APPENDIX

H-8 SOCIO-ECONOMIC

SOCIAL IMPACT ASSESSMENT

MUKONDELELI WIND ENERGY FACILITY

MPUMALANGA PROVINCE

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Prepared

By

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EXECUTIVE SUMMARY

INTRODUCTION AND LOCATION

Assessment (EIA) process for the proposed up to 300 MW Mukondeleli Wind Energy Facility (WEF) located approximately 8-10 km south of the town of Secunda in the Mpumalanga Province. The energy generated from the facility will used to produce green hydrogen at the proposed Green Hydrogen Electrolyser facility located at Sasol Secunda. The project site is situated within the Govan Mbeki Municipality (GMM), located within the Gert Sibanye District Municipality (GSDM).

Tony Barbour Environmental Consulting was appointed to undertake a specialist Social Impact Assessment (SIA) as part of an EIA process.

SUMMARY OF KEY FINDINGS

KEY FINDINGS

The key findings of the study are summarised under the following sections:

- Fit with policy and planning.
- Construction phase impacts.
- Operational phase impacts.
- Cumulative impacts.
- Decommissioning phase impacts.
- No-development option.

POLICY AND PLANNING ISSUES

The development of renewable energy is strongly supported at a national, provincial, and local level. The development of and investment in renewable energy is supported by the National Development Plan (NDP), New Growth Path Framework and National Infrastructure Plan, which all refer to and support renewable energy. Development of renewable energy is also supported at a provincial and local level. The development of the proposed WEF is therefore supported by key policy and planning documents.

CONSTRUCTION PHASE

The key social issues associated with the construction phase include:

Potential positive impacts

- Creation of employment and business opportunities, and the opportunity for skills development and on-site training.

The construction phase will extend over a period of approximately 36 months and create in the region of 220 employment opportunities. Members from the local communities in Secunda and the GMM would qualify for the majority of low skilled and semi-skilled employment opportunities and a number of skilled opportunities. The Most of these employment opportunities will accrue to Historically Disadvantaged (HD) members from the local community. Given relatively high local unemployment levels and limited job opportunities in the area, this will represent a significant, if

localised, social benefit. A percentage of the wage bill will be spent in the local economy which will also create opportunities for local businesses in Secunda and the MM. The capital expenditure associated with the construction phase will be approximately R 2.5-3 billion (2022 Rand value). This will create opportunities for local companies and the regional and local economy. Due to the presence of the mining and energy sector, there are likely to suitably qualified companies in Ermelo that can provide the required services and products. The local service sector will also benefit from the construction phase. The potential opportunities would be linked to accommodation, catering, cleaning, transport, and security, etc. associated with the construction workers on the site.

Potential negative impacts

- Impacts associated with the presence of construction workers on local communities.
- Impacts related to the potential influx of jobseekers.
- Increased risks to livestock and farming infrastructure associated with the construction related activities and presence of construction workers on the site.
- Increased risk of grass fires associated with construction related activities.
- Nuisance impacts, such as noise, dust, and safety, associated with construction related activities and vehicles.
- Impact on productive farmland.

The findings of the SIA indicate that the significance of the potential negative impacts with mitigation will be **Low Negative**. The potential negative impacts associated with the proposed construction phase can therefore be effectively mitigated if the recommended mitigation measures are implemented. Table 1 summarises the significance of the impacts associated with the construction phase.

Table 1: Summary of social impacts during construction phase

Impact	Significance No Mitigation/Enhancement	Significance With Mitigation/Enhancement
Creation of employment and business opportunities	Medium (Positive)	Medium (Positive)
Presence of construction workers and potential impacts on family structures and social networks	Low (Negative)	Low (Negative)
Influx of job seekers	Low (Negative)	Low (Negative)
Safety risk, stock theft and damage to farm infrastructure associated with presence of construction workers	Medium (Negative)	Low (Negative)
Increased risk of grass fires	Medium (Negative)	Low (Negative)
Impact of heavy vehicles and construction activities	Medium (Negative)	Low (Negative)
Loss of farmland	Medium (Negative)	Low (Negative)

OPERATIONAL PHASE

The following key social issues are of relevance to the operational phase:

Potential positive impacts
- Generate renewable energy to produce green hydrogen and ammonia.
- Creation of employment opportunities.
- Benefits associated with establishment of community trust.
- Benefits for local landowners.

The proposed project will supplement South Africa's energy and assist to improve energy security. In addition, it will also reduce the country's reliance on coal as an energy source. This represents a positive social benefit.

Potential negative impacts
- Visual impacts and associated impacts on sense of place.
- Potential impact on property values.
- Potential impact on tourism.

The findings of the SIA indicate that the significance of all the potential negative impacts with mitigation will be **Low Negative**. The potential negative impacts can therefore be effectively mitigated. The significance of the impacts associated with the operational phase are summarised in Table 2.

Table 2: Summary of social impacts during operational phase

Impact	Significance No Mitigation/Enhancement	Significance With Mitigation/Enhancement
Generate renewable energy to produce green hydrogen and ammonia	Moderate (Positive)	High (Positive)
Creation of employment and business opportunities during maintenance	Low (Positive)	Medium (Positive)
Benefit associated with community trust	Moderate (Positive)	High (Positive)
Benefits for landowners	Low (Positive)	Medium (Positive)
Visual impact and impact on sense of place	Low (Negative)	Low (Negative)
Impact on property values	Low (Negative)	Low (Negative)
Impact on tourism	Low (Negative)	Low (Negative)

CUMULATIVE IMPACTS

Cumulative impact on sense of place
The establishment of the proposed WEF and other renewable energy facilities in the area will create the potential for combined and sequential visibility impacts. However, the impact on the areas sense of place should be viewed within the context of the impact of the Secunda industrial complex on areas sense of place. The areas sense of place has also been impacted by large-sale mining operations. The potential visual impact on the areas sense place is therefore likely to be limited.

Cumulative impact on local services and accommodation
The potential cumulative impact on local services and accommodation will depend on the timing construction phases for the different renewable energy projects in the area. With effective planning the significance of the potential impact was rated as **Low Negative**.

Cumulative impact on local economy
The significance of this impact with enhancement was rated as **Moderate Positive**.

DECOMMISSIONING

Given the relatively small number of people employed during the operational phase (~ 20), the potential negative social impact on the local economy associated with decommissioning will be limited. In addition, the potential impacts associated with the decommissioning phase can also be effectively managed with the implementation of a retrenchment and downscaling programme. With mitigation, the impacts are assessed to be Low (negative). Decommissioning will also create temporary employment opportunities. The significance was assessed to be Low (positive).

NO-DEVELOPMENT OPTION

The No-Development option would represent a lost opportunity for South Africa to generate renewable energy to produce green hydrogen and ammonia. This would represent a significant negative social cost.

CONCLUSION AND RECOMMENATIONS

Conclusion

The findings of the SIA indicate that the proposed Mukondeleli WEF project will create a number of social and socio-economic benefits, including creation of employment and business opportunities during both the construction and operational phase. In addition, the WEF will generate renewable energy to produce green hydrogen and ammonia.

The findings of the SIA also indicate that the potential negative impacts associated with both the construction and operational phase are likely to be **Low Negative** with mitigation. The potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented. The Mukondeleli WEF is therefore supported by the findings of the SIA.

Recommendations

- Substation Alternative 1 is the preferred option.
- The developer should liaise with the affected landowners to ensure that the final layout minimises the impact on productive crop land[1].

[1] Enertrag has met with the affected landowners to address the issues raised.

TABLE OF CONTENTS

CONTENTS OF THE SPECIALIST REPORT – CHECKLIST

Regulation GNR 326 of 4 December 2014, as amended 7 April 2017, Appendix 6	**Section of Report**
(a) details of the specialist who prepared the report; and the expertise of that specialist to compile a specialist report including a *curriculum vitae*;	Section 1.6, Annexure C
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Section 1.7, Annexure D
(c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 1.1, Section 1.2
(cA) an indication of the quality and age of base data used for the specialist report;	Section 1.2, Section 3
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 4
(d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	N/A for SIA
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 1.2, Annexure B
(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 4, Section 5
(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 3
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1.5
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment, or activities;	Section 4, Section 5,
(k) any mitigation measures for inclusion in the EMPr;	Section 4
(l) any conditions for inclusion in the environmental authorisation;	Section 4, Section 5
(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	N/A
(n) a reasoned opinion— i. as to whether the proposed activity, activities or portions thereof should be authorised; iA. Regarding the acceptability of the proposed activity or activities; and 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 or Environmental Authorization, and where applicable, the closure plan;	Section 5.3
(o) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Annexure A, list of interviews
(p) any other information requested by the competent authority	N/A
Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	

ACRONYMS

BESS	Battery Energy Storage System
DEA	Department of Environmental Affairs
DEA&DP	Department of Environmental Affairs and Development Planning
DM	District Municipality
EIA	Environmental Impact Assessment
GMM	Govan Mbeki Municipality
GSDM	Gert Sibanye District Municipality
HD	Historically Disadvantaged
IDP	Integrated Development Plan
IPP	Independent Power Producer
kV	Kilovolts
LED	Local Economic Development
LM	Local Municipality
MW	Megawatt
SEF	Solar Energy Facility
PGDS	Provincial Growth and Development Strategy
SDF	Spatial Development Framework
SIA	Social Impact Assessment
SIA	Social Impact Assessment

SECTION 1: INTRODUCTION

1.1 INTRODUCTION

The WSP was appointed by ENERTAG South Africa to manage the Environmental Impact Assessment (EIA) process for the proposed up to 300 MW Mukondeleli Wind Energy Facility (WEF) located approximately 8-10 km south of the town of Secunda in the Mpumalanga Province. The energy generated from the facility will used to produce green hydrogen at the proposed Green Hydrogen Electrolyser facility located at Sasol Secunda. The project site is situated within the Govan Mbeki Municipality (GMM), located within the Gert Sibanye District Municipality (GSDM) (Figure 1.1).

Tony Barbour Environmental Consulting was appointed to undertake a specialist Social Impact Assessment (SIA) as part of an EIA process.

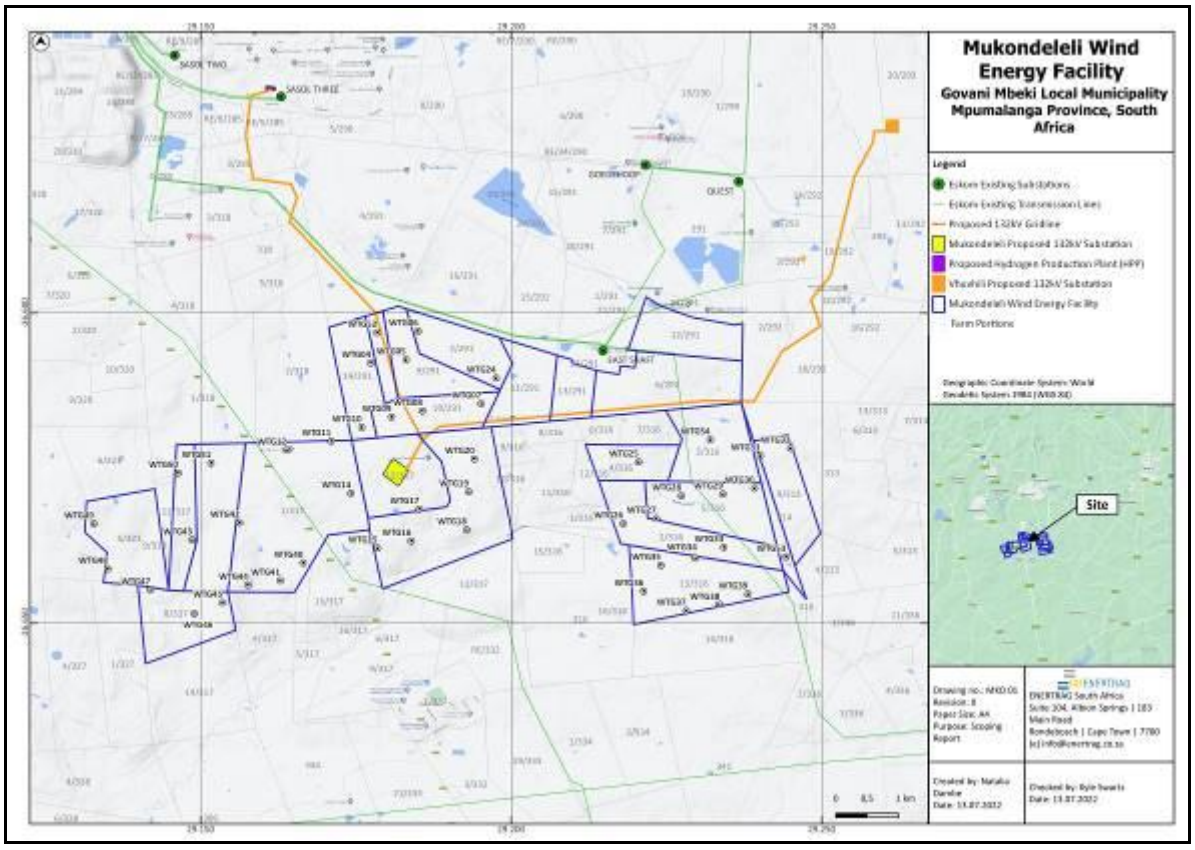


Figure 3.2: Regional location of Mukondeleli WEF site

1.2 TERMS OF REFERENCE AND APPROACH TO STUDY

The approach to the SIA study is based on the Western Cape Department of Environmental Affairs and Development Planning Guidelines for Social Impact Assessment (February 2007). These guidelines are based on international best practice. The key activities in the SIA process embodied in the guidelines include:

- Describing and obtaining an understanding of the proposed intervention (type, scale, and location), the settlements, and communities likely to be affected by the proposed project.
- Collecting baseline data on the current social and economic environment.
- Identifying the key potential social issues associated with the proposed project. This requires a site visit to the area and consultation with affected individuals and communities. As part of the process a basic information document was prepared and made available to key interested and affected parties. The aim of the document was to inform the affected parties of the nature and activities associated with the construction and operation of the proposed development to enable them to better understand and comment on the potential social issues and impacts.
- Assessing and documenting the significance of social impacts associated with the proposed intervention.
- Identifying alternatives and mitigation measures.

In this regard the study involved:

- Review of socio-economic data for the study area.
- Review of relevant planning and policy frameworks for the area.
- Review of information from similar studies, including the SIAs undertaken for other renewable energy projects.
- Site visit and interviews with key stakeholders.
- Identifying the key potential social issues associated with the proposed project.
- Assessing and assessing the significance of social impacts associated with the proposed project.
- Identification of enhancement and mitigation measures aimed at maximizing opportunities and avoiding and or reducing negative impacts.

Annexure A contains a list of the secondary information reviewed and interviews conducted. Annexure B summarises the assessment methodology used to assign significance ratings to the assessment process.

1.3 PROJECT DESCRIPTION

Mukondeleli Wind (RF) (Pty) Ltd is proposing to develop the Mukondeleli Wind Energy Facility (WEF), with a maximum capacity of up to 300 MW, located in the Govan Mbeki Municipality in the Mpumalanga Province of South Africa. The energy generated from the facility will used to produce green hydrogen at the proposed Green Hydrogen Electrolyser facility located at Sasol Secunda. The Green Hydrogen Electrolyser facility and the associated 132 kV overhead power line and step-down substation is subject to a separate Basic Assessment Application to be undertaken by the applicant.

The proposed Mukondeleli WEF and associated infrastructure include the following components:

- Up to 54 wind turbine generators (WTGs) with a maximum export capacity of up to 300 MW (Photograph 1.1).
- Turbines with a hub height of up to 200 m and a rotor diameter of up to 200 m.
- Hardstand areas of approximately 1 500 m^2 per turbine.
- Temporary construction laydown and storage area of approximately 4 500m^2 per turbine.
- Medium voltage cabling connecting the turbines will be laid underground.
- A Battery Energy Storage System (BESS) comprising of several utility scale battery modules within shipping containers or an applicable housing structure on a

concrete foundation. Lithium-Ion Phosphate, Lithium Nickel Manganese Cobalt oxides or Vanadium Redox flow technologies will be considered as the preferred battery technology, however, the specific technology will only be determined following EPC procurement (Photograph 1.2).

- Internal roads with a width of up to 10 m providing access to each turbine, the BESS, on-site substation (SS), step-down SS and laydown area. The roads will accommodate cable trenches and stormwater channels (as required) and will include turning circle/bypass areas of up to 20 m at some sections during the construction phase. As such, the roads and cables will be positioned within a 20 m wide corridor. Existing roads will be upgraded wherever possible, although new roads will be constructed where necessary.
- A temporary construction laydown/staging area of approximately 4.5 hectares (ha) which will also accommodate the operation and maintenance (O&M) buildings.
- A 33/132kV on-site SS to feed electricity generated by the proposed Mukondeleli WEF into the step-down substation at the Sasol facility. The on-site SS will accommodate 1 x 132 kV incoming feeder bay, 1x 132 kV outgoing feeder bay and a motorised isolator with protection and metering.

The key project details for the Mukondeleli WEF and associated infrastructure are summarised in Table 1.1. The anticipated timeframe for construction is a minimum of 36 months.

Table 1.1: Components of WEF

Component	Description / Dimensions
Site coordinates (centre point)	Lat 26°37'34.04"S; Long 29°10'24.53"E
Affected farm portion/s	Bosjesspruit 291 (Portions 2, 6, 8, 9, 10, 11, 12, 13 and 14) Brandwacht 316 (Portions 2, 3, 4, 5 and 13) Knoppies 314 (Portion 0) Knoppiesfontein 313 (Portion 9) Tweefontein 321 (Portion 5) Van Tondershoek 317 (Portions 1, 2, 7, 8, 11 & 12)
Application site area	Approximately 3600 ha
Total project footprint area (including the internal roads, but excluding access roads leading to the site)	To be determined during dEIA prior to phase
Total WEF capacity	Up to 300 MW
BESS capacity	Up to 300 MW/1200 MWh
Proposed technology	Wind turbines and associated infrastructure, including a BESS
BESS technology	Lithium-Ion Phosphate, Lithium Nickel Manganese Cobalt oxides or Vanadium Redox flow technologies will be considered as the preferred battery technology, however, the specific technology will only be determined following EPC procurement.
Number of turbines	Up to 42 turbines
Turbine hub height from ground	Up to 200 m
Turbine rotor diameter	Up to 200 m
Turbine blade length	Up to 100 m
Height of BESS	Approximately 5-10 m
Height of the on-site	Approximately 7 – 10 m

Substation	Up to 22 m (including lighting)
On-site SS and BESS complex area	Combined footprint of up to 4ha
Construction laydown area	Up to 3ha footprint
Permanent laydown area	Part of the construction laydown area. The applicability of a concrete tower manufacturing facility will only be confirmed following EPC procurement. Up to 10ha.
O&M building area	Up to 2ha
Turbine hardstand area	Part of the substation and BESS complex and will include: - Operations building of approximately 200m2; - Workshop and stores area of approximately 300m2; and - Refuse area for temporary waste storage and conservancy tanks to service ablution facilities.
Width of internal access roads	Approximately 1 500m² per turbine
Length of internal access roads	Up to 10m, including turning circle/bypass areas of up to 20m. The roads and cables will be positioned within a 20m wide corridor.
Site access	To be determined based on the final layout
Grid connection and proximity	R546
Height of substation fencing	Connection to step-down substation (to be built at Sasol Secunda facility) Approximately 10km
Type of fencing	Up to 3 m high

Photograph 1.1: Typical example of wind turbine

Photograph 1.2: Example of BESS located in storage containers

1.4 ASSUMPTIONS AND LIMITATIONS

1.4.1 Assumptions

Technical suitability
It is assumed that the development site represents a technically suitable site for the establishment of the proposed WEF and associated infrastructure.

Strategic importance of the project
The strategic importance of promoting renewable and other forms of energy is supported by the national and provincial energy policies.

Fit with planning and policy requirements
Legislation and policies reflect societal norms and values. The legislative and policy context therefore plays an important role in identifying and assessing the potential social impacts associated with a proposed development. In this regard, a key component of the SIA process is to assess the proposed development in terms of its fit with key planning and policy documents. As such, if the findings of the study indicate that the proposed development in its current format does not conform to the spatial principles and guidelines contained in the relevant legislation and planning documents, and there are no significant or unique opportunities created by the development, the development cannot be supported.

1.4.2 Limitations

Demographic data
Some of the provincial documents do not contain data from the 2011 Census and or 2016 Household Community Survey. However, where required the relevant 2011 and 2016 data has been provided.

1.5 SPECIALIST DETAILS

Tony Barbour, the lead author of this report, is an independent specialist with 28 years' experience in the field of environmental management. In terms of SIA experience Tony Barbour has undertaken in the region of 260 SIAs and is the author of the Guidelines for Social Impact Assessments for EIA's adopted by the Department of Environmental Affairs and Development Planning (DEA&DP) in the Western Cape in 2007. Annexure C contains a copy of Tony Barbour's CV.

Schalk van der Merwe, the co-author of this report, has an MPhil in Environmental Management from the University of Cape Town and has worked closely with Tony Barbour over the last seventeen years.

1.6 DECLARATION OF INDEPENDENCE

This confirms that Tony Barbour and Schalk van der Merwe, the specialist consultants responsible for undertaking the study and preparing the SIA Report, are independent and do not have any vested or financial interests in the proposed power line being either approved or rejected. Annexure D contains a signed declaration of independence.

1.7 REPORT STUCTURE

The report is divided into five sections, namely:

- Section 1: Introduction
- Section 2: Summary of key policy and planning documents relating to renewable energy and the area in question
- Section 3: Overview of the study area
- Section 4: Identification and assessment of key social issues
- Section 5: Summary of key findings and recommendations.
- Section 4: Identification of key social issues

SECTION 2: POLICY AND PLANNING ENVIRONMENT

2.1 INTRODUCTION

Legislation and policy embody and reflect key societal norms, values, and developmental goals. The legislative and policy context therefore plays an important role in identifying, assessing, and evaluating the significance of potential social impacts associated with any given proposed development. An assessment of the "policy and planning fit[2]" of the proposed development therefore constitutes a key aspect of the Social Impact Assessment (SIA). In this regard, assessment of "planning fit" conforms to international best practice for conducting SIAs.

Section 2 provides an overview of the policy and planning environment affecting the proposed project. For the purposes of meeting the objectives of the SIA the following policy and planning documents were reviewed:

- The National Energy Act (2008).
- The White Paper on the Energy Policy of the Republic of South Africa (December 1998).
- The White Paper on Renewable Energy (November 2003).
- Integrated Resource Plan (IRP) for South Africa (2019).
- The National Development Plan (2011).
- National Infrastructure Plan (2012).
- Mpumalanga Vision 2030 Strategic Implementation Framework (2013-2030)
- Mpumalanga Economic Growth and Development Path (2011).
- Mpumalanga Spatial Development Framework (2019).
- Govan Mbeki Municipality Integrated Development Plan (2020-2021).

2.2 NATIONAL POLICY ENVIRONMENT

2.2.1 National Energy Act (Act No 34 of 2008)

The National Energy Act was promulgated in 2008 (Act No 34 of 2008). One of the objectives of the Act was to promote diversity of supply of energy and its sources. In this regard, the preamble makes direct reference to renewable resources, including solar and wind:

"To ensure that diverse energy resources are available, in sustainable quantities, and at affordable prices, to the South African economy, in support of economic growth and poverty alleviation, taking into account environmental management requirements (…); to provide for (…) increased generation and consumption of renewable energies" (Preamble).

[2] Planning fit" can simply be described as the extent to which any relevant development satisfies the core criteria of appropriateness, need, and desirability, as defined or circumscribed by the relevant applicable legislation and policy documents at a given time.

2.2.2 White Paper on the Energy Policy of the Republic of South Africa

Investment in renewable energy initiatives, such as the proposed SEF, is supported by the White Paper on Energy Policy for South Africa (December 1998). In this regard, the document notes:

"Government policy is based on an understanding that renewables are energy sources in their own right, are not limited to small-scale and remote applications, and have significant medium and long-term commercial potential".

"Renewable resources generally operate from an unlimited resource base and, as such, can increasingly contribute towards a long-term sustainable energy future".

The support for renewable energy policy is guided by a rationale that South Africa has a very attractive range of renewable resources, particularly ***solar*** and wind and that renewable applications are in fact the least cost energy service in many cases; more so when social and environmental costs are taken into account.

Government policy on renewable energy is thus concerned with meeting the following challenges:

- Ensuring that economically feasible technologies and applications are implemented.
- Ensuring that an equitable level of national resources is invested in renewable technologies, given their potential, and compared to investments in other energy supply options.
- Addressing constraints on the development of the renewable industry.

The White Paper also acknowledges that South Africa has neglected the development and implementation of renewable energy applications, despite the fact that the country's renewable energy resource base is extensive, and many appropriate applications exist.

2.2.3 White Paper on Renewable Energy

The White Paper on Renewable Energy (November 2003) (further referred to as the White Paper) supplements the *White Paper on Energy Policy*, which recognizes that the medium and long-term potential of renewable energy is significant. This Paper sets out Government's vision, policy principles, strategic goals, and objectives for promoting and implementing renewable energy in South Africa.

The White Paper notes that while South Africa is well endowed with renewable energy resources that have the potential to become sustainable alternatives to fossil fuels, these have thus far remained largely untapped. As signatory to the Kyoto Protocol[3], Government is determined to make good the country's commitment to reducing greenhouse gas emissions. To this purpose, Government has committed itself to the development of a framework in which a national renewable energy framework can be established and operate.

[3] The Kyoto Protocol is a protocol to the United Nations Framework Convention on Climate Change (UNFCCC), aimed at fighting global warming. The UNFCCC is an international environmental treaty with the goal of achieving "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system". The Protocol was initially adopted on 11 December 1997 in Kyoto, Japan and entered into force on 16 February 2005. As of November 2009, 187 states have signed and ratified the protocol (Wikipedia).

South Africa is also a signatory of the Copenhagen Accord, a document that delegates at the 15th session of the Conference of Parties (COP 15) to the United Nations Framework Convention on Climate Change agreed to "take note of" at the final plenary on 18 December 2009. The accord endorses the continuation of the Kyoto Protocol and confirms that climate change is one of the greatest challenges facing the world. In terms of the accord South Africa committed itself to a reduction target of 34% compared to business as usual. In this regard, the IRP 2010 aims to allocate 43% of new energy generation facilities in South Africa to renewables.

Apart from the reduction of greenhouse gas emissions, the promotion of renewable energy sources is aimed at ensuring energy security through the diversification of supply (in this regard, also refer to the objectives of the National Energy Act).

Government's long-term goal is the establishment of a renewable energy industry producing modern energy carriers that will offer in future years a sustainable, fully non-subsidised alternative to fossil fuels.

2.2.4 Integrated Resource Plan (2019)

South Africa's National Development Plan (NDP) 2030 offers a long-term plan for the country. It defines a desired destination where inequality and unemployment are reduced, and poverty is eliminated so that all South Africans can attain a decent standard of living. Electricity is one of the core elements of a decent standard of living. In formulating its vision for the energy sector, the NDP took as a point of departure the Integrated Resource Plan (IRP) 2010–2030 promulgated in March 2011. The IRP is an electricity infrastructure development plan based on least-cost electricity supply and demand balance, taking into account security of supply and the environment (minimize negative emissions and water usage).

On 27 August 2018, the then Minister of Energy published a draft IRP which was issued for public comment (Draft IRP). Following a lengthy public participation and consultation process the Integrated Resource Plan 2019 (IRP 2019) was gazetted by the Minister of Mineral Resources and Energy, Gwede Mantashe, on 18 October 2019, updating the energy forecast for South Africa from the current period to the year 2030. The IRP is an electricity capacity plan which aims to provide an indication of the country's electricity demand, how this demand will be supplied and what it will cost.

The IRP notes that South Africa is a signatory to the Paris Agreement on Climate Change and has ratified the agreement. The energy sector contributes close to 80% towards the country's total Green House Gas (GHG) emissions of which 50% are from electricity generation and liquid fuel production alone. A transmission from a fossil fuel-based energy sources is therefore critical to reducing GHG emissions. In September 2021 South Africa released its latest emission targets, indicating that it intended to limit Green House Gas (GHG) emissions to 398-510 MrCo2e by 2025, and 350-420 MrCo2e by 2030. These emissions are significantly lower than 2016 emission targets and will see South Africa's emissions decline in absolute terms from 2025, a decade earlier than planned (World Resource Institute, 2021).

The IRP (2019) notes that 39 730 MW of new generation capacity must be developed. Of the 39 730 MW determined, about 18 000 MW has been committed to date. This new capacity is made up of 6 422 MW under the REIPPP with a total of 3 876 MW operational on the grid. Under the Eskom build programme, the following capacity has been commissioned: 1 332MW of Ingula pumped storage, 1 588MW of Medupi, 800MW of Kusile and 100MW of Sere Wind Farm. In addition, IPPs have commissioned 1

005MW from two Open Cycle Gas Turbine (OCGT) peaking plants.1 005 MW from OCGT for peaking has also been commissioned (IRP 2019, page 14).

In terms of IRP (2019) provision has been made for the following new additional capacity by 2030:

- 1 500MW of coal.
- 2 500MW of hydro.
- 6 000MW of solar PV.
- 14 400MW of wind.
- 1 860MW of nuclear.
- 2 088MW for storage.
- 3 000MW of gas/diesel.
- 4 000MW from other distributed generation, co-generation, biomass and landfill technologies.

Figure 2.1 provides a summary of the allocations and commitments between the various energy sectors.

	Coal	Coal (Decommis-sioning)	Nuclear	Hydro	Storage	PV		Wind	CSP	Gas & Diesel	Other (Distributed Generation, CoGen, Biomass, Landfill)
Current Base	37,149		1 860	2,100	2 912	1 474		1 980	300	3 830	499
2019	2,155	-2,373						244	300		Allocation to the extent of the short term capacity and energy gap.
2020	1,433	-557				114		300			
2021	1,433	-1403				300		818			
2022	711	-844			513	400	1,000	1,600			
2023	750	-555				1000		1,600			500
2024			1,860					1,600		1000	500
2025						1000		1,600			500
2026		-1,219						1,600			500
2027	750	-847						1,600		2000	500
2028		-475				1000		1,600			500
2029		-1,694			1575	1000		1,600			500
2030		-1,050		2,500		1000		1,600			500
TOTAL INSTALLED CAPACITY by 2030 (MW)	33,364		1,860	4,600	5,000	8,288		17,742	600	6,380	
% Total Installed Capacity (% of MW)	43		2.36	5.84	6.35	10.52		22.53	0.76	8.1	
% Annual Energy Contribution (% of MWh)	58.8		4.5	8.4	1.2*	6.3		17.8	0.6	1.3	

Installed Capacity
Committed/Already Contracted Capacity
Capacity Decommissioned
New Additional Capacity
Extension of Koeberg Plant Design Life
Includes Distributed Generation Capacity for own use

- 2030 Coal Installed Capacity is less capacity decommissioned between years 2020 and 2030.
- Koeberg power station rated/installed capacity will revert to 1,926MW (original design capacity) following design life extension work.
- Other/ Distributed generation includes all generation facilities in circumstances in which the facility is operated solely to supply electricity to an end-use customer within the same property with the facility.
- Short term capacity gap is estimated at 2,000MW.

Figure 2.1: Summary of energy allocations and commitments based on the 2019 IRP

As indicated above, the changes from the Draft IRP capacity allocations see an increase in solar PV and wind, and a significant decrease in gas and diesel; and new inclusions include nuclear and storage.

In terms of renewable energy five bidding rounds have been completed for renewable energy projects under the RE IPP Procurement Programme. The most dominant

technology in the IRP2019 is renewable energy from wind and solar PV technologies, with wind being identified as the stronger of the two technologies. There is a consistent annual allocation of 1 600MW for wind technology commencing in the year 2022 up to 2030. The solar PV allocation of 1 000MWs per year is incremental over the period 2022 to 2030, with no allocation in the years 2024 (being the year the Koeberg nuclear extension is expected to be commissioned) and the years 2026 and 2027 (presumably since 2 000MW of gas is expected in the year 2027). The IRP 2019 states that although there are annual build limits, in the long run such limits will be reviewed to take into account demand and supply requirements.

2.2.5 National Development Plan

The National Development Plan (NDP) contains a plan aimed at eliminating poverty and reducing inequality by 2030. The NDP identifies 9 key challenges and associated remedial plans. Managing the transition towards a low carbon national economy is identified as one of the 9 key national challenges. Expansion and acceleration of commercial renewable energy is identified as a key intervention strategy.

2.2.6 The New Growth Path Framework

The aim of the New Economic Growth Path Framework is to enhance growth, employment creation and equity. Central to the New Growth Path is a massive investment in infrastructure as a critical driver of jobs across the economy. In this regard, the framework identifies investments in five key areas namely: energy, transport, communication, water, and housing.

The New Growth Path also identifies five other priority areas as part of the programme, through a series of partnerships between the State and the private sector. The Green Economy as one of the five priority areas to create jobs, including expansions in construction and the production of technologies for solar, wind and biofuels. In this regard, clean manufacturing and environmental services are projected to create 300 000 jobs over the next decade.

2.2.7 National Infrastructure Plan

Government adopted a National Infrastructure Plan (NIP) in 2012. The aim of the plan is to transform the economic landscape while simultaneously creating significant numbers of new jobs and strengthening the delivery of basic services. The aim of the NIP is support investments is to improve access by South Africans to healthcare facilities, schools, water, sanitation, housing and electrification. The plan also notes that investment in the construction of ports, roads, railway systems, ***electricity plants***, hospitals, schools, and dams will contribute to improved economic growth.

As part of the National Infrastructure Plan, Cabinet established the Presidential Infrastructure Coordinating Committee (PICC). The Committee identified and developed 18 strategic integrated projects (SIPS). The SIPs cover social and economic infrastructure across all nine provinces (with an emphasis on lagging regions) and included three energy SIPs, namely SIP 8, 9 and 10.

- SIP 8: Green energy in support of the South African economy.
- SIP 9: Electricity generation to support socio-economic development.
- SIP 10: Electricity transmission and distribution for all.

The NIP 2050 was gazetted for public comment on 10 August 2021[4]. The first phase of the NIP 2050 focuses on four critical network sectors that provide a platform, namely, energy, freight transport, water, and digital infrastructure. In line with the NDP, the vision for the energy sector is to promote:

- Economic growth and development through adequate investment in energy infrastructure" (generation, transmission, and distribution) and reliable and efficient energy service at competitive rates, while supporting economic growth through job creation by stimulating supply chains.
- Social equity through expanded access to energy at affordable tariffs and through targeted, sustainable subsidies for needy households.
- Environmental sustainability through efforts to reduce pollution, reduce water usage and mitigate the effects of climate change.

The NIP 2050 notes that by 2030, the NDP set a target that more than 90% of the population should enjoy access to grid connected or off-grid electricity by 2030. To realise this vision, South Africa's energy system will be supported by effective policies, institutions, governance systems, regulation and, where appropriate, competitive markets. In terms of energy mix, NIP 2050 notes that coal will contribute significantly less to primary-energy needs in the future, while gas will have an important enabling role, energy supply will be ***increasingly dominated by renewable energy resources– especially wind and solar which are least cost and where South Africa has a comparative advantage.***

NIP 2050 also notes that South Africa is signatory of the Paris Agreement which aims to achieve Net Zero greenhouse gas emissions by 2050. To achieve this will require a shift to a least cost energy path that is increasingly reliant on renewables. For South Africa this is imperative for the following reasons:

- SA cannot afford to overspend while dramatically expanding capacity
- Renewables can be built quickly and in modular form thereby avoiding many of the challenges associated with mega projects.
- Trade partners are expected to increasingly impose border carbon taxes harming SA exports.
- SA will need to commit to emission reductions as a global citizen.

2.3 PROVINCIAL AND LOCAL LEVEL POLICY AND PLANNING

2.3.1 Mpumalanga Vision 2030

The Mpumalanga Vision Mpumalanga Vision 2030 Strategic Implementation Framework (2013-2030) provides a provincial expression of the key priorities, objectives and targets outlined in the National Development Plan 2030. In line with the objectives of the NDP the Mpumalanga Vision focusses on the following key socio-economic outcomes.

- Employment and Economic Growth
- Education and Training
- Health Care for all
- Social Protection

The Mpumalanga Vision 2030 also identifies nine key drivers that have a bearing on the spatial development of the province. Key Drivers 1 to 6 are focused towards promoting economic development and job creation, Key Drivers 7 and 8 are focused on

[4] Gazette No. 44951

human settlement in and around the key priority nodes/areas identified and linked to Key Drivers 1-6, and Key Driver 9 is focused on the conservation and sustainable management of the natural environment. The key relevant Key Drivers are summarised below.

Key Driver 1: Nodal Development. Key Driver 1 identifies corridors linked to key roads where investment should be focussed. Of relevance to the project the N17 is identified as a key corridor. Five primary nodes for development are also identified, including Secunda (and Ermelo).

Key Driver 2: Business, Commercial and Industrial Development. Key driver 2 focuses on development of business and commercial sectors on the primary, secondary and rural nodes in Mpumalanga and the potential for these activities to generate employment job opportunities. Of relevance to the study the vision notes that the bulk of industrial investment in Mpumalanga Province should be clustered around the existing industrial strongholds, including Secunda (Petrochemical Industry).

Key Driver 9: Environmental Management and Conservation. The vision notes that in terms of mining it is important to establish proper environmental management systems during the operational phase of the mines to prevent large scale water and air pollution. While the section does not specifically refer to renewable energy, much of the mining in Mpumalanga is linked to coal mining and power generation, both of which are large consumers of water. The water demands associated with renewable energy are significantly lower than those associated with traditional coal power stations.

2.3.2 Mpumalanga Growth and Development Path

The Mpumalanga Economic Growth and Development Path (MEGDP)(2011) is informed by the National Economic Growth Path. The MEGDP notes that Mpumalanga is committed to increasing local economic development and job creation in the agricultural, industrial, manufacturing, ***green economy***, tourism, and mining sectors. The (MEGDP) is informed by six key pillars, namely:

- Job creation
- Inclusive and shared growth of a diversified economy
- Spatial distribution
- Integration of regional economies
- Sustainable human development
- Environmental sustainability

The pillars of job creation, the development of a diversified economy, and sustainable environmental development are all relevant to the proposed development.

The MEGDP also identifies a number of key employment drivers aimed at realising the MEGDP objectives and securing strong and sustainable growth for the next decade. Of relevance these include the creation of employment of economic sectors including energy and the development of new economies including green industries.

2.3.3 Mpumalanga Spatial Development Framework (2019)

The spatial vision for Mpumalanga Province is "A sustainable, vibrant and inclusive economy, Mpumalanga". The SDF identifies a number of opportunities and challenges facing the province. The opportunities are linked to the province's natural resources, well developed economy, and established economies.

Natural Environment: The natural environment is diversified and is associated with the Highveld and the Lowveld areas in the province. Five major rivers systems in the flow through Mpumalanga and it is an important catchment area.

Connectivity and Infrastructure: The province is well connected in terms of infrastructure and is connected to Maputo and Richards Bay ports by both rail and road.

Economy: The province's rich biodiversity and scenic beauty support the tourism industry, while at the same time mining, specifically coal mining, plays a key role in the province's economy. The availability of high potential soil and diverse climatic condition also support a range of crops.

Urban settlements: The key urban centres are well established economic centres and offer the opportunity for further economic development by leveraging on the towns' economic bases.

In terms of challenges, climate change is identified as a key challenge. In this regard the activities in the province, specifically the generation of coal powered energy, account for 90% of South Africa's scheduled emissions. The province is also home to 50% of the most polluted towns in the country. The predicted impacts associated with climate change include decreased rainfall in the province and increase temperatures. This will increase the risk of natural disasters, including droughts, flooding, and fires.

The SDF identifies five spatial objectives, namely:

Connectivity and corridor functionality: The aim is to ensure connectivity between nodes, secondary towns, marginalised areas, the surrounding area, and to green open space systems.

Sustainable concentration and agglomeration: The aim is to promote the creation of an agglomeration economy that will encourage people and economic activities to locate near one another in urban centres and industrial clusters.

Conservation and resource utilisation: The aim is to promote the maximisation, protection and maintenance of ecosystems, scarce natural resources, high-potential agricultural land, and integrated open space systems.

Liveability and sense of place: The aim is to create settlements that contribute to people's sense of personal and collective wellbeing and to their sense of satisfaction in being residents of a settlements.

Rural diversity and transformation: The aim is to create Urban-Rural anchors and choices for residents within the rural economy linked to access to markets, food security and security of land tenure.

Connectivity and corridor functionality, Sustainable concentration and agglomeration, and Conservation and resource utilisation are of specific relevance the proposed development.

Connectivity and corridor functionality
The strategic objectives (SOs) that are relevant the study area and the proposed development include:

- Strategic Objective 2: Development of the existing corridors and building new linkages to increase capacity and economic opportunities and ensure connectivity to the surrounding areas
- Strategic Objective 5: Decongestion of the coal haul roads and Improvement of Freight Network

In terms of SO 2, the spatial linkages identified for development and upgrading include the upgrade of N17, N17/N2 Corridor and the N12 and N11 corridor. The N17 is located to the north of the site.

Sustainable concentration and agglomeration

Of specific relevance, Strategic Objective 4, Diversify Economy, focusses on the need to diversify the economy. The SDF notes that mining sector contributes 25% to Mpumalanga's GVA. In addition, there are a number of other sectors directly or indirectly dependent on mining such as manufacturing (specifically metal processing) and utilities (specifically power generation). The combined GVA of these three sectors makes up more than 40% of the provincial GVA.

However, the SDF recognises that mining is not a sustainable industry and resources are finite. There is therefore a need for a gradual shift from mining-oriented sectors to the sustainable economic sectors to maintain sustained growth of the provincial economy. Mpumalanga's Coal Mining and Coal Fired Power Plant region (located mainly in the Highveld area) will be come under increasing pressure due to environmental considerations. As a result, the region is likely to experience a decline in demand for coal and with it a decline in the associated employment it creates. There is therefore a need to diversify the regional economy and facilitate the gradual transition of economic activities in the region. The proposed development supports the objective of diversifying the provinces economy.

Conservation and resource utilisation

The strategic objectives (SOs) that are relevant the study area and the proposed development include:

- Strategic Objective 2: Ensure conservation of all water resources and catchment Areas.
- Strategic Objective 4: Promote a low carbon and climate resilient economy.
- Strategic Objective 6: To optimally utilise the mining potential without compromising the long-term sustainability of the natural environment.

Strategic Objective 2: Ensure Conservation of all Water Resources and Catchment Areas

Achieving Strategic Objective 2, Ensure Conservation of all Water Resources and Catchment Areas is closely linked to diversifying the economy. The SDF notes that the provinces water resources are under pressure from high demand activities, including Eskom's power stations, mining, and industrial uses. The proposed development represents a low consumer of water.

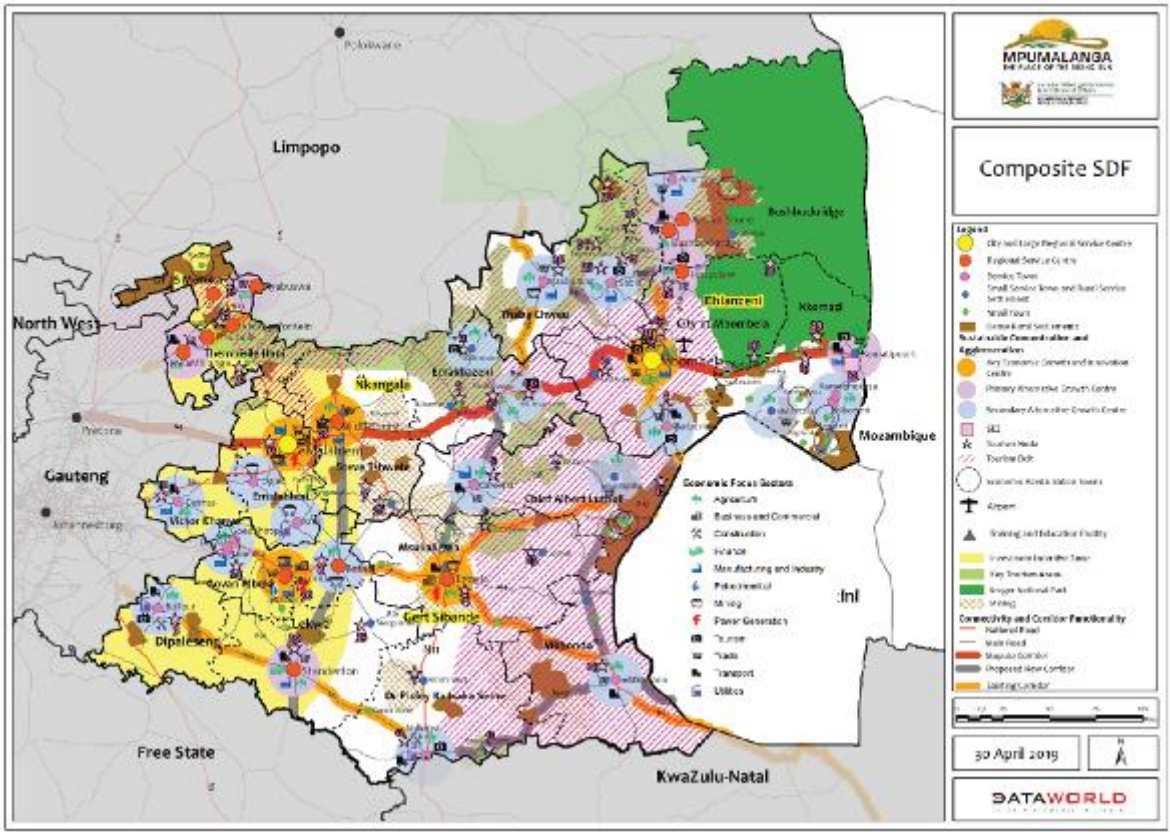
Strategic Objective 4: Promote a Low Carbon and Climate Resilient Economy

Mpumalanga is home to 12 of Eskom's 15 coal-fired power stations; petrochemical plants including Sasol's refinery in Secunda; metal smelters; coal and other mines; brick and stone works; fertiliser and chemical producers; explosives producers; and other smaller industrial operations, making the Highveld one of South Africa's industrial heartlands (CER, 2017). As a result, the air quality within the Mpumalanga Province, especially within the Highveld area, is the poorest in South Africa. The

Highveld region accounts for approximately 90 % of South Africa's scheduled emissions of industrial dust, sulphur dioxide and nitrogen oxides (Wells et al. 1996, as cited in Josipovic et al. 2009). Achieving Strategic 4, Promote a low carbon and climate resilient economy, is closely linked to diversifying the economy. The proposed development supports the development of a low carbon, climate resistant economy.

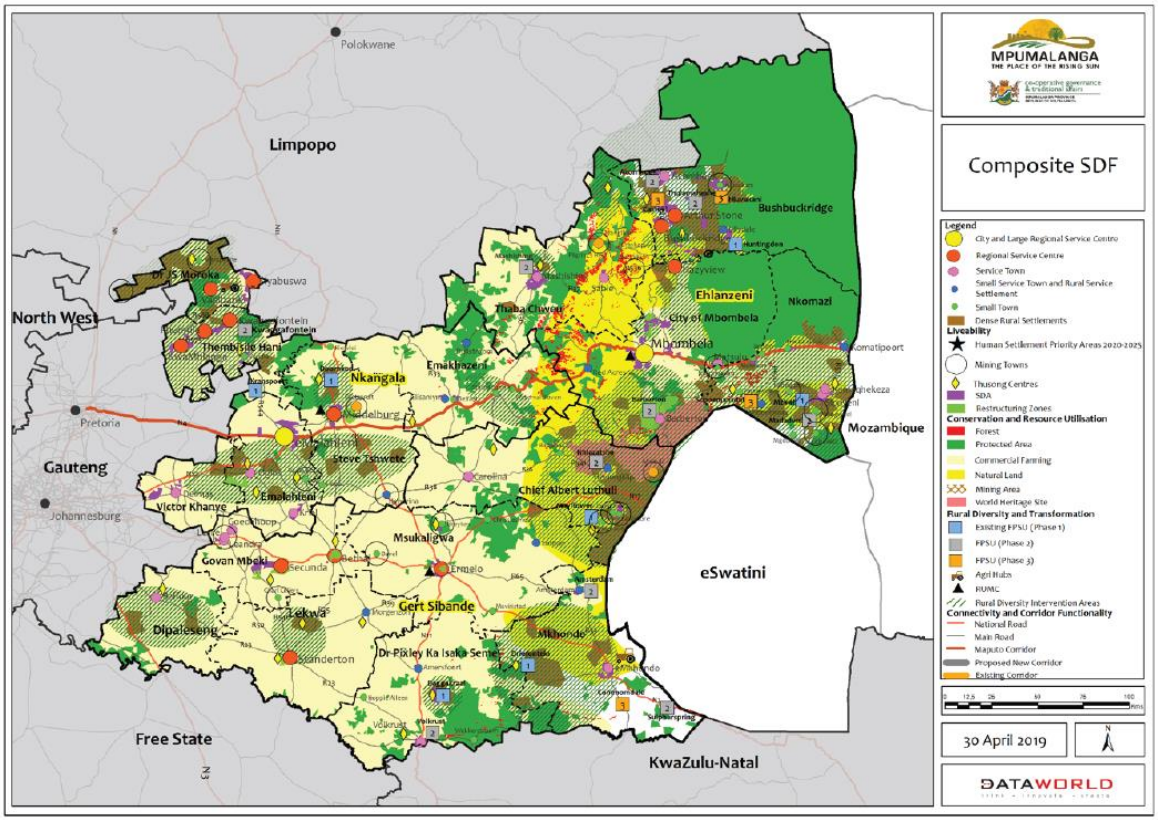
Strategic Objective 6: To optimally utilise the mining potential without compromising the long-term sustainability of the natural environment

Mining contributes R 49.6 billion (approximately 25%) to the provincial economy. The key mining sector is coal, which represents 83% of South Africa's coal production. The mining sector, specifically coal mining, creates employment opportunities and supports the manufacturing and power generation sector. However, mining is also associated with many issues including water and soil contamination, air pollution and environmental degradation. Achieving Strategic 6, To optimally utilise the mining potential without compromising the long-term sustainability of the natural environment is closely linked to diversifying and developing a low carbon climate resistant economy. The proposed development supports the objective of diversifying and developing a low carbon, climate resistant economy. In terms of the high-level composite spatial development framework, Ermelo is identified as a Regional Service Centre (red dot) and the development area located to the south east of the town falls within a mining area (brown hatched) (Figure 2.2). The economic sectors in the area include mining and power generation. The dominant land use in the area is commercial agriculture (yellow, Figure 2.3).



Source: Mpumalanga SDF

Figure 2.2: Mpumalanga Composite SDF-Economic Activities



Source: Mpumalanga SDF

Figure 2.3: Mpumalanga Composite SDF-Land Uses

2.3.4 Govan Mbeki Integrated Development Plan

The Govan Mbeki Municipality (GMM) is located in the south-eastern part of Mpumalanga Province and is one of seven local municipalities that make up the Gert Sibande District Municipality (GSDM). The GMM is made up of eight towns and 32 electoral wards. The project site is located within Ward 5 to the east and south east of Secunda. The vision of the Govan Mbeki Municipality (GMM) as set out in the 2020/2021 IDP review is "To be a Model City and Centre of Excellence" The associated Mission Statement is to serve our community by:

- Providing sustainable, quality services.
- Enabling diversified local economic development and job creation.
- Ensuring the financial sustainability of the Municipality.
- Working together with our stakeholders.
- Empowering our workforce.
- Ensuring sound corporate governance.

The Vision, Mission and Values are informed by six (6) Key Strategic objectives of which Strategic Objective 3, To facilitate and create an enabling environment for diversified local economic development, social cohesion, and job creation and Strategic Objective 5, To develop spatially integrated, safe communities and a protected environment, are relevant to the proposed development.

A SWOT analysis undertaken as part of the IDP process identified key strengths, weaknesses, opportunities, and threats. The key findings relevant to the project include:

Strengths
- Petro-Chemical and synthetic fuels plant
- Good tourism potential
- Good infrastructure
- Rail Network
- Mining Area
- University /satellite campus

Opportunities
- Economic development opportunities
- SMME Development
- Industrial Park West of Secunda

Weaknesses
- Ageing electricity infrastructure.
- Pressure on energy sources.

Threats
- Eskom Price increases.
- Unemployment and poverty.
- Climate change.
- Air pollution.
- Water shortages.
- Limited lifespan of mines.
- Increasing population (informal settlements, pressure on housing, unemployment, infrastructure, and municipal services).
- Closure of mining and petrochemical industry.

The IDP provides a summary of the key socio-economic challenges facing the GMM, of which the following are relevant to the project.

- High and rising in unemployment.
- Youth unemployment.
- Creating of local economic development opportunities.
- Closure of mines.
- Increasing dependency rates.
- Low education levels and declining matric pass rate.
- Social development concerns such as clinics, police stations, schools,

The IDP notes that the key economic sectors that contribute to the local economy within in Govan Mbeki community are:

- Trade (including tourism).
- Mining.
- Manufacturing.
- Finance.
- Agriculture.

The IDP lists the Local Economic Development (LED) Strategic Objectives as per the LED Strategy. Of relevance these include:

- Industrialisation of the Govan Mbeki economy using current and future comparative and competitive advantages; and newly targeted industries.

- Diversification of the local economy to reduce overreliance on the two complimentary sectors of coal mining and fuel from coal SASOL production.
- Improvement of living standards of the local citizenry through business and employment opportunities across economic sectors and industries

The LED strategy for the GMM is underpinned by six strategic pillars or programmes, namely:

- **Pillar One:** Govan Mbeki Industrialisation Programme. Of key relevance the programme the programme focuses on manufacturing activities based on sectors and industries with future growth prospects especially agro-processing and ***alternative energy sources***. The aim is to diversify the economy and reduce dependence on the two dominant and complimentary sectors of coal mining and fuel production.
- **Pillar Two:** SMME and Cooperatives Incubation Programme. Agriculture and agro processing have been identified as key sectors and industries that can provide leverage for SMME and cooperatives incubation.
- **Pillar Three:** Tourism Hub Development Programme.
- **Pillar Four:** Warehousing and Logistics Hub Development Programme. –
- **Pillar Five:** Education, Skills and Capacity Development Programme. The programme thrust is to develop and or boost the skills and capacity of small businesses and cooperatives within the GMM.
- **Pillar Six:** Marketing and Investment Promotion Programme.

The IDP also refers to the establishment of a Special Economic Zone (SEZ) in the GMM, including the establishment of an industrial park. The proposed Industrial Park is to be located on an identified portion of land north west of Secunda. The success of the park and other industrial developments in the GMM will be dependent on the provision of reliable energy.

Section 7.1 of the IDP provide an overview of the Spatial Development Framework for the GMM. Six strategic objectives (SOs) are listed namely:

- Strategic Objective 1: Economic development and job creation supporting and guiding development.
- Strategic Objective 2: Promoting education, training, and innovation.
- Strategic Objective 3: Accommodating urbanisation and transforming human settlements.
- Strategic Objective 4: Promote the development of the rural areas within Govan Mbeki that can support sustainable economic, social, and engineering infrastructure.
- Strategic Objective 5: Protect biodiversity, water, and agricultural resources.
- Strategic Objective 6: Infrastructure Investment.

Strategic Objective 1, 5 and 6 are relevant to the proposed development.

Strategic Objective (S0)1: Of specific relevance SO 1 refers to the need to diversify the local mining dependent economy by phasing in renewable energy options, which include concentrated solar power, wind, and natural gas, reducing dependence on coal resources.

Strategic Objective (SO) 5: Of specific relevance SO5 highlights the need to minimise the consumption of scarce environmental resources, particularly water, electricity and land and protect biodiversity, water, and agricultural resources.

Strategic Objective (SO) 6: Of specific relevance SO6 highlights the need to ensure efficient supply of electricity and water install green infrastructure, including renewable energy.

At the local ward level, the needs analysis for Ward 5 indicated that the key challenges and community relevant to the project and that could be supported by SED contributions include repair of street lights, general maintenance of verges, up-grading of taxi rank next to Secunda Mall, cemetery and sports facilities

SECTION 3: OVERVIEW OF STUDY AREA

3.1 INTRODUCTION

Section 3 provides a baseline description of the study area with regard to:

- The administrative context.
- Provincial context.
- Overview of district and local municipalities.
- Site and the surrounding land uses.

3.2 ADMINISTRATIVE CONTEXT

The study area is located within the Govan Mbeki Municipality (GMM) within the Mpumalanga Province. The MM is one of the seven Local Municipalities that make up the Gert Sibande District Municipality (GSDM)(Figure 3.1). The town of Secunda is the administrative seat of the GMM.

Figure 3.1: Location of Govan Mbeki Municipality within the Gert Sibande District Municipality.

3.3 DEMOGRAPHIC OVERVIEW

Population

The population of the GMM in 2016 was 340 091 (Community Household Survey 2016). Of this total, 32.5% were under the age of 18, 63.3% were between 18 and 64, and the remaining 4.2% were 65 and older. The GMM therefore had a high percentage of the population that fall within the economically active group of 18-65. The population of Ward 5 in 2011 was 9 219 (Census 2011). Of this total, 21.5% were under the age of 18, 72.1% were between 18 and 64, and the remaining 6.4% were 65 and older. Ward 5 like the GMM also had a high percentage of the population that fall within the economically active group of 18-65. The figures are higher than the figures for the GSDM and Mpumalanga (57.7% and 56.6% respectively). This is due to the employment opportunities associated with the industrial, mining and manufacturing activities in the MM.

The dependency ratio is the ratio of non-economically active dependents (usually people younger than 15 or older than 64) to the working age population group (15-64). The higher the dependency ratio the larger the percentage of the population dependent on the economically active age group. This in turn translates to reduced revenue for local authorities to meet the growing demand for services. The traditional approach is based people younger than 15 or older than 64. The information provided provides information for the age group under 18. The total number of people falling within this age group will therefore be higher than the 0-15 age group. However, most people between the age of 15 and 17 are not economically active (i.e., they are likely to be at school).

Using information on people under the age of 18 is therefore likely to represent a more accurate reflection of the dependency ratio. Based on these figures, the dependency ratios for the GMM, the GSDM and Mpumalanga in 2016 were 58%, 73.5% and 77% respectively. The dependency ratio for Ward 5 in 2011 was 38.6%. The lower dependency ratios in the GMM and Ward 5 reflect the employment and economic opportunities in and around Secunda linked to the towns petrochemical and industrial sector.

In terms of race groups, Black Africans made up 85.8% of the population on the GMM, followed by Whites, 12.1% and Coloureds (1.2%). The figures for Ward 5 in 2011 were Whites (72.6%), Black Africans (22.2%), Indian or Asian (2.7%) and Coloureds (2.3%). The main first language spoken in the GMM was isizulu, 60.5%, followed by Siswati, 7.3% and Afrikaans, 6.2%. In Ward 5 Afrikaans (64.6%) followed by English (11.1%) were the main languages spoken.

Households and house types

The total number of households in the GMM in 2016 was 108 892, which constituted approximately 33% of the total number of households in the GSDM. Of these 63% were formal houses, 20.4% were shacks, and 10.6% were flats in backyards. The figures for the GSDM were 67.2%, 13.4%, 6.7% and 8.3% respectively. While the majority of dwellings in the GMM are formal structures there are a high percentage of informal structures which reflects the migration of jobseekers to the area and the pressure this in turn places on housing. In Ward 5 82.5% of the dwellings were formal houses. There were no reported shacks.

In terms of ownership, 46% of the dwellings in the GMM were owned and fully paid off, while 10.6% were in the process of being paid off. 17.9% of the dwellings were rented

from private individuals. In Ward 5, 15.2% were owned and fully paid off, 34.2% were in the process of being paid off, and 35% were rented. A relatively large percentage of the properties in the GMM (56.6%) were owned and or in the process of being paid off. This reflects a relatively stable and established community.

In terms of household heads, approximately 30.8% of the households in the GMM and 39.1% of the households in the GSDM were headed by women. These figures similar to the provincial figure of 39.71%. The figure for Ward 5 in 2011 was substantially lower at 15.5%. The high percentage of households headed by women in the GMM reflects the likelihood that the men have left the area in search of employment opportunities in Gauteng. This is despite the well-developed industrial sector in and around Secunda. Women headed households tend to be more vulnerable.

Household income

Based on the data from the 2011 Census, 16.6% of the population of the GMM had no formal income, 3.6% earned less than R 4 800, 5.5% earned between R 5 000 and R 10 000 per annum, 12.6% between R 10 000 and R 20 000 per annum and 16.4% between R 20 000 and 40 000 per annum (2016). The poverty gap indicator produced by the World Bank Development Research Group measures poverty using information from household per capita income/consumption. This indicator illustrates the average shortfall of the total population from the poverty line. This measurement is used to reflect the intensity of poverty, which is based on living on less than R3 200 per month for an average sized household (~ 40 000 per annum). Based on this measure, in the region of 54.7% of the households in the GMM and 65.2% in the GSDM live close to or below the poverty line. The figure for Ward 5 in 2011 was 16.9%.

The low-income levels in the GMM and GSDM reflect the limited formal employment opportunities outside in the urban areas. This is also reflected in the high unemployment rates. The low-income levels are a major concern given that an increasing number of individuals and households are likely to be dependent on social grants. The low-income levels also result in reduced spending in the local economy and less tax and rates revenue for the GMM. This in turn impacts on the ability of the GMM to maintain and provide services.

Household income levels are likely to have been impacted by the COVID-19 pandemic. The number of households in the GMM and GSDM that live close to or below the poverty line is likely to have increased over the last 18 months. This, coupled with the high dependency ratio, is a major cause of concern for the area.

Employment

The official unemployment rate in the GMM in 2016 was 17.2%, while 48.5% were employed, and 31% were regarded as not economically active. The figures for Ward 5 in 2011 were 3.6%, 63.6% and 32.4% respectively. However, the COVID-19 pandemic is likely to have resulted in an increase in unemployment rates in both the GMM and Ward 5. Recent figures released by Stats South Africa also indicate that South Africa's unemployment rate is in the region of 36%, the highest formal unemployment rate in the world.

Education

In terms of education levels, the percentage of the population over 20 years of age in the GMM and GSDM with no schooling was 6.5% in 2016, compared to 10.8% and 11.3% for the GSDM and Mpumalanga Province respectively. The figure for Ward 5 in 201 was 1.8%. The percentage of the population over the age of 20 with matric in the GMM (2016) and Ward 5 (2011) was 39.4% and 39.2% respectively, compared to

34.3% and 36.1% for the GSDM and Mpumalanga. The education levels in the GMM and Ward 5 are therefore marginally higher than the DM and Provincial figures.

3.4 MUNICIPAL SERVICES

Electricity
Based on 2016 survey, 95.1% of households in the GMM had access to electricity, compared to 90% for the GSDM and 93% for Mpumalanga.

Access to water
Based on the 2016 survey information, 96.9% of households in the GMM were supplied by a service provider. This compares to 86.7% and 80.5% for the GSDM and Mpumalanga respectively. The figure for Ward 5 in 2011 was 91.4%.

Sanitation
94.9% of the households in the GMM had access to flush toilets (2016), while 3.4% relied on pit toilets. This compares to 65.3% and 42.1% for the GSDM and Mpumalanga respectively. The figure for Ward 5 in 2011 was 94.5%. Only 0.5% of the households in the GMM reported that they had no access to formal sanitation, compared to 2.6% and 2.8% for the GSDM and Mpumalanga respectively.

Refuse collection
72.5% of the households in the GMM had access to regular refuse removal service, while for 13.9% the service was provided, but not on a regular basis. This compares to 52.2% for the GSDM (regular) and 5.2% (irregular). 89% of households in Ward 5 had their waste collected on a regular basis by a service provided.

3.5 OVERVIEW OF STUDY AREA

3.5.1 Introduction

The study area is located approximately 8-10 south of the town of Secunda in the GMM(Figure 3.2). The town of Secunda has its origins in the 1973/74 international oil crisis when the then South African Government took the decision to establish a second coal liquefaction plant following the establishment of the first at Sasolburg in the 1950s. After the site for the Sasol complex had been identified, it had to be decided whether or not to combine the existing towns of Evander and Trichardt. The huge burden that extensions of this nature would have had on the financial and administrative resources of the established communities as well as the tempo at which such development should proceed was decisive and resulted in the decision to develop Trichardt and Secunda to be one town, named Secunda. Evander, located ~ 8km to the west of the current day Secunda, remained a separate town. Trichardt borders onto the northern part of Secunda.

The first town area was proclaimed in June 1976[5]. The name Secunda is derived from the from the Latin, secundi meaning second/following, and was given to the town as it was the second extraction refinery producing oil from coal, after Sasolburg, which is located approximately 140km west of Secunda. The town was located adjacent to the large coalfields in the area, including the Evander and Winkelhaak coal mines located to the north west of the town. The Secunda facility consists of Sasol Two (1980) and

[5] https://www.primidi.com/secunda_mpumalanga/early_history

Sasol Three (1982) is the largest coal liquefaction plant in the world, and produces synthetic fuel, diesel, and related fuels and petrochemicals from coal gasification. The Secunda facility is located to the south of the town, approximately 3.5 km from the northern boundary of the WEF site (Photograph 3.1).

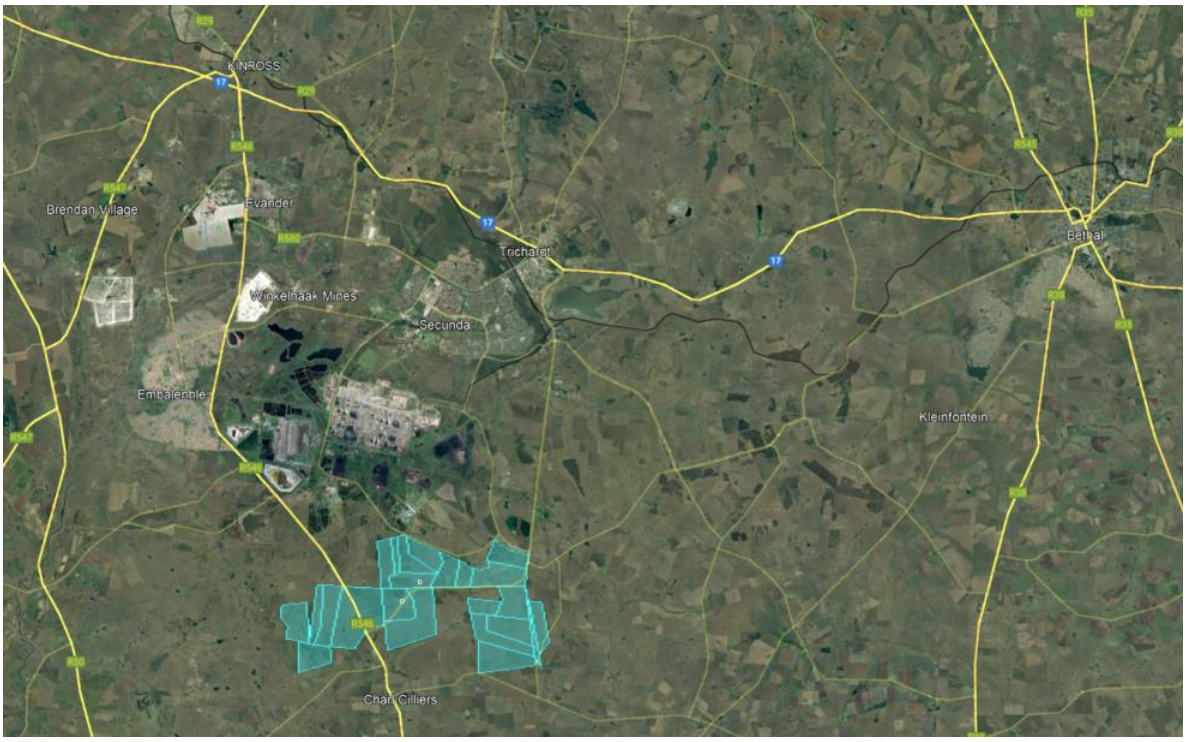


Figure 3.2: Regional location of Mukondeleli WEF (blue area)

Photograph 3.1: Secunda Sasol Facility

The town of Secunda is located approximately 90 km west of Benoni in Guateng, and 23 km west of Bethal. The N17 which runs to the north of the town and the site connects the towns of Benoni and Bethal (Figure 3.2). The small settlement of Charl Cilliers is located ~ 2km to the south of the WEF site. The Brandspruit Mine is located ~ 1.5 km to the north of the northern boundary of the WEF site. The western section of the WEF site is bisected by the R 546 (Figure 3.3).

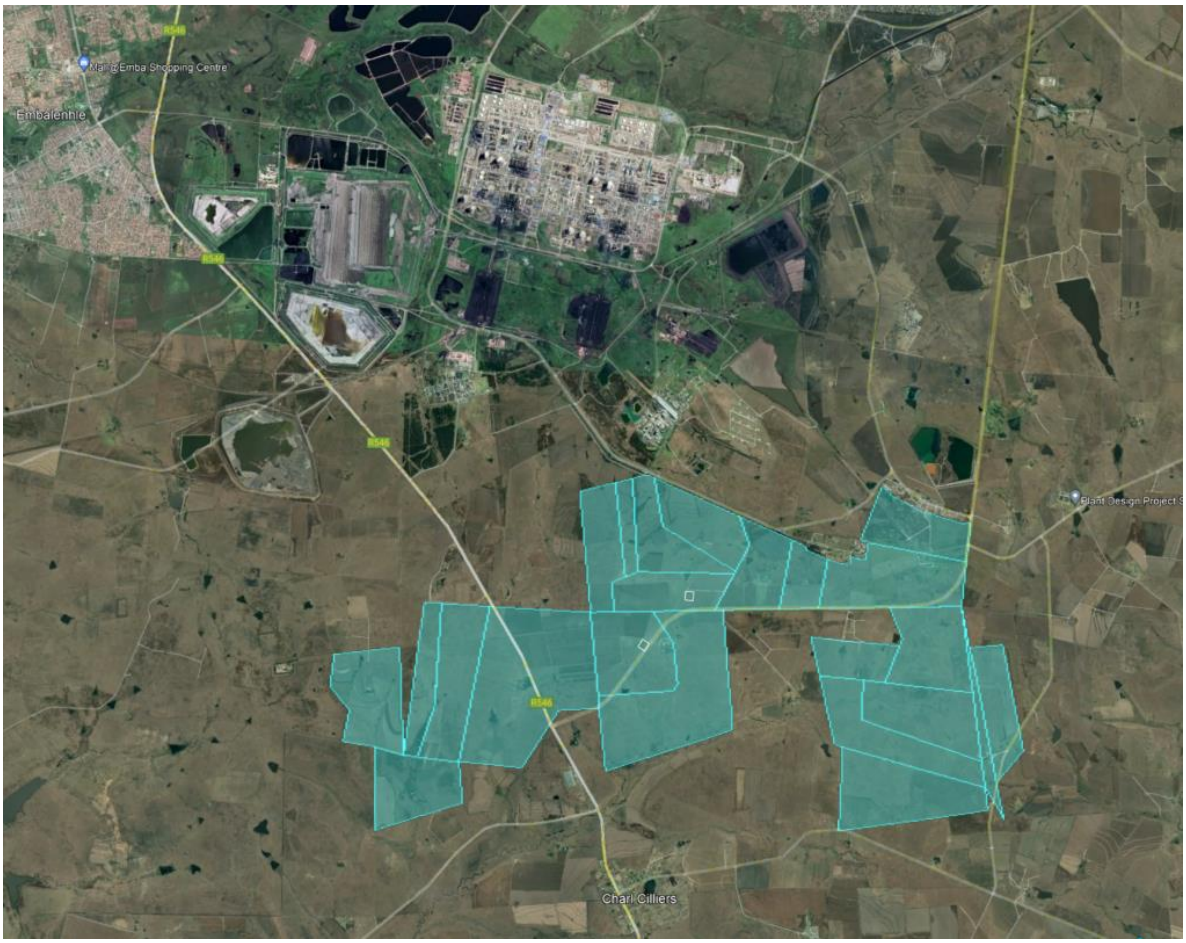


Figure 3.3: Location of Mukondeleli WEF (blue area) relative to Secunda Sasol facility (north) and Charl Cilliers (south)

The Mukondeleli WEF site is located immediately to the south of SASOL's large Secunda complex south of the large town of Secunda. The small residential settlement of Charl Cilliers is located approximately 1.5 km to the south of the site, and the small Secunda Extension 67 Industrial Area adjacent to the north (Figure 3.4X).

Figure 3.4: Mukondeleli WEF site (pink fill) in relation to Sasol Secunda (dark blue outline), existing transmission lines (orange), nearby urban areas (grey), the Trichardt-Charl Cilliers Road (light blue), other study area roads (red), and coal conveyor belts (light pink).

Access to the study area is directly or indirectly off the R546 (Secunda-Standerton) or the Trichardt-Charl Cilliers Road linking the R546 to the N17 (Standerton-Bethal) (Photograph 3.2). A number of smaller public roads link the Trichardt-Charl Cilliers Road to the small Charl Cilliers settlement and the broader farming area west of Bethal (Photograph 3.3). Many roads originated as mining roads. The Trichardt-Charl Cilliers Road carries significant volume of heavy vehicle traffic associated with the movement of coal trucks, and traffic generated by industrial and agro-industrial operations along the road, e.g., Trichardt Crushers, Grootvlei brick factory, Constantia Fertilizer blending plant. The large Trichardt grain silo is also located off the road near the south east entrance to Trichardt.

Photograph 3.2: Intersection of the R546 (Standerton Road) and Trichardt-Charl Cilliers Road.

Photograph 3.3: Trichardt-Charl Cilliers Road immediately to the north of Grootvlei 584/RE site property, Trichardt Crushers (Secunda Ext 63) to the right.

The SASOL Secunda premises occupies approximately 8 000 ha to the north of the site (Photograph 3.4). The complex includes petro-chemical, explosives and fertilizer production and coal mining. Historic and operational coal mining operations are associated with the premises and farming area to the south and east, i.e., including the study area (Photograph 3.5). Many properties have been undermined. Closed shafts, rescue boreholes, quarries, and coal conveyor belts are in evidence in the study area. Farmers are compensated by SASOL with water in exchange for loss of access to boreholes.

Photograph 3.4: Sasol Complex seen from Bosjesspruit 291/11 to the south.

Photograph 3.5: Buried coal conveyor belt on northernmost portion of Brandwacht 316/3 (Te Water)

The broader study area is criss-crossed by a web of existing transmission lines. This is linked to SASOL Secunda and the collieries and gold mines in the Secunda-Evander area. Two substations are currently located along the Trichardt-Charl Cilliers Rd. The immediate study area is however currently only moderately affected, namely by 2 roughly north south aligned 132 kV lines, one of which is aligned along the R 546, Standerton Road (Photograph 3.6).

Photograph 3.6: Transmission line along the R546 on Vantondershoek 317/1 (Steyn)

The area immediately to the east and south of the SASOL Secunda premises is dominated by mixed farming operations. Limited employment opportunities are associated with these operations. Properties are relatively small. Room for expansion of cropped fields is typically hampered by lack of suitable soils. Soy and maize grown under dryland conditions are the key crops (Photograph 3.7). The nearest grain silo complex is located on the outskirts of Trichardt, just off the Trichardt-Charl Cilliers Road (Photograph 3.8). In the broader study area, silos are also located in Delmans, and bunkers at Tutuka and Vogelvlei.

Photograph 3.7: Start of planting season on Bosjesspruit 291/10 (Joubert)

Photograph 3.8: Afgri Trichardt silos at the southern entrance to Trichardt

Land unsuitable for cropping is used as rangeland. Beef cattle predominate, but many operations also include sheep (Photograph 3.9). The veld carrying capacity is relatively high, 1 head of cattle to 5 ha (2018), or 2 sheep per hectare.[6] Harvest residue is utilized as grazing on many properties. Many operations also cultivate pasture crops (e.g., Oulandsgras) for commercial silage and own use. Due to chronic stock theft and predation (jackal), most operations kraal (and count) their stock overnight. Kraals are typically located at the farm yards).

Photograph 3.9: Cattle grazing on Knoppiesfontein 313/9 (Te Water); farmstead on adjacent Knoppies in the background.

The study area (main) properties are typically inhabited. Farmsteads are located 2-5 km apart, often in proximity to public or mining roads (Photograph 3.10). Labourers' houses are typically located in proximity (or on) farm yards. The trend is for farmers to transport in workers from nearby urban areas such as Charl Cilliers and Embalenhle on a daily basis. A few labourers continue to live on study area properties (Photograph 3.11).

[6] https://gis.elsenburg.com/apps/cfm/#

Photograph 3.10: Farm yard on Vantondershoek 317/12 (Joubert) viewed from Trichardt-Charl Cilliers Road

Photograph 3.11: Workers houses on Vantondershoek 317/1 (Steyn)

The sense of place in the study area – and indeed, broader area – is dominated by SASOL Secunda. Infrastructure, smoke and steam emissions and flaring are visible throughout the immediate study area. Odours are perceptible on many study area properties. The area along the SASOL property's eastern and southern periphery is characterized by farming activities mixed with industrial ones, e.g., quarrying, brick making. No significant tourism receptors are located in the study area. This is linked to the disturbed landscape context and the somewhat featureless landscape. Existing tourism in the broader area is associated with essential travel (e.g., work-related), water sports (Trichardsfontein Leisure Resort south east of Trichardt), function venues, and a few commercial (paying) hunting operations mainly catering to local biltong hunters.

3.5.2 Site properties

The Mukondeleli WEF site affects 23 properties which belong to 7 land owners (Figure 3.5). Turbines are proposed on properties belonging to six land owners, namely Messrs Alfie Serfontein, Jan van Jaarsveld, Jan-Jan Steyn, Tienie Joubert, Izak Joubert and Te Water (TW Group). The substation Alternative 1 (preferred) site is located on Bosjesspruit 291/10 (Izak Joubert), and the Alternative 2 site on Vantondershoek 317/12 (Tienie Joubert). The properties belonging to Mr Tjorrie Kruger are proposed to only accommodate (likely buried) cabling between the development area on the Te Water properties and the project substation (Alts).

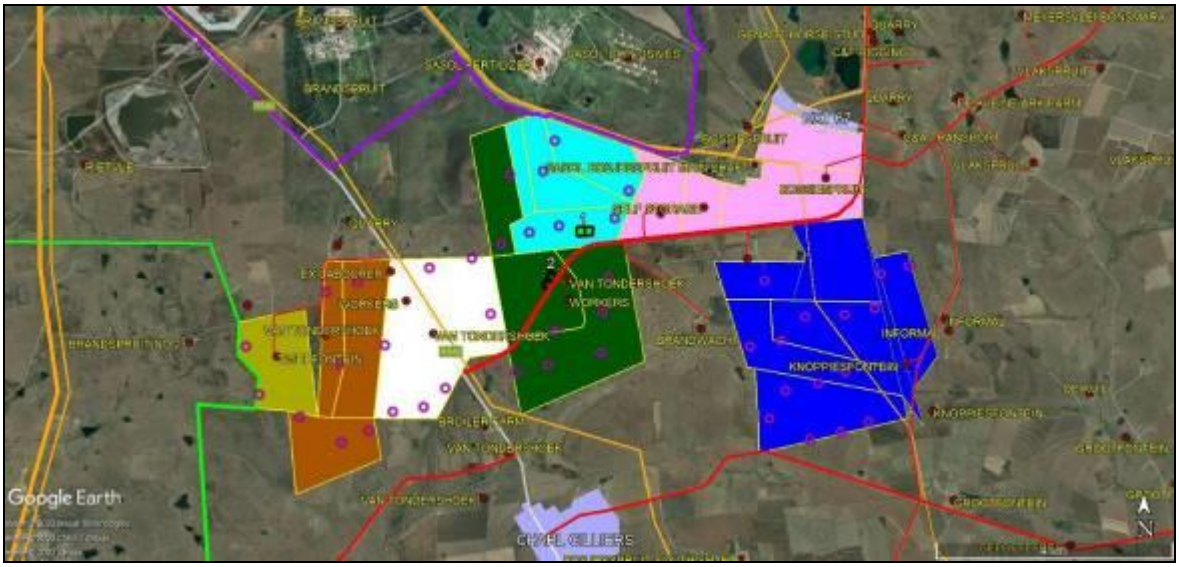


Figure 3.5: Mukondeleli WEF site owners: Serfontein (khaki fill), van Jaarsveld (brown), Steyn (white), Tienie Joubert (green), Izak Joubert (light blue), Kruger (light pink), and TW Group (dark blue). Also indicated are proposed turbines (pink circles), substation alternatives 1 and 2 (black outlines), Sasol Secunda complex boundary (purple), existing transmission lines (orange), nearby urban areas (grey), study area roads (red), and Rhino Lodge boundary (light green).

With the exception of the properties which belong to Mr Izak Joubert and those to Messrs Te Water, the relevant owners reside on (one) of their study area properties (Table 3.1; Photograph 3.12). Messrs Izak (son) and Tenie (father) farm together. The extended family resides on Vantondershoek 317/12. The farmstead located on Knoppiesfontein (Te Water) is currently occupied by a farm manager (Photograph 3.13). Portions of the Kruger properties are leased out for cropping, but the properties are otherwise essentially used for rural-residential purposes (including leased) (Photograph 3.14). Small numbers of tenured farm labourers (1-2) are associated with most operations, while labour associated with the Te Water properties is based off-site (Photograph 3.15).

Table 3.1: Overview of directly affected properties

OWNER	PROPERTY	DWELLINGS	USE
Joubert, Mr Izak	Bosjesspruit 291/2	N.a.	Properties farmed as one unit by father (Tienie) and son (Izak); Both owners reside on Vantondershoek (317/12) farm yard; One resident labourer household on 317/12 south of yard; Dryland field cropping and livestock production; Kennels (Sniff Snuff) on 317/12 yard; 4 permanent employees
	Bosjesspruit 291/8	N.a.	
	Bosjesspruit 291/9	N.a.	
	Bosjesspruit 291/10	N.a.	
Joubert, Mr Tienie	Bosjesspruit 291/14	N.a.	
	Van Tondershoek 317/2	N.a.	
	Van Tondershoek 317/12	Van Tondershoek[7]	
Kruger, Mr Tjorrie	Bosjesspruit 291/6	Bosiesspruit cluster	Owner resides on 291/13; Dwellings on 291/6 (cluster) and 291/11 leased out; Self-Storage facility located on 291/11; Fields leased out to TW Group for dryland cropping; No dedicated workforce
	Bosjesspruit 291/11	Heeltevreden	
	Bosjesspruit 291/12	N.a.	
	Bosjesspruit 291/13	Owner dwelling	
Serfontein, Mr Alfie	Tweefontein 321/5	Tweefontein	Owner's extended family + 2 labourers resident (all on Tweefontein yard); Dryland field cropping and livestock production
Steyn, Mr Jan-Jan	Van Tondershoek 317/1	Van Tondershoek	Owner family resident on property; 1 ex-worker household with tenure rights resident; 2 labourers resident on property; Dryland field cropping and livestock production
TW Group (Messrs Te Water)	Knoppiesfontein 313/9	Knoppiesfontein	Collectively known as Brandwacht; Part of TW Group's Secunda operations based on Grootvlei farm (Trichardt); Brandwacht used mainly livestock production, also limited dryland cropping; Knoppiesfontein farmstead inhabited by farm manager; Labour deployed from Grootvlei when required
	Farm 314	N.a.	
	Brandwacht 316/2	N.a.	
	Brandwacht 316/3	N.a.	
	Brandwacht 316/4	N.a.	
	Brandwacht 316/5	N.a.	
	Brandwacht 316/13	N.a.	
Van Jaarsveld, Mr Jan	Van Tondershoek 317/7	N.a.	Owner and brother reside on 317/11 yard; No tenured labour; Stock farming and game (hunting); Leases out fields to Mr Jan-Jan Steyn for dryland cropping.
	Van Tondershoek 317/8	N.a.	
	Van Tondershoek 317/11	Van Tondershoek	

[7] Shading indicates inhabited dwellings on property.

Photograph 3.12: Farmstead and out-buildings on Vantondershoek 317/11 (van Jaarsveld). The owner and his brother reside on the property

Photograph 3.13: Farmstead on Knoppiesfontein 313/9 (Te Water) used by Brandwacht farm manager

Photograph 3.14: Heeltevreden farmstead and self-storage facility on Bosjesspruit 291/11 (Kruger) north of the Trichardt-Charl Cilliers Road

Photograph 3.15: Dwellings of ex-worker with tenure rights on northern portion of Vantondershoek 317/1

With the exception of the Kruger properties, all study area properties are used primarily for mixed farming operations, viz of dryland summer crops (soy and maize) and beef cattle and/ or sheep (Photographs 3.16 and 3.17). Game farming is carried out on only one property, namely the central portion of Vantondershoek 317/7 (van Jaarsveld). The game is used for commercial hunting, essentially catering to biltong hunters from the region. The accommodation facility for hunters on adjacent 317/11 (at the farm yard), is no longer used. The owner intends to hunt out all game prior to the construction of the WEF (van Jaarsveld, pers. comm). No (other) tourism receptors are located on the site properties.

Photograph 3.16: Fields on west of the Tweefontein 321/5 (Serfontein) farm yard

Photograph 3.17: Kraals and out-buildings on Vantondershoek 317/1 (Steyn)

3.5.3 Potentially sensitive receptors

The turbines (200 m hub height) are mainly proposed on veld used for grazing, but a number are also proposed inside cropped fields on the Serfontein, Joubert, Steyn and Te Water properties (Figure 3.3.6). In all instances, mitigation was deemed possible by the relevant owners, viz. by repositioning the relevant turbines to adjacent headlands ('wenakkers'). None of the directly affected land owners raised concerns with regard to proximity of turbines to dwellings. This is linked to distances exceeding 600 m from residential receptors, and the generally disturbed landscape context. Both proposed substation sites would occupy veld on the Joubert properties. The Alternative 1 substation site is deemed acceptable by the owner, but the Alternative 2 site is deemed unacceptable due to its proximity to the farm yard complex, viz 200 m, and opposite the entrance to the farm yard (Joubert, pers. comm).

Figure 3.6: Turbine and substation locations indicated as acceptable (pink) and unacceptable (blue) by the relevant land owners.

The only potentially significant tourism receptor in the study area, Rhino Lodge, is located adjacent to the west of the site. The large multi-farm property largely consists of old mining properties. Rhino Lodge caters for paying hunting and fishing (catch and release). The property is accessed off the R50 (Leandra-Standerton Road) located approximately 10 km west of the WEF site. Tourist accommodation facilities (chalets) and a functions venue are located near the entrance. The nearest proposed turbine is located on Tweefontein, approximately 7 km east of the chalets. The owner has indicated that, apart from potential restrictions on hunting activities on the portion of Rhino Lodge immediately adjacent to Twwefontein, no sense of place, visual, etc impacts are anticipated (van Coller, pers. comm). A wedding venue (Zorgen Vrij) located approximately 2 km NNE of the site, has recently closed down (Botha, pers. comm). Ukhozi Lodge, located 5 km to the north of the site, forms part of SASOL's Rian Rademan Training Centre.

3.5.4 Other renewable energy facilities

The Mukondeleli WEF project is not located within a Renewable Energy Development Zone (REDZ). The only historic application indicated on the DFF&E's renewable energy

applications website located within a 35 km range of the site, is the proposed (2016) 66 MW Tutuka SEF located SE of the site. Enertrag is currently also proposing the Vhuvhili SEF (separate application) located to the north east of the Mukondeleli WEF site (Figure 3.7).

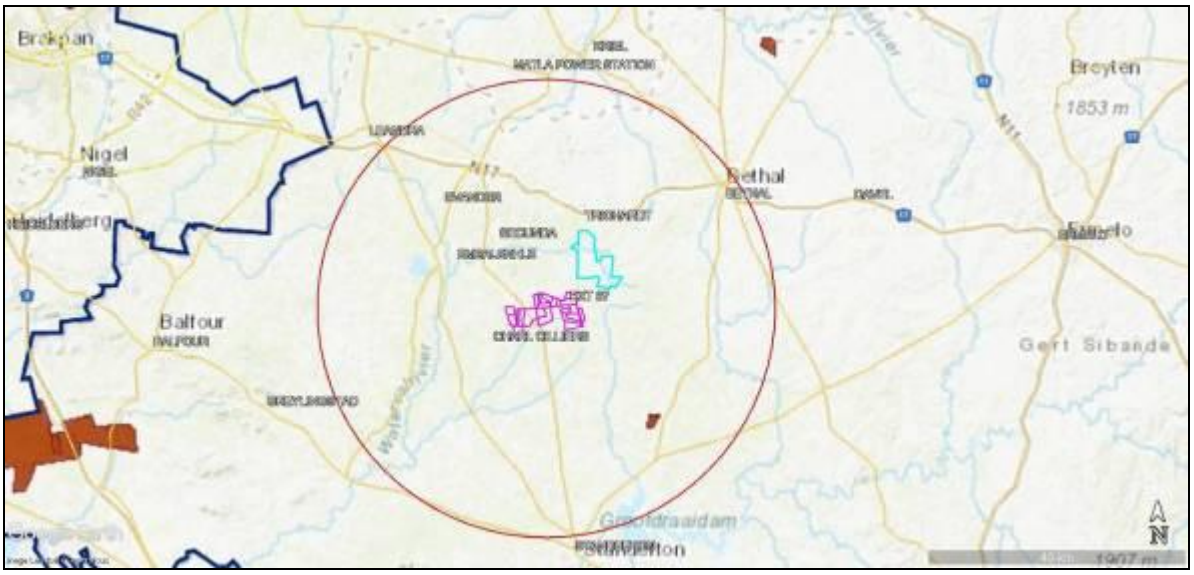


Figure 3.7: Mukondeleli WEF site properties (pink) in relation to other REF applications within a 35 km radius (red); concurrently proposed Enertrag Vhuvhili SEF outlined in light blue (Source: DFF&E)

SECTION 4: ASSESSMENT OF KEY SOCIAL ISSUES

4.1 INTRODUCTION

The identification of key issues was based on:

- Review of project related information.
- Experience/ familiarity of the author with the area and local conditions.
- Experience with similar projects.

The section is divided into the following sections:

- Compatibility with relevant policy and planning context ("planning fit");
- Social issues associated with the construction phase.
- Social issues associated with the operational phase.
- Social issues associated with the decommissioning phase.
- Social implications of "no development" alternative.
- Social implications associated with cumulative impacts.

4.2 ASSESSMENT OF POLICY AND PLANNING FIT

The development of and investment in renewable energy is supported by the National Development Plan (NDP), New Growth Path Framework and National Infrastructure Plan, which all refer to and support renewable energy. The development of renewable energy is also supported at a provincial and local level. The development of the proposed WEF is therefore supported by key policy and planning documents.

4.3 CONSTRUCTION PHASE SOCIAL IMPACTS

Potential positive impacts

- Creation of employment and business opportunities, and opportunity for skills development and on-site training.

Potential negative impacts

- Impacts associated with the presence of construction workers on local communities.
- Impacts related to the potential influx of job-seekers.
- Increased risks to livestock and farming infrastructure associated with the construction related activities and presence of construction workers on the site.
- Increased risk of grass fires associated with construction related activities.
- Nuisance impacts, such as noise, dust, and safety, associated with construction related activities and vehicles.
- Impact on productive farmland.

4.3.1 Creation of local employment, training, and business opportunities

The construction phase of the WEF will extend over a period of approximately 36 months and create in the region of 220 employment opportunities (43% skilled, 45% semi-skilled and 36% low-skilled). Members from the local communities in the area, specifically Secunda, would be in a position to qualify for most of the low skilled and semi-skilled employment opportunities. Most of these employment opportunities will accrue to Historically Disadvantaged (HD) members of the community. Based on information from similar projects the total wage bill will be in the region of R 50 million (2022 Rand values). A percentage of the wage bill will be spent in the local economy which will also create opportunities for local businesses in the local towns in the area.

Given relatively high local unemployment levels and limited job opportunities in the area, this will represent a significant, if localised, social benefit. The capital expenditure associated with the construction phase will be approximately R 2.5-3 billion (2022 Rand value). Due the lack of diversification in the local economy the potential for local companies is likely to be limited. The majority of benefits are therefore likely to accrue to contractors and engineering companies based outside the GMM. The local service sector will also benefit from the construction phase. The potential opportunities would be linked to accommodation, catering, cleaning, transport, and security, etc. associated with the construction workers on the site.

The hospitality industry in the area will also benefit from the provision of accommodation and meals for professionals (engineers, quantity surveyors, project managers, product representatives etc.) and other (non-construction) personnel involved on the project. Experience from other construction projects indicates that the potential opportunities are not limited to on-site construction workers but also to consultants and product representatives associated with the project.

Table 4.1: Impact assessment of employment and business creation opportunities during the construction phase

Nature: Creation of employment and business opportunities during the construction phase		
	Without Mitigation	**With Enhancement**
Extent	Local (2)	Local (3)
Duration	Short term (2)	Short term (2)
Magnitude	Medium (3)	Medium (3)
Reversibility	N/A	N/A
Probability	Probable (3)	Highly probable (4)
Significance	Low (21)	Moderate (32)
Status	Positive	Positive
Can impact be enhanced?	Yes	
Enhancement: See below		
Residual impacts: Opportunity to up-grade and improve skills levels in the area.		

Assessment of No-Go option
There is no impact as the current status quo would be maintained.

Recommended enhancement measures

In order to enhance local employment and business opportunities associated with the construction phase the following measures should be implemented:

Employment

- Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.
- Where reasonable and practical, the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However, due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area.
- Where feasible, efforts should be made to employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria.
- Before the construction phase commences the proponent should meet with representatives from the MM to establish the existence of a skills database for the area. If such as database exists, it should be made available to the contractors appointed for the construction phase.
- The local authorities, community representatives, and organisations on the interested and affected party database should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the proponent intends following for the construction phase of the project.
- Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase.
- The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.

Business

- The proponent should liaise with the MM with regards the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers (e.g., construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction service providers. These companies should be notified of the tender process and invited to bid for project-related work.

Note that while preference to local employees and companies is recommended, it is recognised that a competitive tender process may not guarantee the employment of local labour for the construction phase.

4.3.2 Impact of construction workers on local communities

The presence of construction workers poses a potential risk to family structures and social networks. While the presence of construction workers does not in itself constitute a social impact, the manner in which construction workers conduct themselves can impact on local communities. The most significant negative impact is associated with the disruption of existing family structures and social networks. This risk is linked to potentially risky behaviour, mainly of male construction workers, including:

- An increase in alcohol and drug use.
- An increase in crime levels.
- The loss of girlfriends and/or wives to construction workers.
- An increase in teenage and unwanted pregnancies.
- An increase in prostitution.
- An increase in sexually transmitted diseases (STDs), including HIV.

The objective will be to source as many of the low and semi-skilled workers locally. These workers will be from the local community and form part of the local family and social networks. This will reduce the risk and mitigate the potential impacts on the local community. The potential impact on the local community will therefore be negligible. The balance of semi-skilled and skilled workers will be accommodated in the nearby town of Secunda.

Table 4.2: Assessment of impact of the presence of construction workers in the area on local communities

Nature: Potential impacts on family structures and social networks associated with the presence of construction workers		
	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (1)
Duration	Short term (2)	Short term (2)
Magnitude	Medium (3)	Low (2)
Reversibility	With rehabilitation/mitigation (3)	With rehabilitation/mitigation (3)
Probability	Probable (3)	Probable (3)
Significance	Moderate (30)	Low (24)
Status	Negative	Negative
Can impact be mitigated?	Yes, to some degree. However, the risk cannot be entirely eliminated	
Mitigation: See below		
Residual impacts: Impacts on family and community relations that may, in some cases, persist for a long period of time. Also, in cases where unplanned / unwanted pregnancies occur or members of the community are infected by an STD, specifically HIV and or AIDS, the impacts may be permanent and have long term to permanent residual/cumulative impacts on the affected individuals and/or their families and the community.		

Assessment of No-Go option
There is no impact as the current status quo would be maintained.

Recommended enhancement measures
- Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.
- Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase.
- The SEP and CHSSP should include a Grievance Mechanism that enables stakeholders to report resolve incidents.
- Where possible, the proponent should make it a requirement for contractors to implement a 'locals first' policy for construction jobs, specifically for semi and low-skilled job categories.
- The proponent should consider the option of establishing a Monitoring Committee (MC) for the construction phase that representatives from local landowners, farming associations, and the local municipality. This MC should be established prior to commencement of the construction phase and form part of the SEP.
- The proponent and contractor should develop a Code of Conduct (CoC) for construction workers. The code should identify which types of behaviour and activities are not acceptable. Construction workers in breach of the code should be subject to appropriate disciplinary action and/or dismissed. All dismissals must

comply with the South African labour legislation. The CoC should be signed by the proponent and the contractors before the contractors move onto site. The CoC should form part of the CHSSP.
- The proponent and the contractor should implement an HIV/AIDS, COVID-19 and Tuberculosis (TB) awareness programme for all construction workers at the outset of the construction phase. The programmes should form part of the CHSSP.
- The contractor should provide transport for workers to and from the site on a daily basis. This will enable the contactor to effectively manage and monitor the movement of construction workers on and off the site.
- The contractor must ensure that all construction workers from outside the area are transported back to their place of residence within 2 days for their contract coming to an end.
- No construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.

4.3.3 Influx of job seekers

Large construction projects tend to attract people to the area in the hope that they will secure a job, even if it is a temporary job. These job seekers can in turn become "economically stranded" in the area or decide to stay on irrespective of finding a job or not. While the proposed project on its own does not constitute a large construction project, the establishment of a number of renewable energy projects in the area may attract job seekers to the area. As in the case of construction workers employed on the project, the actual presence of job seekers in the area does not in itself constitute a social impact. However, the way in which they conduct themselves can impact on the local community. The main areas of concern associated with the influx of job seekers include:

- Impacts on existing social networks and community structures.
- Competition for housing, specifically low-cost housing.
- Competition for scarce jobs.
- Increase in incidences of crime.

These issues are similar to the concerns associated with the presence of construction workers and are discussed in Section 4.3.1. Based on experience from the construction of other renewable energy facilities the potential for economically motivated in-migration and subsequent labour stranding is likely to limited. This is due to the relatively limited number of employment opportunities and short duration of the construction phase.

Table 4.3: Assessment of impact of job seekers on local communities

Nature: Potential impacts on family structures, social networks and community services associated with the influx of job seekers		
	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (1)
Duration	Short term (2)	Short term (2)
Magnitude	Low (2)	Low (2)
Reversibility	With rehabilitation/mitigation (3)	With rehabilitation/mitigation (3)
Probability	Probable (3)	Probable (3)
Significance	Low (27)	Low (24)
Status	Negative	Negative
Can impact be mitigated?	Yes, to some degree. However, the risk cannot be entirely eliminated	
Mitigation: See below		
Residual impacts: Impacts on family and community relations that may, in some cases, persist for a long period of time. Also, in cases where unplanned / unwanted pregnancies occur or members of the community are infected by an STD, specifically HIV and or AIDS, the impacts may be permanent and have long term to permanent cumulative impacts on the affected individuals and/or their families and the community.		

Assessment of No-Go option
There is no impact as the current status quo would be maintained.

Recommended mitigation measures
It is impossible to stop people from coming to the area in search of employment. However, as indicated above, the proponent should ensure that the employment criteria favour residents from the area. In addition:

- Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.
- Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase.
- The proponent, in consultation with the LM, should investigate the option of establishing a MC to monitor and identify potential problems that may arise due to the influx of job seekers to the area. The MC should also include the other proponents of solar energy projects in the area.
- The proponent should implement a "locals first" policy, specifically with regard to unskilled and low skilled opportunities.
- The proponent should implement a policy that no employment will be available at the gate.

4.3.4 Risk to safety, livestock, and farm infrastructure

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

effectively mitigated by careful planning and managing the movement of construction workers and construction related activities during the construction phase.

Table 4.4: Assessment of risk to safety, livestock, and damage to farm infrastructure

Nature: Potential risk to safety of farmers and farm workers, livestock and damage to farm infrastructure associated with the presence of construction workers on site		
	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (1)
Duration	Short term (2)	Short term (2)
Magnitude	Medium (3)	Low (2)
Reversibility	Reversible with compensation (3)	Reversible with compensation (3)
Probability	Probable (3)	Probable (3)
Significance	Moderate (30)	Low (24)
Status	Negative	Negative
Can impact be mitigated?	Yes	
Mitigation: See below		
Residual impacts: No**,** provided losses are compensated for.		

Assessment of No-Go option
There is no impact as the current status quo would be maintained.

Recommended mitigation measures
- Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.
- Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase.
- The proponent should enter into an agreement with the local farmers in the area whereby damages to farm property etc. during the construction phase will be compensated for. The agreement should be signed before the construction phase commences.
- All farm gates must be closed after passing through.
- Contractors appointed by the proponent should provide daily transport for low and semi-skilled workers to and from the site.
- The proponent should establish a MC and CoC for workers (see above).
- The proponent should hold contractors liable for compensating farmers and communities in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers. This should be contained in the Code of Conduct to be signed between the proponent, the contractors, and neighbouring landowners. The agreement should also cover loses and costs associated with fires caused by construction workers or construction related activities (see below).
- The proponent should implement a Grievance Mechanism that provides local farmers with an effective and efficient mechanism to address issues related to report issues related to damage to farm infrastructure, stock theft and poaching etc.

- The Environmental Management Plan (EMP) must outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested.
- Contractors appointed by the proponent must ensure that all workers are informed at the outset of the construction phase of the conditions contained in the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms.
- Contractors appointed by the proponent must ensure that construction workers who are found guilty of stealing livestock and/or damaging farm infrastructure are dismissed and charged. This should be contained in the CoC. All dismissals must be in accordance with South African labour legislation.
- It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.

4.3.5 Increased risk of grass fires

The presence of construction workers and construction-related activities on the site poses an increased risk of grass fires that could, in turn pose, a threat to livestock, crops, wildlife and farm infrastructure. The potential risk of grass fires will be higher during the dry, windy winter months from May to October. The impacts will be largely local and can be effectively mitigated.

Table 4.5: Assessment of impact of increased risk of grass fires

Nature: Potential noise, dust and safety impacts associated with movement of construction related activities and movement of traffic to and from the site		
	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (1)
Duration	Short term (2)	Short term (2)
Magnitude	Low (2)	Low (2)
Reversibility	Reversible (1)	Reversible (1)
Probability	Probable (3)	Low Probability (2)
Significance	Low (21)	Low (12)
Status	Negative	Negative
Can impact be mitigated?	Yes	
Mitigation: See below		
Residual impacts: If damage to local roads is not repaired then this will affect the other road users and result in higher maintenance costs. The costs will be borne by road users who were no responsible for the damage.		

Assessment of No-Go option
There is no impact as it maintains the current status quo.

Recommended mitigation measures
The mitigation measures include:

- Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.

- Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase.
- The proponent should enter into an agreement with the local farmers in the area whereby damages to farm property etc., during the construction phase will be compensated for. The agreement should be signed before the construction phase commences.
- Contractor should ensure that open fires on the site for cooking or heating are not allowed except in designated areas.
- Smoking on site should be confined to designated areas.
- Contractor should ensure that construction related activities that pose a potential fire risk, such as welding, are properly managed and are confined to areas where the risk of fires has been reduced. Measures to reduce the risk of fires include avoiding working in high wind conditions when the risk of fires is greater. In this regard special care should be taken during the high risk dry, windy summer months.
- Contractor should provide adequate fire-fighting equipment on-site, including a fire fighting vehicle.
- Contractor should provide fire-fighting training to selected construction staff. As per the conditions of the Code of Conduct, in the advent of a fire being caused by construction workers and or construction activities, the appointed contractors must compensate farmers for any damage caused to their farms. The contractor should also compensate the fire-fighting costs borne by farmers and local authorities.
- No construction staff, with the exception of security staff, to be accommodated on site overnight.

4.3.6 Nuisance impacts associated with construction related activities

Construction related activities, including the movement of heavy construction vehicles of and on the site, has the potential to create dust, noise and safety impacts and damage to local roads. The impacts will be largely local and can be effectively mitigated.

Table 4.6: **Assessment of the impacts associated with construction related activities**

Nature: Potential loss of livestock and grazing and damage to farm infrastructure associated with increased incidence of grass fires		
	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (1)
Duration	Short term (2)	Short term (2)
Magnitude	Medium (3)	Low (2)
Reversibility	Reversible with compensation (3)	Reversible with compensation (3)
Probability	Probable (3)	Low Probability (2)
Significance	Moderate (30)	Low (16)
Status	Negative	Negative
Can impact be mitigated?	Yes	
Mitigation: See below		
Residual impacts: No**,** provided losses are compensated for.		

Assessment of No-Go option
There is no impact as it maintains the current status quo.

Recommended mitigation measures
The potential impacts associated with heavy vehicles can be effectively mitigated. The mitigation measures include:

- Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.
- Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase.
- Timing of construction activities should be planned to avoid / minimise impact on key farming activities, including planting and harvesting operations.
- The proponent should establish a MC to monitor the construction phase and the implementation of the recommended mitigation measures. The MC should be established before the construction phase commences, and should include key stakeholders, including representatives from local farmers and the contractor(s). The MF should also address issues associated with damage to roads and other construction related impacts.
- Ongoing communication with land owners and road users during construction period. This should be outlined in the SEP.
- The proponent should implement a Grievance Mechanism that provides local farmers and other road users with an effective and efficient mechanism to address issues related to construction related impacts, including damage to local gravel farm roads.
- Implementation of a road maintenance programme throughout the construction phase to ensure that the affected roads maintained in a good condition and repaired once the construction phase is completed.
- Repair of all affected road portions at the end of construction period where required.
- Dust suppression measures must be implemented on un-surfaced roads, such as wetting on a regular basis and ensuring that vehicles used to transport building materials are fitted with tarpaulins or covers.
- All vehicles must be roadworthy, and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits.

4.3.7 Impacts associated with loss of farmland

The activities associated with the construction phase and establishment of the proposed project and associated infrastructure will result in the disturbance and loss of land available for grazing. The impact on farmland associated with the construction phase can be mitigated by minimising the footprint of the construction related activities and ensuring that disturbed areas are fully rehabilitated on completion of the construction phase. In addition, the landowner will be compensated for the loss of land.

Based on feedback from the affected land owners, turbine footprint issues relate to impacts on cropped areas. Messrs Serfontein (321/5), Steyn (317/1), Joubert (291/14, 291/9, 291/10, 291/2), and Te Water (313/9) indicated that a number of proposed turbine locations are located within cropped areas. However, the landowners all indicated that mitigation was possible by repositioning the relevant turbines to adjacent headlands ('wenakkers')(See Figure 3.6). This would reduce the impact on productive land.

In terms of substation, Substation Alternative 2 was regarded as due its proximity to the residential cluster on Van Tondershoek (317/12). Alternative 1 is acceptable, as deemed sufficiently distant, and not impacting on cropping land (Joubert, pers. comm).

The affected landowners also indicated that they should be provided with information on timing of construction activities in order to plan cropping and stocking activities. Harvests are typically marketed in advance of activities, i.e., farmers are committed to deliver contracted yields. This requires annual planning, determining how much land needs to be cultivated that season within the operation.

Table 4.7: Assessment of impact on farmland due to construction related activities

Nature: The activities associated with the construction phase, such as establishment of access roads and the construction camp, movement of heavy vehicles and preparation of foundations for the project etc. will damage farmlands and result in a loss of farmlands for grazing / crops.		
	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (1)
Duration	Short term (2)	Short term (2)
Magnitude	Medium (3)	Low (2)
Reversibility	Reversible with compensation and rehabilitation (3)	Reversible with compensation and rehabilitation (3)
Probability	Highly Probable (4)	Probable (3)
Significance	Moderate (40)	Low (24)
Status	Negative	Negative
Can impact be mitigated?	Yes	Yes
Mitigation: See below		
Residual impacts: If damage to and or loss of productive land is not avoided and or minimised can impact on viability of farming operations and livelihoods.		

Assessment of No-Go option
There is no impact as it maintains the current status quo.

Recommended mitigation measures
The potential impacts associated with damage to, and loss of farmland can be effectively mitigated. The aspects that should be covered include:

- The loss of high-quality agricultural land should be avoided and or minimised by careful planning of the final layout of the proposed WEF turbines. The recommendations of the agricultural / soil assessment should be implemented.
- Affected landowners should be consulted about the timing of construction related activities in advance.
- The footprint associated with the construction related activities (access roads, construction platforms, workshop etc.) should be minimised.
- An Environmental Control Officer (ECO) should be appointed to monitor the establishment phase of the construction phase.

- All areas disturbed by construction related activities, such as access roads on the site, construction platforms, workshop area etc., should be rehabilitated at the end of the construction phase.
- The implementation of a rehabilitation programme should be included in the terms of reference for the contractor/s appointed. The specifications for the rehabilitation programme should be drawn up by the Environmental Consultants appointed to manage the EIA.
- The implementation of the Rehabilitation Programme should be monitored by the ECO.

4.4 OPERATIONAL PHASE SOCIAL IMPACTS

The following key social issues are of relevance to the operational phase:

Potential positive impacts
- Generate renewable energy to produce green hydrogen and ammonia.
- Creation of employment opportunities.
- Benefits associated with the establishment of a Community Trust.
- Benefits to the affected landowners.

Potential negative impacts
- Visual impacts and associated impacts on sense of place.
- Impact on property values.
- Impact on tourism.

4.4.1 Generate renewable energy to produce green hydrogen and ammonia

The aim of the project is to generate renewable energy to produce commercially usable green hydrogen and ammonia that can be used as a fuel for transport in hydrogen fuel cells and or in different industrial uses. The ammonia will be primarily used for the production of ammonium nitrate (fertiliser) and manufacture of plastics, explosives, textiles, pesticides, and other chemicals. Ammonia can also be used as a stable 'carrier' of hydrogen, allowing hydrogen to be readily stored and transported. The proposed project will therefore create opportunities to improve energy security in South Africa by generating alternative energy sources and reduce the carbon footprint associated with current energy generation. The project will also produce green ammonium nitrate for the South African farming and industrial sector and support the transmission of South Africa's fossil fuel-based economy to renewable energy.

Table 4.8: Generate renewable energy to produce green hydrogen and ammonia

Nature Development of infrastructure support renewable energy and produce green hydrogen and ammonia for SA		
	Without Mitigation	**With Mitigation**
Extent	Local, Regional and National (4)	Local, Regional and National (4)
Duration	Long term (4)	Long term (4)
Magnitude	High (4)	High (4)
Reversibility	N/A	N/A
Probability	Highly Probable (4)	Definite (5)
Significance	Moderate (48)	High (60)

Status	Negative	Positive
Can impact be enhanced?	Yes	
Enhancement: See below		
Residual impacts: Overall reduction in CO_2 emission, reduction in water consumption for energy generation, contribution to the development of the renewable energy sector in South Africa and benefit for economic development and investment.		

Assessment of No-Go option
There is no impact as it maintains the current status quo.

Recommended mitigation measures
- As a policy level, government should be encouraged to develop and implement economic incentives to support investment in and the development of green hydrogen and ammonia initiatives.
- Maximise opportunities for local content and procurement.
- Maximise employment opportunities for local community members.
- Implement training and skills development programs for members from the local community.

4.4.2 Creation of employment opportunities

The proposed development will create in the region of 20 full time employment opportunities during the operational phase, of which 20% will be low-skilled, semi-skilled 30%, and 50% skilled. Based on similar projects the annual operating budget will be in the region of R 24 million (2022 Rand values), including wages.

Table 4.9: Assessment of employment and business creation opportunities

Nature: Creation of employment, skills development and business opportunities associated with the operational phase		
	Without Mitigation	**With Enhancement**
Extent	Local and Regional (1)	Local and Regional (2)
Duration	Long term (4)	Long term (4)
Magnitude	Low (2)	Medium (3)
Reversibility	N/A	N/A
Probability	Low Probability (2)	Highly Probable (4)
Significance	Low (14)	Moderate (36)
Status	Positive	Positive
Can impact be enhanced?	Yes	
Enhancement: See below		
Residual impacts: Creation of permanent employment and skills and development opportunities for members from the local community and creation of additional business and economic opportunities in the area		

Recommended enhancement measures

The enhancement measures listed in Section 4.4.1, i.e., to enhance local employment and business opportunities during the construction phase, also apply to the operational phase. In addition, the proponent should investigate providing training and skills development to enable locally based service providers to provide the required services for the operational phase.

4.4.3 Generate income for affected landowner

The proponent will enter into rental agreements with the affected landowners for the use of the land for the establishment of the proposed WEF. In terms of the rental agreement the affected landowner will be paid an annual amount dependent upon the area affected. The additional income will reduce the risk to his livelihoods posed by droughts and fluctuating market prices for farm outputs and farming inputs, such as fuel, feed etc. The additional income represents a significant benefit for the affected landowner.

Table 4.10: Assessment of benefits associated with income generated for the affected farmer(s)

Nature: The generation of additional income represents a significant benefit for the local affected farmer(s) and reduces the risks to their livelihoods posed by droughts and fluctuating market prices for sheep and farming inputs, such as feed etc.		
	Without Mitigation	**With Enhancement**
Extent	Local and Regional (1)	Local and Regional (2)
Duration	Long term (4)	Long term (4)
Magnitude	Low (2)	Medium (3)
Reversibility	N/A	N/A
Probability	Probability (3)	Definite (5)
Significance	Low (21)	Moderate (45)
Status	Positive	Positive
Can impact be enhanced?	Yes	
Enhancement: See below		
Residual impacts: Support for local agricultural sector and farming		

Assessment of No-Go option
There is no impact as it maintains the current status quo.

Recommended enhancement measures
- Implement agreements with affected landowners.
- The loss of high-quality agricultural land should be avoided and or minimised by careful planning in the final layout of the proposed SEF facilities. The recommendations of the agricultural / soil assessment should be implemented.

4.4.4 Visual impact and impact on sense of place

The proposed PV SEF has the potential to impact on the areas existing rural sense of place. However, given the location of the site next to the existing, large Secunda petrochemical facility and associated coal mines the potential impact on the areas sense of place is likely to be limited. This was confirmed during the site visit. None of

affected landowners or adjacent owners interviewed raised concerns regarding the potential impact on the areas sense of place.

Table 4.11: Visual impact and impact on sense of place

Nature: Visual impact associated with the proposed facility and associated infrastructure and the potential impact on the areas rural sense of place.		
	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	Low (2)	Low (2)
Reversibility	Reversible with rehabilitation (3)	Reversible with rehabilitation (3)
Probability	Low Probability (2)	Low Probability (2)
Significance	Low (26)	Low (26)
Status	Negative	Negative
Can impact be mitigated?	Yes	
Enhancement: See below		
Residual impacts: Potential impact on current rural sense of place		

Assessment of No-Go option
There is no impact as it maintains the current status quo.

Recommended mitigation measures
The recommendations contained in the VIA should also be implemented.

4.4.5 Potential impact on property values

The potential visual impacts associated with the proposed WEF have the potential to impact on property values. Based on the results of a literature review undertaken for wind farms the potential impact on property values in rural areas is likely to be limited. In this regard a study undertaken in Australia in 2016 (Urbis Pty Ltd) found that:

- Appropriately located wind farms within rural areas, removed from higher density residential areas, are unlikely to have a measurable negative impact on surrounding land values.
- There is limited available sales data to make a conclusive finding relating to value impacts on residential or lifestyle properties located close to wind farm turbines, noting that wind farms in NSW have been constructed in predominantly rural areas.

Based on the findings of the literature review the impact of the proposed WEF on property values is therefore likely to be low, specifically given the location of the site next to the existing, large Secunda petrochemical facility and associated coal mines.

As indicated below, the only potentially significant tourism receptor in the study area, Rhino Lodge, is located adjacent to the west of the site. Based on the comments from the owner the WEF will not impact on current activities and as such the value of the property. The proposed WEF is therefore unlikely to impact on adjacent property values.

Table 4.12: Assessment of potential impact on property values and operations

Nature: Visual impact associated with the proposed facility and associated potential impact on property values.		
	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (1)
Duration	Long term (4)	Long term (4)
Magnitude	Low (2)	Low (2)
Reversibility	N/A	N/A
Probability	Low Probability (2)	Low Probability (2)
Significance	Low (16)	Low (14)
Status	Negative	Negative
Can impact be mitigated?	Yes	
Enhancement: See below		
Residual impacts: Potential impact on current rural sense of place and property values		

Assessment of No-Go option
There is no impact as it maintains the current status quo.

Recommended mitigation measures
The recommendations contained in the VIA should be implemented.

4.4.6 Potential impact on tourism

The potential visual impacts associated with the proposed WEF have the potential to impact on tourism facilities and tourism in the area. Based on the findings of the literature review there is limited evidence to suggest that the proposed WEF would impact on the tourism in the GMM and or GSDM.

The only potentially significant tourism receptor in the study area, Rhino Lodge, is located adjacent to the west of the site. The owner indicated that, apart from potential restrictions on hunting activities on the portion of Rhino Lodge immediately adjacent to Tweefontein, no sense of place, visual, etc impacts are anticipated (van Coller, pers. comm). A wedding venue (Zorgen Vrij) located approximately 2 km NNE of the site, has recently closed down (Botha, pers. comm). Ukhozi Lodge, located 5 km to the north of the site, forms part of SASOL's Rian Rademan Training Centre. The proposed WEF will therefore not impact on local tourism operations.

Table 4.13: Impact on tourism in the region

Nature: Potential impact of the WEF on local tourism operations and activities		
	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	Very Low (1)	Very Low (1)
Reversibility	N/A	N/A
Probability	Low Probability (2)	Low Probability (2)
Significance	Low (14)	Low (14)
Status	Negative	Negative
Can impact be mitigated?	Yes	
Enhancement: See below		
Residual impacts: Potential impact on current rural sense of place and future tourism opportunities in the area.		

Assessment of No-Go option
There is no impact as it maintains the current status quo.

Recommended mitigation measures
The recommendations contained in the VIA should be implemented.

4.5 ASSESSMENT OF DECOMMISSIONING PHASE

Typically, the major social impacts associated with the decommissioning phase are linked to the loss of jobs and associated income. This has implications for the households who are directly affected, the communities within which they live, and the relevant local authorities. However, in the case of the proposed facility the decommissioning phase is likely to involve the disassembly and replacement of the existing components with more modern technology. This is likely to take place in the 20 - 25 years post commissioning. The decommissioning phase is therefore likely to create additional, construction type jobs, as opposed to the jobs losses typically associated with decommissioning.

Given the relatively small number of people employed during the operational phase (~ 20), the social impacts at a community level associated with decommissioning will be limited. In addition, potential impacts associated with the decommissioning phase can be effectively managed with the implementation of a retrenchment and downscaling programme. With mitigation, the impacts are assessed to be Low (negative). Decommissioning will also create temporary employment opportunities, which would represent a positive temporary impact. The significance would be Low with enhancement due to limited opportunities and short duration.

Table 4.14: Social impacts associated with decommissioning

Nature: Social impacts associated with retrenchment including loss of jobs, and source of income. Decommissioning will also create temporary employment opportunities, which would represent a positive temporary impact		
	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (2)
Duration	Short term (2)	Short term (2)
Magnitude	Low (2)	Very Low (1)
Reversibility	N/A	N/A
Probability	Probability (3)	Probability (3)
Significance	Low (18)	Moderate (15)
Status	Negative	Negative
Can impact be mitigated?	Yes	
Enhancement: See below		
Residual impacts: Loss of income and work opportunities.		

Assessment of No-Go option
There is no impact as it maintains the current status quo.

Recommended mitigation measures

- The proponent should ensure that retrenchment packages are provided for all staff retrenched when the plant is decommissioned.
- All structures and infrastructure associated with the proposed facility should be dismantled and transported off-site on decommissioning.

4.6 CUMULATIVE IMPACT ON SENSE OF PLACE

The potential cumulative impacts on the areas sense of place will be largely linked to potential visual impacts. In this regard the Scottish Natural Heritage (2005) describes a range of potential cumulative landscape impacts associated with wind farms on landscapes. These issues are also likely to be relevant to solar facilities and associated infrastructure. The relevant issues identified by Scottish Natural Heritage study include:

- Combined visibility (whether two or more wind farms will be visible from one location).
- Sequential visibility (e.g. the effect of seeing two or more wind farms along a single journey, e.g. road or walking trail).
- The visual compatibility of different wind farms in the same vicinity.
- Perceived or actual change in land use across a character type or region.
- Loss of a characteristic element (e.g. viewing type or feature) across a character type caused by developments across that character type.

The guidelines also note that cumulative impacts need to be considered in relation to dynamic as well as static viewpoints. The experience of driving along a tourist road, for example, needs to be considered as a dynamic sequence of views and visual impacts,

not just as the cumulative impact of several developments on one location. The viewer may only see one renewable energy facility and the associated infrastructure at a time, but if each successive stretch of the road is dominated by views of renewable energy facilities, then that can be argued to be a cumulative visual impact (National Wind Farm Development Guidelines, DRAFT - July 2010).

As indicated above, the only historic application indicated on the DFF&E's renewable energy applications website located within a 35 km range of the site, is the proposed (2016) 66 MW Tutuka SEF located south east of the site. Enertrag is currently also proposing the Vhuvhili SEF (separate application) located to the north east of the Mukondeleli WEF site. There is therefore the possibility of combined and sequential impacts. However, give the location of the site the potential impact of the proposed WEF and associated infrastructure on the areas sense of place is likely to be limited. The cumulative impacts are also likely to be low with mitigation, specifically given the location of the site next to the existing, large Secunda petrochemical facility and associated coal mines.

Table 4.15: Cumulative impacts on sense of place and the landscape

Nature: Visual impacts associated with the establishment of more than one REF and the potential impact on the area's rural sense of place and character of the landscape.		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Local (2)	Local and regional (3)
Duration	Long term (4)	Long term (4)
Magnitude	Low (2)	Low (2)
Reversibility	Reversible with rehabilitation (3)	Reversible with rehabilitation (3)
Probability	Low Probability (2)	Probable (3)
Significance	Low (26)	Moderate (36)
Status (positive/negative)	Negative	Negative
Can impacts be mitigated?	Limited potential	
Mitigation: See below		

Assessment of No-Go option
There is no impact as it maintains the current status quo.

Recommended mitigation measures
The recommendations contained in the VIA should be implemented.

4.7 CUMULATIVE IMPACT ON LOCAL SERVICES AND ACCOMMODATION

The establishment of a number of REFs has the potential to place pressure on local services and accommodation, specifically during the construction phase. The objective will be to source as many low and semi-skilled workers for the construction phase from the GML. This will reduce the pressure on local services and accommodation and the nearby town of Secunda. However, given the relatively short duration of the construction phase the potential impact is likely to be limited.

The potential impact should also be viewed within the context of the potential positive cumulative impacts for the local economy associated with the establishment of the proposed facility and associated renewable energy projects in the GMDM. These benefits will create opportunities for investment in the GMM, including the opportunity to up-grade and expand existing services and the construction of new houses.

Table 4.16: Cumulative impacts on local services

Nature: The establishment of a number of renewable energy facilities and associated projects, such as the proposed WEF in the GMM, has the potential to place pressure on local services, specifically medical, education and accommodation.		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Local (2)	Local and regional (3)
Duration	Short term (2)	Medium term (3)
Magnitude	Low (2)	Medium (3)
Reversibility	N/A	N/A
Probability	Low Probability (2)	Low Probability (2)
Significance	Low (12)	Low (18)
Status (positive/negative)	Negative	Negative
Can impacts be mitigated?	Yes	
Mitigation: See below		

Assessment of No-Go option
There is no impact as it maintains the current status quo.

Recommended mitigation measures
The proponent should liaise with the GMM to address potential impacts on local services.

4.8 CUMULATIVE IMPACT ON LOCAL ECONOMY

In addition to the potential negative impacts, the establishment of renewable energy facilities and associated infrastructure, including the proposed WEF, will also create several socio-economic opportunities for the GMM. The positive cumulative opportunities include creation of employment, skills development and training opportunities, and downstream business opportunities.

The potential cumulative benefits for the local and regional economy are associated with both the construction and operational phase of renewable energy projects and associated infrastructure and extend over a period of 20-25 years. However, steps must be taken to maximise employment opportunities for members from the local communities in the area and support skills development and training programmes.

Table 4.17: Cumulative impacts on local economy

Nature: The establishment of a number of renewable energy facilities and associated projects, such as the proposed WEF in the GMM, will create employment, skills development and training opportunities, creation of downstream business opportunities.		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Local and regional (2)	Local and regional (3)
Duration	Long term (4)	Long term (4)
Magnitude	Low (2)	High (4)
Reversibility	N/A	N/A
Probability	Highly Probable (4)	Definite (5)
Significance	Moderate (32)	Moderate (55)
Status (positive/negative)	Positive	Positive
Can impacts be enhanced?	Yes	
Enhancement: See below		

Assessment of No-Go option
There is no impact as it maintains the current status quo.

Recommended mitigation measures
The proponent should liaise with the GMM to identify potential opportunities for the local economy and businesses.

4.9 ASSESSMENT OF NO-DEVELOPMENT OPTION

The aim of the project is to produce commercially usable green hydrogen and ammonia that can be used in many different industrial downstream uses. Ammonia can also be used as a stable 'carrier' of hydrogen, allowing hydrogen to be readily stored and transported. This will assist to reduce South Africa's carbon footprint.

South Africa relies on coal-powered energy to meet more than 90% of its energy needs. South Africa is therefore one of the highest per capita producers of carbon emissions in the world and Eskom, as an energy utility, has been identified as the world's second largest producer carbon emissions.

The No-Development option would represent a lost opportunity for South Africa to produce green hydrogen and ammonia and reduce its carbon footprint. This would represent a significant negative social cost.

Table 4.18: Assessment of no-development option

Nature: No-development option would result in the lost opportunity for South Africa to improve energy security and reduce carbon emissions via the use of renewable energy and associated benefits in terms of global warming and climate change.		
	Without Mitigation8	**With Enhancement**9
Extent	Local-International (5)	Local-International (5)
Duration	Long term (4)	Long term (4)
Magnitude	Medium (3)	Medium (3)
Reversibility	N/A	N/A
Probability	High Probability (4)	High Probability (4)
Significance	Moderate (48)	Moderate (48)
Status	Negative	Positive
Can impact be mitigated?	Yes	
Enhancement: See below		
Residual impacts: Reduce carbon emissions via the use of renewable energy and associated benefits in terms of global warming and climate change.		

Recommended enhancement measures

The proposed WEF should be developed, and the mitigation and enhancement measures identified in the SIA and other specialist studies should be implemented.

8 Assumes project is not developed
9 Assumes project is developed

SECTION 5: SUMMARY OF KEY FINDINGS

5.1 INTRODUCTION

Section 5 lists the key findings of the SIA. These findings are based on:

- A review of key planning and policy documents pertaining to the area.
- A review of social and economic issues associated with similar developments.
- Site visit and interviews with key stakeholders.
- The experience of the authors with other renewable energy projects.

5.2 SUMMARY OF KEY FINDINGS

The key findings of the study are summarised under the following sections:

- Fit with policy and planning.
- Construction phase impacts.
- Operational phase impacts.
- Cumulative impacts.
- Decommissioning phase impacts.
- No-development option.

5.2.1 Policy and planning issues

The development of and investment in renewable energy is supported by the National Development Plan (NDP), New Growth Path Framework and National Infrastructure Plan, which all refer to and support renewable energy. The development of renewable energy is also supported at a provincial and local level. The development of the proposed WEF is therefore supported by key policy and planning documents.

5.2.2 Construction phase impacts

The key social issues associated with the construction phase include:

Potential positive impacts

- Creation of employment and business opportunities, and the opportunity for skills development and on-site training.

The construction phase will extend over a period of approximately 36 months and create in the region of 220 employment opportunities. Members from the local communities in Secunda and the GMM would qualify for the majority of low skilled and semi-skilled employment opportunities and a number of skilled opportunities. The Most of these employment opportunities will accrue to Historically Disadvantaged (HD) members from the local community. Given relatively high local unemployment levels and limited job opportunities in the area, this will represent a significant, if localised, social benefit. The total wage bill will be in the region of R 50 million (2022 Rand values). A percentage of the wage bill will be spent in the local economy which will also create opportunities for local businesses in Ermelo and the MM. The capital expenditure associated with the construction phase will be approximately R 2.5-3 billion (2022 Rand value). This will create opportunities for local companies and the regional and local economy. Due to the presence of the mining and energy sector, there are likely

to suitably qualified companies in Ermelo that can provide the required services and products. The local service sector will also benefit from the construction phase. The potential opportunities would be linked to accommodation, catering, cleaning, transport, and security, etc. associated with the construction workers on the site.

Potential negative impacts

- Impacts associated with the presence of construction workers on local communities.
- Impacts related to the potential influx of jobseekers.
- Increased risks to livestock and farming infrastructure associated with the construction related activities and presence of construction workers on the site.
- Increased risk of grass fires associated with construction related activities.
- Nuisance impacts, such as noise, dust, and safety, associated with construction related activities and vehicles.
- Impact on productive farmland.

The findings of the SIA indicate that the significance of the potential negative impacts with mitigation will be **Low Negative**. The potential negative impacts associated with the proposed construction phase can therefore be effectively mitigated if the recommended mitigation measures are implemented. Table 5.1 summarises the significance of the impacts associated with the construction phase.

Table 5.1: Summary of social impacts during construction phase

Impact	Significance No Mitigation/Enhancement	Significance With Mitigation/Enhancement
Creation of employment and business opportunities	Medium (Positive)	Medium (Positive)
Presence of construction workers and potential impacts on family structures and social networks	Low (Negative)	Low (Negative)
Influx of job seekers	Low (Negative)	Low (Negative)
Safety risk, stock theft and damage to farm infrastructure associated with presence of construction workers	Medium (Negative)	Low (Negative)
Increased risk of grass fires	Medium (Negative)	Low (Negative)
Impact of heavy vehicles and construction activities	Medium (Negative)	Low (Negative)
Loss of farmland	Medium (Negative)	Low (Negative)

5.2.3 Operational phase impacts

The following key social issues are of relevance to the operational phase:

Potential positive impacts

- Generate renewable energy to produce green hydrogen and ammonia.
- Creation of employment opportunities.
- Benefits associated with establishment of community trust.
- Benefits for local landowners.

The proposed project will supplement South Africa's energy and assist to improve energy security. In addition, it will also reduce the country's reliance on coal as an energy source. This represents a positive social benefit.

Potential negative impacts
- Visual impacts and associated impacts on sense of place.
- Potential impact on property values.
- Potential impact on tourism.

The findings of the SIA indicate that the significance of all the potential negative impacts with mitigation will be **Low Negative**. The potential negative impacts can therefore be effectively mitigated. The significance of the impacts associated with the operational phase are summarised in Table 5.2.

Table 5.2: Summary of social impacts during operational phase

Impact	Significance No Mitigation/Enhancement	Significance With Mitigation/Enhancement
Generate renewable energy to produce green hydrogen and ammonia	Moderate (Positive)	High (Positive)
Creation of employment and business opportunities during maintenance	Low (Positive)	Medium (Positive)
Benefit associated with community trust	Moderate (Positive)	High (Positive)
Benefits for landowners	Low (Positive)	Medium (Positive)
Visual impact and impact on sense of place	Low (Negative)	Low (Negative)
Impact on property values	Low (Negative)	Low (Negative)
Impact on tourism	Low (Negative)	Low (Negative)

5.2.4 Assessment of cumulative impacts

Cumulative impact on sense of place
The establishment of the proposed WEF and other renewable energy facilities in the area will create the potential for combined and sequential visibility impacts. However, the impact on the areas sense of place should be viewed within the context of the impact of the Secunda industrial complex on areas sense of place. The areas sense of place has also been impacted by large-sale mining operations. The potential visual impact on the areas sense place is therefore likely to be limited.

Cumulative impact on local services and accommodation
The potential cumulative impact on local services and accommodation will depend on the timing construction phases for the different renewable energy projects in the area. With effective planning the significance of the potential impact was rated as **Low Negative**.

Cumulative impact on local economy
The significance of this impact with enhancement was rated as **Moderate Positive**.

5.2.5 Decommissioning phase

Given the relatively small number of people employed during the operational phase (~ 20), the potential negative social impact on the local economy associated with decommissioning will be limited. In addition, the potential impacts associated with the decommissioning phase can also be effectively managed with the implementation of a retrenchment and downscaling programme. With mitigation, the impacts are assessed to be Low (negative). Decommissioning will also create temporary employment opportunities. The significance was assessed to be Low (positive).

5.2.6 Assessment of no-development option

The No-Development option would represent a lost opportunity for South Africa to generate renewable energy to produce green hydrogen and ammonia. This would represent a significant negative social cost.

5.3 CONCLUSION AND RECOMMENDATIONS

Conclusion

The findings of the SIA indicate that the proposed Mukondeleli WEF project will create a number of social and socio-economic benefits, including creation of employment and business opportunities during both the construction and operational phase. In addition, the WEF will generate renewable energy to produce green hydrogen and ammonia.

The findings of the SIA also indicate that the potential negative impacts associated with both the construction and operational phase are likely to be **Low Negative** with mitigation. The potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented. The Mukondeleli WEF is therefore supported by the findings of the SIA.

Recommendations

- Substation Alternative 1 is the preferred option.
- The developer should liaise with the affected landowners to ensure that the final layout minimises the impact on productive crop land[10].

[10] Enertrag has met with the affected landowners to address the issues raised.

ANNEXURE A

INTERVIEWS

- Botha, Ms Melodie (telephonic 2022-10-18). Zorgen Vrij wedding venue.
- Janse van Vuuren, Mr Hannes (telephonic 2022-10-18). Vlakspruit 292/21/RE.
- Joubert, Mr Tienie (2022-10-12). Bosjesspruit 291/2, 291/8, 291/9, 291/10, 291/14; Vantondershoek 317/2, 317/12.
- Kotze, Mr Gert (telephonic 2022-10-18). Vlakspruit 292/14, 292/15.
- Kruger, Mr Tjorrie (2022-10-13). Bosjesspruit 291/6, 291/11, 291/12, 291/13.
- Ludik, Mr Louis (2022-10-13; telephonic 2022-10-18). Vlakspruit 292/22, Poverty Acres 585.
- Serfontein, Mr Alfie (2022-10-11). Tweefontein 321/5.
- Steyn, Mr Jan-Jan (2022-10-13). Vantondershoek 317/1.
- Te Water, Mr Dewald (2022-10-12; telephonic 2022-10-18).). Knoppiesfontein 313/9, Knoppies 314, Brandwacht 316/2, 316/3, 316/4, 316/13, Grootvlei 293/18, 293/20, 293/21, 293/23, Grootvlei 584/RE.
- Van Coller, Mr Herman (telephonic 2022-10-18 and 2020-10-19). Rhino Lodge.
- Van Dyk, Mr Hennie (telephonic 2022-10-18). Vlakspruit 292/13.
- Van Jaarsveld, Mr Jan (2022-10-12). Vantondershoek 317/7, 317/8, 317/11.
- Vermeulen, Mr Andries (2022-10-13). Vlakspruit 292/20/RE.

REFERENCES

- The National Energy Act (2008).
- The White Paper on the Energy Policy of the Republic of South Africa (December 1998).
- The White Paper on Renewable Energy (November 2003).
- The National Development Plan (2011).
- New Growth Framework (2010).
- Mpumalanga Vision 2030 Strategic Implementation Framework (2013-2030)
- Mpumalanga Economic Growth and Development Path (2011).
- Mpumalanga Spatial Development Framework (2019).
- Govan Mbeki Municipality Integrated Development Plan (2020-2021).

ANNEXURE B

METHODOLOGY FOR THE ASSESSMENT OF POTENTIAL IMPACTS

Assessment of Impacts and Mitigation

The assessment of impacts and mitigation evaluates the likely extent and significance of the potential impacts on identified receptors and resources against defined assessment criteria, to develop and describe measures that will be taken to avoid, minimise or compensate for any adverse environmental impacts, to enhance positive impacts, and to report the significance of residual impacts that occur following mitigation.

The key objectives of the risk assessment methodology are to identify any additional potential environmental issues and associated impacts likely to arise from the proposed project, and to propose a significance ranking. Issues / aspects will be reviewed and ranked against a series of significance criteria to identify and record interactions between activities and aspects, and resources and receptors to provide a detailed discussion of impacts. The assessment considers direct[11], indirect[12], secondary[13] as well as cumulative[14] impacts.

A standard risk assessment methodology is used for the ranking of the identified environmental impacts pre-and post-mitigation (i.e. residual impact). The significance of environmental aspects is determined and ranked by considering the criteria[15] presented in **Table 0-1**.

Table 0-1: Impact Assessment Criteria and Scoring System

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Impact Magnitude (M) The degree of alteration of the affected environmental receptor	Very low: No impact on processes	Low: Slight impact on processes	Medium: Processes continue but in a modified way	High: Processes temporarily cease	Very High: Permanent cessation of processes
Impact Extent (E) The geographical extent of the impact on a given environmental receptor	Site: Site only	Local: Inside activity area	Regional: Outside activity area	National: National scope or level	International: Across borders or boundaries
Impact Reversibility (R) The ability of the environmental receptor to rehabilitate or restore after the activity has caused environmental change	Reversible: Recovery without rehabilitation		Recoverable: Recovery with rehabilitation		Irreversible: Not possible despite action
Impact Duration (D) The length of permanence of the impact on the environmental receptor	Immediate: On impact	Short term: 0-5 years	Medium term: 5-15 years	Long term: Project life	Permanent: Indefinite

[11] Impacts that arise directly from activities that form an integral part of the Project.

[12] Impacts that arise indirectly from activities not explicitly forming part of the Project.

[13] Secondary or induced impacts caused by a change in the Project environment.

[14] Impacts are those impacts arising from the combination of multiple impacts from existing projects, the Project and/or future projects.

[15] The definitions given are for guidance only, and not all the definitions will apply to all the environmental receptors and resources being assessed. Impact significance was assessed with and without mitigation measures in place.

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Probability of Occurrence (P) The likelihood of an impact occurring in the absence of pertinent environmental management measures or mitigation	Improbable	Low Probability	Probable	Highly Probability	Definite
Significance (S) is determined by combining the above criteria in the following formula:	$[S = (E + D + R + M) \times P]$ $Significance = (Extent + Duration + Reversibility + Magnitude) \times Probability$				
IMPACT SIGNIFICANCE RATING					
Total Score	0 – 30	31 to 60	61 – 100		
Environmental Significance Rating (Negative (-))	**Low (-)**	**Moderate (-)**	**High (-)**		
Environmental Significance Rating (Positive (+))	**Low (+)**	**Moderate (+)**	**High (+)**		

ANNEXURE B

Tony Barbour
ENVIRONMENTAL CONSULTING

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Tony Barbour's has 30 years' experience in the field of environmental consulting and management. His experience includes working for ten years as a consultant in the private sector followed by four years at the University of Cape Town's Environmental Evaluation Unit. He has worked as an independent consultant since 2004, with a key focus on Social Impact Assessment. His other areas of interest include Strategic Environmental Assessment and review work.

EDUCATION

- BSc (Geology and Economics) Rhodes (1984);
- B Economics (Honours) Rhodes (1985);
- MSc (Environmental Science), University of Cape Town (1992)

EMPLOYMENT RECORD

- Independent Consultant: November 2004 – current;
- University of Cape Town: August 1996-October 2004**:** Environmental Evaluation Unit (EEU), University of Cape Town. Senior Environmental Consultant and Researcher;
- Private sector: 1991-August 2000: 1991-1996**:** Ninham Shand Consulting (Now Aurecon, Cape Town). Senior Environmental Scientist; 1996-August 2000: Steffen, Robertson and Kirsten (SRK Consulting) – Associate Director, Manager Environmental Section, SRK Cape Town.

LECTURING

- University of Cape Town: Resource Economics; SEA and EIA (1991-2004);
- University of Cape Town: Social Impact Assessment (2004-current);
- Cape Technikon: Resource Economics and Waste Management (1994-1998);
- Peninsula Technikon: Resource Economics and Waste Management (1996-1998).

RELEVANT EXPERIENCE AND EXPERTISE

Tony Barbour has undertaken in the region of 300 SIA's, including SIA's for infrastructure projects, dams, pipelines, and roads. In addition, he is the author of the Guidelines for undertaking SIA's as part of the EIA process commissioned by the Western Cape Provincial Environmental Authorities in 2007. These guidelines have been used throughout South Africa.

Tony was also the project manager for a study commissioned in 2005 by the then South African Department of Water Affairs and Forestry for the development of a Social Assessment and Development Framework. The aim of the framework was to enable the Department of Water Affairs and Forestry to identify, assess and manage social impacts associated with large infrastructure projects, such as dams. The study also included the development of guidelines for Social Impact Assessment, Conflict Management, Relocation and Resettlement and Monitoring and Evaluation.

Countries with work experience include South Africa, Namibia, Angola, Botswana, Zambia, Lesotho, Swaziland, Ghana, Senegal, Nigeria, Mozambique, Mauritius, Kenya, Ethiopia, Oman, South Sudan, Sudan and Armenia.

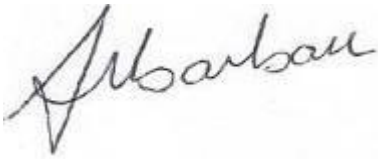
ANNEXURE D

The specialist declaration of independence in terms of the Regulations_

I, Tony Barbour , declare that --

General declaration:

I act as the independent specialist in this application;
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;
I declare that there are no circumstances that may compromise my objectivity in performing such work;
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;
I will comply with the Act, Regulations and all other applicable legislation;
I have no, and will not engage in, conflicting interests in the undertaking of the activity;
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;
all the particulars furnished by me in this form are true and correct;
and
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:

Tony Barbour Environmental Consulting and Research

Name of company (if applicable):

20 December 2022

Date: