The impact will be low due to the limited number of receptors near the construction sites.
- **Influx of job seekers (construction):** A significant number of employment opportunities will be created during construction, attracting job seekers from the surrounding communities.



- **Construction workers** may explore the local community for leisure and social activities. This could lead to social ills that can impact local families and their social structures.
- **Increase in crime levels (construction and operations):** On-site activities could attract criminals, but this could be mitigated with effective security measures and access control.

Cumulative impacts

Cumulative impacts refer to other similar developments within 30 km that could compound any positive or negative impacts associated with the proposed development. Potential negative impacts would be compounded, such as a sense of place, influx, traffic, crime, and nuisance factors. The benefits of several renewable energy projects will also be compounded, particularly in terms of skills development in a sector that is still in its infancy in South Africa. Contributing to economic income and local authorities could catalyse further economic development, whilst a compounded demand for goods and supplies could provide new business opportunities. There are several other renewable energy projects within 30 km of the Carpe Diem North site, including the proposed 300 MWp Carletonville SPP and 150 MWp Carpe Diem South SPP within 5 km.

Mitigation measures

Many potential impacts could be mitigated by introducing the measures proposed by various specialists; these must be considered and implemented by the developer. Monitoring and evaluating socio-economic impacts, as well as assessing outcomes, would further inform the social and economic fabric and the impact on surrounding land users. The following mitigation measures related to the **socio-economic context** are proposed and should be consolidated into an Implementation Plan as part of the Construction Environmental Management Plan (CEMP) and/or Operational Environmental Management Plan (OEMP).

Pre-construction (CEMP)
Procurement Strategy that includes the following and applies to the project: (a) Initiate the activity during the first phase of the development; (b) The strategy is the responsibility of the contractor(s) collectively under the guidance of the Municipality; (c) Focus on opportunities for local labour in the surrounding areas and businesses as a priority. Contractors are required to indicate the geographical location of sub-contractors (businesses) and local labour; and (d) Local contractors invited to tender for work in the context of the terms and conditions included in RFP documentation, which would include skills development, on-site training, gender equality, etc.
Pre-construction & Construction (CEMP)
Communication Protocols that address directly and indirectly affected residents and surrounding landowners, with specific reference to activities, timelines and intended impacts related to the construction phase and all related activities associated with the implementation of the project (i.e. during the operational phase).
Objectives • To orientate, generate awareness and gain positive attitudes among stakeholders as far as possible; and • To engage and inform stakeholders of progress regarding all phases of construction. Target audience • Property owners and users of the land portions directly surrounding the proposed activity; and • Other stakeholders and property owners that may be affected.



Major types of messages

- Inform directly affected residents on the periphery of the development site and others that would frequent the area;
- The commencement date for construction activities related to the project;
- Duration and extent of the construction activities and details of individual construction activities;
- Progress updates, including any delays in a construction-related activity; and
- Introduce appropriate signage to warn persons frequenting the area and those residing adjacent to the development area.

Construction phase	
Nuisance factors (dust and noise)	Dust and noise emissions during the construction period should be minimised through a Construction Environmental Management Plan (CEMP). The noise could also be reduced with mufflers and silencers on large trucks, as well as restricting activities to working hours.
Influx of job-seekers, impact on local communities	Contractors need to employ people from the immediate area whenever possible.
Increase in local crime	Co-operation between the Developer and contractors is essential to ensure that the area around the proposed development remains secured during construction. On-site security measures, such as perimeter fencing, controlled access and security guards and patrols will minimise the risk.
Operational phase	
Sense of place	Implementing recommendations made by relevant specialists to mitigate potential negative impacts

Impact statement

The most significant socio-economic **benefit** from the proposed Carpe Diem Solar North SPP is the anticipated production of **150 MWp of renewable energy**, which can be delivered to Eskom or the local area. In terms of **economic benefits**, an estimated R2,1 billion in capital investment could add R1,82 billion (net of the import leakage) to the GGP of the Gauteng economy during construction. Between R714 million to R873 million is likely to accrue as direct operational spending over the first ten years from the commencement of operations. The project could sustain about 8 208 (direct, indirect and induced) employment opportunities during construction and create 59 to 72 new job opportunities during operations. Several potential **minor negative impacts** were identified, mainly related to the sense of place, dust and noise, influx and criminal activities. However, if the site is properly managed and national regulations are followed, along with the mitigation measures recommended by various specialists, the significance of these impacts will be low to moderate.

Our assessment is that the social benefits of the proposed development outweigh the potential costs, but this must be considered in the context of an operation that adheres to local and national operational guidelines.



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List of Acronyms

BESS	Battery Energy Storage System
EIA	Environmental Impact Assessment
GGP	Gross Geographic Product
GVA	Gross Value Added
GW	Gigawatt
IDC	Industrial Development Corporation
IDP	Integrated Development Plan
IPP	Independent Power Producer
LED	Local Economic Development
MW	Megawatt
NERSA	National Energy Regulator of South Africa
PSDF	Provincial Spatial Development Framework
PV	Photovoltaic
REFIT	Renewable energy feed-in tariff
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
SAM	Social Accounting Matrix
SDF	Spatial Development Framework



1 BACKGROUND

1.1 Introduction

JUWI Renewable Energies (Pty) Ltd proposes the development of the Carpe Diem Solar Photovoltaic Plant (SPP), consisting of two plants with a combined output of 300 MWp, on Portion 5 of Farm Varkenslaagte 119 (Carpe Diem North) and Portion 27 of Farm Doornfontein 118 (Carpe Diem South).

The applicant proposes to develop the approximately 290 ha Carpe Diem North property as an independent Solar Photovoltaic Plant (SPP) with an electricity generation capacity of up to 150 MW, developed in two 75 MW sections that share all associated bulk infrastructure, as well as the on-site SPP substation. The proposed site is near Carletonville in the Merapong City Municipality, West Rand District of Gauteng. The site is located outside the promulgated Renewable Energy Development Zones but within an area identified in the Gauteng Province Environmental Management Framework (GPEMF) that excludes certain NEMA requirements within Environmental Management Zones (EMZ).

Dr Jonathan Bloom of Multi-Purpose Business Solutions was commissioned as an independent consultant to prepare a Socio-Economic Impact Assessment for the proposed development. Jonathan Bloom (PhD, Corporate Finance) is the managing member of Multi-Purpose Business Solutions and a professor of real estate at Stellenbosch University until 2013. He has conducted over 100 socio-economic impact and related assessments as an independent consultant for real estate and other developments throughout Southern Africa. Jonathan has research skills in designing and implementing research projects from both qualitative and quantitative perspectives. He majored in statistics and business economics, and his background in statistical modelling of economic aspects related to projects and cost-benefit assessments has been used to assist clients with assessing the socio-economic impacts associated with projects. Refer to **Annexure D** for a declaration confirming Dr Bloom's independence and **Annexure E** for a copy of his *Curriculum vitae*.

1.2 Terms of Reference

The objectives of the Socio-Economic Impact Assessment are as follows:

- A description and understanding of the proposed project, its location, conceptual scale, layout, etc.;
- A socio-demographic and -economic profile of the population (and communities) residing within specified concentric zones from the site proposed for the project and relate the zone profiles to the socio-economic and demographic profile for the areas;
- An assessment of the economic sector development patterns applicable to the Merapong municipal area in which the proposed project is located;
- Assess and comment on the financial viability and feasibility of the project and the fit (compatibility) of the proposed project with spatial planning from an economic perspective; and
- Identify possible social and economic impacts/consequences/implications, as well as costs and benefits associated with the proposed activity during construction and operations, that could affect the net societal welfare of the communities in the area.
- Include socio-economic comments received from interested and affected parties that participate in the EIA process and, where applicable, with representatives of key stakeholder groups;
- Ascertain the overall direct and indirect/induced monetary benefits, i.e. direct GGP (Gross Geographic Product) and job creation potential on the economies of the Merapong Municipality, the West Rand District and South Africa;
- State and discuss potential externalities and impacts from a social perspective; and
- Consider social investment initiatives to support the local community through the project.



The Socio-Economic Impact Assessment will comply with Appendices 2, 3 and 6 of the NEMA EIA Regulations 2014 to inform the Public Participation Process (and responses to any issues). The report and processes will meet the NEMA EIA Regulations (Republic of South Africa, 2014) requirements, applicable best practice guidelines and policies and other relevant statutory requirements.

1.3 Approach & Methodology

Our approach for assessing the socio-economic impacts of the proposed development is presented in **Figure 1**. The illustration demonstrates that evaluating a project's financial feasibility and long-term viability is a crucial starting point, as long-term positive economic impacts can only arise from a financially sustainable or viable project. It must also be compatible with and demonstrate integration into economic and spatial planning for the area, which encompasses both economic and spatial planning. These hurdles are a critical aspect of economic desirability, ensuring that the proposed development complements economic planning as reflected in spatial development planning, local economic development plans and strategies for the area. Given the nature of the proposed activities and the project's significance for direct investment in the Merafong District Municipality, monitoring and evaluation are essential throughout construction and operations. Both the envisaged positive and potential negative impacts need to be monitored through an inclusive and credible process, for which a broad framework is outlined in **Section 7**.

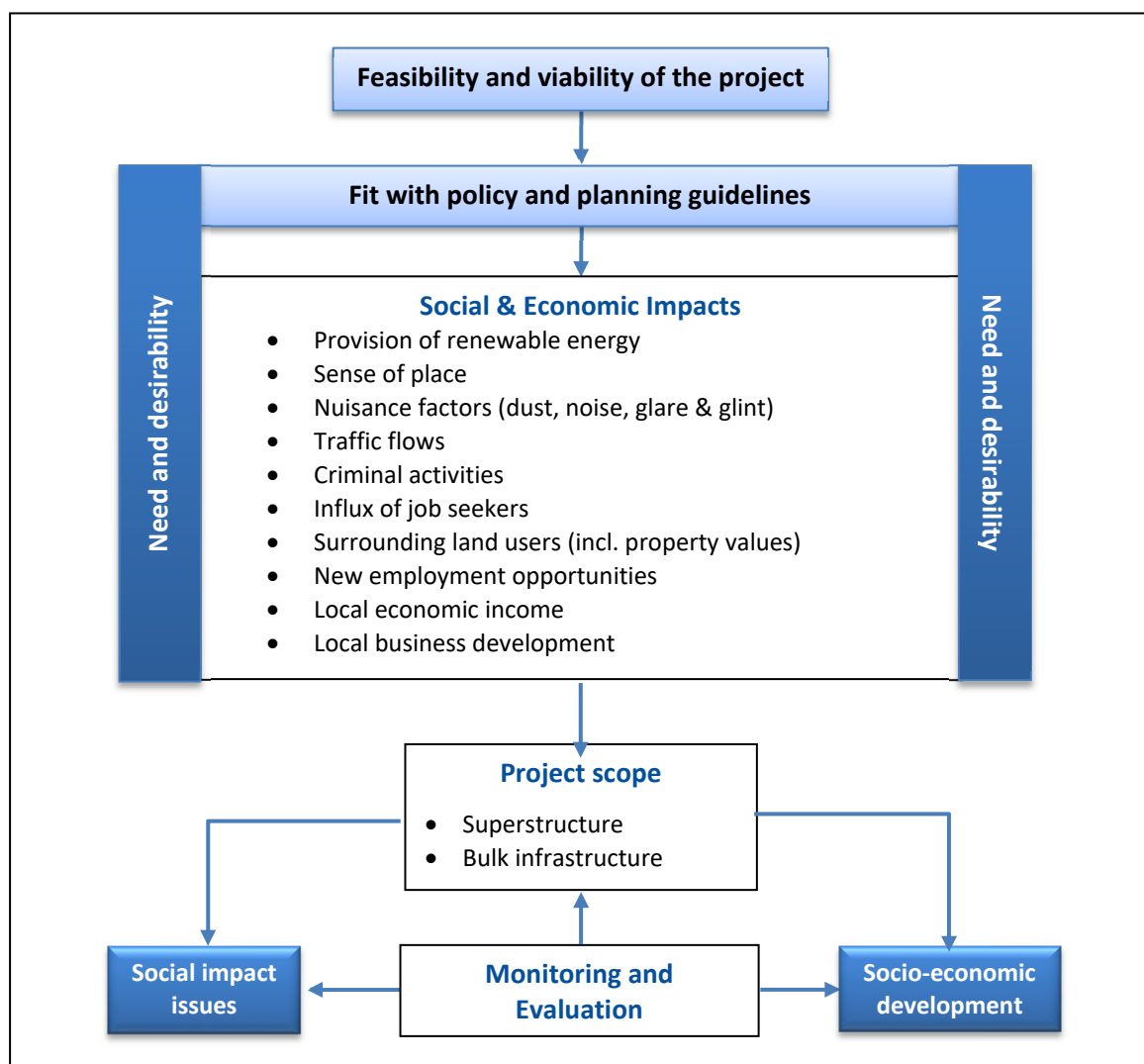


Figure 1: Methodology for specialist socio-economic input for the Environmental Impact Assessment process.
Source: Multi-Purpose Business Solutions



1.3.1 Data gathering and analysis

The analysis of primary inputs typically includes information collected from interviews with key stakeholders and/or representatives of stakeholder groups that are directly or indirectly affected by the proposed development. Secondary sources (including reports and publications) are consulted to inform the independent socio-economic assessment findings and complement the primary research. Our approach to addressing comments from stakeholder groups and Interest and Affected Parties (I&APs) involves incorporating relevant inputs from the environmental process conducted by the Environmental Assessment Practitioner (EAP) and assessing these inputs from a socio-economic perspective. Where applicable, I&APs will be identified for further consultation to obtain additional information for inclusion in the report. These parties may include, but are not limited to, the local authority, landowners, surrounding landowners, local business associations (where applicable), leaders of the community, community organisations, interest groups, etc.

The socio-economic impact assessment study area is defined as concentric zones that include all sub-places (communities) within 5 km and 10 km of the proposed development site. Refer to the socio-demographic and economic analysis in **Section 4** for a detailed description of the communities likely to be affected by the development.

1.3.2 Impact assessment

The proposed project would have both qualitative and quantitative impacts (benefits and costs) on the socio-economic fabric of the area. We will consider the core project's quantitative economic impact, i.e. positive and negative consequences, and analyse the socio-economic impact. Where applicable, a qualitative assessment of benefits and costs from a social perspective will be provided, and the different impacts will be assessed using the impact rating methodology indicated in **Annexure A**; a summary of the assessment outcomes is provided in **Annexure B**.

Per NEMA EIA Regulations (2014, as amended), the potential impacts of the following Alternatives are assessed:

- **Preferred Alternative** – the Carpe Diem North Solar PV Plant (SPP) Facility on Portion 5 of the Farm Varkenslaagte No. 119;
- **No-Go Alternative** - implies that the *status quo* is maintained.

Estimating the economic impact of a project or development can be a constructive process for understanding the potential benefits. However, it should be noted that estimating these benefits is more helpful in understanding the likely order of magnitude related to impacts rather than specific amounts. An economic impact assessment traces spending through an economy and measures the cumulative effects of that spending over time. Defining the area of influence is an important first step in the process. The focus of the economic impact is local, regional or national. The nature of the proposal determines the impact region, which can be the entire country, a province, an individual or a combination of municipalities. An economic impact assessment would thus estimate the economic consequences of the project on the local economy.

An Economic Impact Analysis assesses the direct and indirect contributions of construction spending and operational revenues (spending) to the economy by applying multipliers. Benefit-cost and Economic Impact Analyses are not directly comparable but are complementary in providing a micro-level appraisal and macro-economic assessment of the impact related to the development. Once the direct investment is determined, the indirect/induced impacts are estimated. The multiplier effect is the relationship between one form of economic activity and the total additional activity it generates. An Economic Impact Analysis is thus based on the multiplier concept, which estimates the amount of additional economic activity that will result from an initial investment of R1. It is termed as such because the total impacts are larger than an investment's initial, direct impact during construction or operations. For example, an aggregate economic multiplier of 2,50 would mean that for each Rand spent on operations, R2.50 is generated. Subtracting the original R1.00 of operational spending (direct impact) leaves R1.50 of additional spending on items and services, referred to as the indirect/induced impact.

For this study, a Social Accounting Matrix (SAM) is employed to assess and estimate the indirect and induced impacts of the project on the local and regional economy. A Social Accounting Matrix (SAM) represents the flows



of all economic transactions within an economy (regional or national). The SAM represents the total direct contribution to and indirect impact on the economy in terms of value added to Gross Geographic Product (GGP).

1.3.3 Assumptions

The following assumptions are used to calculate employment and economic income during the construction period:

- The structure and composition of the Gauteng economy will remain unchanged. This is necessary to enable the use of multiplier analyses.
- No significant political and other administrative changes on a national or provincial level.
- An initial construction period of 2 years was used to assess employment during construction.
- The supply of skilled labour will be a limiting factor in the construction process.
- Only total labour demand is considered; no race, gender or skill level is considered; and
- Import leakage¹ of 20% was assumed for the construction phase.

1.3.4 Limitations

Several limitations were identified during the study:

- Although the 2022 Census high-level results have been released, many issues cast doubt on the credibility and validity of the 2022 Census. The large undercount of 30%, way above any acceptable norm, does not provide any confidence in the results, and much criticism has been levelled at the methodology and other matters. Without more recent credible information, we used the outdated 2011 Census to provide some demographic and socio-economic context.
- Given the lack of detailed information on the potential revenue of the proposed development, it is impossible to quantify the potential contribution toward the local economy once all the envisaged components are complete and operating.

¹ Leakage refers to capital or income that exits an economy or system rather than remaining within it.

2 PROJECT DESCRIPTION

2.1 Location, site description and current zoning

JUWI Renewable Energies (Pty) Ltd proposes the development of the Carpe Diem North Solar PV Plant (SPP) Facility on Portion 5 of the Farm Varkenslaagte No. 119 near Carletonville (**Figure 2**). The approximately 290 ha Carpe Diem North property will function as an independent Solar Photovoltaic Plant (SPP) with an electricity generation capacity of up to 150 MW, developed in two 75 MW sections that share all associated bulk infrastructure, as well as the on-site SPP substation. An overhead power line (OPL) from the proposed development sites to the adjacent Eskom Carmel MTS Substation will be installed.

The site, zoned as Agricultural, is excluded from any promulgated Renewable Energy Development Zones. The DFFE Screening Tool Report indicated that the area was identified in the Gauteng Province Environmental Management Framework (GPEMF) for future development, and the 2019-2020 Merafong MSDF earmarked it for residential and agricultural uses. The land cover is mainly natural grassland (379 ha), temporary unplanted (clear-felled) plantation forest (44 ha), open & sparse plantation forest (12 ha) and fallow land and old fields (grass) (17 ha).



Figure 2: The relative location of the proposed Carpe Diem North site and surrounds.

Source: Legacy EMC, 2025

2.2 Project description

JUWI Renewable Energies (Pty) Ltd proposes the Carpe Diem North Solar project on Portion 5 of the Farm Varkenslaagte No. 119, which lies immediately to the north of Eskom's Carmel Main Transmission Substation (MTS). The applicant intends to develop the approximately 290 ha Carpe Diem North property as an independent Solar Photovoltaic Plant (SPP) with an electricity generation capacity of up to 150 MW, developed in two 75 MW sections that share all associated bulk infrastructure, as well as the on-site SPP substation (Figure 3).

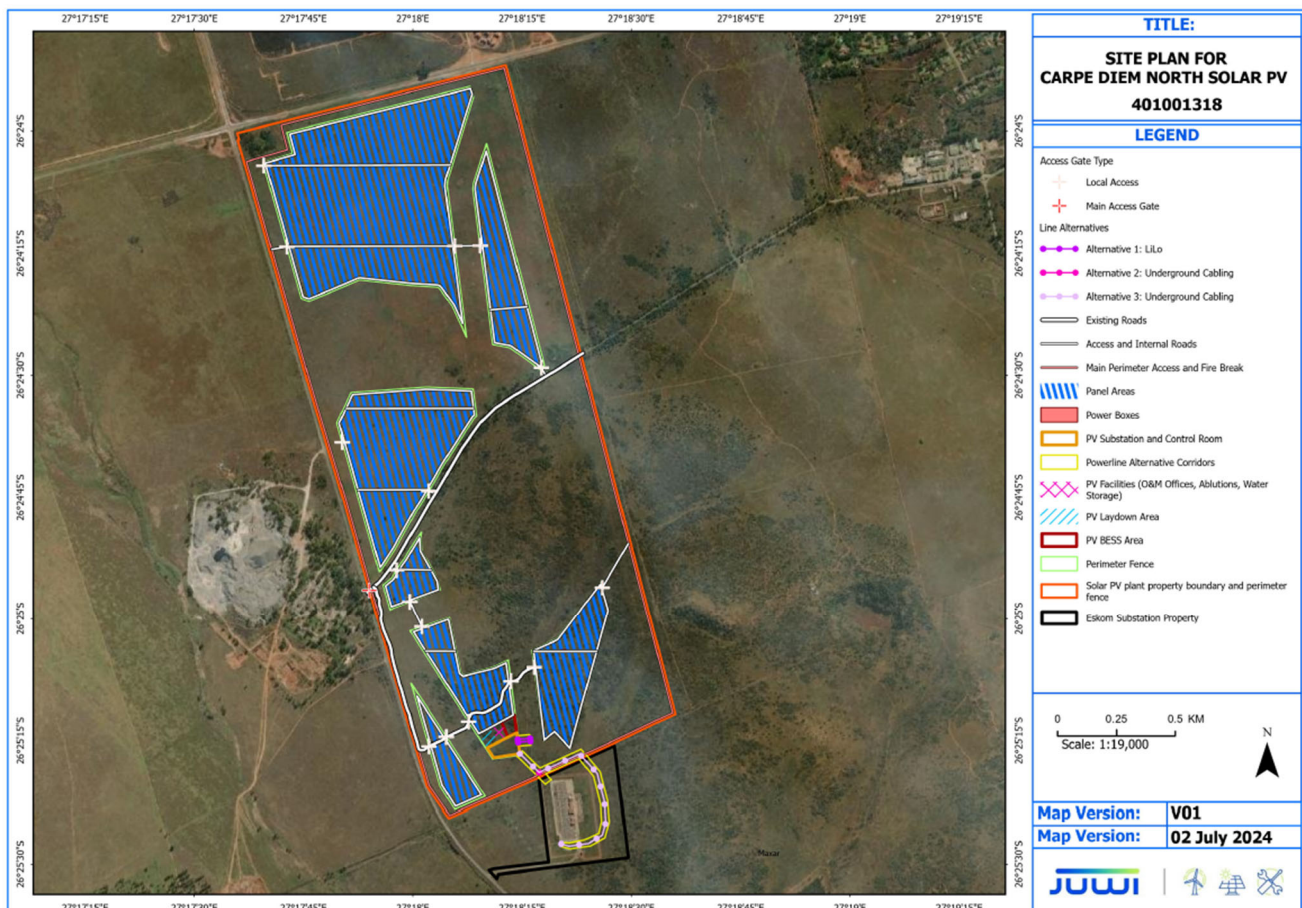


Figure 3: The proposed Site Development Plan for the Carpe Diem North Solar project.

Source: JUWI, dated 2 July 2024

2.2.1 150 MW Carpe Diem North Solar Photovoltaic Plant (SPP)

The on-site SPP substation and part of the grid connection/overhead power line (OPL) corridor footprints form part of the Carpe Diem North SPP footprint. The rest of the OPL corridor footprint falls within Eskom's disturbed Carmel MTS property on Portion 23 of Farm Doornfontein No. 118. The generating component of the SPP contains ground-based photovoltaic (PV) panel arrays mounted on either a single or dual-tracking axis system. This, along with the other associated infrastructure, will be built in a one-off construction process.

The permanent infrastructure development consists of the solar panel array, fencing, 4 m to 8 m wide internal (dirt) access roads, SPP inverters and transformers, an on-site substation including offices, ablutions, storage buildings, a conservancy tank, step-up transformers, water storage facilities, and OPL pylons (leading from the on-site substation to Eskom's Carmel Substation). The Carpe Diem North SPP OPL will most likely be less than 200 m long, but this will be confirmed after finalising grid connections negotiations with Eskom. The on-site substation will comprise collector and switching station portions.



The temporary/construction infrastructure includes lay-down areas, construction site offices, storage buildings, a batching plant, and a stockpile area. Construction ablutions would be provided using regularly serviced portable toilets, and tanker trucks would supply water. Water supply will be sourced from neighbouring farmers or trucked in. Sewage will be treated via an on-site sewage package plant and a conservancy tank. Waste will be temporarily stored on-site and removed to the nearest appropriately registered waste disposal site via contracted service providers. Electricity will be sourced from the SPP itself.

The intended Carpe Diem North application consists of three main portions:

- i. The 150 MW Carpe Diem North SPP panel array with inverter-transformer stations;
- ii. The on-site Carpe Diem North substation, divided into two functional portion:
 - a. the Independent Power Producer (IPP) 'collector substation' portion, where evacuated electricity from the SPP facility will be collected, and
 - b. the 'switching station' substation portion where the evacuated electricity will be stepped up/transformed from 33 kV to 132 kV before it is fed into the Carmel Substation;
- iii. The overhead (most likely 132 kV) power lines strung on steel monopoles will conduct electricity towards the connection point with the national grid at Eskom's adjacent Carmel Substation. The bulk of the permanent grid connection infrastructure, which connects the project to the national grid via Eskom's Carmel Substation, will be handed over to Eskom once it is built. The future Eskom infrastructure is portions ii(b) and iii, as listed above.

2.2.2 Alternatives

A single preferred location alternative will be assessed, identified by optimising the area considering the sensitivities identified in the O&C mapping. Activity alternatives, such as solar PV, wind and CSP, were evaluated, with solar PV considered the best option for the site. No alternative layout is available. As per NEMA EIA Regulations (2014, as amended), the potential impacts of the preferred Alternative are assessed and compared with the No-Go Alternative using the impact rating methodology described in **Annexure A**:

- **Preferred Alternative 1:** Development of the Carpe Diem North Solar PV Plant (SPP) Facility on Portion 5 of the Farm Varkenslaagte No. 119; and
- **No-Go Alternative**, i.e. the *status quo* is maintained.

2.3 Surrounding land users

The surrounding land use related to the Carpe Diem SPP is predominantly agricultural, mining, and residential. A few surrounding land users are briefly described below; their relative locations are indicated in **Figure 4**.



Carletonville is the seat of the Merafong City Local Municipality in the West Rand District Municipality in Gauteng, just north of the richest gold-mining area in the world. Several privately owned gold-mining township villages and contractor labour quarters are established on mining grounds owned by the various mining houses in the area. The villages are located to the South of the R501 provincial road, forming the southern boundary of Carletonville. While the mining companies have changed hands or amalgamated and changed names, the mine villages situated south are known as Blyvooruitzicht, (the oldest) Western Deep and Elandsrand. To the west and south-west are Doornfontein and Deelkraal; to the east is East Village at East Driefontein. The Town of Carletonville is the major shopping centre for the mine village townships (<https://en.wikipedia.org/wiki/Carletonville>).



Figure 4: Proposed site location for the Carpe Diem SPP (yellow polygons) relative to surrounding landusers.

Source: Legacy EMC, 2025

Khutsong is a township in the northwestern part of Carletonville and the scene of widespread unrest in 2006. In 2017/2018, thousands of mine workers lost their jobs due to mines shutting down. With a history of violence and gangsterism, high poverty rates, municipality mismanagement and corruption, and the lack of employment/job-creating opportunities caused crime rates to spike from 2011 until late 2019. (<https://en.wikipedia.org/wiki/Khutsong>). Several extensions have been added to the original township, with one under development on the northern border of Farm Varkenslaagte 119/5, with only the R501 separating it.

Blyvoor Gold Mine is located directly east of Farm Doornkraal 118/27. Blyvoor Gold bought the mine in 2015 after it stood idle for several years. Since the purchase, significant investment has included a new processing plant, new mining equipment, surface and underground infrastructure refurbishment or replacement, and the opening of two additional production levels, with the development of two further levels in progress. Following Eskom's first phase approval, Carletonville's Blyvoor Gold Mine will generate up to 40 MW to meet 40% of its energy needs, Blyvoor director Richard Floyd noted in a release to Mining Weekly (31 January 2023). Blyvoor Gold has partnered with Decentral, a midtier IPP that owns, operates and maintains a portfolio of solar assets in the commercial and industrial sectors. Phase 1 of the project will deliver cost savings to Blyvoor while reducing the mine's reliance on Eskom. There are also longer-term plans to scale the generating capacity to feed clean energy to neighbouring communities and other mining houses, Decentral executive director Christian Bode stated in the release" (https://www.miningweekly.com/article/blyvoor-gold-secures-approval-for-solar-energy-project-2023-01-31/rep_id:3650).





Western Deep, also known as the TauTona Mine or Western Deep No. 3 Shaft, was home to the world's second-deepest mining operation (3.9 km), but was closed in 2018. The mine was one of the West Wits Gold field's three Western Deep Levels mines outside Carletonville. TauTona neighbours the Mponeng and Savuka mines, and they share processing abilities. AngloGold Ashanti owned all three until Savuka was closed in 2017, TauTona in 2018, and Mponeng was purchased by Harmony Gold in 2020. The Anglo American Corporation built the mine, and its 2 km deep main shaft was sunk in 1957, with operations that started in 1962. It was one of the most efficient mines in South Africa and remained in continuous operation even when gold prices were low. The mine had some 800 km of tunnels and employed around 5 600 miners. By 2008, the mine went 3.9 km underground, making it the world's deepest mine (at that time) (https://en.wikipedia.org/wiki/TauTona_Mine).

Blyvooruitzicht Gold Mine is a gold mine and gold-mining village about 5 km south of central Carletonville. On 3 August 1964, a sinkhole in the Westdene mining village buried an entire family alive, and the township was abandoned. (<https://en.wikipedia.org/wiki/Blyvooruitzicht>). At the height of its operations, Blyvooruitzicht was one of the most lucrative gold mines in the country. However, large-scale mining ceased when the mine declared insolvency in August 2013. All the services provided to about 6 000 residents stopped, leaving the residents without basic services and unable to pay for services. Small-scale, illegal mining of the remaining gold picked up as people had to find a way to make a living (<https://mg.co.za/news/2020-02-14-blyvooruitzicht-a-glimmer-of-hope-between-the-sewage-rats-and-fear/>). In 2019, it was announced that Blyvoor Gold will resume gold production at the Number 5 shaft, with a new treatment plant and modern mining techniques to target higher-grade gold, the company intends to halve the production costs (<https://www.engineeringnews.co.za/article/blyvoor-to-begin-producing-gold-again-from-q4-skeat-2019-06-27>).



Kusasaletu (formerly Elandsdraal, an amalgamation of Elandsrand and Deelkraal mines) is a mature, deep-level gold mine with twin vertical and twin sub-vertical shaft systems. Conventional mining methods are used in a sequential grid layout with mining depths reaching 3 388 m below the surface where the Ventersdorp Contact Reef is the primary orebody exploited. It currently employs about 4 000 workers, and the ore mined is treated at the Mponeng plant (<https://www.harmony.co.za/operations/south-africa/underground/kusasaletu/>)



2.4 Other renewable energy projects in the area

Seventeen renewable energy applications within 30 km of the proposed Carletonville SPP site have been approved; some are part of larger projects (**Table 1, Figure 5**). Projects in the planning phase include the proposed 150 MWp Carpe Diem South SPP and 300 MWp Carletonville SSP within 5 km of the site.



Table 1: Other renewable energy projects within 30 km of the proposed SPP

	Project title	Technology	MWp
1.	The Proposed Turffontein Solar 1 Photovoltaic Solar Energy Facility and Grid Connection Infrastructure near Carletonville Gauteng and North West Provinces	Solar	240
2.	The Proposed Carmel Solar 1 Photovoltaic Solar Energy Facility and Grid Connection Infrastructure near Carletonville Gauteng Province	Solar	240
3.	The Proposed Carmel Solar 2 Photovoltaic Solar Energy Facility and Grid Connection Infrastructure near Carletonville Gauteng Province	Solar	240
4.	The Proposed Carmel Solar 3 Photovoltaic Solar Energy Facility and Grid Connection Infrastructure Near Carletonville Gauteng and North West Provinces	Solar	150
5.	The Proposed Varkenslaagte Solar Photovoltaic Solar Energy Facility and Grid Connection Infrastructure Near Carletonville Gauteng Province	Solar	240
6.	The proposed Renewable Energy Generation Project (Mopane Solar PV 2) on Portion 12 of the Farm Blaauwbank 125 IQ, Merafong City Local Municipality, West Rand District Municipality, Gauteng Province	Solar	130
7.	The proposed Renewable Energy Generation Project (Mopane Solar PV 3) on Portion 2 of the Farm Blaauwbank 125 IQ, Merafong City Local Municipality, West Rand District Municipality, Gauteng Province.	Solar	130
8.	The proposed Renewable Energy Generation Project (Mopane Solar PV 4) on Portion 2 of the Farm Rooidraai 85 IQ, JB Marks Local Municipality, Dr Kenneth Kaunda District Municipality, North West Province	Solar	120
9.	The Proposed Rooidraai Solar Photovoltaic Solar Energy Facility and Grid Connection Infrastructure near Carletonville, North West Province	Solar	150
10.	The Proposed Seelo Alpha 240 MW Solar Photovoltaic (PV) & Battery Energy Storage Systems (BESS) Project near the town of Carletonville, North West Province	Solar	240
11.	The Proposed Seelo Beta 240 MW Solar Photovoltaic (PV) & Battery Energy Storage Systems (BESS) Project near the town of Carletonville, North West Province	Solar	240
12.	The Proposed Seelo Charlie 140MW Solar Photovoltaic (PV) & Battery Energy Storage Systems (BESS) Project near the town of Carletonville, North West Province	Solar	140
13.	The proposed Bonsmara Solar Power Plant near Carletonville, Gauteng Province	Solar	250
14.	The proposed Angus Solar Power Plant near Carletonville, Gauteng Province	Solar	250
15.	The proposed Tuli Solar Power Plant near Carletonville, Gauteng Province	Solar	250
16.	The proposed Simbra Solar Power Plant near Carletonville, Gauteng Province	Solar	250
17.	Proposed construction of the 200 MW Photovoltaic Energy Facility for Sibanye Gold Limited on Portion 1, 2, 4, 5 and 6 of the Farm Uitval 280 within the Westonaria Local Municipality in the Gauteng Province	Solar	200
18.	The proposed Phadima Solar PV Facility, near Fochville, Gauteng	Solar	240
19.	The Proposed Sagittarius Solar Power Plant near Potchefstroom, North West Province	Solar	250
20.	The Proposed Scorpio Solar Power Plant near Potchefstroom, North West Province	Solar	250
21.	The Proposed Taurus Solar Power Plant near Potchefstroom, North West Province	Solar	300
22.	300 MW Carletonville SSP on Farm 105 Twyfelvlakte, Merafong City	Solar	300
23.	150 MW Carpe Diem South SSP on Portion 27 of Farm Doornfontein 118, Merafong City	Solar	150

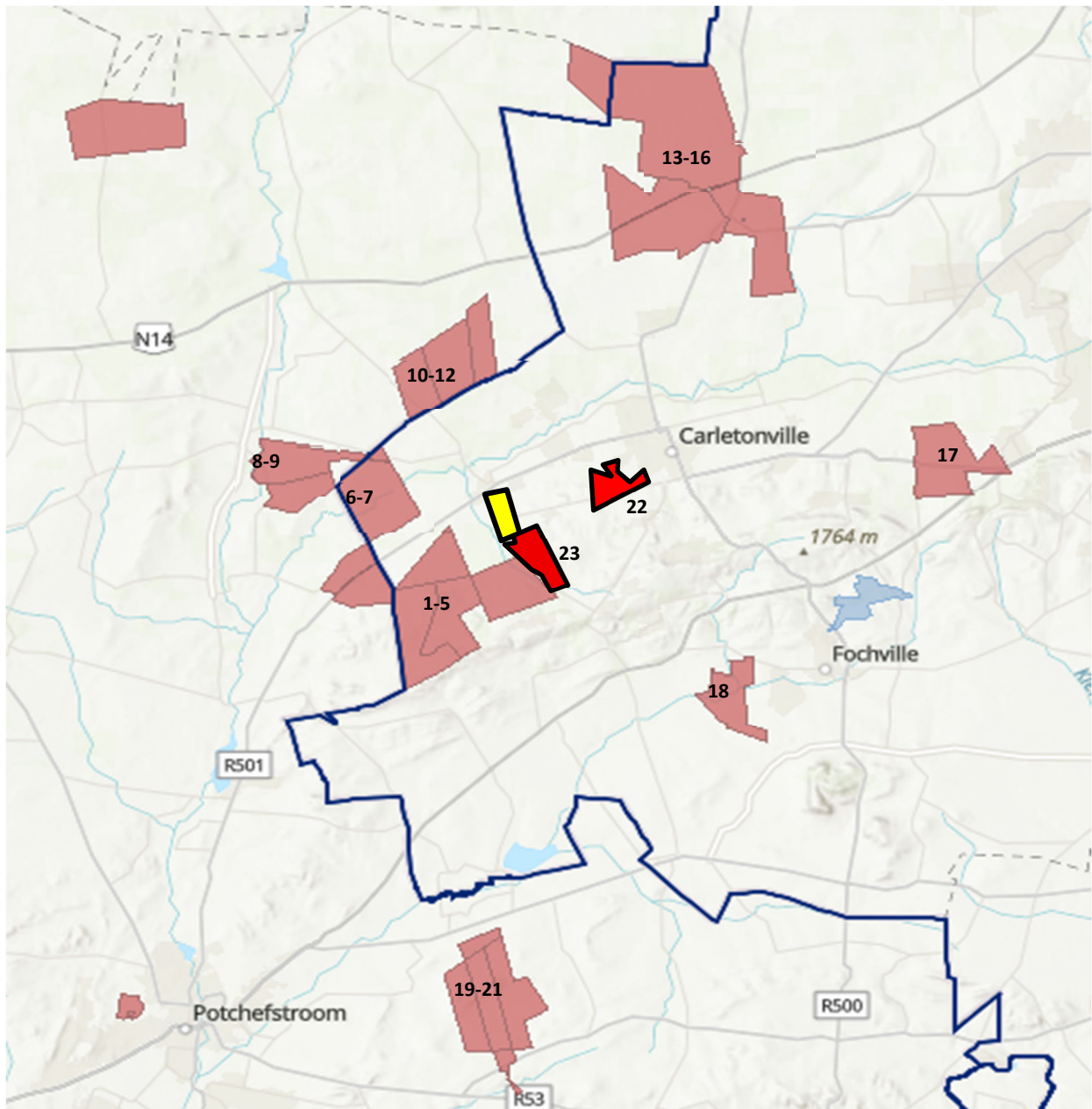


Figure 5: Approved (pink) or proposed (red) renewable projects within 30 km of the proposed Carpe Diem North SPP (yellow polygon).

Source: https://egis.environment.gov.za/data_egis/data_download/current (2024_Q3)

3 OVERVIEW OF THE MERAFONG MUNICIPAL AND WEST RAND DISTRICT ECONOMIES

3.1 Overview

The Merafong Municipal economy contributed approximately 24,54% to the economy of the West Rand District in 2021. In terms of absolute numbers, the Merafong economy generated R68 741 million in Gross Value Added (GVA) at constant prices³, relative to R280 084 million recorded for the West Rand District. The GVA contribution of the Merafong economy to the West Rand District increased from 20,84% in 2005 to 24,54% in 2021. The Merafong economy grew off a solid base by 9,68% per annum from 2005 to 2021.

Figure 6 indicates the contributions of the different sectors to the GVA of the Merafong economy for 2005 and 2021. The largest sector of the Merafong economy in 2021 was Mining and Quarrying, followed by Manufacturing and Finance, Insurance, Real Estate and Business Services. These three sectors contributed almost 69,57% of the total GVA generated by the Merafong economy in 2021, a slight increase from 68,91% in 2005. The Manufacturing sector's contribution decreased from 18,19% in 2005 to 17,25% in 2021, whereas Finance, Insurance, Real Estate and Business Services increased its contribution to GVA from 9,61% in 2005 to 12,44% in 2021.

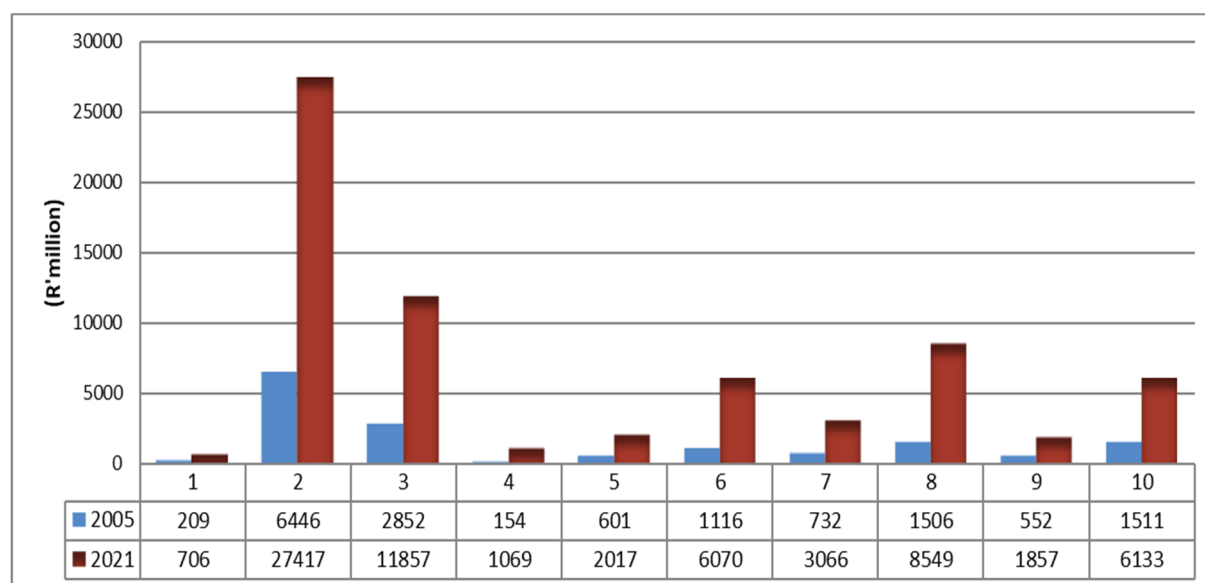


Figure 6: An illustration of the GVA contribution per sector for the Merafong economy in 2005 and 2021

Legend:

- | | |
|--|---|
| 1 Agriculture, hunting, forestry and fishing | 6 Wholesale and retail |
| 2 Mining and quarrying | 7 Transport, storage and communication |
| 3 Manufacturing | 8 Finance, insurance, real estate and business services |
| 4 Electricity, gas and water supply | 9 Community, social and personal services |
| 5 Construction | 10 Government Services |

Source: Adapted from data provided by Quantec Enterprises, 2022

³ GVA and Gross Geographic Product (GGP) or Gross Regional Product (GRP) are very similarly related concepts. GVA excludes taxation and subsidies, whereas GDP includes the items. GVA is analysed using current prices

To understand whether sectors are contracting or growing, it is helpful to consider the overall and annual growth rates for the West Rand District relative to the Merafong economy. **Figure 7** indicates these economies' annual compounded growth rates per economic sector from 2005 to 2021.

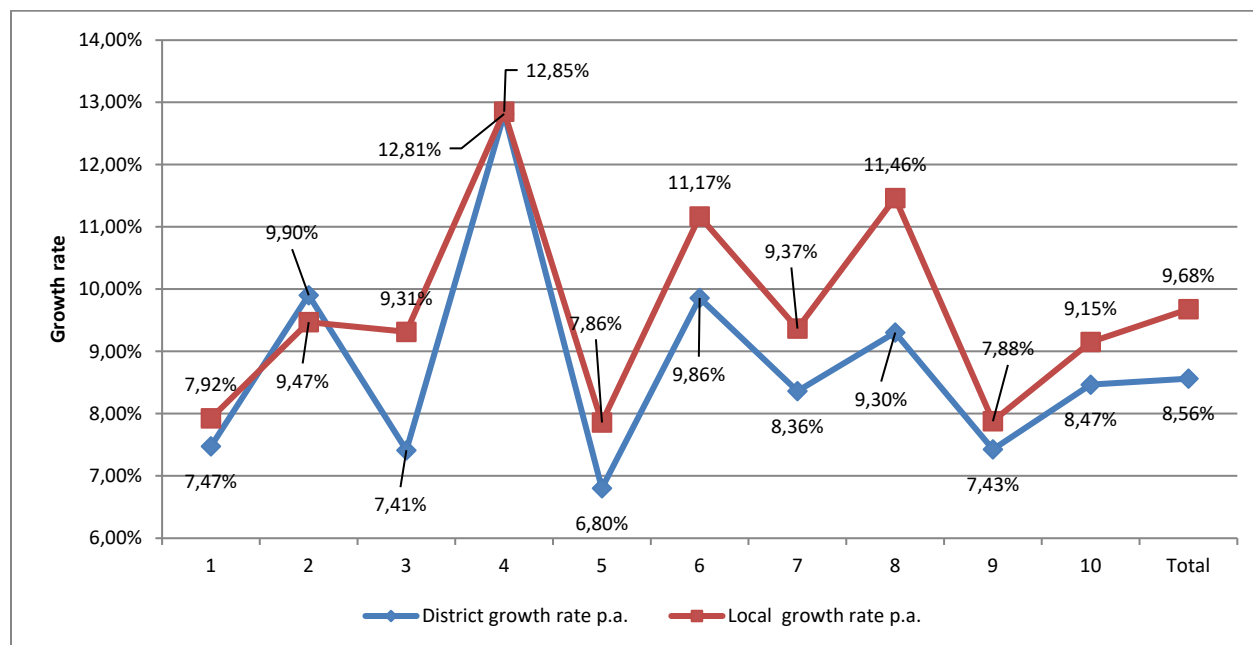


Figure 7: An illustration of the annual nominal growth rates per economic sector for Merafong Municipality and the West Rand District from 2005 to 2021

Legend:

- | | |
|--|---|
| 1 Agriculture, hunting, forestry and fishing | 6 Wholesale and retail |
| 2 Mining and quarrying | 7 Transport, storage and communication |
| 3 Manufacturing | 8 Finance, insurance, real estate and business services |
| 4 Electricity, gas and water supply | 9 Community, social and personal services |
| 5 Construction | 10 Government Services |

Source: Adapted from data provided by Quantec Enterprises, 2022 and own calculations

The West Rand and Merafong economies grew in nominal terms by 8,56% and 9,68% per annum, respectively, from 2005 to 2021 (refer to “Total” in **Figure 7**). The Finance, Insurance, Real Estate and Business Services, Community, Social and Personal Services and Government Services sectors in the Merafong economy achieved a higher growth rate than the District from 2005 to 2021.

The Electricity, Gas and Water Supply, Finance, Insurance, Real Estate and Business Services and Wholesale and Retail sectors demonstrated the highest annual growth rates for the Merafong Municipality from 2005 to 2021, although the Electricity, Gas and Water Supply sector grew off a very low base. In contrast, the Manufacturing sector grew by 9,31% per annum between 2005 and 2021, while its contribution to GVA declined by 5,74% from 2005 to 2021. Mining and Quarrying also indicated a positive growth of 9,83% from 2005 to 2021, but its contribution to GVA decreased by almost 3%.

3.2 Sector analysis of GVA contributions

Figure 8 indicates the contribution of each economic sector to the GVA of the Merafong and the West Rand District economies for 2005 and 2021. An assessment of the larger sectors in the Merafong economy suggests that the contribution of the Wholesale and Retail, Finance, Insurance, Real Estate and Business Services sectors increased their contribution to the economy, while the contribution of the Manufacturing and Mining and Quarrying sectors



decreased slightly over the period. Finance, Insurance, Real Estate and Business Services sector increased its contribution to GVA of the Merafong economy by 29,47% over the period. The manufacturing sector's contribution declined from 18,195% in 2005 to 17,25% in 2021. A similar pattern is found in the District economy from 2005 to 2021. The contribution of the sectors to GVA in the Merafong area and the West Rand District remained more or less in the same proportions whether the sector contribution increased or declined, except for mining and quarrying, whose contribution to the district increased, but slightly declined for the local municipality.

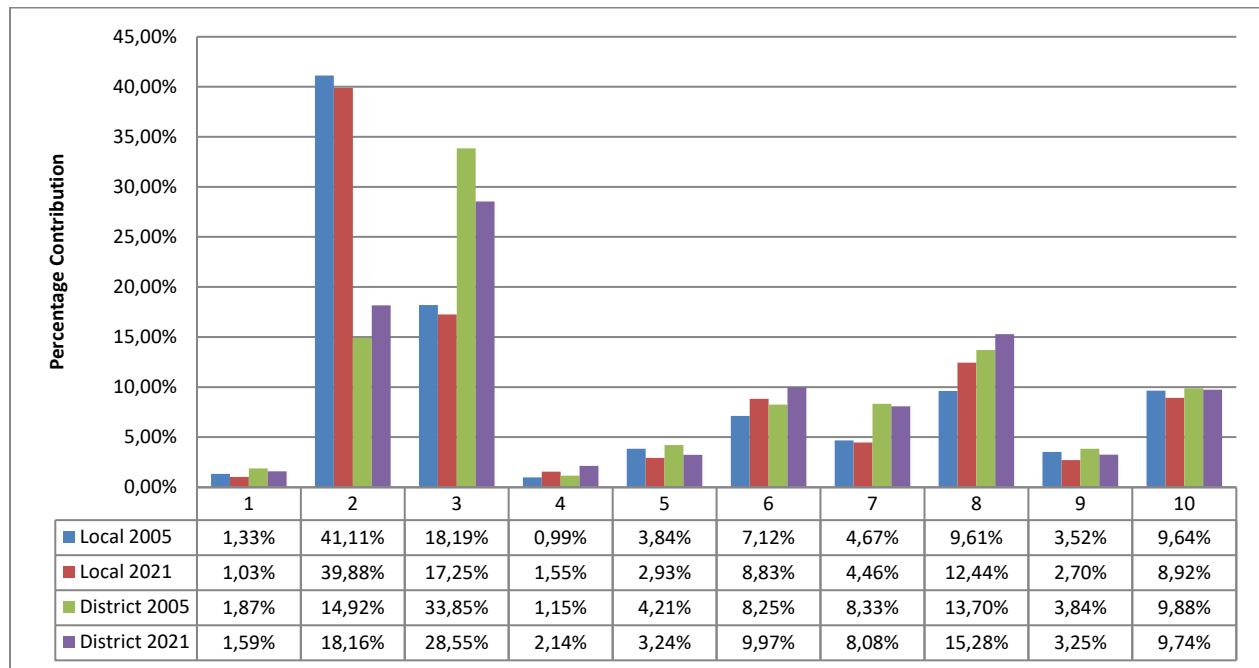


Figure 8: Sector contributions to GVA for the Merafong and West Rand District municipal areas in 2005 and 2021

Legend:

- | | |
|--|---|
| 1 Agriculture, hunting, forestry and fishing | 6 Wholesale and retail |
| 2 Mining and quarrying | 7 Transport, storage and communication |
| 3 Manufacturing | 8 Finance, insurance, real estate and business services |
| 4 Electricity, gas and water supply | 9 Community, social and personal services |
| 5 Construction | 10 Government Services |

Source: Adapted from data provided by Quantec Enterprises, 2022

A synopsis of the data presented in **Figure 8** suggests that three sectors increased their contribution to GVA for the Merafong economy, while seven sectors indicated declining contributions. The trend emerging across the District is similar, where four sectors increased their contribution to the District GVA. The concern with this trend is the reduction in employment levels within the more labour-intensive sectors of the economy. A greater focus on sectors with a service orientation has emerged over the 16 years of the analysis, which are invariably low employment creators compared to manufacturing.

The assessment of GVA sector contributions for the Merafong Municipality and the annual and period growth rates for 2005 and 2021 are indicated in **Table 2**. Among the 10 classified sectors, all sectors showed a yearly increase in economic activity, thus demonstrating growth. However, the growth rate is measured off a very low base for some sectors. The declining trend in the contribution of the Manufacturing sector to GVA is concerning due to the labour-intensive nature of the industries that generally form part of this sector. The analysis also demonstrates that the Manufacturing sector is declining in favour of increases in Finance, Insurance, Real Estate and Business Services and Wholesale and Retail Trade, which alludes to a greater focus on service orientation.



Table 2: An assessment of sector contributions to GVA and annual growth rates in 2005 and 2021 for the Merafong economy

Economic sector (R'million)	Gross Value Added				Growth for Period	Annual growth	Direction of growth
	2005	% of total	2021	% of total			
Agriculture, hunting, forestry and fishing	209	1,33%	706	1,03%	238,77%	7,92%	↑
Mining and Quarrying	6 446	41,11%	27 417	39,88%	325,30%	9,47%	↑
Manufacturing	2 852	18,19%	11 857	17,25%	315,74%	9,31%	↑
Electricity, gas and water supply	154	0,99%	1 069	1,55%	591,86%	12,85%	↑
Construction	601	3,84%	2 017	2,93%	235,47%	7,86%	↑
Wholesale and retail	1 116	7,12%	6 070	8,83%	444,07%	11,17%	↑
Transport, storage and communication	732	4,67%	3 066	4,46%	318,90%	9,37%	↑
Finance, insurance, real estate and business services	1 506	9,61%	8 549	12,44%	467,61%	11,46%	↑
General government	552	3,52%	1 857	2,70%	236,52%	7,88%	↑
Community, social and personal services	1 511	9,64%	6 133	8,92%	305,92%	9,15%	↑
Total	15 679	100,00%	68 741	100,00%	338,42%	9,68%	↑

Source: Adapted from data provided by Quantec Enterprises (2022) and own calculations

The **primary sector** of the economy includes Agriculture, Hunting, Forestry and Fishing activity and Mining and Quarrying. The primary sector contributed 40,91% to the GVA of the Merafong economy in 2021, which is slightly down from 42,44% in 2005. Mining and quarrying is the largest contributor to the GVA of the primary sector, with a sector contribution of 96,87% in 2005, which increased to 97,49% in 2021.

The **secondary sector** of the economy includes Manufacturing, Construction and Electricity, Gas and Water Supply. The secondary sector contributed 23,01% to the GVA of the Merafong economy in 2005, while its contribution to GVA decreased to 21,74% in 2021. The Manufacturing sector's contribution to the secondary sector GVA remained constant over the period at 79%.

The **tertiary sector** of the economy includes Trade, Repairs and Hospitality, Financial Institutions, Real Estate and Business Services; Community, Social and Personal Services; and Government Services. The tertiary sector contributed 34,55% to the GVA of the Merafong economy in 2005, which increased to 37,35% in 2021.

Government services are included in the analysis as part of the tertiary sector. The analysis suggests that the contribution of Government Services to the GVA of the tertiary sector of the Merafong economy decreased from 10,19% in 2005 to 7,23% in 2021.

3.3 General employment trends

A comparison of total employment in the Merafong and West Rand District Municipalities indicates that Merafong contributed 25,25% of the total employment of the West Rand District in 2021, and 1,83% to the total employment in the Gauteng Province. The primary, secondary and tertiary sectors of the Merafong economy contributed 24,86%, 13,65% and 61,49% to total employment in the local economy in 2021, respectively. In contrast, the West Rand District enjoyed total employment contributions of 13,49%, 18,40% and 68,11% from the primary, secondary and tertiary sectors, respectively.

Overall employment in the Merafong economy remained constant from 2001 to 2021. The strong growth in the secondary and tertiary sectors was offset by a large decline in employment in the primary sector of the local economy. Strong employment growth was recorded in the tertiary sector, with an increase of 79,35% from 2001 to 2021, or an annual compounded growth of 2,96%. The West Rand District experienced similar trends, with a decline of 53,97% recorded for the primary sector and increases of 40,22% and 48,85% for the secondary and tertiary sectors, respectively.

In terms of employment growth by sector in the Merafong area and specified periods pre-2008, 2008 - 2011 and post-2011, it is clear that the secondary and tertiary sector grew marginally with 4,14% from 2008 to 2011 (**Figure 9**). The primary sector of the economy shed jobs with a decline of 15,93% from 2008 to 2011. Post-2011, the secondary and tertiary sectors started growing, increasing employment by 18,04% and 14,99% from 2012 to 2021,

respectively, while the primary sector continued to shed jobs, which is more apparent in the mining and quarrying sectors.

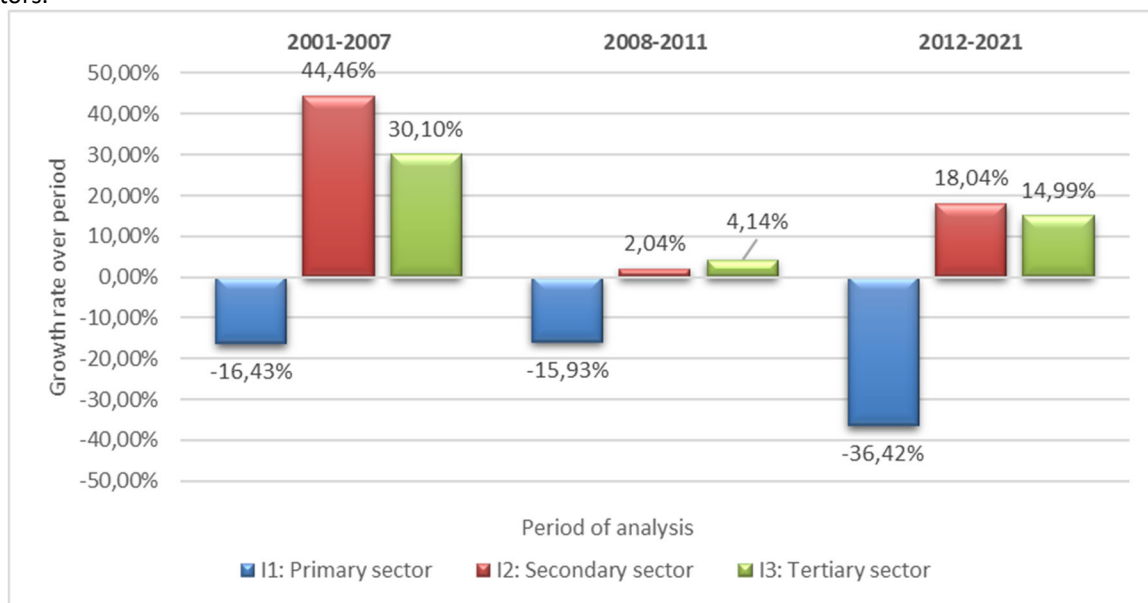


Figure 9: Employment growth in the Merafong Municipality for three specified periods (pre-recession, recession and post-recession) from 2001 to 2021.

Source: Quantec Enterprises, 2022 and own calculations

4 SOCIO-ECONOMIC AND DEMOGRAPHIC PROFILE OF THE POPULATION IN THE STUDY AREA

4.1 Aligning the study area and available statistics

The approach for the preparation of the socio-economic and demographic profile of communities surrounding the site proposed for the development of the Carpe Diem North project entailed the specification of concentric circles representing areas within 5 km and 10 km from the centre point of the site designated for the project (**Figure 10**). This approach was used due to the need to ascertain the relative proximity of communities to the development site to understand the geographical impact of the location on residents in the study area. The choice of 5 km and 10 km radii is based on our observations of population distribution, economic activities and likely procurement sources in the areas surrounding the proposed development. We believe this approach will offer a more realistic socio-demographic and economic profile of the population most likely affected by the proposed development.

The choice of 5 km and 10 km radii is based on our observations of population distribution, economic activities, and likely procurement sources in the areas surrounding the proposed Carpe Diem North project. We believe this approach will offer a more realistic socio-demographic and economic profile of the population most likely to be affected by the SPP's development and operations. To include the larger population of the study area, the assessment covers the 32 sub-places (SP) within 10 km of the site. These include seven sub-places within 5 km of the site, with Doornfontein being the closest. Where applicable, the analysis considers several socio-demographic characteristics of the population as determined by Statistics South Africa. The statistics for the different zones are based on the identified sub-places as defined by Statistics South Africa in the 2011 Population Census Survey. Considering these limitations, the socio-economic and demographic profile thus focuses on the population residing in the specified zones.

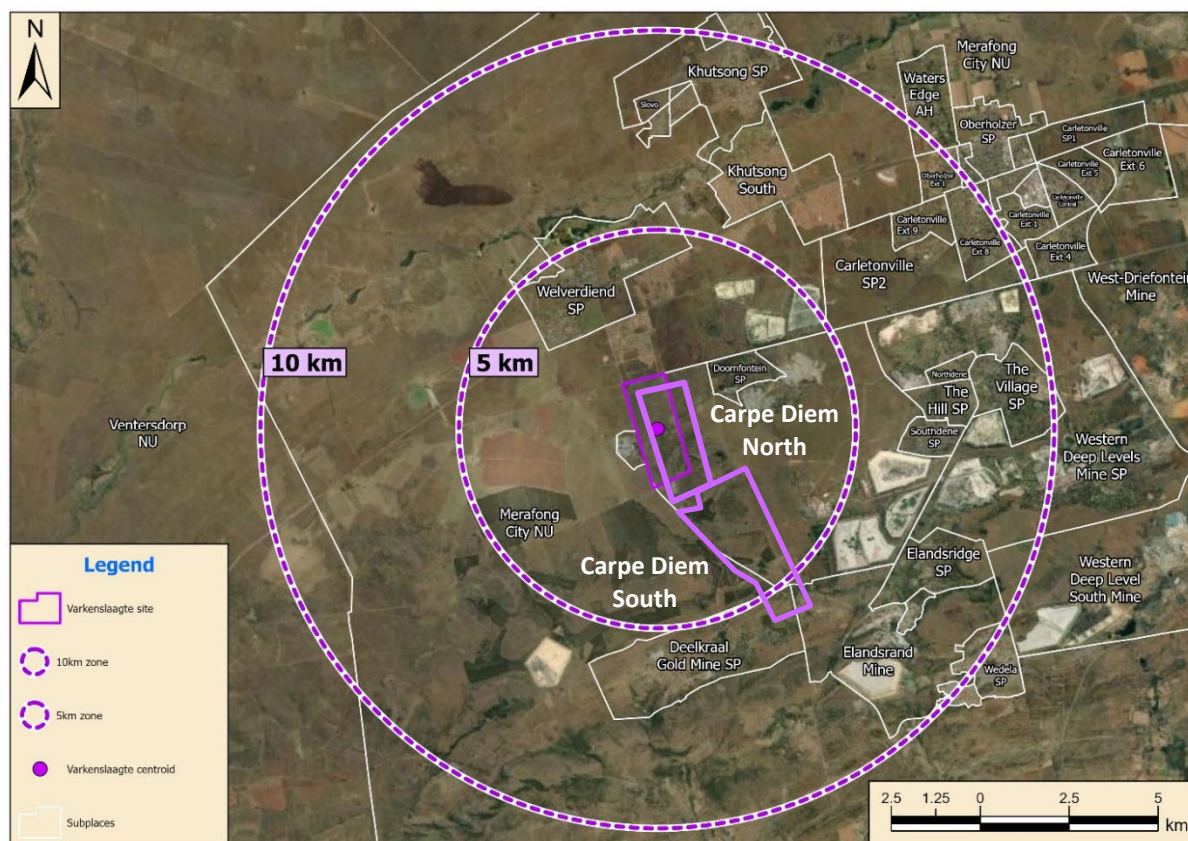


Figure 10: Different concentric zones as applied in the municipal area relative to the proposed Carpe Diem North Solar project

Source: Prepared from GIS data (Statistics South Africa, 2023)



The selected sub-places fall to a greater or lesser extent within the specified radii of 5 km and 10 km, i.e. only a fraction of some large non-urban areas applicable for the analysis. A “clip” is performed using GIS to accurately measure what portion of the sub-places falls within the specified radii. The “clip” applies to sub-places in the 5- and 10 km zones. Below are the clips applicable to the 5 km zone.

766002002 Merafong City NU	3,48%
766004015 Carletonville SP2	0,08%
766010001 Welverdiend AH	37,40%
766010002 Welverdiend SP	77,08%
766018001 Doornfontein SP	100,00%
766018002 Doornfontein Mine	69,80%
766022001 Deelkraal Gold Mine SP	1,95%

The clips of the subplaces applicable to the 10 km zone are indicated below:

675002001 Ventersdorp NU	0,19%	766010001 Welverdiend AH	100,00%
766002002 Merafong City NU	14,04%	766010002 Welverdiend SP	100,00%
766003001 Mandela	9,50%	766014001 Northdene	100,00%
766003002 Khutsong SP	86,36%	766014002 The Hill SP	100,00%
766003003 Sonderwater	40,14%	766015001 The Village SP	95,68%
766003004 Hani	100,00%	766016001 Western Deep Levels Mine SP	49,92%
766003005 Khutsong Ext 3	100,00%	766017001 Southdene SP	100,00%
766003006 Slovo	100,00%	766018001 Doornfontein SP	100,00%
766003007 Khutsong Ext 2	100,00%	766018002 Doornfontein Mine	100,00%
766003008 Khutsong South	100,00%	766019001 Elandsridge SP	100,00%
766004003 Waters Edge AH	11,34%	766020001 Western Deep Level South Mine	5,38%
766004013 Carletonville Ext 8	85,83%	766021001 Elandsrand SP	100,00%
766004014 Carletonville Ext 9	100,00%	766021002 Elandsrand Mine	99,46%
766004015 Carletonville SP2	96,51%	766022001 Deelkraal Gold Mine SP	100,00%
766005002 Pretoriusrus	12,47%	766023001 Wedela SP	32,60%
766005003 Oberholzer Ext 1	88,46%	766023002 Wedela Ext 3	36,55%

4.2 Socio-demographic profile of the study area population

The following socio-demographic profile of the study area is based on data from the 2011 National Population Census Survey (Statistics South Africa, 2013). A summarised socio-demographic profile is presented in **Table 3** for the 2011 census year. Since the population residing within the 5 km zone is very small, the discussion will focus on the 10 km zone with reference to the population within 5 km where applicable.

An analysis based on the specified concentric zones suggests that 3,65% of the population residing in the area (i.e. within 10 km of the proposed site) live within 5 km of the proposed site. An assessment based on the population groups suggests that 50,45% of the population that reside within 5 km of the site are Black African, and 48,09% are White. Within the 10 km zone, 90,67% of the total population are Black African, and 8,45% are White residents.



Table 3: A socio-demographic profile of the study area based on the 2011 Census Survey

Merafong					
		Within 5 km		Within 10 km	
Population:	Black African	1 600	50,45%	78 805	90,67%
	Coloured	29	0,92%	400	0,46%
	Asian	9	0,29%	166	0,19%
	White	1 525	48,09%	7 348	8,45%
	Other	9	0,27%	203	0,23%
	Total	3 171	100,00%	86 917	100,00%
Gender:	Male	1 928	60,80%	45 494	52,34%
	Female	1 243	39,21%	41 422	47,66%
	Total	3 171	100,00%	86 917	100,00%
Age classification:	0 - 14	513	16,17%	22 414	25,79%
	15 - 24	427	13,46%	15 938	18,34%
	25 - 34	489	15,43%	16 740	19,26%
	35 - 44	594	18,74%	12 808	14,74%
	45 - 54	604	19,04%	11 041	12,70%
	55 - 64	337	10,61%	5 128	5,90%
	65 - 120	208	6,55%	2 848	3,28%
	Total	3 171	100,00%	86 917	100,00%

Note: Also refer to Section 1.3.4 with specific reference to the concern related to data validity

Source: Adapted from Statistics South Africa (2013)

4.2.1 Analysis of the study area population

The population of the Merafong Municipal area was 170 897 in 2011 (Statistics South Africa, 2013). **Table 4** indicates the population distribution of residents within 10 km of the site relative to the Municipal population for 2011. The findings suggest that 1,61% and 44,00% of the Merafong population live within 5 km and 10 km of the proposed SPP, respectively. An analysis of the breakdown per population group indicates that Black African and White residents living within 10 km of the site represent 46,11% and 33,55% of the total Merafong, respectively.

Table 4: Breakdown of the population groups as a percentage of the Merafong population in 2011

	Black African	Coloured	Asian	White	Other	Total
Within 5 km	1 600	29	9	1 525	9	3 171
Within 10 km	78 805	400	166	7 348	203	86 917
Merafong Local Municipality	170 897	2 130	564	23 291	639	197 520
Percentage within 5 km	0,94%	1,37%	1,65%	6,55%	1,35%	1,61%
Percentage within 10 km	46,11%	18,80%	29,42%	31,55%	31,73%	44,00%

Source: Statistics South Africa (2013) and own calculations

A discussion of key socio-demographic profile characteristics (population, education and age levels) is provided in the following sections, based on data from the 2011 South African Census (Statistics South Africa, 2013).



4.2.2 Analysis of education levels

An analysis of education levels in the study area for 2011 is provided in **Table 5**. The results indicate that 3,30% of persons living within 5 km of the site had no schooling (including those under school age), whereas 5,91% of the population within 10 km had no schooling in 2011. The assessment further suggests that 90,11% of persons living within 10 km of the site received Grade 1 to Grade 12 schooling, whereas 3,98% obtained Matric with a higher diploma or degree qualification.

Table 5: An analysis of education levels for the population per specified zone in 2011

Education category	Within 5 km	Within 10 km
No schooling	76	4 498
Some primary	383	19 261
Completed primary	87	5 070
Some secondary	883	29 320
Grade 12/Std 10	644	14 950
Higher	226	3 031
Total	2 300	76 129

Notes: N/A are excluded together with unspecified

Source: Statistics South Africa (2013)

4.2.3 Analysis of age levels

An analysis of the age levels among the population within 5 km and 10 km is intended to indicate the population that could be considered economically active, i.e. persons between the ages of 15 and 65. The analysis provides a broad indication of age categories for 2011. **Figure 11** indicates that 16,17% of the population within 5 km of the development site is below 15 years of age, and 25,79 % of all persons under 15 years of age within 10 km of the site.

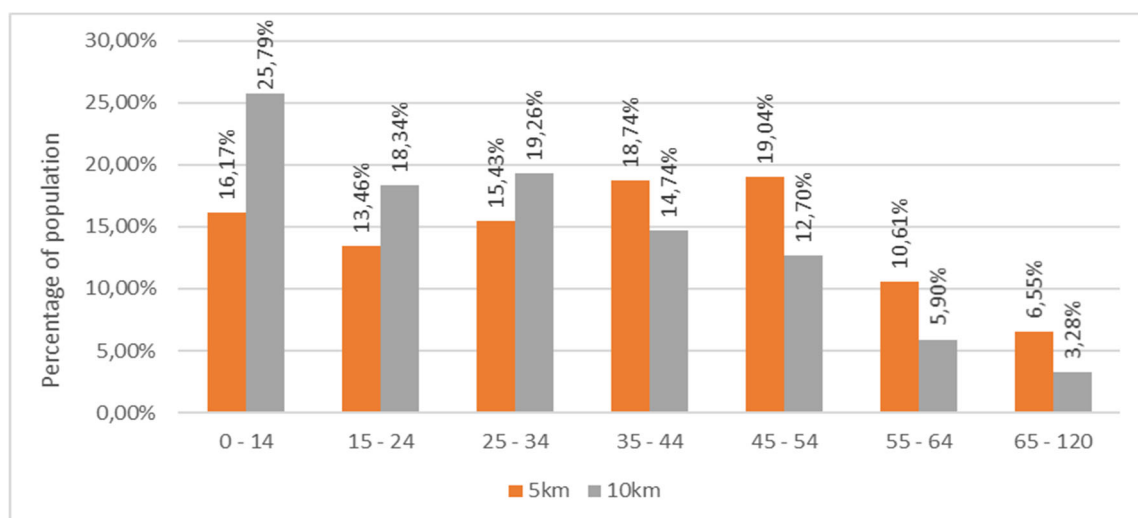


Figure 11: An assessment of percentage contributions to age levels per identified zone for 2011

Source: Compiled from data provided by Statistics South Africa (2013)

Our analysis also suggests that 72,28% of the population within 5 km of the site are in the working-age category (15 to 65 years of age), while the working group within 10 km of the site represents 70,93% of the total population. The assessment indicates that every 2.94 persons who would generally be considered economically active (i.e. between 15 and 65 years of age) could support another person who is not economically active within 5 km of the site. The



latter is slightly lower than the dependency ratio of 4,10 for the population residing within 10 km of the site. A more detailed assessment in **Table 6** suggests that the White and Black African population groups younger than 15 years represent 18,11% and 26,54% of the respective population groups living within 10 km of the site. The dependency ratios suggest that among the Black African population within 10 km of the site, every 2,07 potentially economically active persons could support another person younger than 15 and older than 65. The dependency ratio for the White population group was 2,62.

Table 6: An assessment of age levels among residents in the different zones in 2011 by population group

Age category	0 – 14	15 - 24	25 - 34	35 - 44	45 - 54	55 - 64	65 - 120	Total
Within 5 km								
Black African	247	183	284	367	360	133	26	1 599
Coloured	6	4	6	5	5	1	1	27
Indian or Asian	3	1	1	1	1	0	2	9
White	251	238	196	218	238	203	179	1 523
Other	4	0	2	2	0	0	0	9
Total	511	426	488	593	603	337	208	3168
Within 10 km								
Black African	20 911	14 724	15 563	11 523	9 749	4 209	2123	78 803
Coloured	109	70	67	67	50	13	13	389
Indian or Asian	32	39	41	25	16	5	8	166
White	1 329	1 069	1 006	1 135	1 209	894	698	7 340
Other	29	34	64	54	16	3	6	205
Total	22 409	15 937	16 740	12 804	11 039	5 125	2848	86 902

Note: A category referring to other is excluded

Source: Statistics South Africa (2013)

4.2.4 Analysis of household income levels

Table 7 provides the household income ranges defined by the specified 5 km and 10 km radii from the centre of the proposed development.

Table 7: Distribution of annual household income for each specified zone in 2011

Income category	Within 5 km		Within 10 km	
No income	64	8,14%	4 567	15,22%
R1 - R4 800	8	0,97%	1 644	5,48%
R4 801 - R 9 600	21	2,72%	2 253	7,51%
R9 601 - R 19 200	68	8,71%	3 753	12,51%
R19 201 – R 38 400	110	14,11%	4 751	15,83%
R38 401 – R 76 800	117	15,04%	7 535	25,11%
R76 801 – R153 600	167	21,45%	2 920	9,73%
R153 601 - R307 200	152	19,42%	1 650	5,50%
R307 201 - R614 400	62	7,94%	687	2,29%
R614 401 - R1 228 800	9	1,12%	168	0,56%
R1 228 801 - R2 457 600	2	0,23%	44	0,15%
R2 457 601 and more	1	0,16%	32	0,11%
Grand Total	781	100,00%	30 003	100,00%



Source: Adapted from Statistics South Africa (2013)

Note that not all the respondents disclosed their income. For those that disclosed their income, 8,14% of the households residing within 5 km of the proposed development had no income, and 41,49% earned less than R76 801 per annum (excluding households with no income). Within 10 km of the site, 15,22% of the households did not have an income, 41,33% had an annual income of less than R76 801, whereas 0,56% declared an income of more than R614 400 per annum.

4.2.5 Employment and skills level analysis

A perspective of employment for the different zones is provided in **Table 8** with specific reference to the number of employed, unemployed and not-economically active persons per population group. The analysis indicates that 31,89% of the total population residing within 5 km of the site is employed, while 40,03% within 10 km are employed. The employed proportion of the Black African and White residential groups are 43,25% and 51,49% of the total population group within 10 km, respectively. An assessment of the dependency ratios for the zones is based on the premise that a factor of people is unemployed or economically inactive for each employed person. The findings suggest a dependency ratio of 0,47 and 0,79 for the total population within 5 km and 10 km, respectively. This implies that every employed resident has to support more than one unemployed or economically inactive person. The ratio for the White and Black African population groups within 10 km of the site is 1,06 and 0,76, respectively.

Table 8: An assessment of employment by population group for 2011 based on specified radii from the site

Category of employment	Black African	Coloured	Indian/ Asian	White	Other	Total
Merafong: Within 5 km						
Employed	316	13	1	449	2	781
Unemployed	74	2	0	73	2	150
Not economically active	937	5	3	572	0	1 518
Total	1 327	20	4	1 094	4	2 449
Dependency ratio per population group	0,31	1,86	0,33	0,70	1,00	0,47
Merafong: Within 10 km						
Employed	24 122	108	57	2 735	119	27 141
Unemployed	12 226	54	11	321	8	12 621
Not economically active	19 420	108	56	2 256	43	21 884
Total	55 767	270	124	5 312	171	61 645
Dependency ratio per population group	0,76	0,67	0,85	1,06	2,29	0,79

Note: Not applicable excluded

Also refer to Section 1.3.4 with specific reference to the concern related to data validity

Source: Statistics South Africa (2013)

4.2.6 Formal and informal sector employment

A further assessment of employment levels is provided by the economic sector and by population group for the population residing within 5 km and 10 km from the proposed site. The findings presented in **Table 9** indicate the percentage employed per population group for the specified zones. The findings applicable to the zone within 5 km of the site suggest that the formal sector employs 76,99% of the economically active population, followed by private households with 16,42%. Our assessment also indicates that 81,30% of the people within 10 km of the site are employed in the formal sector, whereas 9,39% and 9,31% within 10 km are employed in the informal sector and private households, respectively.



Table 9: Classification of employment per economic sector, industry and population group in 2011 for 5 km and 10 km from the site proposed for the development

Sector	Within 5 km	Percentage	Within 10 km	Percentage
Formal sector employment				
Black African	224	30,15%	19 439	72,06%
Coloured	9	1,21%	82	0,30%
Indian or Asian	1	0,13%	46	0,17%
White	336	45,22%	2 302	8,53%
Other	2	0,27%	63	0,23%
Informal sector employment				
Black African	22	2,96%	2 338	8,67%
Coloured	1	0,13%	9	0,04%
Indian or Asian	0	0,00%	8	0,03%
White	26	3,50%	155	0,58%
Other	0	0,00%	24	0,09%
Private households				
Black African	63	8,48%	2 228	8,26%
Coloured	3	0,40%	12	0,04%
Indian or Asian	0	0,00%	6	0,02%
White	56	7,54%	233	0,86%
Other	0	0,00%	34	0,12%
Total	743	100,00%	26 978	100,00%

Note: Excluded from the figures above are categories for Do not know, Unspecified, Not applicable

Source: Adapted from Statistics South Africa (2013)



5 FEASIBILITY OF THE PROJECT AND FIT WITH SPATIAL PLANNING

5.1 Need and desirability

The Department of Environmental Affairs (2014) issued a Guideline on Need and Desirability, accompanied by a list of questions that should be addressed when considering the need and desirability of a proposed development. The strategic context of such applications, broader societal needs, and public interest should be considered when formulating project proposals and evaluating project-specific applications. The concept of “need and desirability” relates to, amongst others, the nature, scale and location of the proposed development and the wise use of land. Essentially, “need” primarily refers to time and “desirability” to place (i.e., is this the right time and the right place for the type of land use/activity being proposed?). The “need and desirability” requires the consideration of the strategic context of the development proposal, along with the broader societal needs and the public interest.

Financial viability should be considered within the context of justifiable economic development, measured against the broader societal needs in both the short term and the long term. While the financial viability considerations of the private developer might indicate if a development is “do-able”, the “need and desirability” will be determined by considering the broader community’s needs and interests as reflected in an IDP, SDF and EMF for the area. Although job creation and economic growth are important, the specific needs of the broader community should be considered in conjunction with the opportunity costs and distributional consequences to determine whether the development will be socially, economically, and environmentally sustainable.

Growing concerns such as climate change and the ongoing exploitation of non-renewable resources have prompted international pressure on countries to increase their share of renewable energy generation. The **2030 Agenda for Sustainable Development Goals** (SDGs, United Nations, 2015) is a universal set of goals, targets and indicators that the United Nations member states are expected to use to frame their agendas and political policies over the next 15 years. This transformative action plan is based on the 17 Sustainable Development Goals, addressing urgent global challenges. The following SDGs are relevant to the proposed SPP:

- Goal 7 – Ensure access to affordable, reliable, sustainable and modern energy for all.
- Goal 8 – Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.
- Goal 9 – Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.
- Goal 13 – Take urgent action to combat climate change and its impacts by regulating emissions and promoting developments in renewable energy.

Over the past few years, South Africa has been adversely affected by disruptions in the electricity supply. Creating a ‘decentralised’ power generation facility will secure a supplementary energy source for the area, especially during the winter season when power consumption is higher. Electricity generated from alternative sources (such as solar, wind, hydroelectric, biomass, biogas, landfill gas, and geothermal) could displace some fossil fuel-based forms of electricity generation and thus contribute to climate change mitigation.

In 2010, the Department of Energy, the Treasury and the Development Bank of Southern Africa collaborated to set up the Independent Power Producer (IPP) office and the Renewable Energy Independent Power Producers Procurement Programme (REIPPPP) to bring renewable energy to the National grid, with construction times for projects averaging less than two years. The REIPPPP is a tender process consisting of “rounds” where the lowest tariff and most competitive economic development score is awarded a 20-year contract with Eskom as the off-taker. At the heart of the programme is the provision that Eskom enters into agreements with IPPs to ensure investors can accurately forecast their profits and bankability. The REIPPPP projects of the first seven bid windows (BW1, BW2, BW3, BW3.5, BW4, 1S21 and 2S21) were distributed across all nine provinces of South Africa. By nature, the distribution of IPPs depends on the location where renewable energy resources offer the most potential for any particular technology (Independent Power Producer Office, 2020). The geographic spread of various IPPs varies throughout the country according to resource potential. The Eastern Cape offers some of the best wind conditions in the world for onshore wind-to-electricity generation, whereas the Northern Cape has the best conditions for solar



electricity generation. Most renewable power plants are located in the rural areas of the Northern, Eastern and Western Cape.

In 2020, the Gas IPP Procurement Programme ("Gas IPPPP") was gazetted to procure 3 000 MW of new generation capacity from gas-fired power generation facilities. The first round of the Bid Window 1 was announced in January 2024 to procure 2 000 MW in land-based electricity generation facilities using natural gas (<https://www.greenbuildingafrica.co.za/takeaways-from-dmre-gas-power-ipp-procurement-programme-bid-window-1/>). Some of the requirements for a 20-year PPA include 49% South African entity participation, with plant capacity ranges of 300 – 1000 MW, operating at a 40% - 65% load commitment, with Eskom to dispatch the facility in line with an agreed monthly load commitment. Submissions are due in August 2024; successful bidders will have six months to reach a financial close and 36 months to construct the facility.

5.2 Financial feasibility

5.2.1 Landowner's perspective

A Solar Photovoltaic Plant is typically constructed in a rural area on farmland that could otherwise be used for agricultural production (i.e. crops or grazing for livestock). A relatively large portion of land is required to erect the PV panels, which are placed in a pattern that maximises their exposure to the sun. The landowner(s) agree with the developer on leasing the property for a specified period that covers the useful economic life of the SPP (20-25 years). The sustainable benefit to the landowner(s) is a percentage of the revenue from selling megawatts (MW) to Eskom. Conversely, the costs incurred would relate to a limited loss of land that could have been used for agricultural production. It is also necessary to consider the impact of the decommissioning phase and the rehabilitation of the land that housed the SPP.

5.2.2 Developer's perspective

The feasibility of a Solar Plant is assessed based on tariffs that the electricity authority is prepared to pay for the electricity provided by IPPs. Profits obtained from supplying an agreed number of MW to the grid will determine the potential returns that may accrue to the IPP, which will be offset against the costs of operating the SPP. A need thus exists to determine the following:

- Capital investment required to acquire and install the PV panels;
- Direct costs associated with the infrastructure to install the PV panels and erect the substation/control room (e.g. grid connection and control system); and
- Indirect costs, e.g. road upgrades, transport of components, lease payable to the landowner, etc.

The large capital outlay for an SPP requires debt financing to make the project feasible. The pre-establishment of the Carpe Diem SPP would incur other costs, including the environmental assessment, legal fees for the agreement between the developer and the landowner(s), and the cost of capital. These costs are considered sunk costs if a project does not proceed, but would be capitalised as part of other capital costs should the project proceed.

The key value drivers to be considered in an assessment of the feasibility of the Solar Plant are as follows:

- Tariff at which electricity is sold to Eskom;
- Envisaged number of MW that the SPP could generate;
- The direct, indirect and pre-establishment costs incurred to construct the SPP;
- Required return on investment for the investors;
- Period of the lease, which covers the construction and operation of the SPP; and
- Ability to secure debt financing to ensure an appropriate capital structure.



5.3 Compatibility with spatial planning from an economic perspective

The direct benefits of a project overstate the actual benefits if the project diminishes benefits elsewhere in the area. Thus, economic desirability is essential in determining whether the proposed project complements economic planning, as reflected in spatial development planning. It is not sufficient that the project results in some positive spin-offs if it is not compatible with planning guidance designed to maximise the *overall* economic potential of an area. For example, energy policy and supply are also a matter of socio-energy system design. Therefore, the IPPPP should also contribute to the broader national development objectives of job creation, social upliftment and the broadening of economic ownership (Independent Power Producer Office, 2020a).

Spatial Development Frameworks (SDFs) and Structure Plans are central to economic development planning, guiding overall development in a direction that local and provincial authorities deem desirable. Notwithstanding, the primary purpose of an SDF is to outline the spatial implications of Integrated Development Plans (IDPs). To provide some context for the establishment of renewable energy facilities, National and Provincial strategy, actions and planning documents related to renewable energy, District and Local documents that relate to IDP, SDF and Local Economic Development (LED) frameworks and renewable strategies, serve as a premise for further assessment.

5.3.1 National Context

The Department of Mineral Resources and Energy's (DMRE) Independent Power Producers Procurement Programme (IPPPP) was established in 2010 to enhance South Africa's electrical power generation capacity (Independent Power Producer Office, 2020a). The Integrated Resource Plan for electricity (IRP) provides a long-term plan for electricity generation to ensure the security of electricity supply, minimise the cost of that supply, limit water usage, and reduce greenhouse gas (GHG) emissions, while allowing for policy adjustments in support of broader socio-economic development imperatives. The IRP 2019 called for 37 696 MW of new and committed capacity to be added between 2019 and 2030 from a diverse mix of energy sources and technologies as ageing coal plants are decommissioned and the country transitions to a larger share of renewable energy. By 2030, the electricity generation mix is set to comprise 33 364 MW (42.6%) coal, 17 742 MW (22.7%) wind, 8 288 MW (10.6%) solar photovoltaic (PV), 6 830 MW (8.7%) gas or diesel, 5 000 MW (6.4%) energy storage, 4 600 MW (5.9%) hydro, 1 860 MW (2.4%) nuclear and 600 MW (0.8%) concentrating solar power (CSP). Furthermore, a short-term gap of at least 2 000 MW was forecasted for 2019 to 2022, while distributed or embedded generation for own use is positioned to add 4 000 MW between 2023 and 2030.

5.3.1.1 National Development Plan 2030

The National Development Plan (NDP, National Planning Commission, 2012a) sets out six interlinked priorities (p. 29):

- Uniting all South Africans around a common programme to achieve prosperity and equity;
- Promoting active citizenry to strengthen development, democracy and accountability;
- Bringing about faster economic growth, higher investment and greater labour absorption;
- Focusing on key capabilities of people and the state;
- Building a capable and developmental state; and
- Encouraging strong leadership throughout society to work together to solve problems.

The NDP proposes to enhance human capital, productive capacity, and infrastructure to raise exports, increase resources for investment, and reduce reliance on capital inflows. Higher investment, supported by improved public infrastructure and skilled labour, will enable the economy to grow faster and more productively. Rising employment and productivity will improve incomes and living standards, and reduce inequality. Shifting the economy towards more investment and lower consumption is thus necessary for long-term economic prosperity (p. 42). Additionally, more efficient and competitive infrastructure is needed to facilitate economic activity that fosters growth and job creation.



Thirteen objectives were identified, with “Environmental Sustainability and Resilience – an equitable transition to a low-carbon economy” relevant to the proposed SPP. In particular, Action 33 states, “Carbon price, building standards, vehicle emission standards and municipal regulations to achieve scale in stimulating renewable energy, waste recycling and retrofitting buildings. This is particularly important given that waste and carbon-equivalent emissions per capita are climbing faster yearly in an ecosystem with finite limits” (p. 90). A global drive for compliance with environmental standards will have cost implications, but it will drive innovation, reduce waste, improve energy efficiency and promote new investment (p. 111).

While achieving the objectives of the National Development Plan requires progress on a broad front, one of the fundamental factors is raising employment through faster economic growth. A sustainable increase in employment will require a faster-growing economy and the removal of structural impediments, such as poor-quality education or spatial settlement patterns that exclude most residents. These are essential to achieving higher rates of investment and competitiveness, as well as expanding production and exports, but they require businesses, labour, communities, and the government to work together (p. 27).

The National Infrastructure Plan aims to transform the economic landscape, creating new employment opportunities and enhancing basic service delivery (National Planning Commission, 2012b). The Presidential Infrastructure Coordinating Committee developed eighteen Strategic Integrated Projects (SIPs). These projects cover social and economic infrastructure across all nine provinces (with an emphasis on lagging regions). The SIPs include catalytic projects that can fast-track development and growth. The SIPs related to energy include:

- Green energy in support of the SA economy
- Electricity generation to support social development
- Electricity transmission and distribution for all

5.3.1.2 National Infrastructure Plan 2050

The National Planning Commission (2022) gazetted a draft National Infrastructure Plan (NIP 2050) to update the 2030 Plan. It states that the energy mix in 2050 will be bolder in terms of sustainability and achieve the lowest cost. The reliance on coal will be reduced in favour of renewable energy, especially solar and wind. The goals are to ensure financial and environmental sustainability and that South African exports have lower levels of embedded carbon and, hence less susceptible to planned border carbon taxes in our major trade partners. By 2050, energy demand is projected to double, which would require expanding the installed generation capacity from 53 GW in 2018 to 133 - 174 GW by 2050. The following is required to add 25 GW to installed capacity by 2030:

- The approach to defining the energy mix will become technically strong. Expanded capacity in the face of accelerated technological change and a changing energy mix requires institutional planning and delivery mechanisms to become more adaptive, responsive, and dynamic.
- The market structure will facilitate a more responsive and sustainable supply. This will require stabilising and separating Eskom, introducing greater private participation, and decentralising the electricity supply.
- State capacity will be strengthened to regulate and oversee energy delivery effectively.
- Electricity will be delivered in a financially sustainable way.
- The transition away from fossil fuels will progress in a measurable, just and sustainable manner. New installed capacity will consist primarily of wind, solar and nuclear, where South Africa has a competitive and comparative advantage.
- Industrial diversification will be promoted through energy infrastructure delivery.
- A centralised database will be maintained, with the requisite confidentiality protection, for reporting existing and expected generation capacity investments by market players to enable informed power system planning and investments for all stakeholders.
- By 2030, the SAFARI-1 research reactor will be replaced with a multi-purpose reactor (MPR), sustaining the research infrastructure for using nuclear technology.
- Effective management of waste emanating from energy generation to support environmental sustainability.



5.3.1.3 Industrial Policy Action Plan 2018/2019 - 2020/2021

The Industrial Policy Action Plan (IPAP, Department of Trade and Industry, 2018) stated that the significant electricity price increases in South Africa led to substantial downward adjustments in consumer demand for electricity, particularly among energy-intensive consumers. Unsurprisingly, Eskom opposed and delayed the expansion of the REIPPPP due to concerns about declining sales, which led to a significant decline in renewable energy-based industrialisation. More importantly, a growing and globally competitive local industry became paralysed, sacrificing the opportunity to participate in the next energy revolution - namely, storage and the associated manufacturing potential (p. 171).

As a first step towards reversing South Africa's historical dependence on fossil fuels to generate electricity, the Government has pledged to peak, plateau and reduce the country's greenhouse gas (GHG) emissions over the coming decades – a commitment that will have major implications for the country's industrial and trade agenda. In parallel, the Government realised that renewable energy could become a significant catalyst for industrial development and consumer benefits. A critical mass of renewable energy-generation projects can achieve various objectives, including localisation of components, job creation and competitiveness improvement. In an initial move to develop the country's renewable energy sector, the Government introduced the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) in 2012, which aimed to develop South Africa's renewable energy sector through a competitive bidding process. In 2018, 6,422 MW of electricity had been procured from 112 renewable energy producers in seven bidding rounds. Meanwhile, 3,162 MW of electricity generation capacity from 57 IPP projects have been connected to the national grid, generating 16,991 GWh of energy. The total committed investment was R201.8 billion, of which REIPPPP attracted R48.8 billion in foreign investment and financing. This created 32,532 new job years for South African citizens and secured carbon emission reductions of 17.25 Mtonnes of CO₂ (p. 41).

The Industrial Energy Efficiency Project specifically address the second phase of the South African IEE Project (2016-2020) to support the industry in changing energy use patterns to be more efficient and sustainable. The project aims to increase industrial energy efficiency in South Africa to contribute to national efforts to improve energy security and electricity supply continuity whilst seeking to enable an energy transition where energy shortages and rising prices do not continually constrain GDP growth. This will be achieved through the implementation of energy management systems (EnMS) and energy systems optimisation (ESO) in industrial plants, together with the capacitation of energy experts to support industry implementation (p. 173).

5.3.1.4 Strategic Environmental Assessment for Wind and Solar Photovoltaic Energy in South Africa 2015, 2019

A Strategic Environmental Assessment (SEA) commissioned by the National Department of Environmental Affairs (DEA) provided guidelines for proactive spatial planning for wind and solar PV energy developments in South Africa (CSIR, 2015). The SEA identified eight geographical areas, known as Renewable Energy Development Zones (REDZs), where large-scale wind and solar PV development would be most suitable, considering environmental, social, and economic factors (**Figure 12**). The findings informed wind and solar PV energy development protocols that will guide project-level environmental assessments and authorisation processes in the REDZs. This will ensure that wind and solar PV development in these areas is given priority in planning, approval and implementation.

The second phase of the SEA (CSIR, 2019), commissioned by the national Department of Environment, Fisheries and Forestry (DEFF), included three additional REDZs for wind and solar photovoltaic energy projects (**Figure 12**). The two new REDZs for PV are located in the Emalahleni and Klerksdorp areas, and the third, focused on wind energy, is situated east of Beaufort West. Renewable energy projects that could be developed in these new REDZs could contribute to mine rehabilitation and support the energy transition in areas where 12 GW of existing coal power stations are planned to be decommissioned by 2030.

The **2019 Integrated Resource Plan** (Department of Energy, 2019) identified 39 696 MW to be added to the national grid between 2019 and 2030. This includes 8 208 MW (20,7%) that have already been committed or contracted under IRP 2010 for grid connection between 2019 and 2022, as well as 31 488 MW (79,3%) of new additional capacity that has to be added between 2019 and 2030. The determination promulgated in September 2020 included 6 800 MW of Solar PV and Wind energy for 2022-2024, 513 MW of Energy Storage, 3 000 MW of Gas for 2024–2027, and 1 500 MW of Coal for 2023-2027.

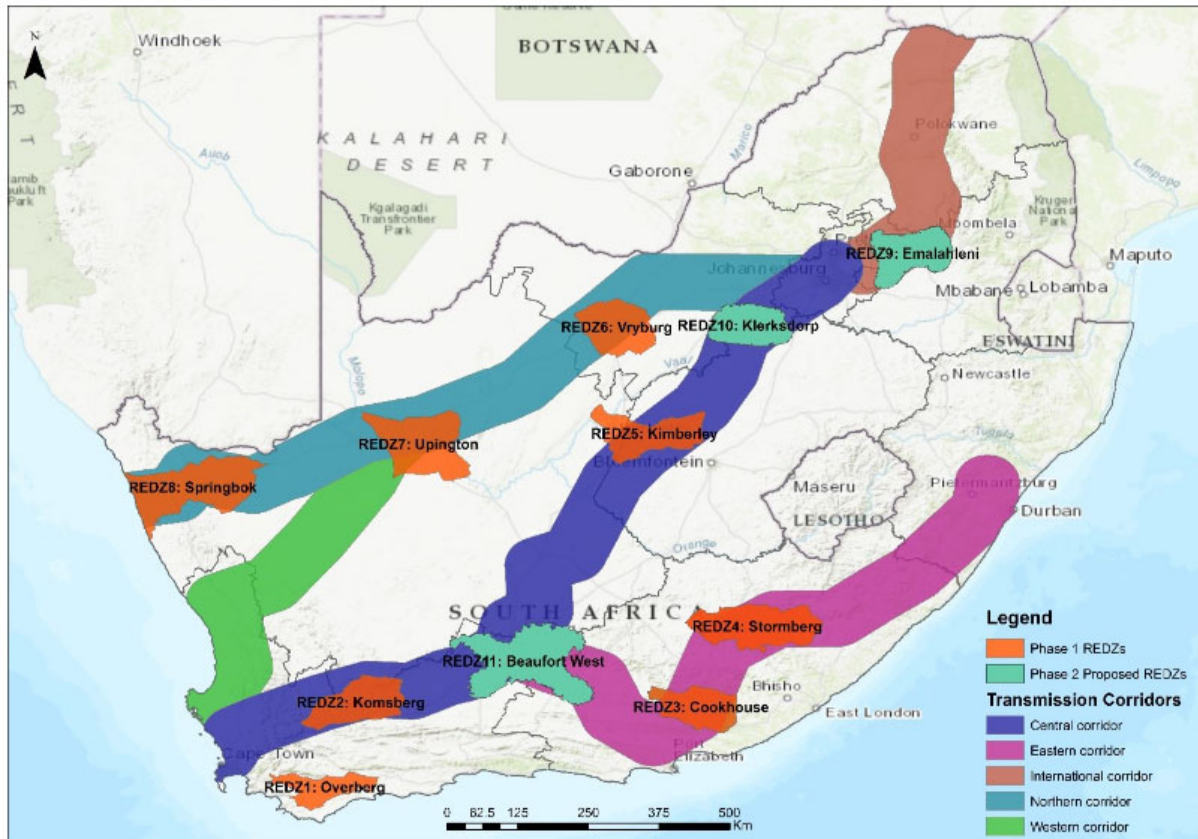


Figure 12: Location of the Renewable Energy Development Zones (REDZs), overlaid onto the electricity grid infrastructure corridors where investment in transmission infrastructure is planned.

The **Draft Integrated Resource Plan 2023** (Dept. Mineral Resources and Energy, 2023) states that, although gas import options will be considered in the short term, local and regional gas resources will allow for scaling up within manageable risk levels. There is significant potential and opportunity for gas resource discovery in the Outeniqua Basin (Brulpadda), specifically in the Free State and Mpumalanga, as well as natural gas from Mozambique and Namibia, and indigenous gas from coal-bed methane and shale gas. Co-operation with neighbouring countries is pursued for joint exploration and beneficiation of natural gas within the SADC region. The exploration to assess the magnitude of local recoverable shale, both inland and coastal, is being pursued and should be accelerated. The availability provides an opportunity to convert to Combined-Cycle Gas Turbine (CCGT) and operate open-cycle gas turbine plants at Ankerlig (Saldanha Bay), Gourikwa (Mossel Bay), Avon (Durban), and Dedisa (Coega Industrial Development Zone) on gas instead of diesel. Intervention 2 for Horizon One (2023-2030) suggests that deploying dispatchable generation options, such as gas-to-power, must be accelerated, as they can address the unserved energy risk and be adapted to power system requirements relatively quickly. For Horizon Two (2031-2050), the analysis indicated that energy pathways based on renewable and clean energy technologies only deliver the desired outcome of decarbonising the power system, as they do not provide security of supply while incurring the highest costs to implement. Security of supply will thus require dispatchable technologies with high utilisation factors, such as different combinations of nuclear, renewables, clean coal and gas.

5.3.2 Provincial planning context

The **2016 Gauteng Spatial Development Framework (SDF)** envisages Gauteng in 2030 as “an integrated, connected space that provides for the needs of all born in or drawn to the province. It aspires to establish a balanced, polycentric spatial network, with strong and resilient nodes enabling mutually beneficial exchanges of goods and services, and movement of people”. Four spatial development strategies were identified to support the establishment of this polycentric form:

1. Capitalising on proximity by directing higher densities closer to economic nodes and public transport



networks and improving conditions in areas closer to economic opportunities to ensure even greater benefits for the people and economy of these areas.

2. Managing new settlement development to prioritise infill development and densification rather than expanding residential development outwards, so new settlements are functional and integrated units of the polycentric provincial network and not based solely on land availability.
3. Building an economic network through a system of high-order nodes and activity corridors, developing economic clusters that benefit from synergies and unlock the advantages of agglomeration.
4. Creating a viable and productive hinterland by protecting valuable resources and high-potential agricultural land from harmful development and managing water resources frugally and effectively.

Ten high-priority provincial spatial development proposals were outlined, with the following being relevant to the proposed Carpe Diem SPP:

- Strengthen and enhance agricultural production and agro-processing to optimise the use of high-value agricultural land in the province, create jobs, grow the economy and improve food security.
- Actively manage and protect the environment and ecosystems, including rehabilitating degraded areas and exploring legislation for a provincial green belt.

The **2021 Review of the Gauteng Spatial Development Framework 2030** related to Electricity & ICT indicated that Gauteng receives 89% of its electricity from coal-fired power plants. Gauteng's peak electricity demand was 10.3 GW in 2021, and it is expected to grow by 2.8% per annum to 13.6 GW by 2030. Municipalities and power utilities in the province have begun projects and schemes to address the province's anticipated long-term needs. However, a strategy for alternative, renewable, and long-term energy sources must be developed. Biomass (waste-energy) generation (16.8 MW) has already been integrated into municipal and Eskom distribution networks, but no further significant IPP's alternative energy is planned for Gauteng for the foreseeable future. Electricity demand is expected to rise by 32% by 2030, requiring bulk infrastructure projects to address the anticipated electricity shortages.

The **2014 Gauteng Provincial Environmental Management Framework (EMF)** aims to assist environmental impact management, including Environmental Impact Assessment (EIA) processes, spatial planning and sustainable development with the following main objectives:

- To make it efficient for urban development (including associated service infrastructure) to occur in defined selected areas with lower environmental concerns and high development demand to help facilitate the implementation;
- To facilitate the optimal use of current industrial, mining land and other suitable derelict land for the development of non-polluting industrial and large commercial developments;
- To protect Critical Biodiversity Areas (CBAs) within urban and rural environments;
- To ensure the proper integration of Ecological Support Areas (ESAs) into rural land use change and development;
- To use ESAs as defined in municipal bioregional plans in spatial planning of urban open space corridors and links within urban areas; and
- To focus on the sustainability of development through the implementation of initiatives such as:
 - energy efficiency programmes, plans and designs;
 - waste minimisation, re-use and recycling;
 - green infrastructure in urban areas; and
 - Sustainable Drainage Systems (SuDS).

The following main proposals of the Gauteng EMF are relevant to the West Rand District:

- The existing developed areas are earmarked as Zone 1 Urban Development Zones, where urban activities are streamlined (exempt from environmental assessment requirements), and infill and densification are promoted to minimise urban sprawl into rural areas.



- Large sections of the study area are earmarked as Zone 4 Normal Control Zone (outside the urban edge), where agricultural uses outside the urban development zone are protected.
- In all parts of the study area, areas are earmarked as Zone 3 High Rural Control Zones, where sensitive areas should be protected.
- Two large areas are set aside for Agri-Hubs, where more sustainable and productive agricultural activities should be established.

2014 Gauteng Transformation, Modernisation and Re-industrialisation Strategy (TMR): The Provincial government intended to embark on three macro interventions jointly with municipalities and the private sector to change the Gauteng economy's space and structure and address unemployment, poverty and inequality. Each of these macro interventions will be supported by specific projects, including *Investment in light manufacturing industries, specifically deployment of solar technologies and solar manufacturing plants or solar farms in the Western Corridor as an area earmarked for renewable energy industrial development, and Infrastructure Investments: Broadening the energy mix – move towards using solar energy and natural gas.*

The **2010 Gauteng Integrated Energy Strategy (GIES)** states the following energy vision for Gauteng Province: *A Gauteng Province that is powered by a low-carbon economy with a significant share of national "green jobs", and accessible and affordable energy services that do not impact the health of people or the environment.*

It was anticipated that Gauteng would have a modern energy system by 2055, which would be highly efficient and significantly reduce fossil fuel use and fuel poverty. The total energy consumption is expected to be reduced by approximately 18% compared to "business as usual" projections. Clean and renewable energy is projected to contribute 47% of the energy mix, and emission reductions of 49% are anticipated relative to 2007 figures. Provincial and local authorities should understand the impacts of their energy use patterns and play a leading role in implementing the province's energy strategy (p. 7). Regarding electricity consumption, targets of 16% and 47% Renewable Energy were set for 2025 and 2055, respectively (p. 9).

Gauteng Province is ideally situated to become the country's hub for solar water heaters and to develop new energy technologies. These opportunities, along with other industries, can lead the way for the province to transition towards a low-carbon economy. Additionally, the growth of a renewable energy industry is known to provide employment opportunities that can directly impact poverty levels. The development of a low-carbon economy is not limited to large industries; it also involves encouraging locally based businesses and developing Small, Medium, and Micro Enterprises (SMMEs) that are critical for the economy and contribute to poverty reduction (p. 25). As a way forward, the province should identify key areas of clean energy development, such as solar energy, landfill gas, and energy-efficient technologies. The province must develop policies that maximise investment in energy-efficient and renewable energy technologies (p. 36). At the time, the most promising local renewable energy options for Gauteng in the short term were identified as solar energy (solar water heaters) and energy from landfill gas. To improve the clean energy profile and reduce the province's carbon footprint, renewable energy from sources outside its geographic boundaries can be purchased (p. 46).

The **2010 Gauteng Employment, Growth and Development Strategy for 2009-2014 (GEGDS)** outlines a set of strategic choices and programmes that will build towards a strong and sustainable Gauteng economy, in which all can access economic opportunities and enjoy decent work within the overall agenda to build a strong and inclusive economy. The envisaged growth path for Gauteng necessitates profound structural changes in the provincial economy to an endogenous economic growth trajectory based primarily on innovation, green growth and inclusivity. Seven drivers support the five strategic pillars:

- Green Economy and Sustainable Energy Usage;
- Innovation and the Knowledge Economy;
- Infrastructure – strategic, socio-economic and bulk;
- Green Jobs;
- Community-led local economic development;
- Skills Development and Capacity Building; and
- Spatial Planning.



The GEGDS also highlights initiatives of which pilot projects focusing on green jobs and green technology investment in the areas of energy efficiency, waste management, rural agricultural development and food security are the most relevant to the West Rand SDF.

Gauteng Provincial Government's **2022 Draft Sector Acceleration Action Plan for Energy** focused on green technologies and driving green baseload as an industrial scaling activity in Gauteng. It identified the following "actionables" to accelerate job-rich growth in the Energy Sector across the Gauteng City Region – 2022 through 2024 and beyond - to be led by Gauteng Provincial Government (GPG) and the Energy Action Lab:

1. Implement and rapidly expand the Gauteng Provincial Government microgrids initiative to create 1000 MW-plus of off-grid green industrial baseload power, including both industrial baseload and local content, including gas utilisation, with a deliberate black industrialist bias. This will include ramping up waste-sourced energy as a contributor.
2. GPG will expand its portfolio financing capability by mid-2022 into a broader energy economy financing platform, drawing on Environmental, Social, and Governance (ESG) funds to support the wider project portfolio outlined in this action plan.
3. GPG will build a large-scale agri-photovoltaic demonstration project using a portion of the land assets available to the western corridor SEZ from March 2022 onwards. This will tie into the agro-processing and green H₂ production capabilities that form part of the SEZs investor pipeline. The price point for the energy will be designed to phase into competitive territory as the initiative scales over time. The roadmap for this intervention must be complete by May 2022.
4. As part of its declared Green H₂ programme, Gauteng will deepen its focus on domestic utilisation (through the microgrids initiative), while also partnering with the Northern Cape to supply components and equipment from Gauteng-based companies to export-driven projects anchored by the new Boegoebaai Green H₂ SEZ. An interprovincial agreement to this effect should be in effect by July 2022.
5. GPG, working with SALGA, will develop a municipal green power supply framework for the province with a deliberate focus on black industrialists, tying in energy efficiency standards for both government and private-sector buildings. The specific roadmap for this must be in place by May 2022.
6. GPG will use these actionables to deliberately build the skills base for the energy sector, anchored by the GPG economic war room partnership with the University of Johannesburg, but working across all frontiers of the training ecosystem. The framework for this must be in place by July 2022.
7. Gauteng will work with the energy sector to support the shift to New Energy Vehicles (NEVs) from an energy availability perspective, utilising the microgrids programme as a capacity scaler. The roadmap outlining this process, which intersects with the automotive sector action plan, was targeted for completion by May 2022.

For the Energy Industrial Sector, the focus would be on new technologies and a diverse energy mix. This would include Special Economic Zones (SEZs):

- Deployment of Vaal SEZ as an enabler for Green H₂ micro-grids, deployed by black industrialists
- Bio-energy, battery storage manufacturing and Industrial Hydrogen to be included within the N12 corridor SEZ
- H₂ fuel cell manufacturing as part of OR Tambo SEZ.
- N12 Corridor SEZ includes Green H₂ focus
- Lanseria Hi-tech SEZ will include Green technologies as a targeted cluster
- Green energy deployment across all SEZ facilities and their associated industrial belts/ clusters, including 100% renewable energy investment incentive package for companies seeking to export to the EU and other carbon-conscious constituencies.

The only reference to Solar energy is to establish a Tier 1 Solar PV producer in Gauteng by ramping the renewable energy grid servicing Green H₂ production on the N12 corridor to 15 GW scale (feeding a 5 GW electrolyser), which would allow converting 100% of GCR buses to a renewable fuel base.

5.3.3 West Rand Planning Context

The West Rand District Municipality of Gauteng covers the West Rand area (excluding Roodepoort) and has its seat in Randfontein. The District Municipalities include the local Municipalities of Mogale City, Merafong City, and Rand West City (**Figure 13**). Major towns in the region include Krugersdorp, Randfontein, Westonaria, and Carletonville. Merafong City, the largest of the three municipalities in the district, has its seat in Carletonville, the mining core of the District, constituting over 50% of Gross Value Add (GVA).

The **West Rand Spatial Development Framework** (2022 Revision)

The first draft of the SDF was published for public comments during 2020, and currently internal & external comments are incorporated into a final document. Once this document has been completed by the service provider, a final WRDM SDF will be submitted to the WRDM executive for approval.

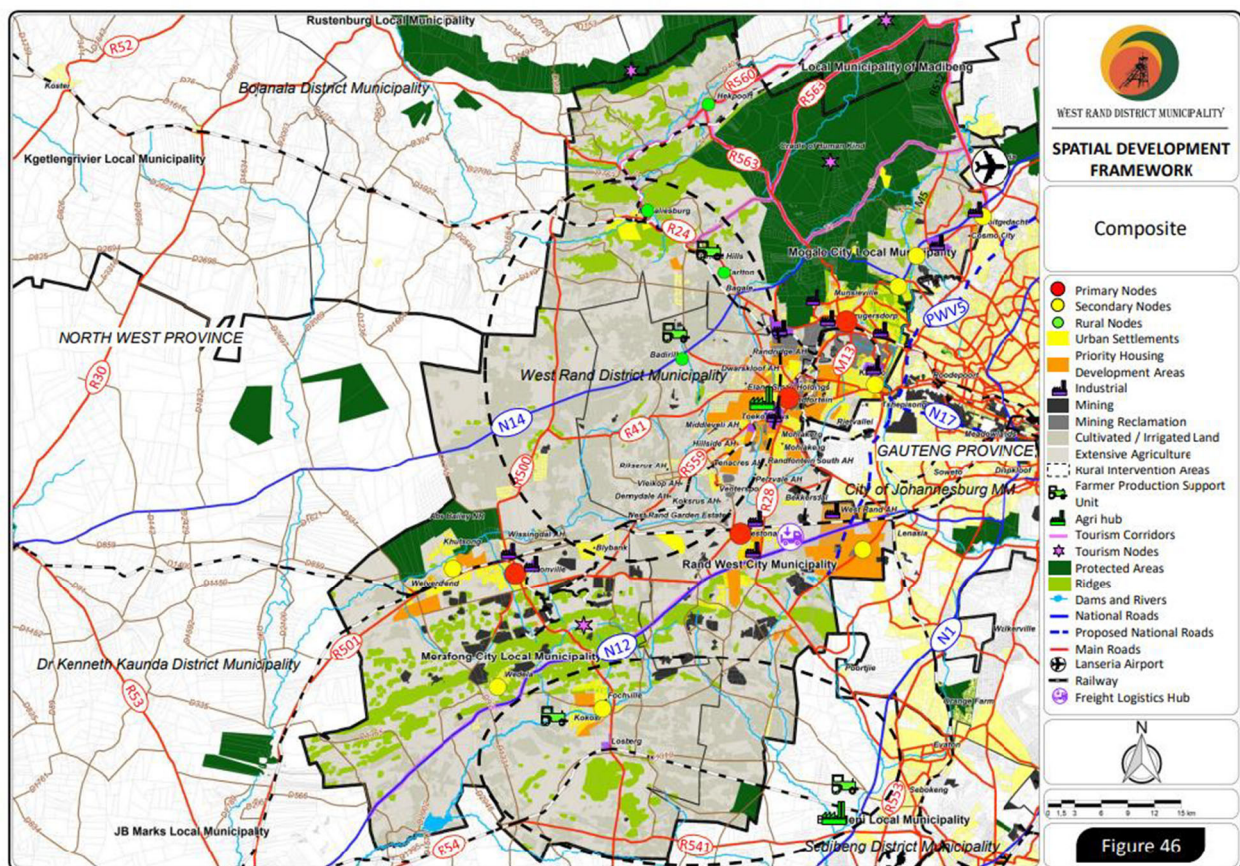


Figure 13: Composite Spatial Development Framework for the West Rand District Municipality

Source: West Rand Spatial Development Framework (2022 Revision)

The West Rand District is home to the Cradle of Humankind World Heritage Site and has a rich and diverse landscape with the Magaliesberg Mountains as a backdrop. The **West Rand District Municipality Spatial Development Framework (2020)** refers to several other policies/strategies that are relevant to the SDF:

The vision of the **2006 West Rand DM Regional Growth and Development Strategy** is to “develop and sustain an integrated, socio-economically and economically thriving and green environment with a unified society.” To achieve this vision, the Regional Growth and Development Strategy identified the following critical requirements:

- Ensure the WRDM is connected – with more people enjoying the benefits of flourishing activity centres where shops, jobs, services and recreation are within walking and travelling distance of their homes, with fast and reliable travel to and from local centres and regional opportunities, with a comprehensive, efficient and networked public transport system and pedestrian routes and access to rural and tourism areas.



- Ensure the WRDM is attractive, with quality, well-maintained urban and rural areas, new developments that comply with high design standards, clean and safe environments, and well-preserved heritage and natural areas.
- Ensure the WRDM is sustainable – with resources well managed and planned for viable and cost-effective service provision; and where the environment is valued as a vital resource and meaningful open space is provided for all.
- Ensure the WRDM is well managed – where development decisions are predictable, fair and cost-effective, partnerships are developed, planning takes place continuously, formal systems for data collection are in place, and data is used to support and improve planning.

The Strategy identified six priorities/key focus areas, including Strategic Objective 4: Environmental Management, which explicitly refers to biofuels, alternative energies (such as photovoltaics), and creating a renewable energy sector.

The Industrial Development thrust of the Municipal Growth and Development Strategy supports the **WRDM Green Economy Programme**. A Solar Farm Cluster and Bio-energy Farm in Merafong City were identified to facilitate the development of the renewable energy sector and downstream sectors, such as technical innovation and manufacturing, thereby stimulating and reindustrialising the manufacturing industries in Merafong. Seven Key Programmes were identified in the Green Economy Programme, with Energy Efficiency listing the following objectives:

- Expanding off-grid options in rural and urban areas
- Refit optimization for large-scale renewable and localization, and
- Up-scaling Solar Water Heater rollout

Following the viability and sustainability assessment, recommendations on each area have been developed, with the following being relevant to the Carpe Diem SSP:

- **Kusasaletu/Elandsrand:** Kusasaletu is expected to close within a few years. If the shaft opened again, it would be operated through mechanisation and automation, with few jobs. The village and infrastructure are spatially isolated, and adaptive reuse options are few and unconvincing. The presence of dolomite compounds this situation. The infrastructure is unsustainable, but the site can be used for agricultural activities or solar farms after demolition and rehabilitation.
- **Blyvooruitzicht:** Blyvoor Mine's gold mining component has recently been revived. The village would have had significant potential to be integrated into Carletonville, although infrastructure and buildings have been stripped and vandalised. The Housing Development Agency (HDA) is conducting a feasibility study on the potential of reviving the village, but there are severe dolomitic constraints. The expectation is that rebuilding will not be viable; the infrastructure is almost a century old and in a very bad state. It could be used for mining, industrial, residential, agricultural, mixed-use, and renewable energy.
- **Driefontein North:** This part of West Driefontein is located closer to Carletonville and the R501. It contains infrastructure that could be vital to the Bioenergy Agro-Industrial Park, which forms part of the larger Bokamoso Ba Rona Program. The infrastructure could be linked to the core network due to its proximity to Carletonville. Land use proposals include industrial; residential (only agriculture-related); and renewable energy. Adaptive reuse possibilities are favourable, especially within the context of Bokamoso Ba Rona, as the existing electrical infrastructure and land are well-suited for solar farms.

The **2012 West Rand District Municipality Green IQ** is a commitment to make the West Rand District the greenest district in South Africa and an African example of how sustainable development should be conducted. The Green IQ is a comprehensive strategy built on five pillars, namely:

- **PEOPLE:** To create a place where people come first, characterized by equity, dignity and possibility; everyone can build a better life for themselves and their children.
- **ECONOMY:** To restructure the economy to seize future development opportunities, foster local resilience, serve the people of the West Rand, and be an example of participatory prosperity.



- **ENVIRONMENT:** To make precious natural resources available for future generations, create a low-carbon built environment dedicated to quality of life, and regenerate rural areas with a new sense of purpose.
- **ENERGY:** To facilitate the creation of new independent power producers to generate renewable, affordable and reliable energy to power new industries and create competitive advantages.
- **INNOVATION:** To establish itself as a centre of excellence in green technology and green living, attract the best minds, and encourage and support the industries of the future.

The WRDM SDF noted the following as the priority spatial issues from the District and Local Spatial Development Frameworks:

- Amending the urban fringe (edge) to allow for future residential expansion;
- Integration of residential development between the historically disadvantaged and advantaged areas;
- Rehabilitating mining dumps and areas to promote the integration of urban areas;
- The establishment of development corridors and the development thereof;
- Facilitating the development of well-defined economic activity nodes;
- Increasing accessibility towards the east;
- Protecting all environmentally sensitive areas and promote tourism;
- Promoting the diversification of the primary economic sector (mining);
- The promotion of agricultural activities, both from a commercial and small-scale farming point of view;
- Managing smallholdings to avoid conflicting and non-complimentary land uses;
- The establishment of higher-order social and commercial activities within the rural environment at selected areas of concentration (rural service area), and
- Enhancing industrial and commercial areas in terms of occupancy, bulk and investment (urban renewal).

West Rand District IDP 2022/23 – 2026/27 (West Rand District Municipality, 2022) lists 13 Development Priorities, including Priority 6—Affordable clean energy. Although it refers to Independent Power Producers, coordinated efficient energy supply systems, and policy implementation, as well as renewable energy, no further details on specific plans or projects are provided.

District One Plan: West Rand District 2021 (West Rand District Municipality, 2021) indicates that the Gauteng Province will invest in creating new industries, economic areas and cities. These joint initiatives will focus on tourism, agriculture, agro-processing, and renewable energy projects. This includes diversifying the West Rand economy from reliance on mining to include bus manufacturing, agri-business and agro-processing, renewable energy and tourism (p. 5).

The One Plan focuses on six strategic goals:

- **People Development:** To fundamentally and radically improve the quality of life and overall well-being of people living in West Rand District Municipality, currently and in the future, emphasising supporting the upliftment of vulnerable and marginalised groups.
- **Economic Positioning:** To strategically position West Rand District Municipality in the national economy and to build a resilient and transformed WRDM economy;
- **Spatial Restructuring and Environmental Sustainability:** To develop a transformed, efficient and sustainable spatial form and environment as a dynamic platform for the economy and integrated human settlements;
- **Infrastructure Engineering:** To mobilise, target, align and manage investment in infrastructure sustainably, supporting the economic positioning and transformed spatial structure of West Rand District Municipality;
- **Integrated Service Provisioning:** To enable the residents of West Rand District Municipality to experience



reliable, cost-effective, viable, sustainable and seamless provisioning of services within functioning places; and

- **Governance:** To improve the performance of all three spheres of government in relation to developmental impact in West Rand District Municipality.

The District seeks to promote regional economic development and growth by prioritising economic development projects, including a feasibility study for a solar and bio-energy park (in progress). The District One Plan refers to the strategic design, demarcation, and establishment of the Western Corridor Special Economic Zone (SEZ), encompassing the new Busmark site and potentially including the Protea West Industrial Park, located closer to Protea Glen. This will link to green energy based on a fast-evolving focus on Green H₂/green ammonia split from water using renewable energy provided by large-scale solar panel installations (p. 25). The Gauteng Infrastructure Finance Agency (GIFA) also issued a bid for a R300-million photovoltaic power station and an Energy Conservation Industrial Park in Merafong. The latter is expected to attract new businesses associated with the green economy and grow a new economic base for the municipality (p. 36).

The key elements of the WRDM RGDS, Green IQ and IDP can be summarised as follows (West Rand District Municipality, 2020):

Vision	Regional Growth and Development Strategy	Green IQ	Integrated Development Plan
Elements	Key Focus Areas	Pillars	Spatial Issues
- Connected	- Spatial Integration	- Innovation	- Contain urban sprawl
- Attractive	- Physical Infrastructure	- Energy	- Establish nodes and corridors
- Sustainable	- Economic Development	- Economy	- Improve eastward connectivity
- Well-Managed	- Environmental Management	- Environment	- Protect the natural environment
	- Social Development	- People	- Promote tourism
	- Governance/Management		- Sustainable utilisation of mining potential
			- Enhance agricultural production
			- Diversify industries
			- Manage rural residential use on small holdings
			- Consolidate rural infrastructure at nodes
			- Actively promote urban renewal
			- Upgrade/expand engineering services

5.3.4 Merafong City Municipal Planning Context

The **Merafong Integrated Development Plan (IDP) 2022-2023** (Merafong City Local Municipality, 2022b) refers to the Energy Plan to address the 5-year plan for the Municipality and redressing the Government's strategy in reducing energy consumption and tackling service backlogs following the National standards. Different economic focus areas were identified, with Focus Area 1: Agriculture and Agro-Industrial aiming to establish a highly competitive economic cluster in the interrelated areas of intensive agriculture and agro-processing (p. 106). Vast tracts of high-value agricultural land in Merafong will be released through the Bokamoso-Ba-Rona initiative of Sibanye Stillwater.

The Bokamoso-Ba-Rona (formerly Merafong Bio) project involves the creation of an agro-based circular economy in the West Rand made up of various integrated components, such as Agro-Parks, bioenergy Plant, an agro-processing hub and a market. The project will include technical assistance components and private sector participation to support farmers with technological expertise, capacity-building, and inputs. In addition, the private sector will provide the necessary off-takes for the produce (p. 296). The Bioenergy Agro-Industrial Park will serve as a major catalyst for agricultural and agro-processing development. It will utilise anaerobic digestion to create suitable value-added products and achieve cost reductions that could attract many industrial and agricultural investors. The IDP noted that the Municipality is using an outdated Growth Development Strategy and does not



have an LED strategy in place to guide new economic opportunities.

The **Merafong City Draft Annual Report 2021/2022** (Merafong City Local Municipality, 2022a) stated that vast tracks of unproductive agricultural zoned land owned by the mines and the Far West Rand Dolomitic Water Association (FWRDWA) present an opportunity for agricultural production and related industrial development, e.g. the establishment of a Bioenergy Park and Agricultural Parks. The Merafong Bioenergy Agro-Industrial Park is a combined agriculture and industrial project that will include bioenergy generation to maximise opportunities. The project will utilise existing land, water, and infrastructure provided by mining companies to develop a new industrial park focused on agriculture and agro-processing. Great strides were made in conceptualising, developing, and funding Merafong City's game-changer projects. The Gauteng Infrastructure Financing Agency (GIFA) concluded the feasibility study for the Bio-energy Eco-Industrial Park. The conceptualization of the project is underway. The African Development Bank and the Gauteng Infrastructure Financing Agency are assisting Merafong to commercialise the project. The African Development Bank has availed R 10 million to bring the project into commercial operation, and construction is expected to start within 18 to 24 months.

5.4 Conclusions

A key factor in the feasibility assessment of a Solar facility is the tariff that NERSA is prepared to pay for the electricity generated by the operator of the solar power plant (SPP). An agreement is concluded with the landowner to lease a portion of the facility for a period that equates to the economic life of the PV Plant. The large capital outlay for the PV panels and the direct and indirect infrastructure costs can only be justified by the tariff obtained for the electricity and the minimum required return for the investors in the project.

It is clear from National, Provincial, District and Local legislation, policies, strategies and action programmes that targets have been set to achieve a greater energy output from renewable energy sources. There is growing pressure on the stable and reliable provision of electricity generation throughout the country, and Eskom's inability to guarantee a constant supply requires investment in alternative and renewable energy sources. The proposed Carpe Diem North Solar project subscribes to the NDP principles by offering renewable resources in an area that requires development to assist employment creation. The site is located within Merafong City Municipality in Gauteng, and is excluded from the promulgated Renewable Energy Development Zones. Regardless, various national policies and strategies indicate the urgent need for renewable energy nationwide.

It aligns with several provincial policies and strategic frameworks that emphasise the need for green energy to combat climate change and support and stimulate economic development in the Gauteng Province. Although solar water heaters and energy from landfill gas were identified as the most promising local renewable energy options for Gauteng in the short term, Solar Power Plants (PPs) offer an attractive alternative for generating renewable energy. Several Climate Change Adaptation and Mitigation Interventions related to renewable energy were proposed for the West Rand DM, including solar parks that will feed electricity into the National Grid, utilising solar energy in residential areas and industry, and promoting the development of "green technology/energy." Incremental implementation of the Smart City Concept is also proposed. The proposed Carpe Diem North Solar project supports these objectives by promoting the development of renewable energy plants. It addresses several renewable energy priorities identified by the Merafong City Local Municipality, which is already investigating a Bioenergy Agro-Industrial Park that will generate solar energy.



6 ASSESSMENT OF IMPACTS

6.1 Introduction

Various qualitative and quantitative socio-economic impacts are attributed to a development project; these impacts can be divided between those applicable to the construction or post-construction (operational) phases. Construction for the proposed Carpe Diem North SPP is expected to take approximately 2 years.

Potential positive socio-economic impacts:-

- Local communities will benefit from the provision of renewable energy.
- Create local employment opportunities for people with different types and levels of skills during construction and operations.
- The local and provincial economies will benefit from the procurement of goods and services and the spending of wages and salaries during construction and operations.

Potential negative socio-economic impacts during construction:-

- The movement of large construction vehicles will affect traffic flows and residents along the access routes.
- Construction activities create dust and noise at the development site that would affect nearby receptors.
- An influx of job seekers could lead to competition with local residents for employment opportunities.
- Construction workers may impact the social fibre of local communities.
- The presence of construction activities may contribute to an increase in local crime.

Potential negative socio-economic impacts during operations:-

- The proposed development may impact the sense of place for passing tourists and surrounding land users.
- Passing aeroplanes and people that may be affected by glare and glint from the PV panels.
- The development could negatively impact the perceived value of surrounding properties if it affects income production or the sense of place.
- The site may be a target for on-site criminal activities, in particular from syndicates in search of high-value PV components.

As per NEMA EIA Regulations (2014, as amended – see **Annexure C**), the potential impacts of the preferred Alternative are assessed and compared with the No-Go Alternative using the impact rating methodology described in **Annexure A**:

- **Preferred Alternative 1:** Development of the Carpe Diem North Solar PV Plant (SPP) Facility on Portion 5 of the Farm Varkenslaagte No. 119; and
- **No-Go Alternative**, i.e. the *status quo* is maintained.

Cumulative impacts refer to any other additional development(s) and existing activities within the immediate area that could compound any positive or negative impacts associated with the proposed development. For the Carpe Diem North Solar project, this particularly relates to other renewable energy projects within 30 km of the proposed development sites. As highlighted in **Section 2.4**, Several other renewable projects within 30 km of Carpe Diem North have been approved or have applications in progress, including the proposed Carpe Diem South and Carletonville project that are located within 5 km.

Where applicable, appropriate **mitigation measures** are proposed to reduce the significance of the specific impacts. **Residual impacts** are those that persist after the implementation of mitigation measures.



6.2 Construction Phase

The negative direct impacts during the construction phase primarily relate to large construction vehicles on access roads, noise and dust, as well as criminal activities and social impacts associated with the presence of construction workers and related activities at the development site. Potential positive direct and indirect impacts include temporary employment opportunities and a contribution to local economic development, specifically in the construction, retail, and services sectors and industries. Note that the duration of the impacts is based on a short construction period of 2 years.

6.2.1 Vehicular traffic due to construction activities

Nature of impact

The movement of large construction vehicles will affect traffic flows and residents along the access routes.

Scope and consequences of impact

The movement of large construction vehicles will impact the road infrastructure and traffic flows along the access routes during the construction phase. Access to the site is via the R501, which connects Carletonville and Potchefstroom; the R500 may also be used, depending on the source of the construction materials. The Traffic Impact Assessment (Koleko, 2023) indicated that access to the development will be provided through a gravel road. During construction, an average of ten vehicles per hour are expected to enter and exit the facility, with five of these being trucks. Traffic counts conducted at three intersections adjacent to the development indicated that all the intersections operated under capacity and with an acceptable level of service (LOS A) for the existing and future scenarios. No road upgrades will be required to accommodate the traffic generated from the development during construction.

No-Go Alternative: Construction vehicles will not impact traffic flows or road services.

Cumulative Impact: Overlapping construction projects in the area would increase the number of construction and delivery vehicles along the R501. The proposed Carletonville SPP and Carpe Diem South SPPs will likely also use the R501 as the main access route and thus add to the cumulative impact if their construction phases overlap with that of the Carpe Diem North Solar project.

Mitigation measures

The Traffic Impact Assessment (Koleko, 2023) concluded that no road upgrades are required to accommodate the traffic generated from the development during construction. It is recommended that at least 10 parking bays be provided on-site. Sidewalks will be constructed along the roads leading to the proposed development sites to facilitate pedestrian movement. Sections within the surrounding road network with fading road markings should be repainted to improve road safety. Road signage should also be erected specifically at intersections.

Impact Rating

The Traffic Impact Assessment (Koleko, 2023) concluded that the proposed Carpe Diem development is expected to have a minimal traffic impact on the surrounding road network.

6.2.2 Nuisance factors (dust and noise)

Nature of impact

Construction activities generate dust and noise at the development site, which can affect nearby receptors.

Scope and consequences of impact

During the introduction of bulk services, large earth-moving equipment and concrete mixers will generate noise



and dust. Most dust will be generated when the site is cleared of vegetation, and the services are introduced. The receptors likely to be affected are mainly the surrounding residents, although the prevailing wind may carry dust particles further. Given the nature of the development, it is likely that dust (and noise to a lesser extent) will only be a nuisance during the first part of the construction phase.

No-Go Alternative: No construction activities at the development site will generate dust and noise that could impact nearby receptors.

Cumulative Impact: Other similar developments within 30 km would have a cumulative impact if their construction phases overlap, particularly the Carpe Diem South, North and Carletonville SPV facilities.

Mitigation measures

Dust and noise emissions during the construction period should be minimised through a Construction Environmental Management Plan (CEMP) for the development, including measures and trigger mechanisms to mitigate any potential impacts to nearby receptors. For example, site construction roads and excavated materials should be sprayed with an eco-friendly dust suppression liquid during dry periods to mitigate against the formation of dry dust particles.

Impact Rating

The impact will be **direct**, with a **low negative** residual significance, and a **medium negative cumulative** significance if the construction of multiple PV solar plants overlaps.

6.2.3 Influx of job seekers

Nature of impact

An influx of job seekers will lead to competition with local residents for employment opportunities.

Scope and consequences of impact

Local people skilled in earth-moving and construction activities can be employed during the construction phase, with additional opportunities available in security, transportation, and related services. An influx of casual workers from Khutsong and Carletonville is highly likely. The local area experienced high unemployment, with only 51,95% of the total population residing within 5 km of the site employed in 2011 (refer to **Section 4**). Given the nature and scope of the development, contractors with an established workforce will be appointed to the project. Combined with strict security, this could discourage casual labourers.

While the influx of people seeking employment does not have a direct social impact, such a movement can still have indirect social impacts. These impacts include the disruption of local community networks and the cohesive social fabric within communities, as well as increased crime levels and disruptions to social services. Construction work on the proposed project is limited to a specified period, and non-local construction labourers may find themselves stranded in the area after the construction phase, resulting in more competition for employment. This could also increase the demand for housing and social services over the long term, as well as various social ills.

No-Go Alternative: Without the proposed development, there will be no influx of job seekers linked to the site.

Cumulative Impact: Given the high unemployment in the area, any construction project would attract job seekers. This will have a cumulative impact, especially if the construction phases of the Carpe Diem South and Carletonville SPV facilities overlap with that of Carpe Diem North.

Mitigation measures

The site will be fenced, and on-site security measures will be implemented. Contractors must commit to employing people from the Carletonville area whenever possible.



Impact Rating

The impact will be **direct and indirect**, with a **low negative** residual significance, and a **medium negative cumulative** significance if the construction of multiple PV solar plants overlaps.

6.2.4 Impact of construction workers on local communities

Nature of impact

Incoming construction workers can disrupt family structures and social networks in local communities.

Scope and consequences of impact

Contractors working on large development projects usually have permanently employed construction workers who move from site to site. These workers are often away from their families for extended periods, depending on the location. If the latter requires them to reside near the construction site, they may explore the local communities for leisure and social activities. This could lead to an increase in alcohol and drug abuse, or sexual interactions that could lead to an increase in prostitution, unwanted pregnancies and sexually transmitted diseases (STDs), including HIV. All these may impact local families and their social structures, but can also damage the construction workers' family structures at home.

No-Go Alternative: Without the proposed development, no construction workers will be linked to the specific site.

Cumulative Impact: Several construction projects in the Carletonville area will employ hundreds of construction workers, potentially impacting the local communities. This will have a cumulative impact, especially if the construction phases of the Carpe Diem South and Carletonville SPV facilities overlap with that of Carpe Diem North.

Mitigation measures

Local labour and local enterprises should be used, defined as residents and businesses in Merafong City. Construction workers from outside the immediate area should return home over weekends or at regular intervals to maintain strong family and social bonds. If required to stay near the construction site, there should be rules of conduct to reduce the potential impact of their social behaviour. The contractors should also implement an STD and HIV awareness and protection programme for the construction workers.

Impact Rating

Given the site's proximity to residential areas, the impact will be **direct and indirect**, with a **low negative** residual significance, and a **medium negative cumulative** significance if the construction of multiple PV solar plants overlaps.

6.2.5 Increase in local crime

Nature of impact

Construction activities may increase the risk of criminal activities in the area.

Scope and consequences of impact

Construction activities are likely to attract criminals searching for easy targets. There is a general perception that crime rates increase in areas where construction activities are ongoing. This may include, but is not limited to, on-site petty theft, theft of building material, on-selling of security information, or burglary and theft at nearby properties. The presence of construction workers and vehicles typically increases the risk of unauthorised individuals entering the construction site undetected. The site is located near residential settlements, within easy reach of casual and organised syndicates known to operate in the area, which is already experiencing construction-related issues (see news snippets).



According to the SAPS Crime Statistics (SAPS, 2025), 753 cases were reported at the Carletonville SAPS office from October to December 2024, whereas 131 cases resulted from police action. The highest numbers were recorded for Contact crimes (321 cases), led by common assault (102 cases) and Assault with the intent to inflict grievous bodily harm (80). Other individual categories that recorded high numbers were Robbery with aggravating circumstances (72 cases), Commercial crime (73 cases) and Malicious property damage (83 cases). Over the same period, the Khutsong SAPS office recorded 331 reported cases and 136 cases due to police action. The highest numbers were recorded for Contact crimes (205 cases), led by Drug-related crimes (102 cases), Assault with the intent to inflict grievous bodily harm (95 cases), and Common Assault (51 cases).

‘Construction mafias’ are holding a key South African economic sector to ransom

South Africa’s construction industry is in crisis. As the Bargaining Council for the Civil Engineering Industry (BCCEI) stated in April 2022, “the problem of intimidation, extortion and violence on construction sites has reached crisis levels”. The “construction mafias” – as they have been dubbed – who are responsible for this intimidation have become widespread since their first appearance in KwaZulu-Natal. Today, these groups have become deeply entrenched in the construction sector. In 2020, the South African Forum of Civil Engineering Contractors (Safcec) estimated losses due to these disruptions amounted to R40.7 billion nationally. In the absence of any effective legal recourse and facing the threat of violence, many businesses have had to concede to these mafias’ demands, legitimising and solidifying their role in the industry. This could have disastrous long-term economic effects for a sector that is already under strain.

Source: Daily Maverick (2022/06/16)

Extortion or Transformation? The Construction Mafia in South Africa

Since 2015, South Africa has witnessed the emergence of a new kind of criminality in the form of organised groups targeting the construction sector under the banner of ‘radical economic transformation’. Dubbed the ‘construction mafia’ in the media, these people have organised themselves into groups known as ‘local business forums’ and invaded construction sites across the country, demanding money or a stake in development projects in what can arguably be described as systemic extortion. While no country is immune to systemic extortion by criminal groups, the extent and impact of this activity depend on the state’s ability to address extortion economies as they arise. In South Africa, the activities of the so-called construction mafia have been fuelled by the state’s weak response, allowing them to expand their operations. In 2019, at least 183 infrastructure and construction projects worth more than R63-billion had been affected by these disruptions across the country. Since then, invasions have continued at construction sites across South Africa.

Source: Extortion or Transformation? The Construction Mafia in South Africa (polity.org.za)

No-Go Alternative: Without the proposed development, existing security problems in the area may continue or be influenced by activities unrelated to the proposed development.

Cumulative Impact: Given the high unemployment rate in the area, additional construction activities are likely to attract criminals from and to the local area. This will have a cumulative impact, especially if the construction phases of the Carpe Diem South and Carletonville SPV facilities overlap with that of Carpe Diem North.

Mitigation measures

Co-operation between the Developer and contractors is essential to ensure that the area around the proposed development remains secure during construction. On-site security measures, such as perimeter fencing, controlled access, security guards and patrols, will minimise the risk.

Impact Rating

The impact will be **direct**, with a **low negative** residual significance, and a **medium negative cumulative** significance if the construction of multiple PV solar plants overlaps.



6.2.6 Economic income and employment during construction

Nature of impact

The Merafong and Gauteng economies will benefit from the project through the procurement of goods and services, as well as the expenditure of wages and salaries. The project will also create temporary employment opportunities for individuals with diverse skill sets and levels of expertise.

Scope and consequences of impact

Estimated values for the initial capital investment include the costs of the module, structural installation, racking, site preparation, electrical installation, wiring, transformers, inverters, and other related expenses, together with wages and salaries, an allowance for an escalation factor, and contingencies. Initial indications and outputs from the feasibility assessment suggest an initial capital cost of approximately R2,1 billion for Carpe Diem North (JUWI, 2024).

The Social Accounting Matrix (SAM) prepared by the Development Bank of Southern Africa distinguishes between “activities” and “commodities”. Activities are the entities that produce goods and services, and commodities are those goods and services produced by activities. Activities produce goods and services by combining the factors of production with intermediate inputs. Initial import leakages are assumed to be approximately 70% of the total construction expenditure (including wages and salaries), based on the premise that not all materials required for the panels and associated infrastructure are manufactured or available in Gauteng. We have assumed that 30% of the main suppliers for the project would emanate from the Gauteng region. An output multiplier is used with a value-added or GRP multiplier to assess the economic impact on expenditure during construction. Our assessment is based on the Gauteng Province with a specific reference to the Merafong District. In this manner, we can capture the inter-regional effects caused by the extended outreach for goods and services from other regions and provinces in South Africa required for construction.

The typical costs associated with the construction of the SPP include the following items that relate to the installation of the PV panels and the required infrastructure:

Breakdown and allocation of investment costs per MW		Allocated to installation	Allocated to infrastructure
Module	60.00%	X	
Structural installation	2.00%	X	
Racking	14.00%	X	
Site preparation	7.00%		X
Electrical installation	3.00%	X	
Wiring, transformer, etc.	5.00%	X	
Inverter	7.50%	X	
Financial costs	1.00%	X	
Road	0.50%		X
Total	100.00%		

The impacts have both direct and indirect effects. Direct effects relate to the electricity sector, which is directly affected by the impact. For example, an exogenous increase in demand for electricity directly impacts the Electricity sector (as defined). However, it may also have indirect effects stemming from linkages between electricity and other sectors or parts of the economy. When we add up all direct and indirect linkages, we arrive at a measure of the multiplier effect created by the increasing demand for electricity. Backwards production linkages create the demand for additional inputs that producers use to supply further goods or services. For example, when electricity production expands, it requires intermediate goods such as pylons, steel cables, bricks, and cement. This demand then stimulates production in other sectors (such as mining, manufacturing and construction) to supply these intermediate goods. Forward production linkages account for the increased supply of inputs to upstream industries.



Based on the narrative above, it is possible to estimate the impact of the expenditure on the Gauteng economy during the construction phase. This impact is represented by an income and output multiplier, which directly or indirectly affects the household incomes of workers involved in the construction phase. The impacts are direct, indirect, and induced, with the latter representing the expenditure of salaries and wages in the local economy. **Table 10** estimates the economic impact of the envisaged direct spending associated with the SPP, focusing on Output⁴, Gross Geographic Product (GGP)⁵, jobs and household income. Note that the figures represent the total economic and employment impacts in nominal terms, with the construction envisaged to take two years.

Table 10: Direct, indirect and induced impact of construction spending related to GGP, output, household income and jobs

Economic measure (R'billion)	Direct	Indirect	Induced	Total
Production output	R1,99	R2,54	R1,16	R5,69
Gross Geographic Product (GGP)	R0,44	R0,91	R0,47	R1,82
Jobs over a two-year construction period	1 553	5 048	1 607	8 208
Household income	R0,26	R0,42	R0,87	R1,55

Source: Multi-Purpose Business Solutions SAM equilibrium model

As stated above, these numbers are based on the estimated project cost during construction (CAPEX), which includes off-site spending on goods, services, and other related items. If only on-site employment during construction is considered, 425 to 520 employment opportunities could be sustained for the duration of the construction period (**Table 11**).

Table 11: Direct on-site employment opportunities

Construction phase employment	Split	Lower bound	Upper bound	Average	Adjustment (+) and (-)	
					-10%	+10%
Jobs per MW		2,8	3,5		Lower	Upper
Total number of jobs		420	525	473	425	520
Panel installation	90%	378	473	425	383	468
Infrastructure	10%	42	53	47	43	52
Skill levels						
Skilled	25%	105	131	118	106	130
Semi-skilled	35%	147	184	165	149	182
Low-skilled	40%	168	210	189	170	208

The information provided above indicates the following:

- The capital investment of an estimated R2,1 billion could generate R5,69 billion in new business sales, referred to as the production (or output) that creates demand for business activity over the construction period.
- The increase in production output could add R1,82 billion (net of the import leakage) to the GGP of Gauteng during construction.

⁴ Output is the quantity of goods or services produced within a specific time period

⁵ Gross Geographic Product is the total monetary or market value of all the finished goods and services produced within a region's borders in a specific time period



- The project could sustain about 8,208 (direct, indirect and induced) employment opportunities, linked to the construction expenditure of R2.1 billion. For instance, 'direct' does not imply on-site labour, but rather refers to the first round of capital expenditure to procure the infrastructure and plant. The first round of spending results in successive rounds of expenditure, known as the indirect effect. The information in **Table 11** refers to on-site employment that forms part of the employment-linked construction expenditure; however, this component is relatively small. Therefore, the term direct impact should not be confused with the on-site labour during the construction phase.
- As a result of the job opportunities created through the proposed interventions, household incomes from job opportunities could increase by R1,55 billion over the construction period.

Note that employment creation does not necessarily imply NEW jobs, but rather sustainable employment for employees of contracted services providers that are not operating at full capacity. If the company doesn't have spare capacity, additional workers may be appointed, in which case NEW jobs will be created for the duration of the construction phase. Thereafter, the employment opportunities will taper away. It is also imperative that the recruitment process should promote gender equality, with women employed wherever possible.

No-Go Alternative: The potential contribution to local economic income and employment will only be realised with the proposed development.

Cumulative Impact: Other development projects in Merafong and Gauteng act synergistically to create more demand for supplies and services and, due to the multiplier effect, catalyse further economic growth in the area.

Mitigation measures

No mitigation applies as it represents a positive impact.

Impact Rating

The impact will be **both direct and indirect, with a medium positive significance** on economic income and temporary employment, with a **medium-high positive cumulative** significance for multiple projects with overlapping construction phases.

6.3 Operational Phase

The most significant concerns for the operational phase relate to the sense of place, crime and surrounding land values. On the positive side, the proposed development will address a growing need for electricity, create new business and employment opportunities, and contribute to local spending.

6.3.1 Provision of renewable energy

Nature of impact

The local community and the rest of South Africa will benefit from the provision of renewable energy.

Scope and consequences of impact

South Africa desperately needs sufficient, sustainable and affordable electricity. Additional electricity sources can provide social, environmental and economic benefits. In many cases, the immediate benefits include an effective reduction in the carbon footprint and the provision of electricity during load shedding. The infrastructure to deliver the power generated by the solar farm to the national grid includes substations, and new power lines are available at the nearby Carmel Substation.

The proposed Carpe Diem North Solar project will add 150 MWp to the national grid. Together with other approved solar plants in the immediate area, it would deliver almost 4 000 MWp of electricity into the Eskom grid, thereby



reducing the dependency on coal and nuclear energy. These PV plants could provide a significant amount of energy to meet local demand, which in turn could attract industries, especially those with high electricity requirements, to the area.

No-Go Alternative: No electricity contribution will be linked to the sites without the proposed development.

Cumulative impact: Several renewable energy projects within 30 km of the proposed development site can deliver almost 4 000 MWp in renewable electricity.

Mitigation measures

No mitigation applies as it represents a positive impact.

Impact Rating

The impact will be **direct and indirect**, with a **low positive** significance, and a **high positive cumulative** significance.

6.3.2 Sense of place

Nature of impact

The proposed development will impact the sense of place for surrounding land users.

Scope and consequences of impact

A sense of place generally refers to the way people perceive places, whether they are streets, communities, cities or regions. This may influence their well-being, how they describe and interact with a place, what value they place on something, etc. The proposed site is located close to residential areas, with a significant number of sensitive receptors within 1 km of the proposed development site. However, the area is home to extensive mining operations that already changed the sense of place from rural to industrial.

The **Visual Impact Assessment** (Graham Young Landscape Architect, 2025) rated the study area's scenic quality as *low to high* within the context of the sub-region. Sensitive viewing areas indicate potential sensitivity, mainly for new residential areas (not yet occupied) to the immediate north of the site and for users of the R501 and local connector roads west of the site. The impact on the visual environment during construction is assessed as low intensity over a localised area and limited to the short term (less than 5 years). The significance of the unmitigated impact would be localised but extend beyond the site boundary (to at least 3.0 km in some areas) and is predicted to be moderate, and remain as such with the implementation of mitigation measures. The impact on the visual environment during the operational phase is assessed to have a moderate intensity over the long term (anticipated to be 30 years). The unmitigated impact would be localised but extend beyond the site boundary (to at least 3,0 km) and is considered moderate, which could be reduced to low with effective mitigation.

The **Aviation Glint & Glare Assessment** (Aviata Consulting, 2023) determined the potential impact that solar glint and glare would have on various aviation receptors within 2 miles of the approach to the various runways. The modelling results indicate that the receptors will be exposed to no glint and glare if a fixed tilt system or single-axis tracking system is used. If a double-axis tracking system is used, the aviation receptors on the approach path to runway 31 (approaching from the east of the Carletonville Airport) will be exposed to green and yellow glare.

No-Go Alternative: Without the proposed development, the current sense of place will be retained. However, other industrial developments in the area, including renewable energy projects, may impact this.

Cumulative Impact: The proposed Carpe Diem North Solar project is within 30 km of several approved solar farms, including the proposed Carpe Diem South and Carletonville SPP within 5 km, which would have a cumulative impact on the sense of place. The Visual Impact Assessment (Graham A Young Landscape Architect, 2025) concluded that the intervisibility and the Project, along with the other solar PV projects proposed in the sub-region, would impact the nature and character of the area beyond the anticipated moderate negative impact of the proposed Project alone. The significance of the cumulative impact of these projects during their operational phases is assessed as



moderate in intensity, and over the long term, with an unmitigated sub-regional impact extending beyond the sites, which is assessed as moderate.

Mitigation measures

The Developers should implement the mitigation measures proposed in the Visual Impact Assessment.

Impact Rating

Our assessment of the Visual Impact Assessment is that the impact will be **direct, with a low negative** residual significance, and a **medium negative cumulative** significance for multiple projects in the subregion.

6.3.3 Increase in local crime

Nature of impact

The expensive PV equipment on-site may attract specialised criminals.

Scope and consequences of impact

The Carpe Diem North Solar project may attract interest from criminals looking for an easy target for valuable equipment. As previously indicated, the SAPS Crime Statistics (SAPS, 2025) recorded 753 cases at the Carletonville SAPS office from October to December 2023. The highest numbers were recorded for Contact crimes (321 cases), led by common assault (102 cases) and Assault with the intent to inflict grievous bodily harm (80). Property-related incidents included 45 cases related to Burglary at residential properties, with 83 cases of Malicious damage to property. Property-related incidents reported at the Khutsong SAPS office included 30 cases related to Burglary at residential properties and 20 cases of Burglary at non-residential properties.

No-Go Alternative: There will be no contribution to criminal activities. However, existing security problems in the area may continue or be influenced by activities unrelated to the proposed development.

Cumulative Impact: Several solar farms in the Carletonville area will enhance the attraction for criminals searching for high-value PV components.

Mitigation measures

On-site security measures, such as perimeter fencing, controlled access and security guards, will minimise the risk.

Impact Rating

The impact will be **direct, with a low negative** residual significance, and a **low negative cumulative** significance.

6.3.4 Impact on surrounding property values

Nature of impact

A new development may affect the current and future perceived value of other properties in the surrounding area.

Scope and consequences of impact

The value of a property is driven by various factors, among others supply and demand, interest rates, the contraction or expansion of the local economy, population growth rates and changes in disposable income to debt ratios. In addition, relative property values are based on the abundance of sites that are either valued or avoided by the market. As these underlying characteristics and resulting relative advantages change, so do the relative prices as these advantages are capitalised into land values. The future value of land in the area is also dependent on spatial planning policies and the bulk supply of land within the area permitted for various uses.



As solar energy facilities are relatively new, few statistics are available to assess the impact of such facilities on the value of surrounding land. A number of studies indicated that large-scale solar arrays often have no measurable impact on the value of adjacent properties, and in some cases may even have positive effects (<https://www.seia.org/research-resources/solar-property-value>). In a USA study of more than 1.8 million property transactions that occurred within six years before and after a utility-scale solar installation was constructed in six states. The results indicated that proximity to solar farms does not deter the sales of agricultural or residential land. However, homes within a mile of a solar farm may see a decrease in property values, with the amount of decrease depending on how far from the solar farm the home is (<https://www.usatoday.com/story/news/nation/2023/03/23/do-solar-farms-affect-property-values-mortgage-home-houses-california-north-carolina-new-jersey/11515239002/>). Aligned with the latter, another study showed that in areas where open space is scarce, covering undeveloped land with solar panels can cause on average a 5% decline in home values relative to homes 1 - 3 miles away (<https://energynews.us/2020/10/20/study-solar-can-hurt-home-values-if-it-displaces-scarce-suburban-greenspace/>).

In 2021, the American Clean Power Association sought to quantify the effect of proximity to solar on property values by examining existing solar installations in Massachusetts and Rhode Island. The study evaluated 208 solar facilities, 71 373 housing sales occurring within one mile of solar facilities, and 343 921 sales between one to three miles of a solar facility. The study provides data which found no negative impact on residential home values near solar arrays in rural areas. Furthermore, there was no evidence of differential property value impacts by the solar installation's size (https://cleanpower.org/wp-content/uploads/2021/08/Solar-and-Property-Values-Fact-Sheet_2.2.22.pdf). In 2022, the American Society of Farm Managers and Rural Appraisers Rich Kirkland from North Carolina and Don Fisher from New York shared their experiences appraising property near solar developments. Their survey indicated that the expectation of lower valuations did not hold true when properties were sold (<https://www.farmprogress.com/commentary/how-solar-is-impacting-farmland-values>).

Abashidze (2022) used property value models to examine how utility-scale, ground-mount solar farms impact nearby agricultural land values. The results indicated that solar farms do not have direct positive or negative spillover effects on nearby agricultural land values. However, results also suggest that solar farm construction may indirectly affect agricultural land values by signalling the land's suitability for future solar development. Specifically, results indicate that the proximity of agricultural land to electric transmission lines may be positively valued after a solar farm is constructed nearby (<https://le.uwpress.org/content/wple/early/2022/12/20/le.99.3.102920-0165R.full.pdf>).

The Carpe Diem development is located within 5 km of residential areas. Although the 2019-2020 Merafong MSDF earmarked the site for residential and agricultural uses, the area has a strong industrial sense of place due to mining activities. Given the high number of approved renewable energy projects, it is likely that the adjacent agricultural land parcels may experience an increase in perceived value as the demand for developable land increases. The **Site Verification and Agricultural Compliance Statement** (Lanz, 2023) concluded that a total footprint of approximately 388 ha would be lost for the lifetime of the development. However, the production potential of that land is limited to only being suitable as grazing land, which represents a minimal loss of agricultural production potential in terms of national food security and for the affected farm. The negative agricultural impact was therefore assessed as being of low significance and as acceptable.

No-Go Alternative: Without any development, the site will not impact surrounding property prices. However, real estate values will fluctuate over time due to the balance between general demand and supply for properties in the area.

Cumulative Impact: Real estate values in the area may decrease if multiple industrial developments negatively impact the area's sense of place and agricultural potential. However, in the absence of intensive agricultural activity in the area and the industrial nature of nearby mining operations, investors could be interested in purchasing more land for solar farm development or support services.

Mitigation measures

Implementation of the recommendations made by the various specialists to mitigate potential negative impacts will be essential to minimise negative impacts. The implementation of mitigation measures in accordance with good management practices, regulations, and guidelines should mitigate potential negative impacts on real estate values.



Impact Rating

The impact will be **direct and indirect, with a low positive** significance and a **low positive cumulative** significance.

6.3.5 Impact on new employment opportunities during the operational phase

Nature of impact

The development will create operational jobs for the duration of the facility's economic life or lease period.

Scope and consequences of impact

Renewable energy facilities generate a limited number of jobs during the operational phase that are specifically related to maintenance and operations over their useful economic life. Due to the specific nature of the jobs and the need to consider local employment, there is a likelihood that local individuals may not possess all the required skills. The permanent job creation is likely to be low as the operational and maintenance teams will perform periodic maintenance and will not be resident on the site. Given the specialist skill requirements, it is likely that teams will perform operations and maintenance functions for several energy facilities within the region. Typical jobs created during the operational phase include project managers, project coordinators, production managers, technicians, maintenance personnel, administrative and office support staff, security personnel, and the removal of alien vegetation.

The number of jobs created per MW varies and depends on the nature and scope of the solar farm. The literature suggests that PV plants with more than 25 MW generating capacity require 0,33 skilled and 0,60 unskilled staff per MW (<https://www.nrdc.org/sites/default/files/renewable-energy-solar-jobs-report.pdf>). Approximately 10% will be management and technically skilled, 30% will be post-matric, technically trained, and experienced personnel, and 60% will be post-matric, employer-trained, job-specific personnel. Our analysis of operational and maintenance jobs is based on 0,422 and 0,516 per MW, reflecting a lower and upper bound. The direct employment impact related to the development is indicated in **Table 12**.

An analysis of the direct employment opportunities indicates that between 118 and 144 job opportunities exist based on a lower and upper bound. The skilled jobs would account for at least 33% of the direct employment needs. The analysis suggests that 42 to 52 skilled persons would be required on a regular basis during the operational phase of the project's economic life. Other direct employment opportunities will be created through security services, cleaning and maintenance, which could result in an additional 76 to 93 direct employment opportunities. It is also imperative that the recruitment process should promote gender equality, with women employed wherever possible.

Table 12: Direct employment estimates during operations

Operational and Maintenance jobs		Lower bound	Upper bound
Jobs per MW (weighted skilled and unskilled)		0,422	0,516
Total number of direct jobs		59	72
Skilled	33%	21	26
Unskilled	60%	38	46

De Aar in the Northern Cape hosts the country's largest solar farm, spanning 473 ha and supplying enough clean renewable energy to power more than 19 000 homes. De Aar residents found that job opportunities in the region have increased, as has economic activity, but not necessarily due to the construction, which did create a couple of thousand temporary jobs. Currently, the solar farm only employs up to 20 local people at best, largely for cleaning and security (<https://www.privateproperty.co.za/advice/property/articles/the-impact-of-solar-farms-on-nearby-property-values/9231>, Accessed 12 June 2024).



Cumulative Impact: Other similar projects in the area could act synergistically to create more demand for supplies and services, which, due to the multiplier effect, would catalyse further economic growth in the area.

No-Go Alternative: Without the proposed development, the potential contribution to local employment will not be realised.

Mitigation

No mitigation applies as it represents a positive impact. However, the developers should use local labour as much as possible to ensure that the local community reaps the maximum benefit from the proposed development.

Impact Rating

The impact will be **direct and indirect, with a low positive** significance, and a **medium positive cumulative** significance.

6.3.6 Direct spend during operations

Nature of impact

The Solar PV facility will generate income for the local economy through ongoing operational expenses.

Scope and consequences of impact

The operational costs (such as land rental, insurance, grid power, repairs and maintenance, administration, etc.) presented in Table 13 are direct costs for the first 10 operational years of the PV solar component. From the 11th year, the operational costs are assumed to increase by 6% annually, reflecting the assumed inflation rate associated with the activity. In terms of operational cost, we have also assumed that two scenarios for local content, at 35% and 50%, would apply to a lower and upper bound ($\pm 10\%$) of the annual operational cost.

Table 13 indicates that R714 million to R873 million is likely to accrue as direct operational spending over the first ten years from the commencement of operations. A 35% local content, i.e., payments made for services rendered by suppliers in Gauteng, could reach approximately R250 million after ten years using a lower bound, and R306 million over the same period for an upper bound. If 50% of the anticipated operational cost accrues to local suppliers as defined, R357 million and R436 million in direct operational expenses could accrue in terms of a lower and upper bound, respectively.

Table 13: Estimated operational costs based on a 35% and 50% local procurement for a lower and upper bound

	Percentage of investment	Lower bound			Upper bound		
			Local content			Local content	
		R 1 890 000 000	35%	50%	R 2 310 000 000	35%	50%
Year 1	2,00%	R 37 800 000	R 13 230 000	R 18 900 000	R 46 200 000	R 16 170 000	R 23 100 000
Year 2	2,50%	R 47 250 000	R 16 537 500	R 23 625 000	R 57 750 000	R 20 212 500	R 28 875 000
Year 3	2,80%	R 52 920 000	R 18 522 000	R 26 460 000	R 64 680 000	R 22 638 000	R 32 340 000
Year 4	3,00%	R 56 700 000	R 19 845 000	R 28 350 000	R 69 300 000	R 24 255 000	R 34 650 000
Year 5	3,50%	R 66 150 000	R 23 152 500	R 33 075 000	R 80 850 000	R 28 297 500	R 40 425 000
Year 6	4,20%	R 79 380 000	R 27 783 000	R 39 690 000	R 97 020 000	R 33 957 000	R 48 510 000
Year 7	4,70%	R 88 830 000	R 31 090 500	R 44 415 000	R 108 570 000	R 37 999 500	R 54 285 000
Year 8	5,00%	R 94 500 000	R 33 075 000	R 47 250 000	R 115 500 000	R 40 425 000	R 57 750 000
Year 9	5,00%	R 95 067 000	R 33 273 450	R 47 533 500	R 116 193 000	R 40 667 550	R 58 096 500
Year 10	5,00%	R 95 637 402	R 33 473 091	R 47 818 701	R 116 890 158	R 40 911 555	R 58 445 079
	Total	R 714 234 402	R 249 982 041	R 357 117 201	R 872 953 158	R 305 533 605	R 436 476 579

Source: Multi-Purpose Business Solutions, based on information provided by JUWI (2024)



Over the 20 years envisaged for the facility's useful life, almost R718 million could accrue to local suppliers based on a lower bound and 35% local content (**Table 14**). Due to the backwards and inter-sectoral linkages, a further R614 million could be generated for the Gauteng economy. Based on the higher bound, a 50% take-up of local content suggests a multiplied increase of R2,33 billion in GVA for the Gauteng economy.

Table 14: Estimated contribution to Gauteng GVA over 20 years based on sensitivities of 50% and 35%

Spend category	Local content		Local content	
	35%		50%	
	Lower bound	Upper bound	Lower bound	Upper bound
Direct	R 717 656 102	R 877 135 236	R 1 025 223 003	R 1 253 050 337
Indirect	R 614 457 155	R 751 003 189	R 877 795 935	R 1 072 861 698
Multiplied increase	R 1 332 113 256	R 1 628 138 425	R 1 903 018 938	R 2 325 912 035

Source: Multi-Purpose Business Solutions

No-Go Alternative: The benefits of local spending will not be realised.

Cumulative Impact: Additional renewable energy developments in the area will further stimulate economic growth and/or contribute towards infrastructure development.

Mitigation measures

No mitigation applies as it represents a positive impact. However, using local suppliers retains income in the economy, so developers must make every effort to procure local suppliers and maximise the economic benefit for the Merafong economy.

Impact Rating

The impact will be **direct and indirect, with a medium positive** significance, and a **medium-high positive cumulative** significance.

6.4 Decommissioning

Solar and wind energy technology is essentially reversible, and decommissioning of a renewable energy facility is straightforward compared to the problems associated with decommissioning a nuclear power station or coal or gas-fired plants. The concrete bases could be removed or covered with peat, stone, or other indigenous material, and the site could be returned to its original state as closely as practicable. The way that a local authority wishes to have a renewable energy facility decommissioned should be covered by clauses in its planning permission, which typically require all visible traces of the renewable energy facility to be removed.

In the case of a Solar farm, the decommissioning phase involves the disassembly and/or replacement of the existing PV panels with modern technology, which usually happens 20 to 30 years after the initial commissioning. The decommissioning phase could create additional construction-related employment opportunities, rather than the typical job loss associated with decommissioning. If the PV panels are disassembled and the site is not further utilised for solar energy production, the land must be rehabilitated to its former state. The environmental rehabilitation of disturbed areas is the responsibility of the developers, who should make provision for this in their long-term budget.

The major social impacts associated with the decommissioning phase are the loss of jobs and the resulting income. This has significant implications for the affected households and the communities in which retrenched workers reside. However, when the solar energy plant is finally decommissioned, the impacts are usually limited to a



relatively small number of permanent employees. These potential impacts can be effectively managed by implementing a retrenchment and downscaling programme, or even reassignment to another solar energy project.

Decommissioning Dilemmas: Navigating the End-of-Life Challenges in Clean Energy Sources

<https://www.powermag.com/decommissioning-dilemmas-navigating-the-end-of-life-challenges-in-clean-energy-sources/>

“Because solar panels and wind turbines typically have a useful life of about 20 to 30 years, experts have urged renewable energy project owners, developers, and other participants to plan for project end-of-life obligations. Solar PV decommissioning typically entails equipment removal, reuse, recycling, and disposal of PV modules. In contrast, wind farm decommissioning involves more steps, including site preparation, laying down the blades, hub, and other wind turbine components, disassembling and cutting, material management, and site rehabilitation.

According to the Electric Power Research Institute (EPRI), some of the biggest challenges the solar, wind, and lithium-ion battery storage industries face relate to managing EOL waste volumes. The independent power-industry research entity suggests that by 2030, global cumulative end-of-life (EOL) PV panels could reach 8 million metric tons (equivalent to approximately 1.2 million dumpsters). By 2050, those numbers could increase to 78 million metric tons (approximately 12 million dumpsters).

“EOL management of existing energy technologies is increasingly viewed as an opportunity to maximise [return on investment] of the critical materials within them; however, only a limited number of EOL management processes are currently in place across the range of technology vendors and project developers, and the extent to which they meet utility sustainability, certification, and liability requirements varies,” EPRI notes. So far, a range of stakeholders, including technology industries, waste management and recycling industries, electric utilities, and environmental regulators “actively recognise future waste volumes as a resource to be reused rather than to be disposed,” EPRI added. However, as “EOL volumes of solar PV panels, wind turbines, and electric vehicle and grid-scale battery energy storage systems increase, electric utilities are attempting to identify how to responsibly and cost-effectively manage these materials.”

For solar panels, at least, custom PV recycling options are emerging to recover high-value materials, such as silver, copper, and silicon. Still, according to U.S. Department of Energy data from 2022, recycling prices hover at roughly \$15 to \$45 per module, “which is an order of magnitude higher than disposal in a landfill fee, which is roughly \$1–\$5 per module,” EPRI noted. The organisation’s technical briefs suggest that, as a good practice, utilities should identify the need to plan for decommissioning solar PV early during project development, which could allow for “several actions at the point of facility design and procurement to reduce risks and influence options for asset management.

7 SOCIAL INVESTMENT AND MONITORING INITIATIVES

7.1 Social investment and community engagement

Social investment initiatives have become a standard inclusion in development proposals submitted to relevant government departments at local, provincial, and national levels. Developers of renewable energy facilities are required and expected to indicate the extent to which the development project will contribute to the socio-economic welfare of surrounding communities and enterprise development through social investment initiatives.

A need exists to align communities' development priorities with the Developers' socio-economic obligations. Multi-Purpose Business Solutions has prepared a framework to provide developers with a sense of direction when assessing what initiatives could be considered part of a social investment programme. **Figure 14** illustrates a matrix consisting of four quadrants based on the nature of the intended investment and the “capital” introduced by the developer as part of the social investment.

	Abstract capital	Physical capital
Active Investment	• Grants • Bursaries • In-house training • Education • Development of small, medium and micro businesses • Youth training initiatives • Environmental initiatives (nursery and training initiatives) • Enterprise development opportunities	• Upgrading of community health facilities (e.g. clinics) • Upgrading and maintenance of sports fields • Construction of new skills development/training facilities • Provision or upgrading of infrastructure (with advantage for the community) • Development or conversion of existing buildings to multi-purpose centres • Community gardening project and farming projects
Passive Investment	• Establishment of community trust funds for environment and development • Provision of guarantees • Advancing preferential terms	• Build a facility and transfer ownership to a community trust for application to the community • Maintenance of community facility

Figure 14: An illustrative matrix of social investment options for Developers

Source: Multi-purpose Business Solutions ©

Notes:

Abstract capital: Active investments refer to time and funds invested in initiatives such as bursaries and in-house training. Passive investment refers to allocating funds to a community trust or other vehicle that disburses the funds to community third parties and projects.

Physical capital: Active investment implies direct investment in the needs of communities by providing new or upgrading existing community facilities such as healthcare centres, schools and recreation and sports facilities. Passive investment in this context refers to establishing a facility for the community, which is then transferred to a trust or other type of entity to administer and maintain the facility on behalf of the community.

It should be noted that the term “social investment” has a broad meaning in this context. In this framework, a distinction is made between (1) physical and abstract capital reflecting the difference between actual funds invested in assets and “in-kind” investment in people, and (2) active and passive investment reflecting the degree of the developer’s actual involvement in the community either directly or through a third party, which could be an entity or other vehicle. A developer could select any one or a combination of the social investment initiatives illustrated in **Figure 13**. We suggest that the application indicate the nature and scope of the social investment, as well as whether a passive or active investment approach will be followed. Our assessment suggests that the type of investment that should be considered by the Developer, based on an agreement with various stakeholders, must achieve the highest impact. These needs should also align with the socio-economic development obligations that bidders must adhere to as part of the economic development scorecard. The latter is a requirement as part of the bidders’ submission to the Department of Energy.



7.2 Socio-Economic Development (SED) and Enterprise Development (ED) commitments

The Independent Power Producer Procurement Programme requires that operators allocate a percentage of their project's Gross Operating Surplus (GOS) to Socio-Economic Development and Enterprise Development initiatives. It is not stipulated how this money must be spent, only that at least 0.6% and 1.5% of GOS should be used to uplift communities within a 50 km radius of the project site through SED and ED initiatives, respectively.

The case of De Aar

Kerry Dimmer | Aug 28, 2023

De Aar in the Northern Cape is host to the country's largest solar farm, in fact, in the entire sub-Saharan region. Its site spans 473 hectares on a 2 674 hectares farm. It supplies enough clean renewable energy to power more than 19 000 homes. De Aar hasn't necessarily attracted new residents due to its solar farm development, nor are locals receiving any benefits. Approximately 24 000 residents are still exposed to load shedding, and the promised share dividends from the Independent Power Producers (IPPs) are yet to be honoured, given that IPPs are still paying back loans to development finance institutions. What De Aar residents have found, however, was that job opportunities in the region have increased, as has economic activity, but not necessarily due to the construction, which did create a couple of thousand temporary jobs. Currently, the solar farm employs up to 20 local people at most, primarily in cleaning and security roles. Where the opportunities lie instead are indirectly attributable to community trusts investing in scholarships for students to qualify as technicians who will run the green power projects.

The De Aar local government is also anticipating benefits in the future through the production of renewable energy, in a similar way that mining can transform a town's wealth or desirability. Whether this will attract more property buyers cannot be determined, but during development and construction, leasing plots in the area was offered at low rates to attract more people to the region.

Source: <https://www.privateproperty.co.za/advice/property/articles/the-impact-of-solar-farms-on-nearby-property-values/9231>
(Accessed 12 June 2024)

7.3 Monitoring framework

An essential component of determining the success of a project from a socio-economic perspective entails monitoring, reviewing and evaluating processes to assess the adherence to socio-economic obligations. Continuous and periodic monitoring and evaluation are required to ensure the achievement of milestones and the overall success of achieving the socio-economic objectives envisaged for the Project. The following activities are geared towards achieving acceptable and ongoing monitoring standards:

- Regular field visits to the project and stakeholders benefiting from the project.
- A review after the first six months after implementation to assess the overall progress and achievement of the objectives and milestones related to the specified targets of employment, skills development, small business development and capacity building.

To monitor the performance related to the achievement of the socio-economic development obligations, the contractor should record and report progress with agreed socio-economic obligations. Typical reporting information should include:

- a) Actual total expenditure on Total Procurement;
- b) Actual total expenditure on Procurement of Materials;
- c) Actual total expenditure on Sub-contracting;
- d) Actual total employment categorised according to standard Occupational Categories; and
- e) Actual total payroll.



The successful implementation and development of the proposed project will ultimately be assessed based on the contribution the project makes during construction and operations to the social development and economic goals of employment creation, skills development and training, small business development, and capacity building in the area. The following Key Performance Areas (KPA) are outcomes based on the scope of social engagement activities:

- Procurement from, or sub-contracting to local enterprises;
- Procurement from, or sub-contracting to enterprises from outside the local area;
- Procurement of local materials/resources;
- Procurement of materials from outside the Merafong Municipality; and
- Recruitment process that promotes gender equality.



8 SUMMARY OF IMPACTS & RECOMMENDATIONS

8.1 Summary of socio-economic impacts

Our assessment determined that the project would have positive and negative socio-economic consequences. Thus, it is necessary to determine whether mitigation of the negative impacts could be implemented and to what extent the developer would be willing to introduce the recommended mitigation measures.

Our assessment determined that the project would have positive and negative socio-economic consequences. Thus, it is necessary to determine whether mitigation of the negative impacts could be implemented and to what extent the developer would be willing to introduce the recommended mitigation measures. The development of the Carpe Diem North SPP with an output of 150 MWp is assessed as the **Preferred Alternative** and compared with the **No-Go Alternative** (maintaining the *status quo*). The latter will have no socio-economic impact and is therefore not scored.

The different socio-economic impacts associated with the proposed Carpe Diem North Solar project and their respective significance after implementing mitigation measures proposed by the relevant specialists (i.e. the **residual impact**) are summarised below. The **Cumulative** impact refers to the impact of the Preferred Alternative when considered together with other renewable energy projects within 30 km of the proposed site. This includes the proposed 300 MWp Carletonville SPP and 150 MWp Carpe Diem South SPP within 5 km of the Carpe Diem North site.

The significance of the impacts after mitigation (refer to **Annexure B**) can be summarised as follows:

Nature of the Impact	Carpe Diem North	Cumulative
Construction		
Nuisance factors (dust and noise)	Low (-)	Moderate (-)
Influx of job seekers	Low (-)	Moderate (-)
Construction workers – local communities	Low (-)	Moderate (-)
Increase in local crime	Low (-)	Moderate (-)
Local economic income and employment	Moderate (+)	Moderate-High (+)
Operations		
Provision of renewable energy	Moderate (+)	High (+)
Sense of place	Low (-)	Moderate (-)
Increase in local crime	Low (-)	Low (-)
Surrounding property values	Low (+)	Low (+)
New employment opportunities	Low (+)	Moderate (+)
Direct spending	Moderate (+)	Moderate-High (+)

Potential positive impacts

Several benefits are associated with the proposed Carpe Diem North Solar project:

- Once operational, the proposed Solar PV Plant will **produce up to 150 MWp of renewable energy**, which can be delivered to Eskom or the local area. Combined with other renewable energy facilities in the area, it could reduce the local economy's dependence on expensive electricity provided by Eskom.
- Job creation:** The project could sustain about 8 208 (direct, indirect and induced) employment opportunities during construction, whereafter some of these jobs will start to taper away. This number is based on the



estimated project cost during construction (CAPEX), which includes off-site expenditures on goods, services, and other related items. If only on-site employment during construction is considered, 425 to 520 employment opportunities could be sustained throughout the construction period.

Between 59 and 72 job opportunities could be created during operations, represented by 21 to 26 skilled persons and 38 to 46 unskilled employment opportunities. The recruitment process must promote gender equality, with a focus on employing women wherever possible.

- **Contribution towards economic income:** During the construction phase, an estimated R2,1 billion could generate R5,69 billion in new business sales, referred to as the production (or output) that creates demand for business activity over the construction period. The increase in production output could add R1,82 billion (net of the import leakage) to the GGP of Gauteng during the construction period. As a result of the job opportunities created through the proposed interventions, household incomes from job opportunities could increase by R1,55 billion during construction.

Between R714 million and R873 million is likely to accrue as direct operational spending over the first ten years from the commencement of operations. A 35% local content, i.e., payments made for services rendered by suppliers in Gauteng, could reach approximately R250 million after ten years using a lower bound, and R306 million over the same period for an upper bound. If 50% of the anticipated operational cost accrues to local suppliers as defined, R357 million and R436 million in direct operational expenses could accrue in terms of a lower and upper bound, respectively.

Over the 20 years envisaged for the facility's useful life, almost R718 million could accrue to local suppliers based on a lower bound and a 35% local content requirement. Due to the backwards and intersectoral linkages, an additional R614 million could be generated for the Gauteng economy. Based on the higher bound, a 50% take-up of local content suggests a multiplied increase of R2,33 billion in GVA for the Gauteng economy.

- **Real estate values of surrounding land:** Since the Carletonville area has become a hotspot for solar PV plants, there may be a demand for land parcels to be developed, which would increase the perceived property value.

Potential negative impacts

The following potential negative impacts have been identified:

- **Sense of place (operations):** The solar panels and associated infrastructure will impact the sense of place for sensitive receptors within 3 km of the proposed development site. However, the area is home to extensive mining operations that have already changed the sense of place from rural to industrial.
- **Dust and noise (construction):** The impact will be low due to the limited number of receptors near the construction sites.
- **Influx of job seekers (construction):** A significant number of employment opportunities will be created during the construction phase, attracting job seekers from the surrounding communities.
- **Construction workers** may explore the local community for leisure and social activities. This could lead to social ills that can impact local families and their social structures.
- **Increase in crime levels (construction and operations):** On-site activities could attract criminals, but this could be mitigated with effective security measures and access control.

Cumulative impacts

Cumulative impacts refer to other similar developments within 30 km that could compound any positive or negative impacts associated with the proposed development. Potential negative impacts would be compounded, such as a sense of place, influx, traffic, crime, and nuisance factors. The benefits of several renewable energy projects will also be compounded, particularly in terms of skills development in a sector that is still in its infancy in South Africa. Contributing to economic income and local authorities could catalyse further economic development, whilst a compounded demand for goods and supplies could provide new business opportunities. There are several other renewable energy projects within 30 km of the Carpe Diem North site, including the proposed 300 MWp Carletonville SPP and 150 MWp Carpe Diem South SPP within 5 km.



Mitigation measures

Many potential impacts could be mitigated by introducing the measures proposed by various specialists; these must be considered and implemented by the developer. Monitoring and evaluating socio-economic impacts, as well as assessing outcomes, would further inform the social and economic fabric and the impact on surrounding land users. The following mitigation measures related to the **socio-economic context** are proposed and should be consolidated into an Implementation Plan as part of the Construction Environmental Management Plan (CEMP) and/or Operational Environmental Management Plan (OEMP).

Pre-construction (CEMP)	
Procurement Strategy that includes the following and applies to the project: (e) Initiate the activity during the first phase of the development; (f) The strategy is the responsibility of the contractor(s) collectively under the guidance of the Municipality; (g) Focus on opportunities for local labour in the surrounding areas and businesses as a priority. Contractors are required to indicate the geographical location of sub-contractors (businesses) and local labour; and (h) Local contractors invited to tender for work in the context of the terms and conditions included in RFP documentation, which would include skills development, on-site training, gender equality, etc.	
Pre-construction & Construction (CEMP)	
Communication Protocols that address directly and indirectly affected residents and surrounding landowners, with specific reference to activities, timelines and intended impacts related to the construction phase and all related activities associated with the implementation of the project (i.e. during the operational phase). Objectives • To orientate, generate awareness and gain positive attitudes among stakeholders as far as possible; and • To engage and inform stakeholders of progress regarding all phases of construction. Target audience • Property owners and users of the land portions directly surrounding the proposed activity; and • Other stakeholders and property owners that may be affected. Major types of messages • Inform directly affected residents on the periphery of the development site and others that would frequent the area; • The commencement date for construction activities related to the project; • Duration and extent of the construction activities and details of individual construction activities; • Progress updates, including any delays in a construction-related activity; and • Introduce appropriate signage to warn persons frequenting the area and those residing adjacent to the development area.	
Construction phase	
Nuisance factors (dust and noise)	Dust and noise emissions during the construction period should be minimised through a Construction Environmental Management Plan (CEMP). The noise could also be reduced with mufflers and silencers on large trucks, as well as restricting activities to working hours.
Influx of job-seekers, impact on local communities	Contractors need to employ people from the immediate area whenever possible.
Construction phase	
Increase in local crime	Co-operation between the Developer and contractors is essential to ensure that the area around the proposed development remains secured during construction. On-site security measures, such as perimeter fencing, controlled access and security guards and patrols will minimise the risk.



Operational phase	
Sense of place	Implementing recommendations made by relevant specialists to mitigate potential negative impacts

Impact statement

The most significant socio-economic **benefit** from the proposed Carpe Diem Solar North SPP is the anticipated production of **150 MWp of renewable energy**, which can be delivered to Eskom or the local area. In terms of **economic benefits**, an estimated R2,1 billion in capital investment could add R1,82 billion (net of the import leakage) to the GGP of the Gauteng economy during construction. Between R714 million to R873 million is likely to accrue as direct operational spending over the first ten years from the commencement of operations. The project could sustain about 8 208 (direct, indirect and induced) employment opportunities during construction and create 59 to 72 new job opportunities during operations. Several potential **minor negative impacts** were identified, mainly related to the sense of place, dust and noise, influx and criminal activities. However, if the site is properly managed and national regulations are followed, along with the mitigation measures recommended by various specialists, the significance of these impacts will be low to moderate.

Our assessment is that the social benefits of the proposed development outweigh the potential costs, but this must be considered in the context of an operation that adheres to local and national operational guidelines.



9 REFERENCES

- Aviata Consulting (2023): *Aviation Glint & Glare Assessment: The Proposed 150MW Carpe Diem Solar PV Facility, Merafong City, Gauteng, South Africa*. Link Hills.
- CSIR (2015): *Strategic Environmental Assessment for Wind and Solar Photovoltaic Energy in South Africa*. Stellenbosch.
- CSIR (2019): *Phase 2 Strategic Environmental Assessment for Wind and Solar Photovoltaic Energy in South Africa*. Stellenbosch.
- Delta Ecology (2023): *Aquatic Biodiversity Impact Assessment: Proposed Carpe Diem Solar Photovoltaic Plant, Merafong City, Gauteng Province*. Cape Town.
- GEOSS (2023): *Desktop Geohydrological Assessment for groundwater development and identification of potential borehole locations, Carpe Diem Solar PV Facility, near Carletonville*. Stellenbosch.
- Department of Trade and Industry (2018): *Industrial Policy Action Plan 2018/19-2020/2021*. Pretoria.
- Department of Energy (2019): *Integrated Resource Plan 2019*. Pretoria.
- Department of Mineral Resources and Energy (2023): *Draft Integrated Resource Plan 2023*. Pretoria.
- Enviro Insight (2023): *Avifaunal Assessment: Scoping Impact Assessment for the proposed Carpe Diem Solar PV Facility located on Portion 5 of Farm Varkenslaagte No. 119 and Portion 27 of Farm Doornfontein No. 118, Gauteng Province*. Pretoria.
- Gauteng Department of Local Government and Housing (2010): *Gauteng Integrated Energy Strategy*. Johannesburg.
- Gauteng Provincial Government (2010): *Gauteng Employment, Growth and Development Strategy for 2009-2014*. Johannesburg.
- Gauteng Provincial Government (2014): *Gauteng Provincial Environmental Management Framework*. Johannesburg.
- Gauteng Provincial Government (2014): *Gauteng Transformation, Modernisation and Re-industrialisation Strategy (TMR)*. Johannesburg.
- Gauteng Provincial Government (2016): *Gauteng Spatial Development Framework 2030*. Johannesburg.
- Gauteng Provincial Government (2021): *Spatial Development Framework 2030 Review – Electricity & ICT*. Johannesburg.
- Gauteng Provincial Government (2022): *Draft Sector Acceleration Action Plan - Energy*. Johannesburg.
- Graham Young Landscape Architect (2025): *Carpe Diem Solar Park Visual Impact Assessment*. Groenkloof.
- Independent Power Producer Office (2020a): *Independent Power Producers Procurement Programme (IPPPP): An Overview*. Centurion.
- Independent Power Producer Office (2020b): *REIPPPP focus on Western Cape: Provincial Report Volume 3*. Centurion.
- Koleko (2023): *Carpe Diem PV Traffic Scoping Assessment Report*. Johannesburg.
- Lanz, J. (2023): *Site Sensitivity Verification and Agricultural Compliance Statement for the Carpe Diem Solar Energy Facility near Carletonville in Gauteng Province*. Cape Town.
- Merafong City Local Municipality (2022a): *Merafong City Draft Annual Report 2021/2022*. Carletonville.
- Merafong City Local Municipality (2022b): *Merafong City Local Municipality Integrated Development Plan 2022-2023*. Carletonville.
- National Planning Commission (2012a): *National Development Plan 2030: Our Future – make it work*. Pretoria.
- National Planning Commission (2012b): *National Infrastructure Development Plan 2030*. <https://www.gov.za/issues/national-infrastructure-plan>.



National Planning Commission (2022): *Draft National Infrastructure Plan 2050*.
https://www.gov.za/sites/default/files/gcis_document/202203/46033gon1874.pdf

Quantec Enterprises (Pty) Ltd. (2022): *South African standardised industry indicator database: Sources and description*. Unpublished.

Republic of South Africa (2014): *Integrated Environmental Management Guideline Series 9: Guideline on the need and desirability in terms of the Environmental Impact Assessment (EIA) Regulations 2010*. Government Gazette (No. 38108), Notice 891 of 2014. Pretoria.

SAPS (2025): *SAPS Crime Statistics 2024_2025_3rd_Quarter*. Available at
<https://www.saps.gov.za/services/crimestats.php>

Statistics South Africa (2013): *National Population Census of the South African Population, 2011*. Pretoria.

United Nations (2015): *Transforming our world: the 2030 Agenda for Sustainable Development*. Department of Economic and Social Affairs & Sustainable Development. <https://sdgs.un.org/2030agenda>.

West Rand District Municipality (2020): *West Rand District Municipality Spatial Development Framework: Draft Report, Phase 3: Spatial Proposals & Phase 4: Implementation Framework*. Randfontein.

West Rand District Municipality (2021): *District One Plan: West Rand District*. Randfontein.

West Rand District Municipality (2022): *West Rand District Municipality Integrated Development Plan 2022/23 – 2026/27 as Reviewed in 2022/23*. Randfontein.



ANNEXURE A: IMPACT RATING METHODOLOGY

The following methodology has been applied to the prediction and assessment of impacts. Potential impacts have been rated in terms of the direct, indirect, and cumulative nature of the impact:

- **Direct** impacts – are impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity. These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable;
- **Indirect** impacts – of an activity are indirect or induced changes that may occur because of the activity. These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken, or which occur at a different place because of the activity;
- **Cumulative** impacts – are impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present, or reasonably foreseeable future activities. Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time and can include both direct and indirect impacts.

The significance of each potential impact, with and without the implementation of the proposed mitigation measures, will be assessed based on the following variables (evaluation components):

- **Spatial extent** – The size of the area that will be affected by the impact;
- **Intensity (or Magnitude)** – The anticipated severity of the impact;
- **Duration** – The timeframe during which the impact will be experienced;
- **Probability** – The probability of the impact occurring;
- **Reversibility** – The “reversibility” of the environmental impacts of the proposed development after project cessation or decommissioning; and
- **Irreplaceability** – The “irreplaceability” of natural characteristics in the area that may be impacted upon by the proposed development.

Using the criteria above, the impacts will further be assessed with the use of quantifiable values as described below:

Evaluation of criteria, by means of quantitative ratings and descriptions

Criteria	Description	Quantitative Rating
Duration	Temporary (less than a year)	1
	Short term (1 to 6 years)	2
	Medium term (6 to 15 years)	3
	Long term (the impact will cease after the operational life of the activity)	4
	Permanent (mitigation will not occur in such a way or in such a time span than the impact can be considered transient)	5
Spatial extent	Site specific	1
	Local (less than 2 km from the site);	2
	Regional (within 30 km of the site)	3
	National (beyond Provincial boundaries and within National boundaries)	4
	International / Transboundary (Beyond National boundaries)	5
Intensity Applicable to Negative Impacts (at indicated spatial extent)	None (Biophysical and/or social functions and/or processes will remain unaltered)	0
	Very Low (Biophysical and/or social functions and/or processes might be negligibly altered)	2
	Low (Biophysical and/or social functions and/or processes might be	4



	slightly altered)	
	Medium (Biophysical and/or social functions and/or processes might be notably altered)	6
	High (Biophysical and/or social functions and/or processes might be considerably altered)	8
	Very High (Biophysical and/or social functions and/or processes might be severely altered)	10
Intensity Applicable to Positive Impacts (at indicated spatial extent)	None (Biophysical and/or social functions and/or processes will remain unaltered)	0
	Very Low (Biophysical and/or social functions and/or processes might be negligibly enhanced)	2
	Low (Biophysical and/or social functions and/or processes might be slightly enhanced)	4
	Medium (Biophysical and/or social functions and/or processes might be notably enhanced)	6
	High (Biophysical and/or social functions and/or processes might be considerably enhanced)	8
	Very High (Biophysical and/or social functions and/or processes might be substantially enhanced)	10
Probability	Improbable (5% to no chance of occurring)	1
	Probable (5% - 25% chance of occurring)	2
	Medium Probability (25% - 75% chance of occurring)	3
	Highly probable (75% - 95% chance of occurring)	4
	Definite (greater than 95% chance of occurring)	5
Reversibility	No impact	0
	Impact will be reversible	1
	High potential that impact might be reversed	2
	Moderate potential that impact might be reversed	3
	Low potential that impact might be reversed	4
	Impact cannot be reversed	5
Irreplaceability	None	0
	Very low potential for loss of irreplaceable resources	1
	Low potential for loss of irreplaceable resources	2
	Moderate potential for loss of irreplaceable resources	3
	High potential for loss of irreplaceable resources.	4
	Definite loss of irreplaceable resources	5
CUMULATIVE impact	High: The activity is one of several similar pasts, present or future activities in the same geographical area, and might contribute to a very significant combined impact on the natural, cultural, and/or socio-economic resources of local, regional or national concern.	
	Medium: The activity is one of a few similar pasts, present or future activities in the same geographical area, and might have a combined impact of moderate significance on the natural, cultural, and/or socioeconomic resources of local, regional or national concern.	
	Low: The activity is localised and might have a negligible cumulative impact.	
	None: No cumulative impact on the environment.	

Once the evaluation components have been ranked for each impact, the significance of potential impact are assessed (or calculated) using the following formula:

$$\text{SP (significance points)} = (\text{intensity} + \text{duration} + \text{spatial extent} + \text{irreplaceable} + \text{reversibility}) \times \text{probability.}$$



The maximum value is 150 SP (significance points). The unmitigated and mitigated scenarios for each environmental impact should be rated as per the table below.

15 Definition of significance ratings (positive and negative)

Significance Points	Environmental Significance	Description
125 – 150	Very high (VH)	An impact of high or very-high significance which could influence a decision about whether to proceed with the proposed project, regardless of available mitigation options.
100 – 124	High (H)	Cumulative Impacts: The activity is one of several similar pasts, present or future activities in the same geographical area, and might contribute to a very significant combined impact on the natural, cultural, and/or socio-economic resources of local, regional, or national concern.
75 – 99	Moderate-high (MH)	If left unmanaged, an impact of moderate-high significance could influence a decision about whether to proceed with the proposed project. Mitigation options should be re-evaluated.
40 – 74	Moderate (M)	If left unmanaged, an impact of moderate significance could influence a decision about whether to proceed with the proposed project. Cumulative Impacts: The activity is one of a few similar pasts, present or future activities in the same geographical area, and might have a combined impact of moderate significance on the natural, cultural, and/or socio-economic resources of local, regional, or national concern.
<40	Low (L)	An impact of low significance is likely to contribute to positive decisions about whether to proceed with the proposed project. It will have little real effect and is unlikely to have an influence on project design or alternative motivation. Cumulative Impacts: The activity is localised and might have a negligible cumulative impact.
+	Positive impact (+)	A positive impact is likely to result in a positive consequence/ effect and is likely to contribute to positive decisions about whether to proceed with the proposed project.



ANNEXURE B: IMPACT ASSESSMENT OUTCOMES

PROJECT ALTERNATIVE	POTENTIAL ENVIRONMENTAL IMPACT/ NATURE OF IMPACT	ENVIRONMENTAL SIGNIFICANCE																PROPOSED MITIGATION
		BEFORE MITIGATION								AFTER MITIGATION								
		M	D	E	I	R	P	TOTAL (SP)	S	M	D	E	I	R	P	TOTAL (SP)	S	
Potential social impacts on local communities during construction																		
Nuisance factors (dust and noise)																		
Carpe Diem North	Construction activities create dust and noise at the development site that would affect nearby receptors.	4	2	2	0	1	5	45	M (-)	2	2	2	0	1	5	35	L (-)	Dust and noise emissions during the construction period should be minimised by implementing a CEMP. No Traffic Impact Assessment was done, i.e. mitigation measures were proposed to address increased traffic during construction.
Cumulative		6	2	3	0	1	5	60	M (-)	4	2	3	0	1	5	50	M (-)	
“No-Go”	No increased traffic, dust and noise related to the development site, but other activities in the area could affect nearby receptors.	-	-	-	-	-	-	-	-									
Influx of job seekers																		
Carpe Diem North	An influx of job seekers will lead to competition with local residents for employment opportunities.	4	2	2	0	1	4	36	L (-)	2	2	2	0	1	4	28	L (-)	Contractors must commit to employing people from the immediate area whenever possible.
Cumulative		6	2	3	0	1	4	48	M (-)	4	2	3	0	1	4	40	M (-)	
“No-Go”	There will be no influx of job seekers linked to the site, but other construction and/or operational activities in the area may attract job seekers.	-	-	-	-	-	-	-	-									
Local communities																		
Carpe Diem North	Incoming construction workers can disrupt family structures and social networks in local communities.	4	2	2	0	1	4	36	L (-)	2	2	2	0	1	4	28	L (-)	Local labour and local enterprises should be used, defined as residents and businesses in Merafong City. Construction workers from outside should return home regularly.
Cumulative		6	2	3	0	1	4	48	M (-)	4	2	3	0	1	4	40	M (-)	
“No-Go”	No construction workers will be linked to the specific site.	-	-	-	-	-	-	-	-									
Local crime																		
Carpe Diem North	The presence of construction workers may increase the risk of criminal activities in the area	4	2	2	0	1	4	36	L (-)	2	2	2	0	1	4	28	L (-)	Co-operation between Developer and contractors essential to ensure that the area remains secured during construction. On-site security measures, such as perimeter fencing, controlled access, security guards and patrols, will minimise the risk.
Cumulative		6	2	3	0	1	4	48	M (-)	4	2	3	0	1	4	40	M (-)	
“No-Go”	No increase in criminal activities linked to the site, but security problems remain sensitive to other activities.	-	-	-	-	-	-	-	-									
Contribution towards local economic income and employment																		
Carpe Diem North	The local and provincial economies will benefit from the procurement of goods and services and the spending of wages and salaries. Temporary employment opportunities for people with different types and levels of skills.	4	2	3	0	0	5	45	M (+)									No mitigation applies as it represents a positive impact.
Cumulative		10	2	3	0	0	5	75	M-H (+)									
“No-Go”	No contribution towards economic income	-	-	-	-	-	-	-	-									



PROJECT ALTERNATIVE	POTENTIAL ENVIRONMENTAL IMPACT/ NATURE OF IMPACT	ENVIRONMENTAL SIGNIFICANCE																PROPOSED MITIGATION
		BEFORE MITIGATION								AFTER MITIGATION								
		M	D	E	I	R	P	TOTAL (SP)	S	M	D	E	I	R	P	TOTAL (SP)	S	
Potential social impacts on local communities during operations																		
Provision of renewable energy																		
Carpe Diem North	The local community and the rest of South Africa will benefit from providing renewable energy.	4	5	4	0	0	5	65	M (+)									No mitigation applies as it represents a positive impact.
Cumulative		10	5	5	0	0	5	100	H (+)									
“No-Go”	No contribution to renewable energy will be linked to the site without the proposed development	-	-	-	-	-	-	-	-									
Sense of Place																		
Carpe Diem North	The proposed development will affect the sense of place for surrounding land users	4	5	2	0	0	5	55	M (-)	2	5	2	0	0	4	36	L (-)	The Developers should implement the mitigation measures proposed in the Visual Impact Assessment.
Cumulative		8	5	3	0	1	5	85	MH (-)	6	5	3	0	0	4	56	M (-)	
“No-Go”	The current sense of place will be retained, but other developments in the area may impact this.	-	-	-	-	-	-	-	-									
Local crime																		
Carpe Diem North	The expensive equipment on-site may attract criminal activities	4	5	1	0	1	4	44	M (-)	2	5	1	0	1	3	27	L (-)	On-site security measures, such as perimeter fencing, controlled access and security guards, will minimise the on-site risk.
Cumulative		6	5	3	0	1	4	60	M (-)	4	5	3	0	1	3	39	L (-)	
“No-Go”	No criminal activities linked to the site, but existing security problems may continue or influenced by unrelated activities.	-	-	-	-	-	-	-	-									
Surrounding property values																		
Carpe Diem North	A new development may affect the current and future perceived value of other properties in the surrounding area	4	5	2	1	2	3	42	M (-)	2	5	2	0	0	3	27	L (+)	Implementation of mitigation measures related to visual, traffic and nuisance factors will minimise negative impacts.
Cumulative		6	5	3	1	2	3	51	M (-)	4	5	3	0	0	3	36	L (+)	
“No-Go”	Real estate values would increase/decrease independently of the proposed project.	-	-	-	-	-	-	-	-									
Contribution towards employment																		
Carpe Diem North	The project will support sustainable employment for people with different types and levels of skill.	0,5	5	2	0	0	5	37,5	L (+)									No mitigation applies as it represents a positive impact.
Cumulative		4	5	3	0	0	5	60	M (+)									
“No-Go”	No contribution towards temporary employment	-	-	-	-	-	-	-	-									
Contribution towards local economic income																		
Carpe Diem North	The local and provincial economies will benefit from the procurement of goods and services and the spending of wages and salaries	3	5	4	0	0	5	60	M (+)									No mitigation applies as it represents a positive impact. However, the Developer should be cognisant of the importance of using local labour, goods and services as far as possible.
Cumulative		8	5	4	0	0	5	85	MH (+)									
“No-Go”	No contribution towards economic income	-	-	-	-	-	-	-	-									



ANNEXURE C: APPENDIX 6 CHECKLIST

Compliance with Appendix 6 of the National Environmental Management Act (NEMA) Environmental Impact Assessment (EIA) Regulations, 2014

Requirements of Appendix 6 of the 2014 EIA Regulations	Included in the report in:
(1) A specialist report prepared in terms of these Regulations must contain-(a) details of-	
(i) the specialist who prepared the report; and	Section 1.1, Annexure E
(ii) the expertise of that specialist to compile a specialist report including a <i>curriculum vitae</i> ;	
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Annexure C
(c) an indication of the scope of, and the purpose for which the report was prepared;	Section 1: Introduction & Terms of Reference
(cA) an indication of the quality and age of base data used for the specialist report;	Section 1.3.4: Limitations
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 2: Project description and Section 6: Identification of impacts
(d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 1.3: Approach & Methodology
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Section 2: Project description
(g) an identification of any areas to be avoided, including buffers;	N/A
(h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Section 2: Project description
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1.3: Assumptions and Limitations
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	Section 6: Identification of impacts
(k) any mitigation measures for inclusion in the EMPr;	Section 8
(l) any conditions for inclusion in the environmental authorisation;	Section 8
(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 8
n) a reasoned opinion-	
(i) whether the proposed activity or portions thereof should be authorised; and	
(iA) regarding the acceptability of the proposed activity or activities; and	Section 8
(ii) if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	
(o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	Section 1.3
(p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Responses to comments are provided as part of the EIA process and will be included in a Comments and Response Table prepared by the EAP.
(q) any other information requested by the competent authority.	Not applicable
(2) Where a government notice gazetted by the Minister provides for any proposal or minimum information requirement to be applied to a specialist reports, the requirements as indicated in such notice will apply.	Report prepared in accordance with Economic and Social Specialist input Guidelines issued by Department of Environmental Affairs and Development Planning.



ANNEXURE D: DECLARATION OF INDEPENDENCE



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

	(For official use only)
File Reference Number:	
NEAS Reference Number:	
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2014

PROJECT TITLE

Socio-Economic Impact Assessment: Carpe Diem North Solar project on Farm Varkenslaagte 119/5, Merafong City, Gauteng

• SPECIALIST INFORMATION

Specialist Company Name:	Multi-Purpose Business Solutions cc			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition	100%
Specialist name:	Dr Jonathan Zorah Bloom			
Specialist Qualifications:	BCom, HonsBCom, MCom, PhD			
Professional affiliation/registration:	Not applicable			
Physical address:	1479 Milano Place, Val de Vie Estate, Paarl			
Postal address:	1479 Val de Vie Estate, Paarl			
Postal code:	7646	Cell:	083 299 8523	
Telephone:	021-8800774		Fax:	086 500 2546
E-mail:	jzbloom@mweb.co.za			



• **DECLARATION BY THE SPECIALIST**

I, Jonathan Bloom, declare that –

- f) I act as the independent specialist in this application;
- g) I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- h) I declare that there are no circumstances that may compromise my objectivity in performing such work;
- i) I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- j) I will comply with the Act, Regulations and all other applicable legislation;
- k) I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- l) I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- m) all the particulars furnished by me in this form are true and correct; and
- n) I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the Specialist

Multi-Purpose Business Solutions cc

Name of Company

9 June 2025

Date



ANNEXURE E: ABBREVIATED *CURRICULUM VITAE* OF SPECIALIST

DR. JONATHAN BLOOM

NAME: Jonathan Zorah Bloom
ID NUMBER: 670626 5061 081
CURRENT STATUS: Managing Member, Multi-Purpose Business Solutions cc
NATIONALITY: South African Citizen
DATE OF BIRTH: 26 June 1967
LINGUISTIC ABILITIES: Proficient in English and Afrikaans
ADDRESS (Office): 1479 Milano Place, Val de Vie Estate, Paarl, 7646
Telephone: +27-21-880 0774
Mobile: +27-83-299 8523
Fax: +27-21-880 1721
E-mail: jbloom@mpbs.co.za

EDUCATION AND QUALIFICATIONS

1985: Matriculation at Paarl Boys' High School, Paarl
1989: BComm, Stellenbosch University
1990: HonsBComm (*cum laude*), Stellenbosch University
1992: MComm (*cum laude*), Stellenbosch University
2001: PhD (Corporate Finance), Stellenbosch University

EMPLOYMENT AND ACADEMIC EXPERIENCE

1 January 2008 to 31 July 2013: Part-time Professor of Corporate Finance, specialising in Real Estate Investment and Financing, Stellenbosch University.

1 July 2001 to 31 December 2007: Professor of Corporate Financial Management, specialising in Real Estate Investment and Financing, Stellenbosch University, with a special interest in business development.

2003 to April 2019: Director of Blue Cube Systems (Pty) Ltd and Blue Cube Intellectual Property Company (Pty) Ltd, private sector companies in the ICT industry.

1995 to present: Managing Member of Multi-Purpose Business Solutions, a niche business advisory and economic development consulting firm with a specific focus on the public and government sector.

1 July 2000 to 30 June 2001: Executive Manager of Chartered Alliance (Pty) Ltd, with assigned responsibility for the Business Services Unit within the Lateral Corporate Finance division of Chartered Alliance.

1 July 1999 to 30 June 2000: Executive Director of Crusader Systems (Pty) Ltd, charged with establishing a presence for the Business Solutions Group in the financial services industry.

1 January 1991 to 30 June 1999: Lecturer in the Department of Business Management, Stellenbosch University.



BUSINESS AND ADVISORY EXPERTISE

- Public transport (IPTN) business development and implementation
- Project Management
- Public-Private-Partnership facilitation and procurement
- Commercialisation Initiatives
- Real Estate Development Services
- Financial Appraisals and Feasibility Studies
- Social and Economic Impact Assessments
- Customer Surveys
- Local Economic Development Planning with project development focus
- Member of the Technical Assistance Unit (TAU) of the National Treasury as a professional service provider (Number - 1295 TAU)
- Member of the Public Private Partnership (PPP) Unit of the National Treasury as a professional service provider (Number - 1137 PPP UNIT)

ACHIEVEMENTS

- Y-rating from the National Research Foundation (NRF), which recognises the research and development potential of young researchers (2003).
- Member of the National Research Foundation (NRF) assessment panel for Masters and PhD prestige scholarships.
- Rector's award for Excellence in Research (2003), Stellenbosch University.

SELECTION OF PROJECT INVOLVEMENTS RELATED TO SOCIO-ECONOMIC IMPACT ANALYSES

- Socio-Economic Impact Assessment for the proposed 150 MW LPG Fuelled Power Generating Facility, Saldanha Bay, for Legacy Environmental Management Consulting.
- Socio-Economic Impact Assessment for the proposed 100 MW LPG Fuelled Power Generating Facility, Saldanha Bay, for Legacy Environmental Management Consulting.
- Socio-Economic Impact Assessment for the proposed 1000 MW Liquefied Natural Gas (LNG) to Power Plant; LNG Storage and Regassification Facility, Overhead Electricity Transmission Line, and Associated Infrastructure across various Farm Portions, Saldanha, Western Cape, for Legacy Environmental Management Consulting.
- Socio-Economic Impact Assessment for the proposed Sterrekus Solar Energy Facility & Overhead Power Lines, Blaauwberg, for Legacy Environmental Management Consulting.
- Socio-Economic Impact Assessment for the proposed Mixed Township Development on Portion 1, 8 and 21 of Grootfontein Farm No. 394IR in the City of Tshwane, for GKM Environmental.
- Socio-Economic Impact Assessment for the proposed Carletonville Solar Photovoltaic Plant on Farm 105 Twyfelvlakte, Merafong City, Gauteng, for Legacy Environmental Management Consulting.
- Socio-economic Impact Assessment for the proposed Carpe Diem Solar Photovoltaic Plant on Farms Varkenslaagte 119/5 and Doornfontein 118/27, Merafong City, for Legacy Environmental Management Consulting.
- Socio-Economic Impact Assessment for the proposed 50 MW Eland Solar PV Plant and associated Overhead Line, eMakhazeni Municipality, for Legacy Environmental Management Consulting.
- Socio-Economic Impact Assessment for the proposed Cape Winelands Airport, Fisantekraal, for Capital Expenditure Projects (Pty) Ltd.
- Socio-economic Impact Assessment for the proposed Gydo Renewable Energy Project, Witzenberg Municipality, for SPV



Renfields.

- Input for Liveable Urban Waterway (LUW) projects, including Property Analysis, Resident Perception Analysis and Socio-economic Analysis of proposed interventions, for Lukhozi Consulting Engineers: Grootboschkloof River Corridor, Keyzers River Corridor, Sand and Langevele Canal Confluence, Spaanschemat & Prinskasteel River Confluence, Westlake River (and Wetland), and Vygekraal River
- Macassar stage gate review: Supplementary analysis in support of feasibility study for the introduction of inundation measures, for Lukhozi Consulting Engineers.
- Socio-economic and Benefit-Cost Analysis for proposed Eerste River Flood Alleviation Project in Macassar; Supplementary Report: Comparative analysis of Scenario 2a and 2a(i), for Lukhozi Consulting Engineers.
- Property Analysis for proposed Eerste River Flood Alleviation Project in Macassar, for Lukhozi Consulting Engineers.
- Property Analysis for the Lourens River Flood Alleviation Phase 2 Project, for Lukhozi Consulting Engineers.
- Socio-economic and –demographic analysis and housing need assessment: Prepared as an input for the development of Erven 7444 and 5321, Macassar, for Lukhozi Consulting Engineers.
- Socio-economic and –demographic analysis and housing need assessment: Prepared as an input for the development of Erf 5113, Gordon's Bay, for Lukhozi Consulting Engineers.
- Socio-economic and –demographic analysis and housing need assessment: Prepared as an input for the Strandfontein Development Framework, for Lukhozi Consulting Engineers.
- Socio-Economic Impact Assessment for the proposed Klipheuwel Organic Waste Beneficiation and Biogas Facility on Farm Corona RE/480, Paarl, for Resource Management Services.
- Socio-Economic Impact Assessment for the proposed Ebenezer Mega Hall Centre and Sports Fields, on a Portion of Farm 727/22, Warburgh Road, Joostenbergvlakte, for Legacy Environmental Management Consulting.
- Socio-economic Impact Assessment for the proposed Cape Winelands Airport, Fisantekraal, for Capital Expenditure Projects (Pty) Ltd.
- Socio-economic Impact Assessment for the proposed Bellpark Mixed-use development, Bellville, for Legacy Environmental Management Consulting.
- Economic Scoping Assessment for the proposed Wesco Waste Management Facility (WMF) on the Farm Brakkefontein 32, Cape Town, for SLR Consulting (South Africa) (Pty) Ltd.
- Socio-economic Impact Assessment for the proposed Western Cape Wind Energy Facility, located in the Overberg REDZ, Western Cape Province, for Terramanzi Group.
- Socio-Economic Impact Assessment for the Klipfontein Solar Farm in the West Coast District for Resource Management Services.
- Socio-Economic Impact Assessment for the Stellenbosch Bridge development in Klapmuts, Stellenbosch, for Stellenbosch Bridge Properties (Pty) Ltd.
- Socio-Economic Impact Assessment for the proposed Lucullus Gardens Development, Joostenbergvlakte for Urban Land Joostenbergvlak (Pty) Ltd.
- Socio-economic Impact Statement for the additional housing on the Uitgezocht development in Paarl. Terramanzi Group commissioned the project.
- Benefit-Cost Value Assessment and socio-economic implications associated with the Picardi Residential Development, Paarl, for Arun Projects (Pty) Ltd.
- Socio-Economic Impact Assessment for the Darwin Road housing development, Joostenbergvlakte, for Lukhozi Consulting Engineers.
- Socio-Economic Impact Assessment for the Longlands Manor development in Vlottenburg, Stellenbosch for Legacy Environmental Consulting.
- Socio-Economic Impact Assessment for the proposed Klipfontein Solar Farm of the Afro Fishing facility in the Port of Mossel Bay for Afro Fishing (Pty) Ltd.
- Financial viability, cost-benefit and market analysis for a proposed Mediclinic in the George Area. The assignment adopted a strategic approach to packaging a project that had transport-related issues, location considerations and required spatial alignment (2018-2019).
- Economic impact assessment and financial modelling for the development of Waterfront in the Port of Mossel Bay for Transnet National Ports Authority (TNPA)



- Socio-Economic Impact Assessment for Substantive Amendment Application for the Levendal Development in Southern Paarl for Val de Vie Investments (Pty) Ltd.
- Socio-Economic Impact Assessment for the River Farm development in Paarl for Val de Vie Developments (Pty) Ltd.
- Socio-Economic Impact Statement for the proposed Paarl Valleij Estate in Northern Paarl for Paarl Valleij Developments (Pty) Ltd.
- Socio-Economic Impact Assessment for the proposed Gourits Abalone Farm, in association with PHS Consulting.
- Socio-economic Impact Assessment for the proposed Vlotenburg Village development on Vredenheim Farm, Stellenbosch, in association with Withers Environmental Consultants.
- Economic and financial analysis, strategy formulation input for the preparation of an Urban Development Strategy for Stellenbosch Municipal area. The assignment entailed the development of a value surplus or deficit model to assess the impact of development decisions on the socio-economic fabric of the Stellenbosch economy, communities and the Municipality from an infrastructure and operational income and expense perspective. Rode and Associates commissioned the assignment.
- The development and application of a value assessment model for the Klipmuts Special Development Area (SDA) (Stellenbosch Municipality) to assess the investment, economic and funds flow impact for a development scenario. Assignment also included a property valuation analysis and the preparation of a community investment structure supported by a SPV. Beal Africa commissioned the assignment.
- Financial Economic analysis and preparation of an Investment Decision-making Platform as an input for the George Settlement Restructuring Strategy. RoyalHaskoning DHV commissioned the assignment.
- Socio-economic impact assessment for the development of a proposed Tungsten Mining Project in Piketberg in terms of the NEMA regulations and Mineral Petroleum and Resources Act.
- Socio-Economic Impact Assessment for the Mamre Wind Energy Facility in the City of Cape Town Metropolitan Area for Mulilo Mamre Wind Energy (Pty) Ltd.
- Social and Labour Plan for the application of a Mining Right for a proposed Tungsten Project in Piketberg in terms of the Mineral Petroleum and Resources Act.
- Economic impact assessment of the construction phase for the redevelopment of the Somerset Precinct in the Cape Town area for Department of Public Works, Western Cape in association with Rode and Associates.
- Socio-economic impact assessment for the development of two mariculture sites off the coast of the Eastern Cape for the Department of Environmental Affairs and Development Planning in association with Cape Environmental Practitioners, George.
- Economic Impact Assessment and Social Impact Assessment for the Parklands development in Saldanha Bay on the West Coast for Parklands Township Developers (Pty) Ltd.
- Socio-Economic Impact Assessment for development on a portion of the farm Constantia Uitsig and Klipfontein Solar Farm of the tourism and hospitality facilities on the Farm.
- Socio-Economic Impact Assessment for the development of a residential estate in Melkbosstrand, Cape Town, for Nuplan Africa.
- Economic Impact Assessment and Social Impact Assessment with a social development focus for the Bella Riva development in the Durbanville region of the Cape Town Metropolitan Area of the Western Cape.
- Socio-Economic Impact Assessment for the development of two Wind Energy Facilities (Goereesoe and Kluitjieskraal) near Swellendam for Inca Energy (Pty) Ltd.
- Socio-Economic Impact Assessment for the proposed development of the Clover Wind and Solar Energy facility near Darling, Swartland Municipal area.
- Socio-Economic Impact Assessment for the proposed development of the Storm Photovoltaic Plant, Saldanha Bay, for Midnight Storm Investments 184 (Pty) Ltd.
- Socio-Economic Impact Assessment for the proposed development of Organic Recycling Processing Facility on Portion 2 of the Farm Olyphantsfontein No. 935, Malmesbury, for Soil and More Reliance.
- Socio-Economic Impact Assessment for the proposed development of the Dysselsdorp RE-Power PV Plant, near Oudtshoorn, Western Cape, for Dysselsdorp RE-Power (Pty) Ltd.
- Socio-Economic Baseline Assessment for the proposed Schaap Kraal Philippi Horticultural Area (PHA), Cape Town, for MSP Developments (Pty) Ltd.
- Social Impact Assessment with a social development focus for the Bosbokkamp Residential development in Stilbaai, Western Cape for Asla Devco (Pty) Ltd.