



**ENVIRONMENTAL IMPACT ASSESSMENT FOR
GRASKOPPIES WIND FARM, NEAR
LOERIESFONTEIN IN THE NORTHERN CAPE
PROVINCE**

**SOCIO-ECONOMIC IMPACT STUDY
DRAFT REPORT**

JULY 2017



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DECLARATION OF INDEPENDENCE

I, Elena Konstantinovna Broughton, declare that:

- 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.
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of section 24F of the Act.

Signed:



Date: 04 July 2017

DECLARATION OF INDEPENDENCE

I, Zimkita Zenande Nkata, declare that:

- 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.
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Signed:



Date: 04 July 2017

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ACRONYMS AND ABBREVIATIONS

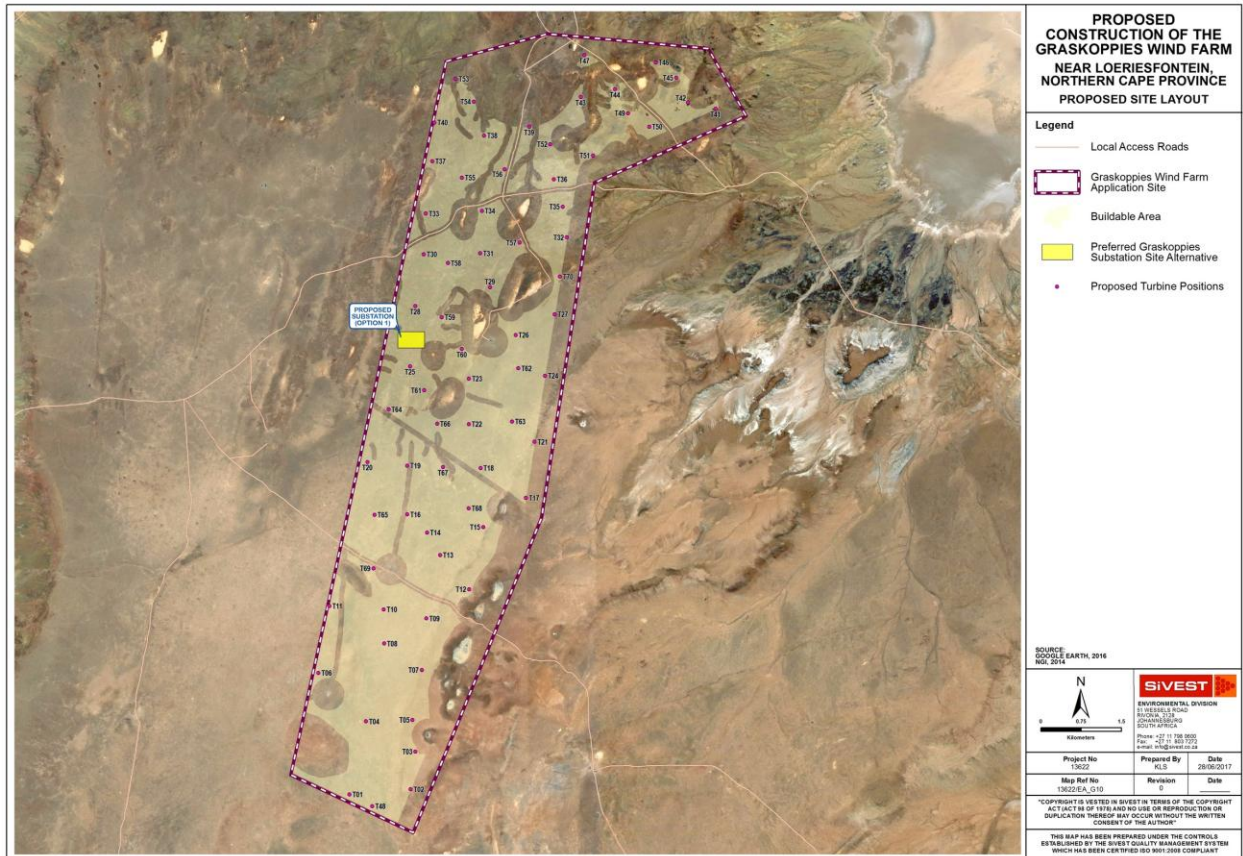
CAGR	Compounded Average Growth Rate
CSP	Concentrated Solar Power
DM	District Municipality
ED	Enterprise Development
EIA	Environmental Impact Assessment
FTE	Full Time Equivalent
GDP	Gross Domestic Product
GDP-R	Gross Domestic Product per Region
GGP	Gross Geographic Product
I&AP's	Interested and Affected Parties
IDP	Integrated Development Plan
IRP	Integrated Resource Plan
IPAP	Industrial Policy Action Plan
LED	Local Economic Development
LM	Local Municipality
MLL	Minimum Living Level
MW	Megawatt
NC	Northern Cape
NDP	National Development Plan
NGPF	New Growth Path Framework
PGDS	Provincial Growth & Development Strategy
PV	Photovoltaic
RE	Renewable Energy
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
SED	Socio-economic Enterprise Development
SDF	Spatial Development Framework
WTP	Willingness to Pay

1 INTRODUCTION

This document is prepared by **Urban-Econ Development Economists** in request by **SiVEST Environmental Division** on behalf of **Mainstream Renewable Power (Pty) Ltd** to undertake a Socio-Economic Impact Study for the development of a **235MW Graskoppies Wind farm** near Loeriesfontein. The socio-economic impact study is conducted as part of the Environmental Impact Assessment (EIA) process managed by SiVEST Environmental Division.

1.1 Brief Description of the Project

Mainstream Renewable Power (Pty) Ltd. proposes the development of a wind farm near Loeriesfontein in the Northern Cape Province. The 235 MW wind farm and accompanying infrastructure is intended to be established on Portion 2 of Graskoppies Farm No. 176 and Portion 1 of Hartebeestleegte No.216.



Map 1-1: Regional location of the project

1.2 Scope and Purpose of the Study

The socio-economic impact assessment contains information that together with other specialists allows assessment of the project from a sustainable development perspective and assists in identifying “the most practicable environmental option” that provides the “most benefit and causes the least damage to the environment as a whole, at a cost acceptable to society”, in the long-term and the

short-term. In light of the above and in line with the Environmental Impact Assessment (EIA) Regulations of 2014, the purpose of the socio-economic impact assessment is to ensure that the project, if approved, provides for justifiable social and economic development outcomes. As such it aims to:

- identify, predict, and evaluate geographical, social, economic, and cultural aspects of the environment that may be affected by the project activities and associated infrastructure
- advise on the alternatives that best avoid negative impacts or allow to manage and minimize them to acceptable levels, while optimising positive effects

The specific objectives of the study include:

- Engage with the environmental practitioner and the client to gain necessary background on the project
- Delineate the zone of influence in consultation with other specialists on the team
- Determine the affected communities and economies located in the zone of influence and identify sensitive receptors within the delineated study area, i.e. communities, land uses and economic activities that could be directly or indirectly negatively affected by the proposed project or benefit from it
- Determine the data required to assess potential impacts and respond to the questions outlined in the guidelines related to needs and desirability assessment
- Review secondary data and assess data gaps
- Conduct a site visit and collect primary social and economic data of the parties that may be directly or indirectly be affected (positively or negatively) by the proposed project to address data gaps
- Create profiles for the communities and economies representing the study areas and the environmentally affected zone
- Identify, predict, and evaluate the potential positive and negative impacts associated with the project following the environmental specialist's methodology
- Advise on the most suitable alternative, inclusive of the "no-go" option
- Develop a mitigation plan by proposing mitigation measures for negative effects and enhancement measures for positive impacts

1.3 Methodology

The following methodology was followed in completing the study:

1. **Orientation:** The study started with gaining an understanding of the proposed project during various stages of its lifecycle and potentially affected environment. Review of various data and

maps provided for the project, as well as discussions with the project team, informed the delineation of the potential zone of influence associated with each component of the project. The delineated zone of influence defined the spatial boundaries of the area to be included in the assessment and assisted in identifying likely impacted and beneficiary communities and economic activities, as well as other stakeholders of the project.

2. **Policy alignment review:** Relevant government policies and other strategic documents were gathered and reviewed to determine the alignment of the proposed project with the strategic plans of various government spheres and highlight any potential red flags, if such exist.
3. **Baseline profiling:** Following policy review, primary and secondary data were gathered to create the socio-economic profile of the delineated zone of influence. The baseline profile assisted in gaining an understanding of the communities and economic activities to be likely affected or benefit from the proposed project. This included description of the study area's composition and locational factors, economic and labour profiles, way of life of communities located within the zone of influence, their demographic trends and cultural references, their health and wellbeing, and their living environment. A specific attention was paid to the socio-economic composition of the area affected by the project's footprint and its potential environmental effects, i.e. visual, noise, air pollution, etc.
4. **Impact analysis and evaluation:** Derived from the review of the project is the list of various negative and positive socio-economic impacts that can ensue as a result of the proposed activity during various stages of its life cycle. All identified socio-economic impacts were assessed and categorised in line with the rating provided by the environmental specialist (refer to Annexure A-impact rating methodology at the end).
5. **Formulation of mitigation and enhancement measures:** Following the analysis and ranking of impact, mitigation and enhancement measures, where applicable, were formulated whereby recommendations to reduce or eliminate the potential negative effects on the affected parties and enhance positive impacts were provided.

1.4 Data sources, site investigation activities, and consultation process

The project made use of both secondary and primary data.

Secondary data gathering

Secondary data was sourced from the following databases and documents:

- Stats SA Census, 2011
- Quantec Research Standardised Regional Data, 1995-2013
- Integrated Development Plans (IDP's)
 - Namakwa District Municipality Integrated Development Plan (2015-2016)
 - Hantam Local Municipality Integrated Development Plan (2015-2020)
 - Khai-Ma Local Municipality Integrated Development Plan (2011)
- Spatial Development Frameworks (SDF's)
 - Northern Cape Spatial Development Framework (2012)

- Namakwa District Spatial Development Framework (2012)
- Hantam Local Municipality Spatial Development Framework (2010)
- Khai-Ma Local Municipality Spatial Development Framework (2011)
- Provincial strategic documents
 - Northern Cape Provincial Growth and Development Strategy (2011)
 - Northern Cape Local Economic Development Framework (2011)

A critical review of the secondary data was undertaken to determine its relevance and accuracy considering the date the data represents and the spatial distinction made. Although the information was deemed to be largely relevant and accurate, it did not provide the details concerning the directly and indirectly affected farm owners, as well as the recent trends with respect to the socio-economic changes observed in the local community given the recent developments in the area. These identified gaps in the data were addressed during the primary data gathering exercise.

Primary data gathering

The **primary data** gathering for this project was done by in-person interviews with the identified interested and affected individuals. Where in-person interviews were not possible, all effort was made to communicate with the specific individual or individuals either telephonically or via electronic correspondence.

The **in-person interviews** were undertaken during a site visit that took place between 11 October 2016 and 14 October 2016. During this time, a total of ten interviews were completed. Six of these interviews related to the owners and residents of directly and indirectly affected farm portions. The other four interviews were with four local community (Loeriesfontein) members, which consisted of a local lawyer, crèche owner, the domestic helper at the crèche, as well as the owner of Loeriesfontein Spar. The last four interviews were done to triangulate the information gathered from secondary data sources on the socio-economic status quo of the wider community, which may be affected by the proposed development.

Below is a list of farmers who were consulted by means of in-person interviews during the site visit, which took place on 11 October to 14 October 2016. The summary of the data gathered during the interviews and feedback received is provided in Chapter 4.

Table 1-1: Information on contacted interested and affected parties (I&APs)

Farm	Contact person	Position
Portion 2 of Graskoppies Farm no. 176	Nico Louw	Farm owner
Portion 1 of Hartebeestleege Farm no. 216	Albie Louw	Farm owner
Portion 1 of Graskoppies Farm no. 176	Koosie Nel	Farm owner
Portion 1 of Farm Konnes no. 183	Jacobus Nel	Farm owner
Rem of Hartebeestleege Farm no. 216	Dr Nel	Farm owner

The following table outlines the member of the wider Loeriesfontein community, who were also engaged with during the course of the site visit. The feedback from these individuals serves the purpose of understanding the socio-economic dynamics of the town and how these are impacted by

the renewable energy facilities, which are currently being established in the area. Feedback received from these members is referenced in Chapter 2 of this document, where applicable.

Table 1-2: Details of the members of wider Loeriesfontein community

Name	Occupation
Mr Alwyn Muller	Loeriesfontein lawyer
Mrs Maria Husselman	Local crèche owner
Mrs Hendrika Skeepers	Mrs Maria Husselman's domestic helper
Mr Victor Haupt	Owner of Loeriesfontein Spar

The following table outlines the parties that were not engaged with during the course of the study as well as the reasons for the lack of engagement with the particular farmers.

Table 1-3: I&APs that could not be contacted

Interested & Affected Parties (I&APs)	Reason for non-engagement
Portion 1 of Hoepel Farm no. 180	No answer on given contact details
Springbok Pan No.1164	Contact details not available
Portion 2 of Springbok Tand Farm no. 215	No answer on given contact details

1.5 Assumptions, limitations and gaps in knowledge

- The secondary data sources used to compile the socio-economic baseline (demographics, dynamics of the economy) although not exhaustive, can be viewed as being indicative of broad trends within the study area.
- The study was done with the information available to the specialist within the timeframes and specified budget.
- Possible impacts and stakeholder responses to these impacts cannot be predicted with complete accuracy, even when circumstances are similar and these predictions are based on research and years of experience, taking the specific set of circumstances into account.
- It is assumed that the motivation, and ensuing planning for the project were done with integrity and that all information provided to the specialist by the project proponent and its consultants to date is accurate.
- It is assumed that the project description and infrastructure components as discussed above, are reasonably accurate. These details were used to assess the potential impacts.
- Regarding the interviews undertaken, the following assumptions were made:
 - Questions asked during the interviews were answered accurately.
 - The degree of the perceived possible significance of concerns raised by the respondents were truthfully rated by the respondents.
 - The attitude of the respondents towards the project will remain reasonably stable over the short- to medium- terms.
- It is also assumed that the general concerns and opinions raised by all land owners interviewed, such as security concerns, would also apply to the land owners not consulted with for whatever reason.
- Considering the information obtained through primary as well as secondary sources, it can be concluded that the level of risk to the project associated with this knowledge gap is low.

2 POLICY REVIEW

A policy review plays an integral role in the early stages of a project. The review provides a high level indication of whether a project is aligned with the goals and aspirations of the developmental policy within a country and at local level. Furthermore, the analysis signposts any red-flag or developmental concerns that could jeopardise the development of the project and assist in amending it preventing costly and unnecessary delays.

The following government strategic documents applicable to the delineated study areas were examined:

- National: (South Africa)
 - New Growth Path Framework (NGPF) (2010)
 - National Development Plan (NDP) 2030 (2011 – 2030)
 - Integrated Resource Plan (IRP) 2010-2030 promulgated in 2011
 - Industrial Policy Action Plan (IPAP2) (2012/2013 – 2014/2015)
- Regional: Northern Cape Province
 - Northern Cape Provincial Spatial Development Framework (2012)
 - Northern Cape Municipal Local Economic Development Framework (2011)
 - Northern Cape Provincial Growth and Development Strategy (2011)
- Local: Namakwa District Municipality, Hantam and Khai-Mai Local Municipalities
 - Namakwa District Spatial Development Framework 2012
 - Namakwa District Municipality Integrated Development Plan 2015-2016
 - Hantam Local Municipality Local Economic Development Strategy 2011
 - Hantam Local Municipality Integrated Development Plan 2015-2020
 - Hantam Local Municipality Rural Spatial Development Framework 2010
 - Khai-Ma Local Municipality Integrated Development Framework 2012-2017
 - Khai-Ma Local Municipality Spatial Development Framework 2011

Alignment with national development objectives

The expansion of South Africa's renewable energy capacity generation will play a vital role in consolidating energy security, mitigating climate change and stimulating economic growth to improve the general standard of living of all South Africans. Developing the Renewable Energy (RE) industry is one of the national priorities as per the following policies and strategies:

- **New Growth Path Framework (NGPF):** The overarching objectives listed in national policy and frameworks include the impending need to reduce poverty, achieve equity, and increase economic growth. Thus, at the forefront of the government action plan is the creation of decent employment opportunities through the support of labour-intensive sectors and assurance of long-term economic growth. To ensure sustained job creation prospects, government has placed further emphasis on the promotion of local industrial capacity and skills development in advanced industries. Because of this, the New Growth Path Framework (NGPF) states that the diversification of the national economy is vital to improving both the rate of absorption as well

as the Gross Domestic Product (GDP) growth rate and has thus set a target to stimulate employment by five million new jobs by the year 2020. The development of the RE sector is particularly identified to have a potential to play an important role in creating decent work, reducing inequality and eradicating poverty (Department of Economic Development, 2010).

- **The National Development Plan (NDP):** To successfully overcome the triple threat challenge of poverty, unemployment, and inequality posed to the country, the National Development Plan encourages all regions to seize the advantage of natural resources endowed to them. This, however, must be achieved in a sustainable and equitable manner. For the goals embedded within the policy to be met, of critical importance is the proposed path toward developing and growing a green economy. In line with international protocol I and ambitions, the NDP acknowledges South Africa's dependence on fossil fuel based energy production as a key challenge and this has placed further emphasis on the need to transition toward a low-carbon economy. To achieve this, the NDP seeks to ensure that half of all new electricity generating capacity is provided through renewable energy resources. This means that at least 20 000 MW of electricity should be procured from renewable resources by 2030. Electricity derived from these sources will increase both the national grid capacity and replace the 11 000 MW of electricity derived from coal-powered stations (National Planning Commission, 2011).
- **Integrated Resource Plan (IRP):** The IRP, which was promulgated in 2011, was established with the purpose of serving as a living plan to monitor South Africa's forecast electricity capacity by the year 2030. Since the IRP's establishment, the government has committed itself to producing 8 400 MW from Photovoltaic (PV), 8 400 MW from wind as well as 1 000 MW from Concentrated Solar Power (CSP) by the year 2030. The path to achieving this goal then led to the establishment of the Renewable Energy Independent Power Producer Procurement programme (REIPPP) which is essentially the key vehicle for securing electricity capacity from the private sector for renewable energy as well as non-renewable sources. Currently, the three ministerial determinations have called for a procurement of 13 125 MW of renewable energy from IPP's; of this, 6 360 MW has been allocated to wind energy projects. In consideration of the four and a half bidding windows that have already been achieved, 3 346 MW have already been awarded to existing wind projects. This has resulted in the possibility of 3 013 MW to be allocated to more renewable energy projects thus creating opportunities for projects such as the one under analysis to be established.
- **Industrial Policy Action Plan (IPAP):** Both the Integrated Resource Plan and the Industrial Policy Action Plan (IPAP) specify that 21 500 MW of renewable energy capacity should be established by 2030. This capacity will be primarily derived from wind and solar technologies, which will serve to reduce the country's heavy reliance on energy derived from coal-intensive non-renewable resources thus significantly reducing greenhouse gas emissions. With this, the crucial goal of improving employment will be achieved whilst improving the standard of living of South African resident's in the process.

The review of the national policies suggests that the proposed Graskoppies Wind Farm agrees and is in alignment with national developmental priorities insofar as it will assist in achieving the set target for electricity generation using renewables and contribute to the development of human capital and technology.

Alignment with Provincial policies

- **Northern Cape Provincial Growth and Development Strategy (NC PGDS):** This document highlights the importance of developing new energy sources through adopting energy applications that are in correlation with the Provinces' natural resource endowment. This is encouraged so as to be mindful of the vulnerable and fragile ecosystems whilst maintaining the integrity of the natural and cultural attributes of the Province (Northern Cape Government, 2008). The provision of electricity through renewable energy sources is also seen as a reliable way to promote and accelerate economic growth within the Province through ensuring that key industry users at critical locations improve their competitiveness. Although there is sufficient reason towards investing in the use of renewable energy in the Province, it is essential that potential developments be considerate of the tourism industry component of the Province.

The Northern Cape Province has had 17% average annual growth in national visitors as well as 25% annual growth of international visitors during the 2001-2011 period, resulting in a total tourism contribution of 6% toward the provincial Gross Geographic Product (GGP) (Dennis Moss Partnership, 2012). This highlights that tourism is a key sector in the Northern Cape that has the potential to grow, transform and diversify the provincial economy. This means that extra care should be taken in ensuring that renewable energy developments do not result in a negative impact on the tourism potential of the Province and nor do they interfere with the region's natural environment.

- **Northern Cape Municipal Local Economic Development Framework (NC LED):** In South, just over a third (37%) of the population reside in rural areas. Due to this, of particular importance is the provision of a mix of alternative energy sources so as to make affordable and adequate energy available to developing communities. To achieve this, there needs to be a sufficient optimal exploitation of renewable sources. As a result of this, the Department of Minerals and Energy has embarked on several national, provincial and local level wind and solar energy systems. The Namakwa District in particular, has potential for both wind and solar electricity generating capacity developments such as the one under analysis (Northern Cape Province, 2011).

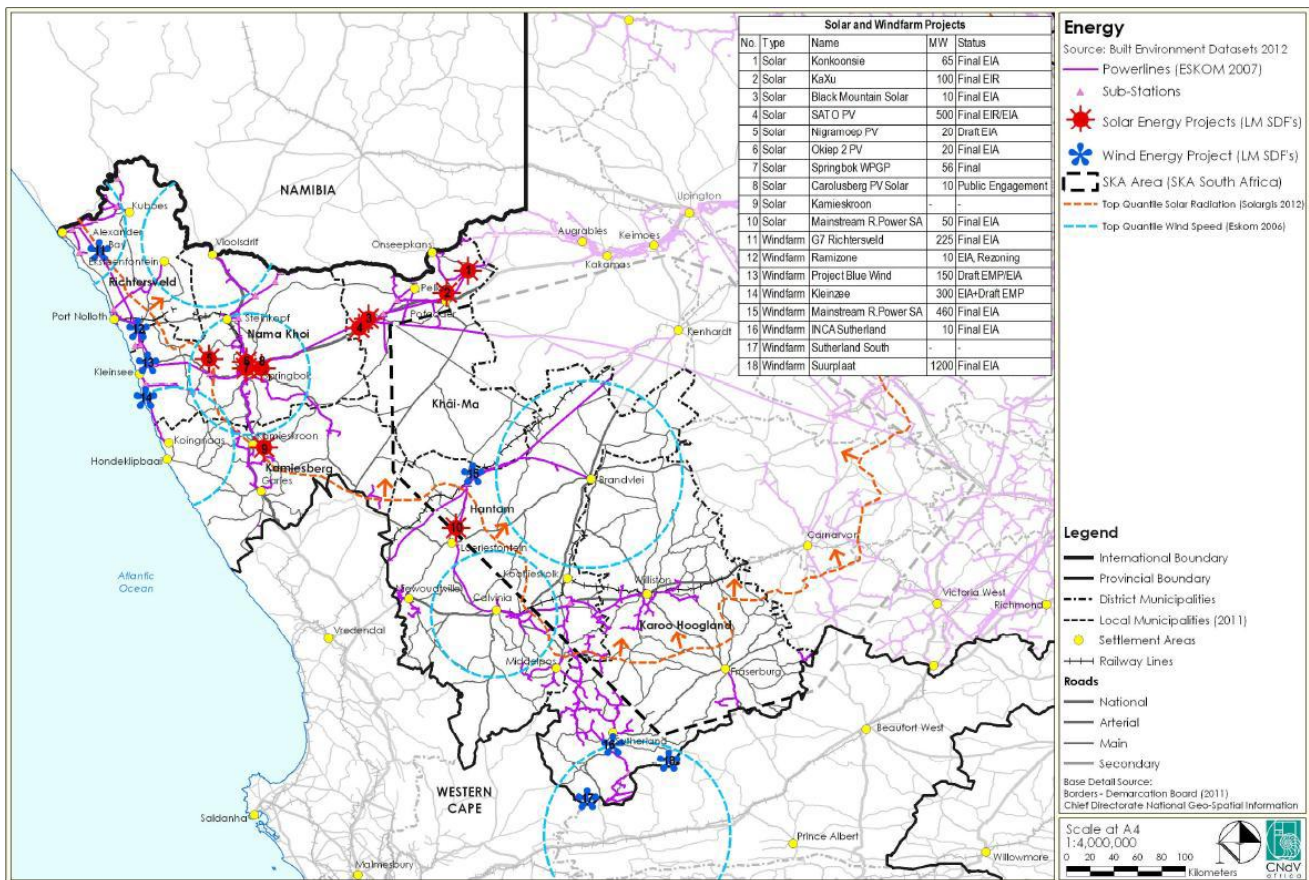
The provincial policies promote the development of the renewable energy projects, particularly if these projects are capable to also facilitate the development of the local tourism industry or at least do not prevent the industry from realising its potential.

Alignment with Local and Regional development priorities

Although much of the focus within district and local municipalities relates to the development and delivery of basic services, infrastructure, agriculture and tourism, the development of a green economy remains to be seen as an additional fundamental pillar of growth. Thus, in like manner with the national and provincial policies, the district and local municipalities have placed considerable emphasis on the prioritisation and promotion of renewable energy resources within their boundaries.

The Namakwa District Municipality, Khai-Ma and Hantam Local Municipalities have developed strategies to extract growth and development potential from such investments.

- Namakwa Integrated Development Plan (IDP):** This plan sets out to utilise natural resources in the Province by optimally utilising and managing resources in each sector; this includes the growing realisation of investing in more renewable energy based development. The Namakwa DM has a competitive advantage in the energy sector as wind, solar, wave, nuclear and natural gas energy plants have all been identified as suitable investments in the area. Amongst other sectors such as agriculture and tourism, renewable energy is thus prioritised. Several large-scale renewable energy projects have already been included in the IDP of the district. These are also depicted on Map 2-1 below. The district also recognises the importance of the agriculture and tourism industries in the area and promotes their development and transformation, especially eco-heritage. This and other projects that are under investigation are outlined in the following map extracted from the districts' Spatial Development Framework (Namakwa DM, 2014).



Map 2-1: Renewable projects in Namakwa (CNdV, 2012)

- Hantam LM Integrated Development Plan and Khai-Ma LM Integrated Development Plan (IDP):** Considering the location of the site relative to the Hantam and Khai-Ma Local Municipalities, the review of the strategic policies thereof highlights the importance of improving the living standards of the citizens of the municipalities as being amongst the top priorities of

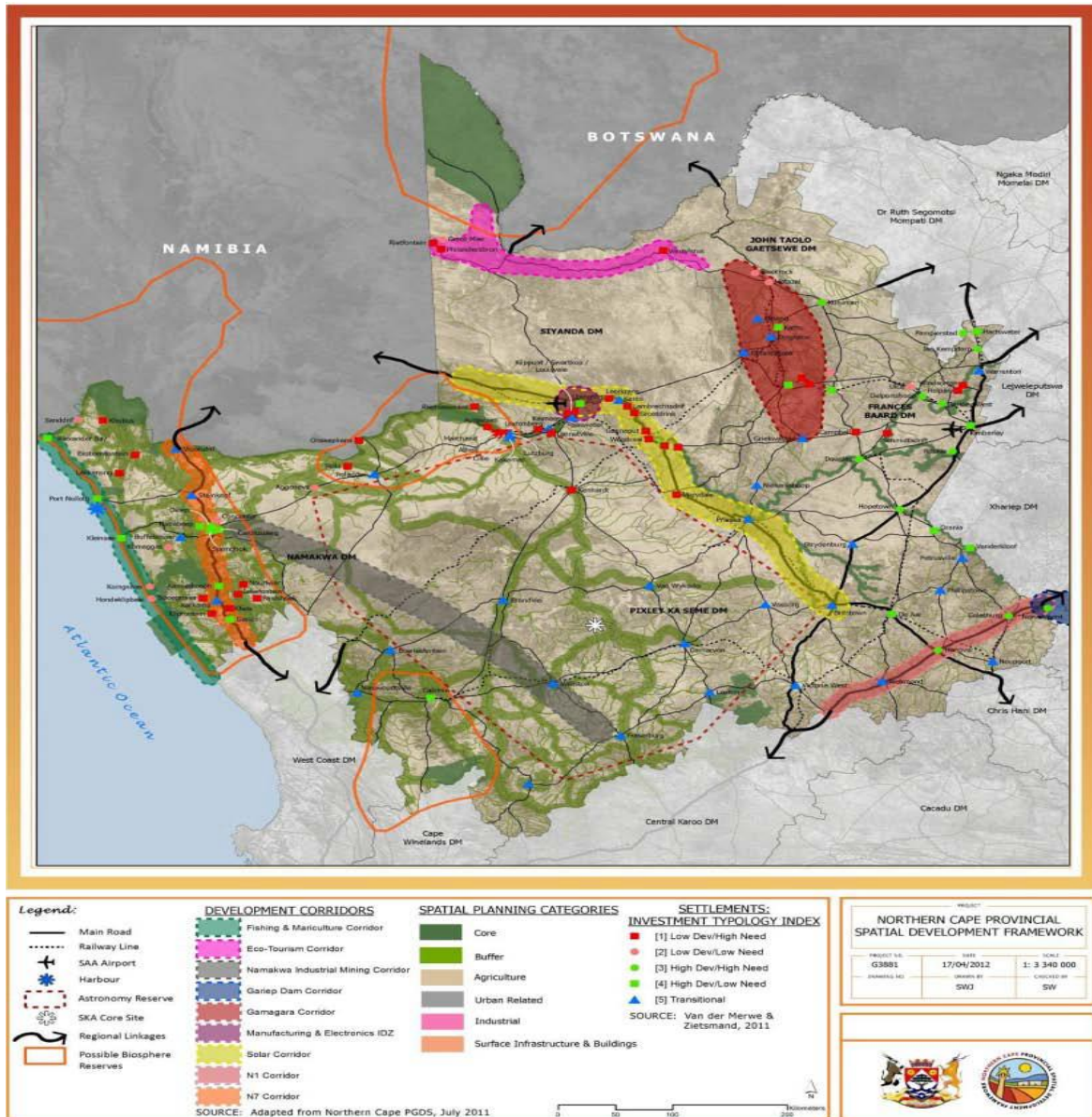
local government. Stimulating and strengthening the economy through various sector development interventions is envisioned to be one of the means to achieve this. Based on the composition and natural resource endowment of these municipalities, particular developmental priority is given to the agriculture and tourism sectors. Although flower tourism is seasonal in the Hantam LM, eco-tourism has been recently seen as the main growth stimulant for the regional economy. At the same time, the agricultural sector provides the most employment opportunities in the municipal area; thus, making it the backbone of the Hantam LM (Hantam IDP, 2015). The above suggests that the tourism and agricultural sectors should be preserved and all effort needs to be made in order to ensure that no new development results in the loss of these activities.

Considering the information above, it is clear that the local government priorities, aside from the improvement of service delivery and living standards of its residents focuses on the development of the local economies by stimulating the growth of among other the tourism and agricultural industries. In general, wind farms are associated with a limited footprint and can co-exist with the above-mentioned sectors. In some instances, the presence of wind farms can be turned into a local attraction, which could stimulate the tourism further. Therefore, it can be suggested that the proposed project does not conflict with any of the identified developmental priorities of the local governments in question, moreover it is also in alignment with the identified means to stimulate the local economy.

Alignment with Spatial planning

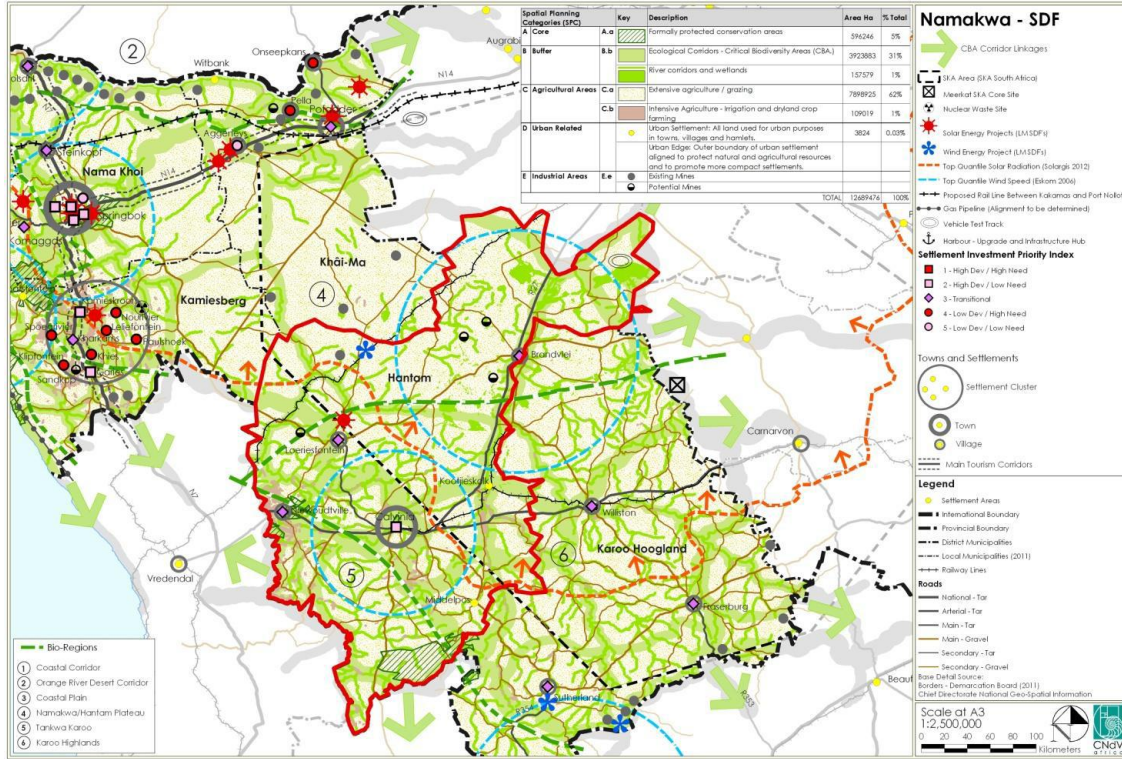
- **Northern Cape Spatial Development Framework (NC SDF):** The provincial Spatial framework is premised on the vision of effectively managing the Provinces' resources in a sustainable and equitable manner, which will be of benefit to the people directly dependent on them. Linked to this, further stress is directed towards the importance of utilising renewable energy to address the needs of the Province prior to exporting the services to the rest of the country. Due to this, in accordance with the Sustainable Development Initiative (SDI), the establishment of a renewable energy system is to be utilised as a driver for economic development; thus, making renewable energy projects a high priority on the provincial agenda (Dennis Moss Partnership, 2012).

Certain interior parts of the Province as well as the Namaqualand coast are said to have considerable potential for renewable energy production and this has resulted in several targets being put in place. For instance, 25% of the Provinces' energy generation capacity is set to be acquired from renewable energy products such as wind, solar, thermal, biomass and hydroelectricity by the year 2020 (Dennis Moss Partnership, 2012). Focusing on renewable energy development will not only assist in diversifying the economy of the Province but it will also be of benefit in aligning regional goals with national goals as it will add to the promotion and growth of green industries. Reviewing the NC SDF as outlined in map 2-2 below, it can be seen that the project under current study will not have any potential spatial development conflicts with provincial plans.



Map 2-2: Northern Cape Spatial Development Framework (Dennis Moss Partnership, 2012)

- Hantam LM Spatial Development Framework and Khai-Ma LM Rural Spatial Development Framework (SDF):** In considering the spatial development pattern of the Khai-Ma LM, strengthening local economic growth is one of the focal aspects. In terms of their contribution to GDP, the agriculture and tourism sector are the main contributors to the economic sector of the Khai-Ma LM as the municipality has a unique environment that needs to be exploited in a sustainable manner (Umsebe Development Planners, 2010). The Hantam LM SDF also further highlights that economic sector interventions in the area has led the municipality to seek complementary development opportunities in sectors such as agriculture, mining, tourism and renewable energy (Umsebe Development Planners, 2010).



Map 2-3: Namakwa SDF- Hantam and Khai-Ma LM (CNdV, 2012)

Upon reviewing the spatial planning component, the Namakwa DM as well as the Hantam and Khai-Ma LMs' spatial development frameworks do not suggest any potential conflicts between the planned spatial development visions and the proposed wind energy project. As outlined in Map 2-3 above, the site where the proposed project will be developed is not located near any settlement or tourism attraction, or is zoned for agriculture, which may be sensitive to the environmental effects of the proposed project.

3 BASELINE INFORMATION

This chapter examines key socio-economic characteristics of the study area, as per delineation provided in the previous chapter. This is essential as it provides both qualitative and quantitative data related to the communities and economies under observation, creating a baseline against, which the impacts can be assessed. As previously stated, the Graskoppies wind farm is proposed to be located in the Hantam LM, which lies within the borders of the Namakwa DM.

3.1 Study area's composition and locational factors

Geographically, the **Northern Cape** is the largest province located within South Africa with an area of 372 889km² equating to approximately 30.6% of South Africa's spatial composition. Despite having the largest surface area, the Northern Cape is the least populated province in South Africa with a population of 1.1 million people equating to 2.2% of the national population (Stats SA, 2011). This province is a dry and hot region classified as a semi-desert as it also experiences scarce rainfall patterns. The Northern Cape Province consists of five districts, namely Frances Baard, Pixley ka Seme, Namakwa, ZF Mgcawu (previously known as Siyanda) and John Taolo Gaetsewe.

The proposed project falls within the **Namakwa DM** which is situated on the western part of the Northern Cape Province and is the largest municipality of the five main municipal districts of the Province covering an area of 126 900km² (34%) of the total provincial landmass. The Namakwa DM is bordered by the Western Cape province on the southern side, Namibia towards the northern side and two districts (ZF Mgcawu and Pixley ka Seme) on the north-east and east side respectively. Although it is the largest district geographically, the Namakwa DM is sparsely populated with a population of 115 842 people, which comprise 10.11% of the total province population (Stats SA, 2011).

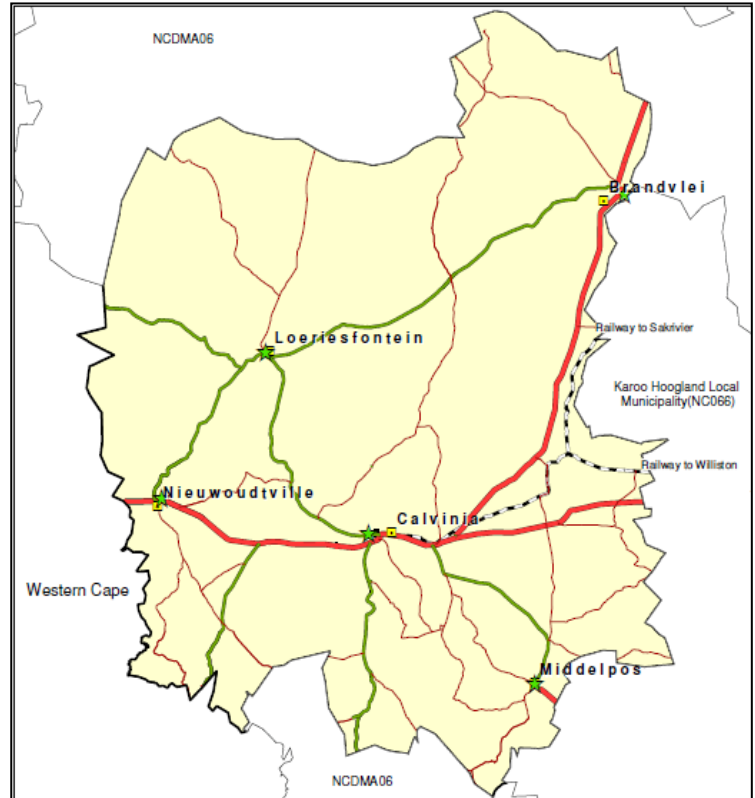
In the Namakwa DM, the project lies within the borders of the Hantam LM and the Khai-Ma LM. The **Hantam LM** is an inland municipality which lies on the west of the Namakwa DM and is located 140km from Springbok. The Hantam LM covers an area of 36 128km² and has a population of 21 581 people (Stats SA, 2011). The municipality is known for its wide open space, striking mountain ranges and nature reserves filled with a vast array of indigenous plants and bulbs (Hantam IDP, 2015). The main attractions of the area are therefore, the floral displays, hiking and the natural environment. Hantam municipality is also furnished with four conservation areas, namely Oorlogskloof Nature Reserve, Hantam National Botanical Gardens, Tanique Karoo National Park and the Akker dam Nature Reserve (Umsebe Development Planners, 2010).

With a total surface area of 16 627km², the **Khai-Ma LM** is situated along the north-western part of the Namakwa DM and is a sparsely populated region with 12 466 people. The Khai-Ma LM is bordered by Namibia on the north, the ZF Mgcawu LM on the east and, the Nama-Khoi LM on the west. Urban nodes surrounding the local municipality include Puffadder as the main centre, Aggeneys, Pella, Witbank and Onseepkans. Although the surrounding area of the region has a low grazing potential, vast amounts of extensive land in Khai-Ma is predominantly used for livestock farming (Umsebe Development Planners, 2010).

3.2 Sense of place, history, and cultural aspects

Loeriesfontein is a small rural service centre town that lies within a basin surrounded by mountains and is situated to the north-west of the town of Calvinia. Loeriesfontein was built around a general store in the year 1894 by a British bible salesman, Frederick Turner (Hantam IDP, 2015). Loeriesfontein has a population of 2 746 people which has grown by 12.4% since the year 2001. The town covers a total surface area of 34.45km² and has a population density of 80 people/km² (Stats SA, 2011).

The south-western part of Loeriesfontein forms part of Namaqualand which is a region popular for its spring flowers and its wide variety of diverse vegetation (Hantam IDP, 2015). Loeriesfontein town also houses the Gannabos (Quiver) Forest, which is home to the worlds' largest colony of the *Aloe Dichotoma* species (Umsebe Development Planners, 2010). During spring, the town is flooded by tourists attracted by the spring flowers. The town also boasts of its' Windmill museum, which is one of only two in the world. Sheep farming and salt mining are the predominant activities within and around Loeriesfontein town (Umsebe Development Planners, 2010).



Map 3-1: Hantam LM towns

3.3 Demographic Profile

The population of any geographical area is the cornerstone of the development process, as it affects the economic growth through the provision of labour and entrepreneurial skills, and determines the demand for the production output. Examining population dynamics is essential in gaining an accurate perspective of those who are likely to be affected by any prospective development or project.

Population demographics

The population of any geographical area is the cornerstone of the development process, as it affects the economic growth through the provision of labour and entrepreneurial skills, whilst simultaneously determining the demand for production output. Examining population dynamics is also essential in gaining an accurate perspective of those who are likely to be affected by any prospective development or project such as the one under analysis.

As previously noted, the **Hantam LM** has a population of 21 581 individuals accounting for 18.6% of the total population of Namakwa DM. In comparison to the year 2001, the Hantam LM has increased by 6.6%. Within the local municipality, 80% of the people reside in urban areas whilst the rest occupy farms. In total, the Hantam LM has 6 341 households with a household density of 0.14km² (Stats SA, 2011). The majority of the people in the Hantam LM reside in the city centre, which is Calvinia town; thus, only a small percentage of people reside in other smaller surrounding towns such as

Loeriesfontein (13%) (Stats SA, 2011). Over 90% of the residents in the municipality as well as the nearby towns (Loeriesfontein and Brandvlei) speak Afrikaans as a first language, with the dominant race being coloured people (82%) and white people lagging behind at 11%. The Hantam LM's population consists of 50.1% males and 49.9% females. The largest group of people fall under those aged between 35 and 64 years of age. In this LM, the youth (15-34 years) encompass about 29.1% of the total population. Only 28% of Hantam residents are married, whilst 54% have never been married (Stats SA, 2011).

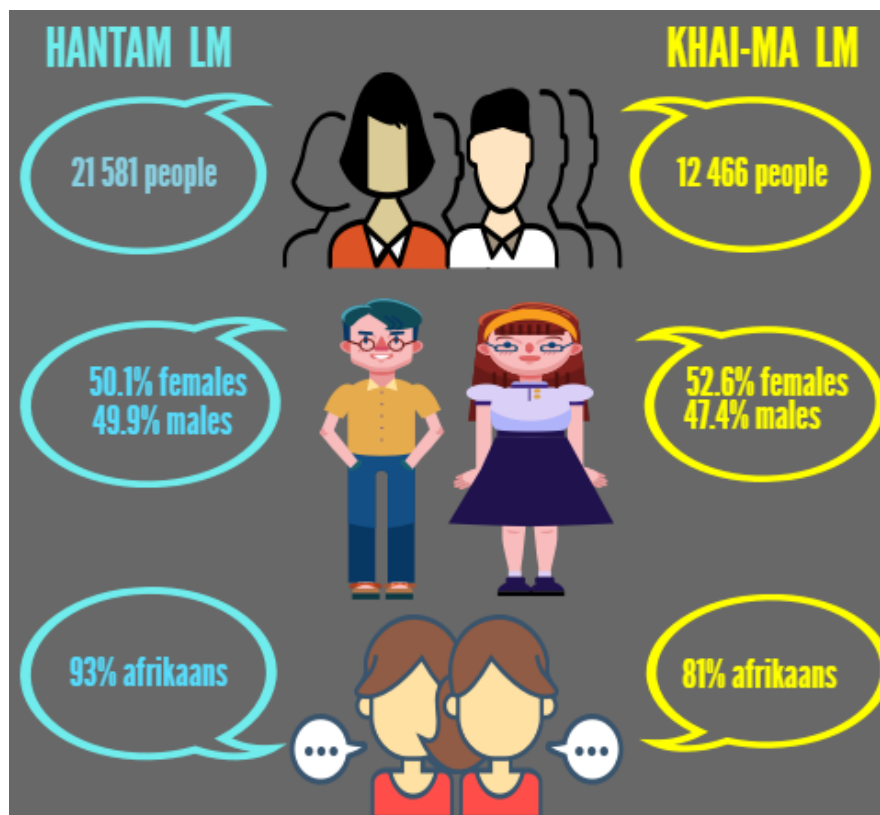


Figure 3-1: Hantam and Khai-Ma LM population demographics (Stats SA, 2011) (Quantec, 2016)

Loeriesfontein, the closest town to the project site, only has 806 households in total resulting in a household density of 23.3 km². The majority (94.3%) of people have access to formal housing whilst the rest either live in houses or flats in a backyard (0.87%) or in informal dwellings (4.12%). A huge portion of people living in Loeriesfontein are coloured (86%), followed by white people at 11.54% whilst Black people equate to 1.9% of the total population. Afrikaans is the main language spoken as more than 90% of the people cited it as their first language, only 0.4% residents speak English whilst 0.5% speak Setswana (Stats SA, 2011). Only 26.5% residents are married, whilst 56.9% have never married.

Although Loeriesfontein is a relatively small town, residents and farm owners stated that since the establishment of similar projects in the area, namely Khobab and Loeriesfontein 2, the town has experienced an influx of people either in an attempt to find employment or to seize economic opportunities brought by the wind farms.

The **Khai-Ma LM** on the other hand, has a smaller population of 12 466 people; this accounts for 10.7% of the total population of the Namakwa DM. Although the population has increased by 6.2% from 11 692 people in 2001, it is still only almost two thirds of the Hantam population (Stats SA, 2011). Most residents within Khai-Ma LM reside in the urban areas (81%) whilst some reside in farms (17%). The total number of households in the Khai-Ma LM is 3 796 resulting in a household density of 0.22km². Just over 80% of the residents speak Afrikaans in the municipality (Stats SA, 2011). Coloured people equate to three quarters of the total population with black people (18%) being the second dominant race. Only 24% of the Khai-Ma LM residents are married whilst 64% have never been married. In like manner with the Hantam LM, the Khai-Ma LM has more males (52.6%) than females (47.4%) with the largest population also falling within 35 and 64 years of age. Although this is the case, this local municipality however, has a youth population (15-34 years) that is just over a third (36.8%) of the total population (Stats SA, 2011).

Health demographics

The process of assessing and monitoring the level of health in a particular area is beneficial as it provides useful information on the development as well as human welfare of an area. Over the last 15 years, in comparison to the rest of South Africa and the Northern Cape Province, the effect of HIV has been less severe on the DM and LM's. AIDS related deaths have also been following a similar pattern.

In the year 2015, the **Hantam LM** reported a total of 956 people to be living with HIV, which equates to 4.5% of the total LM population. Although the number of HIV-positive people for the Namakwa DM (4.9%) is close to that of the LM (4.5%), national and provincial HIV infected percentage levels are much higher, as they are at 11.4% and 7.3%, respectively.

Table 3-1: Population, HIV positive, AIDS and other deaths (2015)

Indicator	South Africa	Northern Cape	Namakwa DM	Hantam LM	Khai-Ma LM
Population	54 956 509	1 175 780	116 834	21 371	11 805
HIV positive	6 248 908	86 146	5 702	956	673
AIDS deaths	206 761	2 360	113	20	7
Other deaths	444 866	9 729	1 159	213	98

The **Khai-Ma LM** had a slightly higher percentage of people living with HIV (5.7%). AIDS related deaths at the national, provincial, regional, and local context are relatively low as they range from a range of 0.1%-0.4%. In a period of 15 years (2000-2015), people living with the HIV illness in the Hantam LM had increased by 695 people whilst residents living in the Khai-Ma LM with the same illness increased by 463 within the same period.

Although the prevalence of HIV/Aids in **Loeriesfontein town** isn't clear, during the site visit and telephonic interviews conducted with various stakeholders it was revealed that construction workers employed to develop wind farms in the area, namely Khobab and Loeriesfontein 2, mingle with young females and this has since resulted in a sharp increase in the rate of teenage pregnancies. The presence of construction workers in the area has also resulted in several social ills such as the use of alcohol and drug abuse. Although interviewed residents agree that this has always been a norm in the town, they have also alluded to the fact that the social ills have exacerbated in the last few years correlating with the period of establishment of the two wind farms. One such example is the increase in the number of liquor licences applied for, as well as an increase in the number of young school girls who interact with construction workers resulting in unwanted pregnancies.

Crime demographics

In the **Hantam LM**, 816 serious crimes were reported; of these, a total amount of 760 were community reported crimes whilst 56 of them were detected by the police. Common assault was the most frequently reported crime with 207 cases, followed by property-related crime with 154 cases and assault with the intention to harm with 125 cases. The total number of serious crimes equate to 17% of the district reported crimes and 1.41% of the provincial reported crime cases. Although the use of alcohol and drugs have increased in Loeriesfontein town, crime levels have been stable and have not resulted in any criminal activities that can be directly linked to the heavy influx of people.

In 2015, the **Khai-Ma LM** had less crime-related occurrences, as only a total of 285 serious crimes were reported. The most commonly reported crimes are similar to trends noted in the Hantam LM but are at less severe rates with common assault reported to have had 69 cases, property related crime with 52 cases and assault with the intent to harm with 46 cases. Crimes reported in Khai-Ma LM equate to 6% of the cases reported at the district level and only 0.5% of the provincial reported crimes.

Table 3-2: Crimes reported by crime type (2015)

Types of crime	South Africa	Northern Cape	Namakwa DM	Hantam LM	Khai-Ma LM
Serious crimes	2209068	57817	4782	816	285
➤ Community reported crimes	2068261	54724	4212	760	255
➤ Crimes dependent on police action for detection	140807	3093	570	56	30

3.4 Economy

The structure of the economy and the composition of its employment provide valuable insight into the dependency of an area on specific sectors and its sensitivity to fluctuations of global and regional markets. Knowledge of the structure and the size of each sector are also important for the economic impact results' interpretation, as it allows the assessment of the extent to which the proposed activity would change the economy, its structure, and trends of specific sectors.

The **Hantam LM** is a relatively small economy valued at R1 184 million in current prices. In total, the economy of the Hantam LM equates to 11.1% of the Namakwa Districts Gross Domestic Product per Region (GDP-R) which was valued at R10 696 million in current prices (Quantec, 2016). The contribution of the LM to the Province as a whole is significantly low as it only accounts for 1.64% of the Northern Cape Province. As outlined in Figure 3-2 below, the Hantam LM economy has been manifesting a fluctuating growth rate revealing its sensitivity to external shocks related to national and global changes. For instance, the Hantam economy was adversely affected by the 2008 global recession as presented in Figure 3-2. Although this was the case, the economy began slowly recovering between the 2010-2011 period. Overall, between the 1995-2011 period, the Hantam LM economy grew at a Compounded Annual Growth Rate (CAGR) of 3,19%.

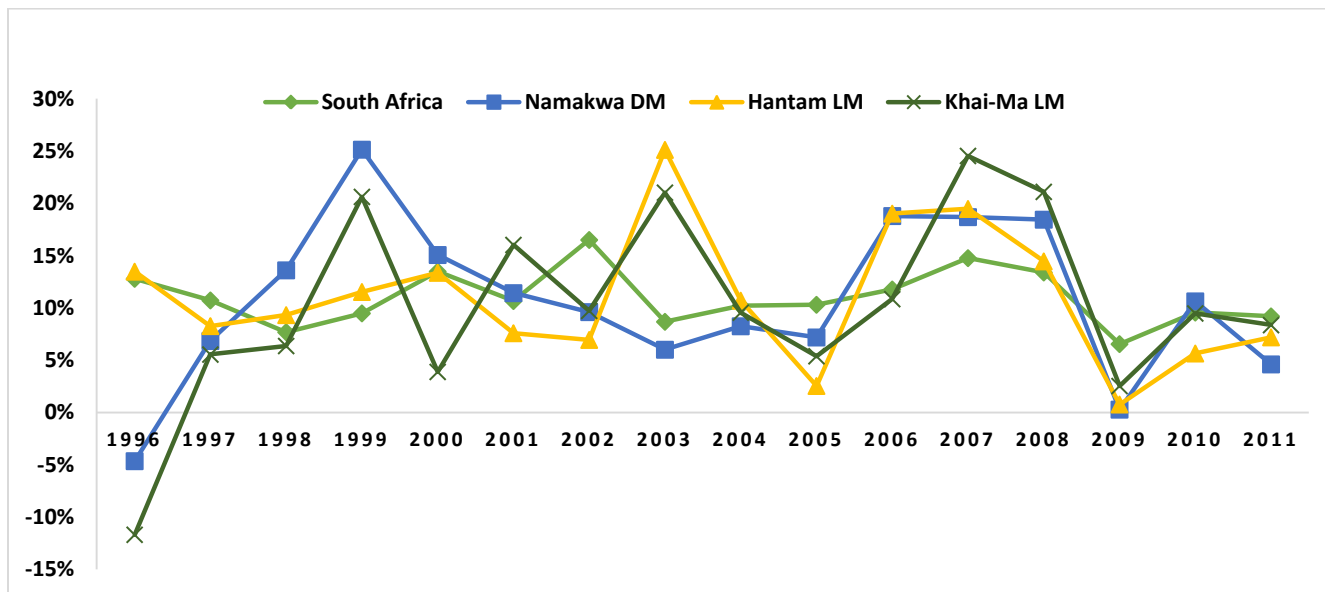


Figure 3-2: Regional economic GDP-R historical trends (Quantec, 2016)

The economy of the **Khai-Ma** LM lags behind the Hantam economy with a total size of R939 million in current prices (Quantec, 2016). This contribution accounts for 8.8% of the districts economy and 1.3% of the Province economy. The Khai-Ma LM experienced similar growth patterns with Hantam, as it experienced stagnation in the year 2009 after the global recession and began recovering shortly after. At constant prices, the 16-year period (1995-2011) CAGR for Khai-Ma LM equates to 2.44%.

According to the Hantam LED Framework (2011), economic development ought to be sustainable. Ensuring that it is sustainable entails strengthening and diversifying the economy through a range of sectors such as the primary, secondary and tertiary sector which should cater for all consumer and business needs. Due to the fact that 72% of the GDP-R of the **Hantam LM** is generated by the tertiary sector, this LM is a service economy with prominent sub-sectors such as general government (13%), transport and communication (16%) as well as wholesale, retail, and trade (25%). A contributing factor to this is mostly likely the numerous government departments that are situated in Calvinia town as it serves as the main seat and administrative town of the Hantam LM (Hantam IDP, 2015). On the other end of the spectrum, within the primary sector, agriculture is the main contributor to GDP-R as it equates to 18% of the Hantam economy.

Although the mining industry currently has a very low contribution to the economy, 80% of the worlds' gypsum reserves lie just outside Loeriesfontein town; thus, an opportunity exists for salt and gypsum mining in the region as salt pans at Dwaggas Pit also employ 30 permanent workers (Umsebe Development Planners, 2010).

Since the start of the construction of Khobab and Loeriesfontein 2 wind farms, the informal hospitality industry in the town of Loeriesfontein has boomed as construction workers have been in need for accommodation in town. To meet the increased demand in accommodation, the majority of the town residents have transformed their backyards and availed their garages for rent purposes.

In conjunction with the 20-year old wind museum in the town, the recently established wind farms have also added value to the tourism component of the area. Due to the influx of people in the town,

the economic impact has been positive for the town as a result of this; food and fuel sales have spiralled increasing businesses' gross revenues and profits in an unprecedented manner. Further positive investments are expected to trickle down to the Loeriesfontein community when the surrounding wind farms start investing 5% of the generated profits in the community, which will take place in eight-nine years.

In the **Khai-Ma LM**, the primary sector contributes the highest percentage (67%) to the municipal GDP-R. Within the primary sector, mining and quarrying is the prominent industry with a contribution of 51%, whilst the agriculture industry contributes 15% to the overall economy. The high percentage contribution of the mining industry is most likely due to the presence of various minerals within the municipal area such as zinc, copper, lead, granite, and quartz (Umsebe Development Planners, 2010). Mining activity is thus exacerbated by the existence of the Black Mountain mine in Aggeneys town as well as the gypsum mine in Pofadder town. The second contributor to the GDP-R of the Khai-Ma LM is the tertiary sector with a contribution of 28%. Within the tertiary sector, the most imminent industries are general government (10%), transport and communication (6%) as well as wholesale and retail trade, catering, and accommodation (6%).

3.5 Labour Force and Employment Structure

Employment is the primary means by which individuals who are of working age may earn an income that will enable them to provide for their basic needs and improve their standard of living. As such, employment and unemployment rates are important indicators of socio-economic well-being.

Labour force composition

During the year 2011, the total working population of the **Hantam LM** consisted of 13 680 people, within this figure, the total labour force only equated to 7 004 people. As outlined in Table 3-3 below, a percentage of 3.4% of people are described as discouraged job seekers, which typically refers to a group of people who are capable of searching for employment but have become discouraged and are no longer looking for employment. The difference between the number of people employed (6 122) and unemployed (882) in the region results in an unemployment rate of 12.6%, which is relatively low in comparison to the national and provincial unemployment rates (29.7% and 27.4%), respectively. Within the Hantam region, Loeriesfontein town has a slightly higher unemployment rate of 14.7% (Stats SA, 2011).

Although only 100-150 local residents are currently employed by the nearby wind farms, the impact of increased employment levels in **Loeriesfontein** has been significant; this is so because in the past the town was heavily reliant on income from extensive farming. However, in the event that agricultural farms undergo expansion, employment levels usually remain the same as farming in the area largely comprises of livestock farming, which is not very labour-intensive. However, with that being said, the prevalence of drug abuse has restricted the number of locals that can be employed as the impact of the drugs is said to result in a lack of personal motivation.

In the **Khai-Ma LM**, the total working population consisted of 8 541 people with a labour force equating to 5 889 people. In 2011, about 4% of people were recorded as discouraged jobseekers. The Khai-Ma LM has a relatively higher unemployment rate of 20.9% (Stats SA, 2011).

Table 3-3: National, Provincial & Regional Labour Force Profile

Town/settlement	Working age	Labour force			Discouraged job seekers	Unemployment rate
		Employed	Unemployed	Total		
South Africa	33928806	13254829	5586624	18841453	1848720	29,7%
Northern Cape	736205	284202	107379	391581	40170	27,4%
Namakwa DM	76579	33713	8455	42168	4258	20,1%
Hantam LM	13860	6122	882	7004	475	12,6%
Loeriesfontein	1767	680	117	797	33	14,7%
Khai-Ma LM	8541	4660	1229	5889	327	20,9%

(Stats SA, 2011)

Employment structure

As depicted in Figure 3-3 below, within the working age population (15-64 years) of the **Hantam LM**, about 60% of the individuals are employed in the formal sector whilst 21% are employed in the informal sector. Employment opportunities provided by private households equate to approximately 17% of the Hantam working population. Within the Hantam LM, Loeriesfontein town employed the least people in the formal sector resulting in it being the dominant job creator in the informal sector. In the **Khai-Ma LM**, more employment is offered in the formal sector whilst only a minority of people work in the informal sector. Similar patterns can be observed for the provision of employment by private households within the LM as well as the towns.

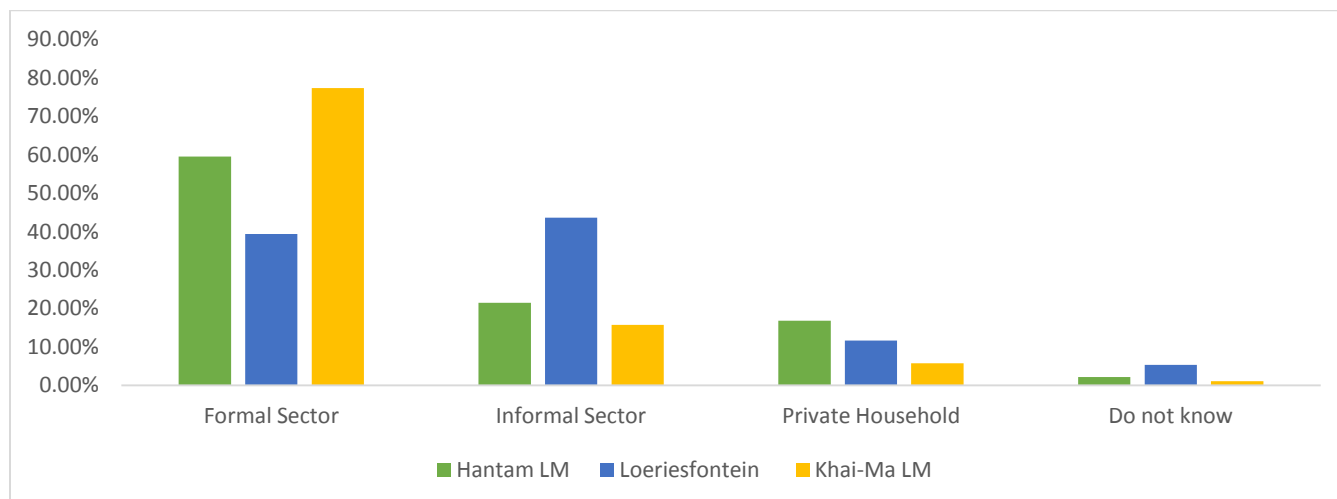


Figure 3-3 : Hantam LM regional employment by sector (Stats SA, 2011)

Within the formal sector, only 14% of people of the Hantam LM's working population are considered to be skilled, whilst majority (30%) of the people either occupy jobs that require semi-skilled or low-skilled individuals. The rest of the working population (27%) are employed in the informal sector. In the Khai-Ma LM, very few individuals (10%) within the working population are considered skilled. Instead, similar to the Hantam LM, majority of people are semi-skilled and lowly-skilled (Quantec, 2016). Twenty percent (20%) of the people within the LM are occupied in the informal sector. As it can be noted in Table 3-4 below, employment percentages by skill level for the Local Municipalities (Hantam and Khai-Ma) are relatively similar to the districts skill level percentages.

Table 3-4: Employment sector and compensation by skill level (2015)

Skills	Employment sector & compensation by skill level					
	Namakwa DM		Hantam LM		Khai-Ma LM	
	Employment	%	Employment	%	Employment	%
Formal: skilled	5092	14%	987	14%	446	10%
Formal: Semi-skilled	11151	32%	2004	29%	1613	36%
Formal: Low-skilled	9917	28%	2077	30%	1536	34%
Informal	8962	26%	1849	27%	879	20%

(Quantec, 2016)

In the Hantam LM, the tertiary sector is the largest contributor to formal and informal employment with 60% share of all employment provided in the municipality. As depicted in Table 3-5 below, such employment consists of opportunities working in wholesale and trade (18%), finance and business services (7%), general government (17%) as well as community, social and personal services with 15%. Although the Hantam LM is dominated by the services sector, within the primary sector, agriculture employs the largest number of people (29%). The secondary sector makes very little contribution to employment services as it only accounts for 10% of the Hantam working population.

In contrast, the Khai-Ma LM is dominated by the primary sector, equating to 54% of municipal working age population. Within this sector, half of the total employment within the municipality is provided by the agriculture industry. The tertiary sector is the second largest contributor to job creation in the Khai-Ma LM; within this sector, prominent industries include general government (12%) and wholesale and retail trade (12%). The secondary sector lags with a contribution of 10% to the working population.

Table 3-5: Employment by economic services in region (2015)

Economic sector	Employment by area					
	Namakwa DM		Hantam LM		Khai-Ma LM	
	Employment	%	Employment	%	Employment	%
Agriculture, Forestry & Fishing	7948	23%	1972	29%	2220	50%
Mining and Quarrying	783	2%	2	0%	175	4%
Manufacturing	1384	4%	140	2%	335	7%
Electricity, gas & water	152	0%	20	0%	4	0%
Construction	2760	8%	564	8%	114	3%
Wholesale and retail trade, catering, and accommodation	7016	20%	1253	18%	517	12%
Transport, storage, and communication	1138	3%	218	3%	64	1%
Finance, insurance, real estate, and business services	2689	8%	493	7%	178	4%
General government	6269	18%	1200	17%	557	12%
Community, social and personal services	4983	14%	1055	15%	310	7%
Industry employment total	35122	100%	6917	100%	4474	100%

3.6 Income

In order to improve the living standards of residents in terms of to the Minimum Living Level (MLL), which broadly refers to the minimum monthly income needed to sustain a household, the Khai-Ma

SDF stipulates that a greater disposable income per household is required. Linked to this point, economic development is thus seen as an essential pathway to raising the living standards and general wellbeing of residents (Umsebe Development Planners, 2010).

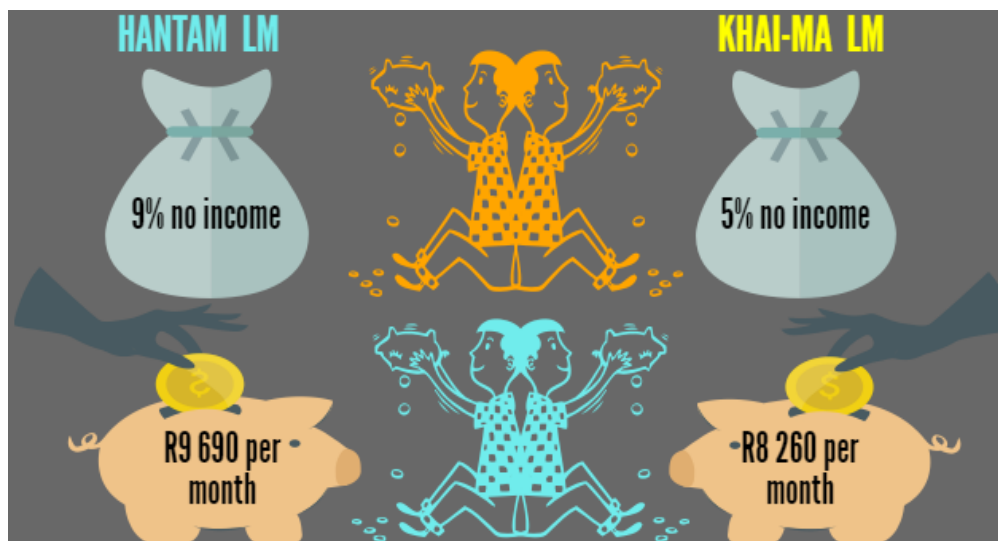


Figure 3-4: Hantam and Khai-Ma LM household income distribution (Stats SA, 2011) (Quantec, 2016)

The average household annual income in the **Hantam LM** is R116 276 in 2016 prices; this implies an average household monthly income of R9 690. The monthly income for Loeriesfontein is R10 620; these figures are relatively higher than the provincial average income, which is R8 521 per month. As highlighted in Table 3-6 below, 9% of households do not have a regular amount of income in both the Hantam LM and Loeriesfontein town which is on par with the national and provincial levels, where the proportion of people who do not receive any form of income equated to 9% and 7% respectively. In the Hantam LM, 54% of people fell below the poverty line as they earned less than R3 200 per month.

The main source of income in the municipality is the agricultural sector; predominantly sheep farming and rooibos tea. The second largest income contributor is the community employment sector; particularly the social and personal services industry.

Subsequent to the establishment of wind farms in the area, new economic opportunities in **Loeriesfontein** town have emerged. Public transport has benefitted as a result of the increased demand for the transportation of workers to and from construction sites. Cleaning services have also provided work opportunities for unemployed individuals whilst informal trading amongst residents has also increased and has stimulated further income and job creation in the town. Wind farm construction companies either pay their workers once a month or every fortnight; this has resulted in more money in circulation as the purchasing power of local residents also increased. This is important as it may assist in reducing the number of people living below the poverty line. Upon consultation, one farmer went to the extent of sharing that poverty levels have been slightly alleviated in the Loeriesfontein town.

The average household annual income in the **Khai-Ma LM** was R99 144 in 2016 prices; this equated to an average household monthly income of R8 262. The main source of income in Khai-Ma is the Black Mountain Mine situated in Aggeneys town, as well as several government departments. Commercial farmers depend on incomes generated from their farms. The rest of the residents are

either dependent on the government grant or they earn a living by providing housekeeping and gardening services (Umsebe Development Planners, 2010).

Table 3-6: Household per monthly income group (2011)

Indicator	Namakwa DM	Hantam LM	Loeriesfontein	Khai-Ma LM
No income	8%	9%	9%	5%
R1 – R3 200	54%	57%	61%	62%
R3 201 – R6 400	14%	12%	12%	10%
R6 401– R12 800	12%	11%	10%	13%
R12 801– R25 600	7%	6%	4%	6%
R25 601– R51 200	2%	2%	2%	1%
>R51 200	4%	3%	3%	2%

(Stats SA, 2011)

3.7 Access to services and state of local built environment

Access to shelter, water, electricity, sanitation, and other services are indicators that assist to determine the standard of living of the people in the area under investigation. Infrastructure and the state of local infrastructure is another indicator to contemplate when considering living standards. The availability of social and economic infrastructure including roads, educational facilities, and health facilities further indicates the nature of the study area, which is valuable in developing a complete profile of the circumstances in which communities are living. These measurements create a baseline against, which the potential impacts of the proposed project can be assessed.

3.7.1 Settlement profile

In comparison to the national population density (42 people/km²), the Hantam LM is characterised by a low density of people per square km. It is also relatively lower than the district (0.91 people/ km²) and provincial (3.07 people/ km²) density. Although population densities for the LM are significantly low (0.59 people/ km²), as outlined in Table 3-7 below, Loeriesfontein town has a higher population density of 79.69 people/km² making it the most densely populated area between the three areas under analysis.

Table 3-7: Population density of Hantam and Khai-ma LM (2011)

Indicator	Towns in the Hantam & Khai-Ma LM's		
	Hantam LM	Loeriesfontein	Khai-Ma LM
Population total	21581	2746	12466
Area (Sq. Km)	36128.07	34.45	16627.9
Population density	0.59	79.69	0.74

(Stats SA, 2011)

The Khai-Ma LM also has a relatively low population density with only 0.74 people/km², making it a sparsely populated region. Most people in the Khai-Ma LM are situated in the urban areas or in agricultural clusters along the Orange River, which also provides opportunities for water sport and recreation as well as resort development (Umsebe Development Planners, 2010)

3.7.2 Access to Housing and Basic Services

With respect to basic service provision and housing, the Namakwa DM is responsible for assisting and ensuring that local municipalities provide adequate housing to inhabitants in their jurisdiction such. The current level of access to various basic services in the municipality are as follows:

- **Housing:** During the year 2011, housing shortages in the **Hantam LM** were an acute problem. In Hantam LM, 94% of houses had access to formal housing (i.e., a house made of brick or a concrete structure on a separate yard). Towns of the Hantam LM followed a similar path with Loeriesfontein having 94% access to formal housing (Stats SA, 2011). Amongst other pressing developments of the municipality, new housing unit developments have been identified by the Hantam SDF (Umsebe Development Planners, 2010). In comparison to the Hantam LM, the **Khai-Ma LM** residents had less access to formal housing as only 74% of inhabitants resided in formal housing structures (Stats SA, 2011).
- **Access to water:** In the **Hantam LM**, more than 90% of the households have access to piped water either inside their dwellings or yards. This includes residents living in Loeriesfontein town. More than 95% of water for the Hantam LM as well as for nearby towns is supplied by a regional or local water scheme operated by the municipality. In the **Khai-Ma LM**, more than 90% of households have access to piped water either in their dwellings or yards. A very low percentage of people do not have any type of access to piped water in the Khai-Ma LM.
- **Access to sanitation:** Although the Spatial Development Framework suggests that almost all households in the **Hantam LM** had access to flush toilets in 2011 (Umsebe Development Planners, 2010), statistics show that just over three quarters (76%) of households in Hantam LM have access to flush toilets either connected to the sewerage or to a septic tank. Whilst the Hantam LM believes to have eradicated the bucket system (Umsebe Development Planners, 2010), 3.1% of residents rely on the bucket latrine system whilst 0.9% do not have any form of access to any form of sanitation (Stats SA, 2011). Just over half of Loeriesfontein residents utilise flush toilets. The **Khai-Ma LM** has the same proportion of people who have access to flush toilets as the Hantam LM, with 6% of people who have no access to any type of sanitation.
- **Access to electricity:** In the **Hantam LM**, only urban areas are provided with electricity whilst the rural areas depend on other sources (Umsebe Development Planners, 2010). Slightly more than three quarters (77%) of households in the municipality have access to electricity for lighting whilst only 15% and 7% of people use candles and solar for lighting, respectively (Stats SA, 2011). Similar trends can be noted when assessing the towns of the municipality as more than 90% of Loeriesfontein town residents have access to electricity. One of the objectives of the municipality is to improve the living standards of its' residents by implementing opportunities for bulk infrastructure development (Urban-Econ Development Economists, 2011). Although the SDF highlights electricity as one of the sectors experiencing backlogs in the **Khai-Ma LM**, 90% of households in the municipality use electricity for lighting whilst the rest use 7% candles and 2% use solar. Development objectives premised on the optimisation

of resources relating to bulk infrastructure such as electricity remains a goal for the municipality (Umsebe Development Planners, 2010).

3.7.3 Transport infrastructure

The transport sector plays a vital role in meeting the objectives of economic development, access to employment opportunities and social infrastructure (Dennis Moss Partnership, 2012). As a result of this, industrial development ought to take the mode of transport utilised by the labour force of a particular region into consideration. This means that new economic developments should not be situated far from the pick-up or drop-off points of various means of transport (Urban-Econ Development Economists, 2011). In 2001, just over a third 36.8% of people in the Hantam LM travelled to work or school by foot. The rest of the people used public transport (4.92%) whilst others made use of bicycles (1.39%) and their own transport facilities (5.12%) (Stats SA, 2001). Using the R55 gravel road, the distance between Calvinia and Loeriesfontein is 86km, whilst travelling from Calvinia to Brandvlei requires the utilisation of the R27 tar surface road for approximately 2 hours and 30 minutes.

The **Hantam LM** is traversed by several regional roads and encompasses two transport corridors (Umsebe Development Planners, 2010):

- Nieuwoudtville – Calvinia - Williston corridor consisting of the R63 tar road and railway link among Calvinia, Williston and Carnarvon, which links Gauteng and the Western Cape
- Nieuwoudtville – Calvinia – Brandvlei -Kenhardt corridor consisting of the R27 tar road leading from Cape Town to Upington, which provides a shortcut alternative to the route via Springbok and is often used by trucks particularly during the grape season. Considering that this is the main route in the region, it is essential that this road is maintained as it is of economic importance to the area.

The **Khai-Ma** IDP places emphasis on the need for local communities to have adequate accessibility to services through the provision of sufficient transport infrastructure. Although the Khai-Ma LM recognises the need for sufficient transport facilities, about 30% of people walked home either to and from work or school. The second most-utilised mode of transport is public transport in the form of buses, trains, and taxis (Umsebe Development Planners, 2010).

As derived from the above, there is currently no national road that passes through the Hantam municipal area. Due to the influx of people and heavy load traffic in the Hantam LM as well as nearby towns, the main route (R27) in the area, which is also the only tarred road connecting Nieuwoudtville and Brandvlei via Loeriesfontein has been rapidly deteriorating and needs to be frequently maintained.

The project site for the proposed wind farm can be accessed through a small gravel access road that isn't wide enough to be traversed by large construction vehicles, which farm owners have expressed their desire for the road to be moved as it isn't far from one of the farm portions. With respect to water availability in the area, consultations with farm owners revealed that the affected farm portions do not have any direct access to water as it is a scarce resource in the area. To prevent water shortage impacts, some farmers in the area have reservoirs within their property or use water tanks to store water

3.7.4 Social and Recreational Infrastructure

More often than not, residents require access to social services and shared community experiences in order to create a sense of belonging to an area. Access to sufficient social infrastructure such as schools, universities, medical facilities also play a significantly important role in maintaining the social contact within communities. Whereas, a lack of social infrastructure results in a number of inconveniences and triggers a series of long-term consequences linked to social cohesion as well as additional costs. Throughout the country, district, and local municipal level government therefore, has the mandate and responsibility to provide and build adequate facilities such as education, health and safety as well as recreational amenities.

Social and Recreational Infrastructure provision within the Hantam and Khai-Ma LM is depicted below:

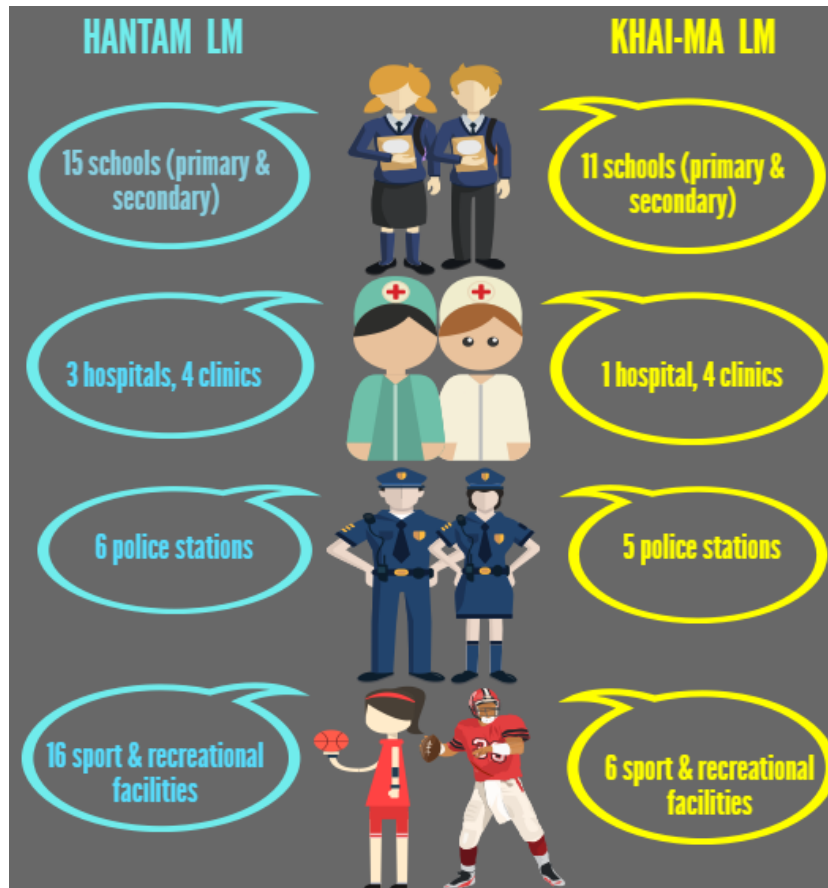
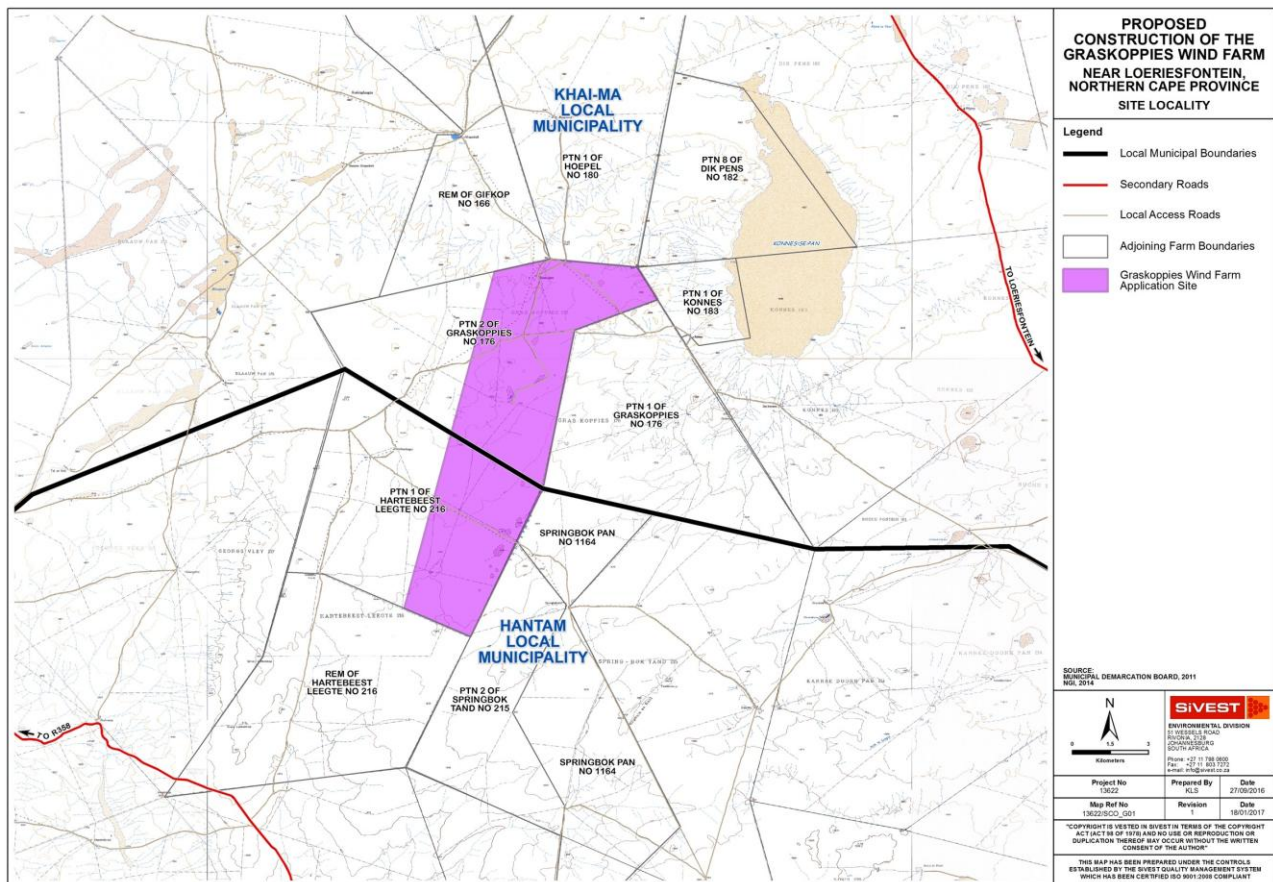


Figure 3-5: Hantam and Khai-Ma LM social and Recreational Infrastructure

4 SITE RELATED INFORMATION

4.1 Land use profile

Map 4-1 below illustrates the proposed site (purple region) for the Graskoppies wind facility near Loeriesfontein town. The planned facility is proposed to be located on Portion 2 of Graskoppies farm No 176 and Portion 1 of Hartebeestleegte Farm No. 216 within the municipal boundaries of Hantam and Khai-Ma. The farms, where the project is proposed to be located as well as the adjacent farms, are considered as the immediate zone of influence as they are most likely to be directly or indirectly affected by the proposed project through various socio-economic and environmental effects.



Map 4-1: Potential zone of influence

The land earmarked for the potential development of the Graskoppies wind farm is currently used for commercial agricultural purposes, specifically sheep farming. In order to gain an understanding of the impact of the proposed development on the immediate zone of influence, in-person as well as telephonic interviews were conducted with farm owners to on understanding day to day farm operations, general demography of the affected farms as well as economical information based on the agricultural processes. The site is located approximately 75km away from the closest urban area and will be developed across the following farm portions (presented in Table 4-1 below):

Table 4-1: Directly and indirectly affected farm portions across zone of influence

Farm Portion	Farm Name	Farm no	Type
2	Graskoppies	176	Directly affected
1	Hartebeestleegte	216	Directly affected
1	Konnes	183	Adjacent
1	Graskoppies	176	Adjacent
Rem	Hartebeestleegte	216	Adjacent

Information obtained during in-person and well as telephonic interviews with the affected landowners is summarised below:

Portion 2 of Graskoppies Farm No.176 (directly affected)

- **General information:**
 - 5 400 hectares used for commercial farming, however main source of income derived from date farming
 - Type of sheep: Meat Masters
 - Average annual revenue: ± R500 000
 - Two permanent workers live on the farm (one of which lives with his wife)
- **Concerns raised:**
 - The farm owner raised concerns related to increased crime activities such as stock theft during construction phase of the wind farm. This is also based on the past experience, when the Sishen-Saldanha railway line was being built, which resulted in dramatical increase in stock theft during the activities.
 - Due to the fact that there will be internal roads and areas designated for the erection of the wind turbines, the construction activity will result in reduced carrying capacity thus reducing the number of sheep that can remain on the farm. As a result of this, farm will only be able to carry 50% of the sheep.
 - Farm owner will have to rent other land during the construction phase; however, no employment will be lost during windfarm development.
 - Water scarcity is a problem in general in the area.

Portion 1 of Hartebeest Leegte Farm No.216 (directly affected)

- **General information:**
 - 5 100 hectares are used for commercial livestock (sheep) farming which is the main source of income
 - Type of sheep: Dorpers
 - Average annual revenue: ± R500 000
 - No workers currently live on the farm
- **Concerns raised for construction phase:**
 - The farm is almost only grass; this however, is not a concern because grass grows very quickly but the destruction of the veld and shrubs are a concern because they recover at much slower rates than the grass and they are the primary source of food for the sheep.

- During the building process, the sheep will have to be moved to another farm, which will be rented and there is not much farmland available to rent in the area; thus, the farm owner will have to be adequately compensated for this.
- Water is a very scarce commodity in the area, so there is great concern related to where the water for the project will be sourced from during the construction phase.
- **Concerns raised for operational phase:**
 - Farm owner is not concerned about the visual impact as he jokingly added that the sheep will most probably enjoy the shade of the wind turbines
 - Economic benefits and opportunities for the farm and the town
 - Concerns related to the rising population as Loeriesfontein is a relatively small town
 - Water scarcity in the area

Portion 1 of Kones Farm No.183 (adjacent)

- **General information:**
 - 6 221 hectares are used for commercial sheep farming which is the main source of income
 - Type of sheep: Mainly Dorpers
 - Average annual revenue: ± R600 000
 - Family resides on the farm during summer rainfall time
 - Two permanent workers live on the farm and receive occasional visits from their families
- **Concerns raised during construction phase: short-term**
 - Traffic and dust from the passing construction vehicles are major concern for Portion 1 of Kones Farm No.183 as the current road is narrow and is not wide enough for two construction vehicles to drive side-by-side. The current road is situated 80m close to the main house, windmill and water reservoir, which service the sheep on the farm.
 - Adequate compensation for loss of grazing area is a concern.
 - Sheep would need to be re-located during the construction phase and other veld will need to be rented.
 - Construction company must regularly update and keep farmers well informed about their plans, operations, and movements. Importantly, the construction company must always receive formal approval from the farmers regarding where they plan to set things up.

Portion 1 of Graskoppies Farm No.176 (adjacent)

- **General information:**
 - 6 000 hectares are used for commercial sheep farming which is the main source of income
 - Type of sheep: Meat Masters
 - Average annual revenue: ± R500 000
 - Family resides on the farm during summer rainfall time (average of eight months/year)
 - One permanent worker lives on the farm and receives occasional visits from his family
- **Concerns raised for construction phase**

- Two concerns raised - destruction of the veld, which is the main source of food for the sheep, and potential stock theft.
- Adequate compensation for loss of grazing, if applicable, area is also a concern.
- The sheep will need to be relocated during the construction phase and to achieve that, other farmland will have to be rented.
- Construction company must regularly update and keep farmers well informed about their plans, operations, and movements. Importantly, the construction company must always receive formal approval from the farmers regarding where they plan to set things up.
- **Concerns raised for operational:**
 - The farm owner has concerns related to the close proximity of power cables to existing infrastructure such as dams, windmills and therefore prefers that power cables be located far from the main house

Remainder of Hartebeestleegte No.216 (adjacent)

- **General information:**
 - 5 400-6000 hectares used for commercial farming however main source of income derived from date farming
 - Type of sheep: Wit Dorpers and Merino's
 - Average annual revenue: ± R183 333
 - Currently, no-workers are employed by the farm however workers periodically live on the farm during the sheering season
- **Concerns raised:**
 - The farm owner mentioned that any operational losses incurred will require compensation.
 - Incurred losses will need to be proportionate to the forfeited rental income (in the event that the sheep are relocated elsewhere during the construction phase).
 - The construction company must ensure that minimal damage is done to the veld and that roads are built without infringing on existing infrastructure (farms, farm gates, water pipes, water installations, windmills etc.).
 - All construction roads that will potentially be built across the farm to be communicated with farm owner in time.
 - The construction workers must ensure that they are careful during the construction activities and none of the project activities cause unnecessary damage to the existing infrastructure and veld.
 - Dust needs to be controlled as the Merino sheep are especially affected by this.

5 IMPACT ANALYSIS

The following sections discuss the socio-economic impacts that the proposed project is envisaged to create, considering the knowledge of the potentially affected socio-economic environment and the project components. The analysis of impacts is divided into the following groups:

- Impact on natural capital
- Impact on human capital
- Impact on social capital
- Impact on cultural and spiritual capital
- Impact on physical capital
- Impact on financial capital
- Impact on political and institutional capital

Figure 5:1 below provides a further breakdown of the impact analysis by focusing on the sub-groups within the umbrella impacts listed above:

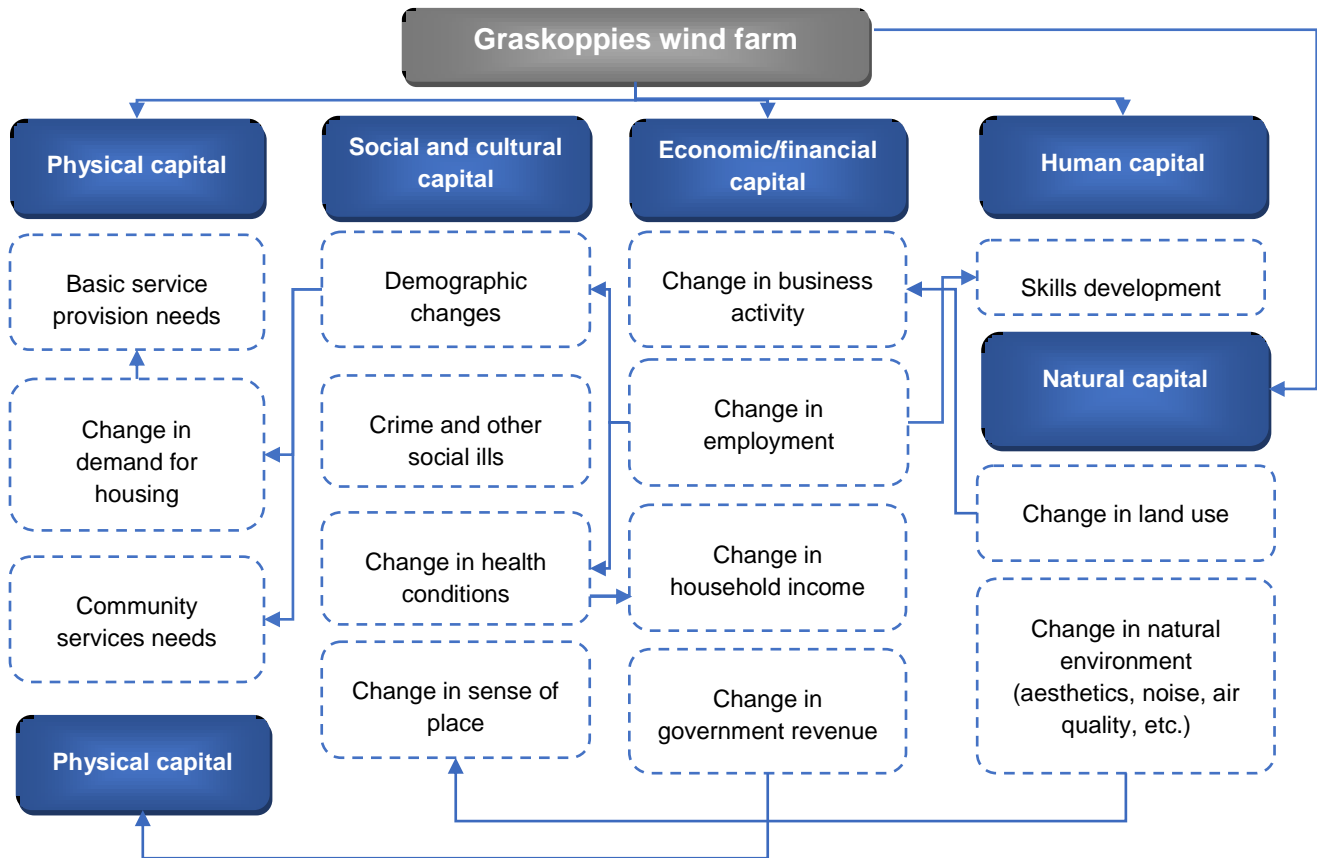


Figure 5-1: Breakdown of impact analysis for Graskoppies wind farm

The review of the potential impact considers the entire project inclusive of all its components (construction and operation phase) and considered alternatives. All impacts identified are assessed in terms of the impact ratings methodology as prescribed by the Environmental Assessment Practitioner (EAP) (refer to Annexure A). It should be noted that some impacts that are to be exerted by activities

during construction may remain during the operation phase. In this instance, impacts are analysed under the phase when they were first experienced and their duration reflected over the period not limited to the actual phase of the project.

5.1 Impact on natural capital

5.1.1 Impact on commercial agricultural resources

The land that is currently proposed for the development of Graskoppies wind farm is used for commercial sheep farming purposes. Should the proposed project be successfully implemented, several agricultural impacts are expected to ensue. These include impacts such as the sterilisation of agricultural land, relocation of sheep, destruction of veld as well as the potential overgrazing of the allocated farm portion all of which are linked to the loss of agricultural potential and employment opportunities. Due to their nature, **impacts related to agricultural productivity of the farms are omitted in this report as they are addressed in the Agricultural Specialist Report.**

5.2 Impact on human capital

5.2.1 Impact on employment

During construction

The project proponent estimates that the **construction** of the proposed Graskoppies wind facility will create 190 employment opportunities for skilled individuals and 233 job opportunities for unskilled individuals. As such, the establishment of the Graskoppies wind farm is expected to create a total of 423 jobs over the 18-24-month construction period. Of these opportunities, 29% of the positions will be made available to local labour which equates to a total of 123 new jobs.

As of the year 2011, a total of 13.8% of the total Hantam LM had no form of education whilst 30% did not complete their secondary education. A very small proportion (7.1%) of people within the Hantam LM continued to further their studies at a higher education institution. Loeriesfontein had 23.3% of people who failed to complete primary school, whilst 15.4% completed their high school. The lack of a formal education and evident low literacy levels in the local municipality implies a limited skills base for appointment of local labour during the construction phase. This means that the 29% of employment opportunities that will be specifically for the local community will be largely filled by the unskilled labour force as it is unlikely that the local area will be able to supply workers with highly specialised skills as this would've required more of a formal education.

The estimated employment will be a short-term temporary situation as they will only last for the duration of the construction phase which is a period of 18- 24 months.

Employment creation during construction phase	
Environmental Parameter	Employment: Towns and settlements surrounding the project site are characterised by very high levels of unemployment, reflecting that the economy of the area is stagnant and is in need of economic stimulation.
Issue/Impact/Environmental Effect/Nature	During the establishment of a wind farm, over 400 job opportunities will be created lasting for the duration of the construction phase. Of these, about 29% will be filled by members from the local community.
<i>Extent</i>	The impact will affect the local community and district.

<i>Probability</i>	The impact will certainly occur (>75% chance of occurrence).	
<i>Reversibility</i>	The impact is completely reversible.	
<i>Irreplaceable loss of resources</i>	The impact will not result in any loss of resources.	
<i>Duration</i>	The impact will last during construction (± 2 years), which will be of a short-term period.	
<i>Cumulative effect</i>	The developments of other renewable projects in the area could significantly increase the number of jobs created, with wind energy projects, it could grow proportionally to the number of new projects implemented.	
<i>Intensity/Magnitude</i>	Considering the high unemployment rate in the district as well the local community, the impact could have a significant impact on alleviating the unemployment levels in the area.	
<i>Significance rating</i>	<p>Prior to mitigation measures: The anticipated impact will have moderate positive effects.</p> <p>After mitigation measures: Ensuring that jobs are allocated to workers in the local area will significantly increase the impact of job creation</p>	
	Pre-mitigation impact rating	Post mitigation impact rating
<i>Extent</i>	2	2
<i>Probability</i>	4	4
<i>Reversibility</i>	1	1
<i>Irreplaceable loss of resources</i>	1	1
<i>Duration</i>	1	1
<i>Cumulative effect</i>	4	4
<i>Intensity/Magnitude</i>	3	4
<i>Significance rating</i>	+36 (Medium positive)	+52 (High positive)
<i>Mitigation measures</i>	<ul style="list-style-type: none"> • Drafting legal and binding enforcements stipulating that majority of the unskilled positions in the project be allocated to local labourers • Where possible, subcontract to local construction companies • Consultation with local authorities is essential so as to manage job creation expectations and ensure that all eligible workers in the primary study area are informed of the opportunities. 	

During operation

Once operational, it is expected that the Graskoppies wind farm will permanently employ 31 individuals. It is envisaged that 17 (55%) of these jobs will be created for skilled individuals whilst 14 (45%) job opportunities will cater for unskilled people. Similar to the construction phase of the wind farm, a total of 9 jobs (29%) will be filled by individuals from the local community.

The Hantam LM is said to have an unemployment rate of 12.6% which equates to 882 individuals looking for work opportunities but are unable to find any. Loeriesfontein has a slightly higher unemployment rate of 14.7%. Considering the percentage of unemployment in the town, the

magnitude of the impact expected to be generated by the Graskoppies on the unemployment levels of the town is relatively low.

Furthermore, according to one of the I&AP's, Loeriesfontein town has always been dependent on income from extensive farming, however; although farms have increased in order to achieve economies of scale, employment figures remained the same. As a result of this, the introduction of RE projects in the region have provided Loeriesfontein community members with an alternative source of employment and income as it is more labour intensive and does not negatively impact on the jobs created by the agricultural sector. Due to this, the expectation of the development of similar projects in the vicinity is expected to result in a significant cumulative impact. The impact is expected to be of a long-term effect as it will last for the duration of the operational phase which encompasses the duration of the entire lifespan of the project (20 years).

Creation of long-term employment in local and national economies through operation and maintenance activities		
Environmental Parameter	Sustainable employment opportunities.	
Issue/Impact/Environmental Effect/Nature	Throughout the lifespan of the project, over 30 employment positions will be created and sustained, of which at least a third will be filled by the local community members.	
<i>Extent</i>	Will affect the local area and district.	
<i>Probability</i>	The impact will certainly occur (>75% chance of occurrence).	
<i>Reversibility</i>	The impact is reversible.	
<i>Irreplaceable loss of resources</i>	The impact will not result in any loss of resources.	
<i>Duration</i>	The impact and its effects is expected to last for the entire operational life of the development resulting in a long-term effect.	
<i>Cumulative effect</i>	The cumulative impact of the project is expected to be medium due to the relatively large number of projects planned to be developed in the area and considering that these projects will be associated with a limited number of sustainable employment opportunities.	
<i>Intensity/Magnitude</i>	Although the operational phase promises long-term employment, in the context of the entire Hantam economy, the effect of the impact is expected to medium-sized.	
<i>Significance rating</i>	<p>Prior to mitigation measures: The anticipated impact will have minor positive effects.</p> <p>After mitigation measures: The anticipated impact will have minor positive effects.</p>	
	Pre-mitigation impact rating	Post mitigation impact rating
<i>Extent</i>	2	2
<i>Probability</i>	4	4
<i>Reversibility</i>	1	1
<i>Irreplaceable loss of resources</i>	1	1
<i>Duration</i>	3	3
<i>Cumulative effect</i>	3	3

<i>Intensity/Magnitude</i>	2	3
<i>Significance rating</i>	+28 (Low positive)	+28 (Low positive)
<i>Mitigation measures</i>	<ul style="list-style-type: none"> Where possible, ensure that the local community members are prioritised for the allocation of the created jobs. 	

5.2.2 Impact on skills and knowledge

During construction

The development of the Graskoppies wind farm will require specialised as well as general labour-related construction skills.

Local community members who will be employed during the construction phase are expected to gain experience from on-the-job training during their employment period. The project proponent estimates that a total of 423 total jobs will be created during the construction phase. Of these job opportunities, 29% (123 jobs) will be filled by members of the local community. The duration of this impact is expected to be of a long-term effect as the skills cannot be reversed once acquired.

Skills development during construction phase		
Environmental Parameter	Skills development: it is expected that those who will receive employment as a result of the construction activities will either be improving an existing skill or acquiring a new skill.	
Issue/Impact/Environmental Effect/Nature	The population of the primary study area mainly consists of unskilled workers with low literacy rates; therefore, employees will benefit from a skills development programme, which is a key component of the development of this project.	
<i>Extent</i>	Impact will affect the district and local communities.	
<i>Probability</i>	The impact will certainly occur (>75% chance of occurrence).	
<i>Reversibility</i>	The impact is irreversible.	
<i>Irreplaceable loss of resources</i>	The impact will not result in the loss of any resources.	
<i>Duration</i>	The impact will have a permanent effect on the employed individuals as the acquired skills and necessary knowledge will remain with the relevant workers and improve their employability.	
<i>Cumulative effect</i>	The development of similar projects in the area will lead to greater labour productivity and employability of construction phase workers.	
<i>Intensity/Magnitude</i>	The low primary school completion rate in the area indicates a lack of skills amongst local communities, thus the opportunity to develop a skilled workforce will have a high impact on the community.	
<i>Significance rating</i>	<p>Prior to mitigation measures: The anticipated impact will have a significant positive effect.</p> <p>After mitigation measures: Utilising appropriate mitigation measures, which ensure that skills development is implemented as part of the establishment will increase the intensity of the impact.</p>	
	Pre-mitigation impact rating	Post mitigation impact rating
<i>Extent</i>	2	2

<i>Probability</i>	3	4
<i>Reversibility</i>	4	4
<i>Irreplaceable loss of resources</i>	1	1
<i>Duration</i>	4	4
<i>Cumulative effect</i>	3	3
<i>Intensity/Magnitude</i>	3	3
<i>Significance rating</i>	+51 (High positive)	+54 (High positive)
Mitigation measures	<ul style="list-style-type: none"> Contracts ensuring that on-the-job training is included and enforced as a condition for the development of this project. To improve the chances of skills development during the construction phase, contractors are encouraged to provide learner-ships and encourage further knowledge sharing. 	

During operations

Once the Graskoppies wind farm is operational, available employment opportunities will specifically require skilled labour. Labourers, engineers and mechanics are among the group of people that will most likely be required for the continual upkeep and maintenance of the wind facility.

In light of the literacy levels of Loeriesfontein town, it is unlikely that the skilled labour required during the operational phase will be sourced from the town implying the need to outsource persons possessing specialised skills from neighbouring towns or they will need to be recruited from the rest of the country. This means that few local people will benefit from jobs created within this phase. The duration of this impact is of a long-term nature as it will last for the duration of the operational phase.

Skills development during the operations phase	
Environmental Parameter	Skills development, long-term knowledge transfer and skills development will take place as a result of the expected new employment creation.
Issue/Impact/Environmental Effect/Nature	Individuals who have receive the long-term employment in the operational activities of the project will gain skills and will be able to practice already existing skills.
<i>Extent</i>	Will affect the entire country.
<i>Probability</i>	Considering the current skills base, the required skills may not be available locally and will need to be sourced elsewhere; thus, the impact will likely occur.
<i>Reversibility</i>	The impact irreversible as once skilled are gained, they cannot be lost.
<i>Irreplaceable loss of resources</i>	The impact will not result in the loss of any resources.
<i>Duration</i>	Considering the duration of the phase, impact will be long-term.
<i>Cumulative effect</i>	The cumulative impact is rated as medium-level as the other projects planned for the area will create additional opportunities for skills transfer and development.
<i>Intensity/Magnitude</i>	Considering the current skills base of local people, the intensity of the impact is expected to be low.

<i>Significance rating</i>	Prior to mitigation measures: The anticipated impact will have a minor positive effect. After mitigation measures: The anticipated impact will have a minor positive effect.	
	Pre-mitigation impact rating	Post mitigation impact rating
<i>Extent</i>	4	4
<i>Probability</i>	3	4
<i>Reversibility</i>	4	4
<i>Irreplaceable loss of resources</i>	1	1
<i>Duration</i>	3	3
<i>Cumulative effect</i>	3	3
<i>Intensity/Magnitude</i>	1	1
<i>Significance rating</i>	+18 (Low positive)	+19 (Low positive)
Mitigation measures	<ul style="list-style-type: none"> • Contracts ensuring that knowledge sharing and on-the-job training should be enforced as a condition for the development of the project. • To ensure that skills are adequately acquired, additional training programmes need to be held during the construction phase to prepare the identified community members to be employed at the next phase, i.e. operational. 	

5.2.3 Impact on health (and nutrition) of the community

The health-related impacts that are expected to ensue as a result of the development of the proposed wind facility are:

- Dust formation created by movement of heavy construction vehicles,
- An increase in the spread of Sexually Transmitted Diseases (STD's) as a result of the influx of jobseekers and migrant workers, and
- An increase in the incidence of social ills such as prostitution, drugs and alcohol abuse.

During the construction phase, dust and noise pollution from construction activities as well as the constant movement of heavy construction vehicles often results in disturbances to farm workers as well as Merino sheep as they are deemed to be vulnerable to dust. This impact will have a short-term duration but could have a longer-term effect if people or animals are negatively impacted.

The construction phase of a wind facility attracts a number of migrant workers and jobseekers. In a community such as Loeriesfontein, the consequential result of this is often the mingling of the male workers with the young females of the area as well as unemployed women who have the hope of receiving financial support from the construction workers. During the interviews, a disgruntled I&AP added that "construction workers are an evil to the town, they bring their tablets and phones and use it to entice young girls who fail to resist the temptation". The subsequent effect of this is an increase in prostitution, unwanted pregnancies, as well as an increase in cases of STDs. In the event that similar projects of this nature are approved, the spread of communicable diseases is expected to increase at

a much more rapid rate due to the greater number of migrant construction workers being present in the area.

An increase in disposable income tends to increase the demand for personal services and goods in the area. During the interviews conducted in the area, community members of Loeriesfontein concurred that since the construction of the two wind facilities (i.e. Khobab & Loeriesfontein 2), construction workers employed by these facilities tend to spend their income in the local area specifically opting to purchase drugs and alcohol, which also attract a number of local young females. Due to this, more alcohol licences have been issued whilst alcohol sales have also increased. One of the prominent store owners in the area added that, although drug abuse has always been a challenge in the local community, the presence of wind farms has exacerbated the problem. On the other hand, it can be argued that the increase in income may improve peoples' standard of living through variables such as access to higher quality health-care, and better nutrition due to the availability of varied choices.

In light of the effect of the projects under construction on the community, positive cumulative impacts such as improved living standards are expected to increase as and when the projects are implemented. Social ills such as alcohol and drug abuse as well as prostitution is also expected to have a high cumulative impact over a long-term period further threatening the health of Loeriesfontein residents.

Impact on health during construction	
Environmental Parameter	Health impacts resulting from the potential influx of migrant workers as well as jobseekers.
Issue/Impact/Environmental Effect/Nature	The proposed development may lead to adverse impacts on the local community members due to the increased alcohol and drug abuse, prostitution, and possibly alleviated levels of dust pollution.
<i>Extent</i>	The impact under discussion will affect the local community.
<i>Probability</i>	The impact will definitely occur, given the empirical evidence with the existing projects in the area
<i>Reversibility</i>	The impact is barely reversible as it is unlikely that unwanted pregnancies and STD's can be reversed even with intense mitigation measures.
<i>Irreplaceable loss of resources</i>	The impact will not result in the loss of any resources.
<i>Duration</i>	Although some health issues might be of a short-term, some may have a long-lasting impact, e.g. HIV/AIDS
<i>Cumulative effect</i>	The impact will result in significant cumulative effect, considering the number of projects planned in the area and the fact that most of the construction worker will need to come from out of town.
<i>Intensity/Magnitude</i>	The intensity of the impact is expected to be high considering the size of the local community to be affected.
<i>Significance rating</i>	Prior to mitigation measures: The anticipated impact will have moderate negative effects and will require little to no mitigation. After mitigation measures: The anticipated impact will still have moderate negative effects even after the implementation of proposed mitigations.
	Pre-mitigation impact rating Post mitigation impact rating

<i>Extent</i>	2	2
<i>Probability</i>	4	3
<i>Reversibility</i>	3	3
<i>Irreplaceable loss of resources</i>	1	1
<i>Duration</i>	1	1
<i>Cumulative effect</i>	3	3
<i>Intensity/Magnitude</i>	3	3
<i>Significance rating</i>	-42 (Medium negative)	-39 (Medium negative)
Mitigation measures	<ul style="list-style-type: none"> • Raising awareness among construction workers on health issues, including HIV/AIDS. • Make condoms available to employees and all contractor workers for free. • Introduce alcohol testing on a weekly basis for construction workers. • Developing a Code of Conduct for all employees related to the project, which includes no tolerance of activities such as alcohol and drug abuse. • Initiating the education campaign among the local community (in partnership with the community members already active in the area) focusing on alcohol abuse, drug abuse, HIV/AIDS, STDs, etc. prior the start of construction and maintaining these throughout the project's duration. 	

5.3 Impact on social capital

5.3.1 Impact on social relations (i.e. social ills)

The Hantam LM's skills base is mostly dominated by semi-skilled (29%) and low-skilled individuals (30%). A very small percentage of people employed within the formal sector are skilled (14%). Due to this, it is highly likely that the Hantam LM and nearby towns do not possess a sufficiently skilled workforce to supply all the labour requirements for the construction and operation of the proposed wind farm facility. This means that low- and semi-skilled labour requirements for both phases can be procured locally however, specialised and skilled workers will most probably be migrant workers. Sourcing skilled migrant workers will then result in an increase in the influx of jobseekers thus increasing the population of the area.

Unemployed individuals from other areas around the region are also mostly likely to migrate to the study area hoping to obtain employment from the Graskoppies development during the **construction phase** and may remain in the area till the **operation phase**, regardless of whether they received employment during construction or not. Influx of male workers into the area is likely lead to the increased number of unwanted pregnancies. Due to this, a **change in demographics** in the short-term and in the long-term is expected to occur. Furthermore, as the number of wind projects are approved, it is likely that the number of jobseekers will increase, resulting in a greater **cumulative impact** on the demographics of the area.

The change in demographics has the potential to result in a spiral of interlinked social ills. The effect of an influx of male workers in the study area has the potential to fuel an **increase in social pathologies** through the following ways:

- Tension between locals and migrants (South African or non-South Africans) who are competing for the same job. During the interview with the local community members, it was revealed that, local contract workers were not pleased with the Poles and black workers coming from other countries 'to take their jobs' for the construction of the Khobab and Loeriesfontein 2 wind farms.
- In addition to this, an influx of people from the rest of the country and Province who are unable to find employment may lead to increased criminal activities.

Change in demographics due to migration of workers from other areas and influx of jobseekers		
Environmental Parameter	Demographics of the area: the area has a relatively small community.	
Issue/Impact/Environmental Effect/Nature	The Loeriesfontein as well as Hantam LM labour force does not have the essential skills and is not diversified enough to provide all skills required in the construction phase; this will necessitate the migration of workers to the area. The projects will also attract jobseekers from various parts of the Province and possibly outside its borders.	
<i>Extent</i>	The impact will affect the local area and district as the demographics of the area will be altered.	
<i>Probability</i>	The impact will certainly occur (>75% chance of occurrence).	
<i>Reversibility</i>	In the likely event that migrant workers as well as job seekers remain in the area after the construction phase in the hope for employment during the operating phase, the impact would only be partly reversible.	
<i>Irreplaceable loss of resources</i>	The impact will not result in any loss of resources.	
<i>Duration</i>	The impact is rated as long-term based on the likelihood that migrant workers will stay in the area for the life of the project.	
<i>Cumulative effect</i>	Considering other renewable energy projects that are planned in the area, the impact would result in a significant cumulative effect as it might attract a significantly greater number of migrant workers.	
<i>Intensity/Magnitude</i>	The male population is expected to increase in the area thus affecting the demographics of the area (short-term and long-term due to chances of unwanted pregnancies), thus resulting in an impact of a medium intensity.	
<i>Significance rating</i>	<p>Prior to mitigation measures: The anticipated impact will result in a medium negative effect.</p> <p>After mitigation measures: Considering the proposed mitigation measures, the intensity of the impact will remain the same.</p>	
	Pre-mitigation impact rating	Post mitigation impact rating
<i>Extent</i>	2	2
<i>Probability</i>	4	3
<i>Reversibility</i>	2	2
<i>Irreplaceable loss of resources</i>	1	1
<i>Duration</i>	3	3

<i>Cumulative effect</i>	4	4
<i>Intensity/Magnitude</i>	2	2
<i>Significance rating</i>	-32 (Medium negative)	-30 (Medium negative)
Mitigation measures	<ul style="list-style-type: none"> • Developers should be open to local recruitment processes and be willing to offer some skills transfer during this phase of the project to ensure maximum local labour procurement. • Recruitment should be done following a transparent approach and adequately communicated in the area to limit the chances of people staying for longer period in hope of finding a job. • Initiating the education campaign among the local community (in partnership with the community members already active in the area) focusing specifically on vulnerable groups of population and motivating them to make right choices in their lives. 	

Increase in social pathologies associated with the influx of migrant labourers and jobseekers to the area		
Environmental Parameter	Social pathologies: factors such as the deterioration in health, increase in crime, prostitution, xenophobia and drugs, etc.	
Issue/Impact/Environmental Effect/Nature	Activities in the construction phase will attract jobseekers and will involve the migration of construction workers to the local town. The increase in the number of construction workers is expected to cause a further increase in social pathologies.	
<i>Extent</i>	The impact will affect the local area and district.	
<i>Probability</i>	Considering the impacts that the already existing wind farms (Khobab & Loeriesfontein 2) have had on the Loeriesfontein community, the impact will certainly occur (>75% chance of occurrence).	
<i>Reversibility</i>	Impacts such as social ills are not defined to a particular area and tend to develop over long time periods. Therefore, if the migrant workers choose to remain in the area after the construction, the impact is rated as only partly reversible.	
<i>Irreplaceable loss of resources</i>	No loss of resources are expected.	
<i>Duration</i>	In the event that migrant workers remain in the area after the construction period, the impact is rated as long-term.	
<i>Cumulative effect</i>	Considering the other renewable projects in the area, the cumulative impact of increased social pathologies is expected to be high.	
<i>Intensity/Magnitude</i>	The increase in social pathologies is most likely to jeopardise the integrity of the area resulting in a medium intensity effect.	
<i>Significance rating</i>	<p>Prior to mitigation measures: The anticipated impact will have moderate negative effects and will require mitigation measures.</p> <p>After mitigation measures: The anticipated impact will be reduced but will remain categorised as a medium negative effect.</p>	
	Pre-mitigation impact rating	Post mitigation impact rating
<i>Extent</i>	2	2
<i>Probability</i>	4	3

<i>Reversibility</i>	2	2
<i>Irreplaceable loss of resources</i>	1	1
<i>Duration</i>	3	3
<i>Cumulative effect</i>	4	4
<i>Intensity/Magnitude</i>	3	2
<i>Significance rating</i>	-48 (Medium negative)	-30 (Medium negative)
Mitigation measures	<ul style="list-style-type: none"> Assist local communities crippled by high levels of drug and alcohol abuse through remedial intervention and awareness programs Introduce awareness campaigns for local community members and workers on the dangers of substance abuse Place more emphasis on the role of and need of a social worker in the area 	

5.3.2 Impact of local community and economic development projects as part of a Social Economic Development (SED) and Enterprise Development Plan

As part of the requirements of the RE IPPPP, project proponents are expected to invest in local communities in which developments are established. During the pre-construction and construction phase, Mainstream Renewable Power South Africa plans to invest about R450 000 into the Loeriesfontein community through various community development projects such as eye tests' and provision of glasses, provision of jungle-gyms, rehabilitation of school infrastructure, community health and wellness days as well as visits to the construction sites.

During operations, the project developer will continue investing in the local community focusing on enterprise development initiative and initiatives that assist in improving the living standards of the local residents. These investments will be made into the projects that will be selected in consultation with the local authorities and community representatives.

The impact is expected to be of a high magnitude considering the small size of the local community and the long-term personal and community benefits derived from these projects. Seeing that Loeriesfontein is a relatively small town, once similar projects in the vicinity are approved, they will also be investing into SED and ED initiatives resulting in the greater cumulative impact on the local economy and residents.

Investment in the local community and economic development projects as part of a Social Economic Development (SED) and Enterprise Development Plan (ED)	
Environmental Parameter	Investment in the local community
Issue/Impact/Environmental Effect/Nature	The developer aims to invest R450 000 in nearby communities through several community development initiatives during the pre-construction and construction phase alone, which will provide long-term benefits for the communities. During operations, investment into the community will continue and include not only social but also enterprise development intuitive.
<i>Extent</i>	The impact will affect the local area.
<i>Probability</i>	Investing into the local economy is a government requirement therefore

	the impact will certainly occur (>75% chance of occurrence).	
<i>Reversibility</i>	The impact will be reversible as investment will cease upon the closure of the project.	
<i>Irreplaceable loss of resources</i>	The impact will not result in the loss of any resources.	
<i>Duration</i>	This impact is rated as long-term as it will take place during the pre-construction, construction, and operational phases of the project.	
<i>Cumulative effect</i>	The base-town for several of the other projects planned in the area is Loeriesfontein, which is also the targeted local community of the project under analysis. If other developers follow the same approach and invest into the community, the cumulative effect will be of high level.	
<i>Intensity/Magnitude</i>	The local district as well as Loeriesfontein town is in need of investment into the local community's health, infrastructure, and skills development; therefore, benefits from the investment will have a high intensity.	
<i>Significance rating</i>	<p>Prior to mitigation measures: The anticipated impact will have a low positive effect.</p> <p>After mitigation measures: The mitigation measures will not affect the scoring of the impact.</p>	
	Pre-mitigation impact rating	Post mitigation impact rating
<i>Extent</i>	2	2
<i>Probability</i>	4	4
<i>Reversibility</i>	1	1
<i>Irreplaceable loss of resources</i>	1	1
<i>Duration</i>	3	3
<i>Cumulative effect</i>	4	4
<i>Intensity/Magnitude</i>	3	3
<i>Significance rating</i>	+45 (Medium positive)	+45 (Medium positive)
Mitigation measures	<ul style="list-style-type: none"> Proponent/project owner needs to establish a relationship with the local authorities such as the Hantam LM and local community leaders to ensure that the SED & ED initiatives that are implemented during the pre-operational stage are aligned with the and relevant needs of the Loeriesfontein community. It is also advisory to engage with the other project developer in the area and, where possible and feasible, coordinate the efforts and spending on community projects to ensure a balanced improvement in the standard of living of local residents and a holistic partnership-based approach to resolving local social ills. 	

5.3.3 Impact on safety

During the construction phase of the project, it is expected that the number of people traversing the directly affected farm portions as well as those in close proximity to project site will increase. This will

make it difficult for landowners to monitor movements within farms as it will most likely be difficult to differentiate between legitimate construction workers and trespassers (loitering jobseekers). As a result of this, land owners and I&APs raised concerns regarding the possibility of an increase in criminal activities during the **construction phase** with particular mention of **personal safety** and **stock-theft** as the main issues.

This means that if the expectations of employment provision during the construction phase are not effectively managed by the proponent, an influx of migrant workers and jobseekers is to be expected. This will result in the increased movement of people in and around the project site placing further emphasis on the concerns of the interviewed land owners.

Furthermore, considering the unemployment rate in Namakwa DM (20.1%), Hantam LM (12.6%), Khai-Ma LM (20.9%) and Loeriesfontein town (14.7%), it is sensible to deduce that should word spread pertaining the potential employment opportunities brought by the proposed development as well as the added possibility of the approval of more proposed developments in the area, the influx of people to the local area from other parts of the province and possibly the country will intensify. The resulting implication of this would be a low to medium cumulative impact.

With the likely possibility of construction phase workers continuing to reside in the nearest town in hope for employment once the construction of the Graskoppies wind facility is complete, such an impact is also most likely to go beyond the construction phase. This would increase the effect of the negative cumulative impact as more people move to the region, it would become increasingly unlikely for all the individuals to get a job as their chances have been reduced due to the spiralling influx of people.

Impact on personal safety and security during construction	
Environmental Parameter	Increased criminal activities and safety & security risk to farmers, guest and workers.
Issue/Impact/Environmental Effect/Nature	Adverse effects on personal and livestock safety as a result of the influx of jobseekers and migrant workers in the vicinity.
<i>Extent</i>	The impact will affect the local area.
<i>Probability</i>	The impact will likely occur (Between 50% to 75% chance of occurrence).
<i>Reversibility</i>	The impact is partly reversible as farmers can be compensated for their losses.
<i>Irreplaceable loss of resources</i>	The impact will not result in irreplaceable loss of resources.
<i>Duration</i>	The impact may last longer than the construction phase.
<i>Cumulative effect</i>	The current construction of Khobab and Loeriesfontein 2 is most likely to raise expectations regarding employment opportunities and may attract more jobseekers. Approval of other developments planned in the area will exacerbate the situation, leading to a noticeable cumulative effect.
<i>Intensity/Magnitude</i>	The intensity of the impact will be of a medium impact.
<i>Significance rating</i>	Prior to mitigation measures: The anticipated impact will have negligible negative effects and requires little to no mitigation After mitigation measures: The anticipated impact will have negligible negative effects and requires little to no mitigation.

	Pre-mitigation impact rating	Post mitigation impact rating
<i>Extent</i>	2	2
<i>Probability</i>	3	2
<i>Reversibility</i>	2	2
<i>Irreplaceable loss of resources</i>	1	1
<i>Duration</i>	2	1
<i>Cumulative effect</i>	3	2
<i>Intensity/Magnitude</i>	2	2
<i>Significance rating</i>	-26 (Low Negative)	-20 (Low Negative)
Mitigation measures	<ul style="list-style-type: none"> • Ensure clear communication of the project information and effective public participation processes to minimise the influx of migrant job seekers. • Movement of construction workers on and off construction site must be closely monitored and managed. • Prior construction, rules and regulations regarding presence of construction workers on site need to be devised in consultation with the land owners of directly affected and adjacent properties. • During construction, the rules and regulations must be clearly communicated to all workers, personal property must be respected and avoided. Penalties for not adhering to the rules should be communicated and enforced. • Manage workers to ensure that they are only on site during the reasonable working hours. 	

5.4 Impact on cultural and spiritual capital

5.4.1 Change in sense of place

Broadly defined, sense of place refers to a collection of qualities and characteristics (visual, cultural, social, and environmental), which provide meaning to a place. Individuals and communities are able to identify with such a space as and when there is an interaction and a balance between the previously listed characteristics. Due to the intertwined nature of a sense of place and the sense of belonging to an area, a change in the surroundings has the potential to affect the wellbeing of the person as it alters the sense of place.

In the context of the proposed Graskoppies wind facility, the potential change in sense of place and associated impact on the cultural capital of the impacted individuals can be analysed on two levels:

- Landowners could potentially have a negative experience if the area distinctly special to them in terms of social and cultural capital is altered to an industrialised space ensued due to the changes in the landscape. The increase in traffic and noise levels from the heavy construction vehicles may negatively affect the sense of place of people residing in close proximity to the project site.
- On the contrary, there could also be a positive experience if landowners view the presence of wind farms within their farms as a way to stimulate the local economy and alleviate poverty levels.

During the interviews with the directly affected and adjacent landowners, the common concern highlighted by all interviewees is the possible destruction of the surrounding veld. This is of grave

concern to the farm owners as the veld is a source of food for the sheep. This means that landowners aren't specifically against the development of the proposed wind facilities in the area but they are concerned about the veld that could be destroyed during construction activities. To highlight their comfort with the development, one of the landowners interviewed during the site visit jokingly said that the sheep will most probably enjoy the shade from the wind turbines and shared a view that that the wind turbines add to the aesthetic appeal of the environment.

Change in sense of place		
Environmental Parameter	An altered sense of place due to the development of the wind farm.	
Issue/Impact/Environmental Effect/Nature	The project is expected to have a notable visual impact, which will alter the landscape and could affect the sense of place of residents, visitors, and project site landowners, which is associated with the area. It may also result in the loss of some veld areas. In addition, the presence of construction workers may change the people's perception of the area as being a quite rural community.	
<i>Extent</i>	The impact will affect the local area.	
<i>Probability</i>	The impact may possibly occur (Between a 25% to 50% chance of occurrence).	
<i>Reversibility</i>	The visual and natural resources will be impacted, but these could be partly reversed after the closure of the project.	
<i>Irreplaceable loss of resources</i>	The impact will result in marginal loss of natural and aesthetic resources.	
<i>Duration</i>	The impact is most likely to last beyond the construction phase as the approval of similar developments in the area might prolong the impact making it of a medium-term.	
<i>Cumulative effect</i>	Given the number of projects that are approved in the area, the impact may result in a notable cumulative effect.	
<i>Intensity/Magnitude</i>	The intensity could reach medium levels.	
<i>Significance rating</i>	<p>Prior to mitigation measures: The anticipated impact will have negligible negative effects and will require little to no mitigation.</p> <p>After mitigation measures: The anticipated impact will have negligible negative effects and will require little to no mitigation.</p>	
	Pre-mitigation impact rating	Post mitigation impact rating
<i>Extent</i>	2	2
<i>Probability</i>	2	2
<i>Reversibility</i>	2	2
<i>Irreplaceable loss of resources</i>	2	2
<i>Duration</i>	2	2
<i>Cumulative effect</i>	3	2
<i>Intensity/Magnitude</i>	2	1
<i>Significance rating</i>	-26 (Low negative)	-24 (Low negative)
Mitigation measures	<ul style="list-style-type: none"> Adhere to the mitigations measures proposed by other environmental specialists (noise, visual, etc.) Ensure the mitigation measure proposed to limit the influx of 	

	people and the prolonged negative effects of the migrants staying in the community after the construction are implemented.
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5.5 Impact on physical capital

5.5.1 Impact on production and Gross Domestic Product (GDP)

The impact of increased production as well as the stimulation of GDP is an impact expected to ensue in the construction and the operational phase. During the construction phase, it is expected to be a temporary increase in production and stimulation in GDP whilst in the operation phase, it will be sustained over a longer time period as it will span across the entire life-span of the wind facility.

During construction

According to the information provided by the project proponent, the anticipated capital expenditure (CAPEX) that will be spent during the construction period for the initiation of the Graskoppies wind facility is R2.5 billion. During the construction phase, the demand for necessary goods will also induce the production of supporting industries and their supply value chains. However, due to the specialised nature of some of the goods required, many will be sourced from outside the local economy and possibly the Province in general.

In order to enhance the benefit of **increased production** to the local community during the construction phase, where possible; there ought to be a commitment towards maximising the use of local labour as well as small local businesses that are able to provide the goods and services required during this stage. As such the project proponent aims to create small medium & micro enterprises (SMME's) for the local community through hiring supporting services such as security, transportation of employees, fencing works, general construction (i.e. gabions, culverts) and cleaning works, plant (equipment) hire as well as the supply of cabling and electrical appliances.

Although the ultimate desire is to involve the local community as much as possible, the local economic base of the region in question is not very well developed and is not diversified; therefore, it is important to note that such opportunities will be limited. This makes it also impossible to determine the magnitude of this impact on the local economy; however, it is likely to be of a short-term effect as it will only last for the duration of the construction phase (18-24 months).

Increased production & temporary stimulation of GDP-R during construction	
Environmental Parameter	GDP-R: Refers to the value of all final goods and services produced within a region during a year.
Issue/Impact/Environmental Effect/Nature	Project capital expenditure is expected to result in an increase in the production of national and local economies as selected goods and services required for the development of the wind farm will be procured from within South Africa. A multiplier effect will be seen at a national level as the injection of funds will in turn increase people's incomes thus increasing their demand for goods and services.
<i>Extent</i>	The national economy will experience an increase in production.
<i>Probability</i>	The impact will certainly occur (>75% chance of occurrence).
<i>Reversibility</i>	Impact is reversible.

<i>Irreplaceable loss of resources</i>	The impact will not result in any loss of resources	
<i>Duration</i>	The impact will last during construction (\pm 2 years), which will be extended to a short-term period.	
<i>Cumulative effect</i>	Establishment of similar projects will multiply the positive impact; therefore, cumulative impact is high.	
<i>Intensity/Magnitude</i>	Impact at a national level will be high.	
<i>Significance rating</i>	<p>Prior to mitigation measures: The anticipated impact will have a significant positive impact at the national level.</p> <p>After mitigation measures: The anticipated impact will have a significant positive impact at the national level.</p>	
	Pre-mitigation impact rating	Post mitigation impact rating
<i>Extent</i>	4	4
<i>Probability</i>	4	4
<i>Reversibility</i>	4	4
<i>Irreplaceable loss of resources</i>	1	1
<i>Duration</i>	1	1
<i>Cumulative effect</i>	4	4
<i>Intensity/Magnitude</i>	3	3
<i>Significance rating</i>	+54 (High positive)	+54 (High positive)
Mitigation measures	<ul style="list-style-type: none"> Where possible and feasible, local procurement of labour, goods, and services must be practiced to maximise the benefit to the local economy. 	

During operations

Although the figure is uncertain, once the wind facility is operational, it will generate an annual revenue for the project proponent.

The long-term upkeep and maintenance of the wind farm will incur specific operational costs during its entire life-span (20 years). Although it would be of benefit to the local community of Hantam, it is highly unlikely that a large portion of the proponents' operating expenditure (OPEX) will be spent in the local economy. This is because the current economic base of the local economy is not sufficient to meet the demands for goods and services required to maintain the facility. Having said this, the local economy will still benefit from the rates and taxes that the facility will pay the local government, security services to be hired, and other less specialised activities required to support operations (i.e. transport of workers, etc.). The national economy will benefit from the payment of income taxes.

In the event that this project as well as the other proposed developments are approved, the potential benefit to the local community may be greater as more projects will be concentrated in the area resulting in a higher positive cumulative impact. Local business people may also see an opportunity in starting businesses that supply small mechanical parts for the continual maintenance of all wind facilities located in the area, further stimulating the local economy.

Sustainable increase in production and GDP-R of the national and local economies through operation and maintenance activities		
Environmental Parameter	GDP-R: The total value of all final goods and services produced in a region within a year.	
Issue/Impact/Environmental Effect/Nature	The operating phase of the wind farm will contribute to an increase in production of the national economy.	
<i>Extent</i>	The impact will affect the entire country.	
<i>Probability</i>	The impact will certainly occur (>75% chance of occurrence).	
<i>Reversibility</i>	The impact is reversible.	
<i>Irreplaceable loss of resources</i>	The impact will not result in the loss of any resources.	
<i>Duration</i>	The impact is rated as long-term as it will last for the entire operational life of the development therefore, it is rated as long-term.	
<i>Cumulative effect</i>	In consideration of the other planned project for the area, the cumulative impact could be high.	
<i>Intensity/Magnitude</i>	The impact will alter the economy of the entire community; it will therefore, result in a medium-sized effect.	
<i>Significance rating</i>	<p>Prior to mitigation measures: The anticipated impact will have a moderate positive effect.</p> <p>After mitigation measures: No mitigation measures exist to increase the intensity of the impact.</p>	
	Pre-mitigation impact rating	Post mitigation impact rating
<i>Extent</i>	4	4
<i>Probability</i>	4	4
<i>Reversibility</i>	4	4
<i>Irreplaceable loss of resources</i>	1	1
<i>Duration</i>	3	3
<i>Cumulative effect</i>	4	4
<i>Intensity/Magnitude</i>	2	2
<i>Significance rating</i>	+40 (Medium positive)	+40 (Medium positive)
Mitigation measures	<ul style="list-style-type: none"> No mitigation measures proposed 	

5.5.2 Impact on social facilities

The proposed development is expected to attract a number of jobseekers and migrant workers in search for employment opportunities during the construction phase (up to two years). Due to the fact that Loeriesfontein is a relatively small town, an influx of people is expected to place increased demand on social and recreational infrastructure in the local economy.

Although the municipal area as a whole does not seem to have any gaps in social infrastructure provision, the continual increase in the total population of the town will exacerbate the pressure on such facilities. Such an impact can be further aggravated in instances where jobseekers are accompanied by their families. In order to avoid the deterioration of social facilities, suitable mitigation

measures ought to be put in place so as to lengthen the depreciation rate of social and recreational infrastructure.

In relation to the proposed wind facility, the impact on social facilities is expected to be short-term, however; the recurring in-migration of workers in the town as a result of similar developments in the area might increase the cumulative impact to be of a significant effect.

Increased demand for social facilities during construction		
Environmental Parameter	Increased pressure on existing social infrastructure.	
Issue/Impact/Environmental Effect/Nature	The influx of jobseekers in the area will result in an increased demand for social, recreational and economic facilities.	
<i>Extent</i>	The impact will affect the local district	
<i>Probability</i>	The impact will likely occur (Between a 50% to 75% chance of occurrence).	
<i>Reversibility</i>	The impact is partly reversible.	
<i>Irreplaceable loss of resources</i>	The impact will not result in any loss of resources.	
<i>Duration</i>	The impact will last for at least the duration of the construction period (\pm 2 years), which will be extended to a short-term period, however, it may remain for several years into the operational period, thus the impact will have a medium-term effect.	
<i>Cumulative effect</i>	The demand for social services is most likely to increase as more similar developments are approved in the area, thus the cumulative impact is high.	
<i>Intensity/Magnitude</i>	Considering that there are no imminent gaps in the provision of social infrastructure, the impact is rated as a medium-sized effect.	
<i>Significance rating</i>	<p>Prior to mitigation measures: The anticipated impact will have a negligible negative effects and will require little to no mitigation measures.</p> <p>After mitigation measures: The anticipated impact will have a negligible negative effects and will require little to no mitigation measures.</p>	
	Pre-mitigation impact rating	Post mitigation impact rating
<i>Extent</i>	2	2
<i>Probability</i>	3	3
<i>Reversibility</i>	2	2
<i>Irreplaceable loss of resources</i>	1	1
<i>Duration</i>	2	2
<i>Cumulative effect</i>	4	3
<i>Intensity/Magnitude</i>	2	2
<i>Significance rating</i>	-28 (Low negative)	-26 (Low negative)
Mitigation measures	<ul style="list-style-type: none"> Engage with the local authorities to inform them on the timeframes of the project. Where possible, assist the local municipality in ensuring that the quality of the social and economic infrastructure does not 	

deteriorate by making use of social responsibility allocations.

5.5.3 Impact on service delivery

One of the greatest challenges facing the municipality are backlogs experienced in housing provision, water supply, maintaining public areas, and upgrade of roads.

- In the year 2015, Loeriesfontein had a housing backlog of 310 houses requiring ± 21 hectares of land.
- Although all residents in the municipal area have complete access to water, Loeriesfontein has recently experienced a water crisis upon which all the wells, which provide the town with water, dried up.
- As was suggested by one of the community members, the development of the other two projects in the area has led to an increase in the amount of litter on the towns streets' as a result of the influx of people to the region in search for employment. This points to the local municipality's limited capacity to mitigate these issues and maintain the streets clean.
- As previously mentioned, the main route in the area is the R27, which is also the only tarred road connecting Nieuwoudtville and Brandvlei via Loeriesfontein. According to one of the I&AP's, since the construction of Khobab and Loeriesfontein 2 wind facilities, this tar road has been rapidly deteriorating due to increased heavy traffic as it as originally tarred for low frequency traffic.

This impact is expected to last for duration of the construction phase (18-24 months) making the duration of the impact to be short-term. In the likely event that most of the people will remain in the area in hope for employment elsewhere or in the operational phase of the project, the demand for certain services will continue to increase placing further pressure on the ability of government to adequately provide basic services to the local economy.

Added pressure on basic services	
Environmental Parameter	Basic services, economic infrastructure, and adequate housing.
Issue/Impact/Environmental Effect/Nature	The influx of jobseekers in the area will result in an increased demand for basic services, as well as social and economic infrastructure in the area. This will place pressure on the local municipality to ensure the adequate provision and monitoring of the deterioration of such services.
<i>Extent</i>	The impact will affect the local area
<i>Probability</i>	The impact will likely occur (Between a 50% to 75% chance of occurrence).
<i>Reversibility</i>	The impact is partly reversible.
<i>Irreplaceable loss of resources</i>	The impact will not result in any loss of resources.
<i>Duration</i>	The impact will last for at least the duration of the construction period (± 2 years), which will be extended to a short-term period, however, it may remain for several years into the operational period, thus the impact will have a medium-term effect.
<i>Cumulative effect</i>	The demand for basic services and infrastructure is most likely to

	increase as more similar developments appear in the area, thus the cumulative impact is high.	
<i>Intensity/Magnitude</i>	With the municipality already experiencing pressure in terms of affordable housing and like services, the impact is expected to be of medium effect.	
<i>Significance rating</i>	<p>Prior to mitigation measures: The anticipated impact will have a negligible negative effects and will require little to no mitigation measures.</p> <p>After mitigation measures: The anticipated impact will have a negligible negative effects and will require little to no mitigation measures.</p>	
	Pre-mitigation impact rating	Post mitigation impact rating
<i>Extent</i>	2	2
<i>Probability</i>	3	3
<i>Reversibility</i>	2	2
<i>Irreplaceable loss of resources</i>	1	1
<i>Duration</i>	2	2
<i>Cumulative effect</i>	4	3
<i>Intensity/Magnitude</i>	2	2
<i>Significance rating</i>	-28 (Low negative)	-26 (Low negative)
Mitigation measures	<ul style="list-style-type: none"> Engage with the local authorities to inform them on the timeframes of the project and possible risks from a service delivery perspective. Engage with the local municipality to discuss the potential impact on local road quality, social infrastructure, and demand for accommodation, as well as possible mitigation measures. 	

5.6 Impacts on financial capital

5.6.1 Impact on household income and financial resources

During construction

The average monthly income for the Hantam LM is R9 690. Of the total population, 54% of people fell below the poverty line as they earned <R3200. Since April 2015, the Hantam municipal area was estimated to have a total of 2 482 indigent households. These are households that, due to a number of socio-economic factors, are unable to afford basic services such as water, basic sanitation, basic energy, health care, housing, food and clothing (usually earning <R1500 per month).

Since all employers are legally obligated to pay their employees, the project proponent estimates that a certain percentage of the annual revenue will be utilised for construction and operation phase labour related costs. However, considering the local labour procurement figures for the construction phase and operation phase, it is reasonable to assume that the employment benefit to local community members will be limited. With that being said, households that have individuals who are amongst the ones who receive employment either during the construction and operation phase of the project will

experience an increase in **disposable income**. In addition to these, some households will receive indirect benefits through the creation of the previously mentioned SMME's through the procurement of catering, gardening, security, cleaning, and transportation services. The accompanying increase in disposal income for individuals receiving indirect benefits will be able to improve the living standards of local residents through factors such as better access to healthcare facilities (nutrition) and less restricted economic choices.

The impact of an increase in disposable income is expected to be of a short-term during the construction period whilst in the operational phase, it will be sustained over a longer period as locals will receive income throughout the lifespan of the wind farm.

Temporary increase in household income and improved standard of living during construction		
Environmental Parameter	Household income: the result of a household member engaging in economic activity; has a direct link to the standards of living.	
Issue/Impact/Environmental Effect/Nature	Currently just over half of the residents of the Hantam LM generate an income less than R3 200. Certain households are expected to experience an increase in household income as a result of the job creation as well as skills development.	
<i>Extent</i>	Will affect local district and community.	
<i>Probability</i>	The impact will certainly occur (>75% chance of occurrence).	
<i>Reversibility</i>	The impact is reversible as the income will only be earned for the duration of the construction period.	
<i>Irreplaceable loss of resources</i>	The impact will not result in the loss of any resources	
<i>Duration</i>	The impact will last during construction (\pm 2 years), which will be extended to a short-term period.	
<i>Cumulative effect</i>	With the potential development of similar renewable projects in the area, the number of jobs created will increase leading to increased household income.	
<i>Intensity/Magnitude</i>	With just over 50% of individuals in the municipality who earn less than R3 200, the impact of the increase in disposable household income will thus result in a medium-sized effect.	
<i>Significance rating</i>	<p>Prior to mitigation measures: Due to the improved living standards accompanying household income increases, the impact will result in a low positive effect.</p> <p>After mitigation measures: Utilising appropriate mitigation measures, the intensity of the impact has increased to a medium positive effect.</p>	
	Pre-mitigation impact rating	Post mitigation impact rating
<i>Extent</i>	2	2
<i>Probability</i>	4	4
<i>Reversibility</i>	1	1
<i>Irreplaceable loss of resources</i>	1	1
<i>Duration</i>	1	1
<i>Cumulative effect</i>	4	4
<i>Intensity/Magnitude</i>	2	3

<i>Significance rating</i>	+26 (Low positive)	+39 (Medium positive)
Mitigation measures	<ul style="list-style-type: none"> Recruit local labour as far as possible so as to ensure that the benefits accrue to local households within the community Employ labour-intensive methods as far as feasible in the construction phase Where possible, sub-contract to local companies 	

During operations

Sustainable increase in household income and improved standard of living during operations		
Environmental Parameter	Household income: the result of a households' member engaging in economic activity which has a direct link of the living standards of a household.	
Issue/Impact/Environmental Effect/Nature	About 54% of the people in the municipality earn less than R3 200 a month thus the operation of the wind farm is expected to result in an injection in the salary of people so as to indirectly improve their standard of living.	
<i>Extent</i>	The impact will affect the local area and district.	
<i>Probability</i>	The impact will certainly occur (>75% chance of occurrence).	
<i>Reversibility</i>	The impact is reversible.	
<i>Irreplaceable loss of resources</i>	The impact will not result in the loss of any resources.	
<i>Duration</i>	The impact will be relevant for the entire life span of the project, long-term.	
<i>Cumulative effect</i>	Based on the current size of the district and local area, the cumulative impact is expected to be medium.	
<i>Intensity/Magnitude</i>	In Loeriesfontein, employment is currently dominated by the informal sector opportunities, thus the provision of sustainable jobs could notably improve the living standards of residents. However, the number of opportunities created by the project during operations will be small; thus the magnitude will be low.	
<i>Significance rating</i>	<p>Prior to mitigation measures: The anticipated impact will have significant positive effects.</p> <p>After mitigation measures: The intensity of the impact remains the same at a significant positive effect.</p>	
	Pre-mitigation impact rating	Post mitigation impact rating
<i>Extent</i>	2	2
<i>Probability</i>	4	4
<i>Reversibility</i>	1	1
<i>Irreplaceable loss of resources</i>	1	1
<i>Duration</i>	3	3
<i>Cumulative effect</i>	2	2
<i>Intensity/Magnitude</i>	1	1
<i>Significance rating</i>	+13 (Low positive)	+13 (Low positive)

Mitigation measures	<ul style="list-style-type: none"> Ensure that local labour is procured to maximise benefit to the local households.
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5.6.2 Impact on the informal hospitality industry

There was a general consensus amongst interviewees regarding the positive economic impact of other projects under construction on the local economy. Broadly, gross profits have doubled for all businesses. Furthermore, the influx of jobseekers as well as migrant workers will have a spiral effect as it will increase the demand for accommodation. Since the establishment of similar projects in the vicinity, the informal hospitality industry has grown as a result of the construction workers needing accommodation in Loeriesfontein town. Residents have opted to availing their backyards and garages for rental purposes. Although it may have a positive outcome for the local tourism industry, I&AP's expressed concerns relating to the possible oversupply of accommodation once the construction phase is complete. However, it can also be argued that this concern may become obsolete with the development of similar proposed projects within the area.

The effect of the impact is expected to be of a short-term effect as it will only last for the duration of the construction phase (period of 18-24 months). The likely establishment of similar projects in the vicinity may result in a significantly high cumulative impact.

Establishment of informal hospitality industry due to increased demand for accommodation	
Environmental Parameter	Formation of informal hospitality industry as a result of the increased demand for accommodation.
Issue/Impact/Environmental Effect/Nature	In the event that construction workers do not reside on the construction sites, local residents have identified an opportunity in providing accommodation for the construction workers and majority of them have resorted to transforming their backyards and garages into rooms available for monthly rentals.
<i>Extent</i>	The impact will affect the local area or district.
<i>Probability</i>	The impact will certainly occur (>75% chance of occurrence).
<i>Reversibility</i>	Considering projects similar to this one, some migrant workers and jobseekers might remain in the area therefore the impact is partly reversible.
<i>Irreplaceable loss of resources</i>	The impact will not result in the loss of any resources.
<i>Duration</i>	The impact will last for at least the duration of the construction period (± 2 years), which will be extended to a short-term period, however, it may remain for several more years if similar projects are developed in the area.
<i>Cumulative effect</i>	In consideration of projects of a similar nature, the cumulative impact is rated as high.
<i>Intensity/Magnitude</i>	In consideration of the dynamics that currently characterise the existing wind farms, construction workers have a preference of residing in town as opposed to living on the construction sites resulting in increased demand for accommodation in the local town; thus, the impact is rated as high.
<i>Significance rating</i>	Prior to mitigation measures: The anticipated impact will have a

	medium negative effect and will require moderate mitigation measures. After mitigation measures: No mitigation measures exist.	
	Pre-mitigation impact rating	Post mitigation impact rating
<i>Extent</i>	2	2
<i>Probability</i>	4	4
<i>Reversibility</i>	2	2
<i>Irreplaceable loss of resources</i>	1	1
<i>Duration</i>	2	2
<i>Cumulative effect</i>	4	4
<i>Intensity/Magnitude</i>	3	3
<i>Significance rating</i>	+45 (Medium positive)	+45 (Medium positive)
Mitigation measures	<ul style="list-style-type: none"> No mitigation measures exist. 	

5.7 Impacts on political and institutional capital

5.7.1 Impact on government ability to service community

Listed amongst one of Namakwa DM's pressing needs is the minimisation of existing infrastructure backlogs. Linked to this, according to the Hantam SDF, the main goal of the LM IDP is to focus on service delivery and to deal with backlogs particularly in housing and access to water. In most instances, certain regions experience backlog problems due to cases where the influx of people (growth in population) in the region exceeds the means to efficiently provide services to the local community. Though this is a common occurrence, it is not the case with the Hantam LM as it is challenged by a lack of resources as well as a lack of capacity to deliver (Umsebe Development Planners, 2010).

Should the proposed Graskoppies wind facility receive authorisation, the wind farm will generate **revenue for the government**. This will either be in the form of tax-related revenue collected by national government (i.e. VAT, payroll, company taxes, and income taxes) and tax-and-rates related revenue collected by local government (i.e. property rates, service rates, etc.). Once government has collected taxes, it is allocated across all local municipalities to assist, support and improve the socio-economic condition of the local population.

The collection of revenue is expected to occur throughout the construction and operational phase of project, the impact is therefore expected to shift from a short-term effect during the construction phase to having a long-term effect during the operational life. The significance of the increase in the local government's ability to deliver services will intensify due to the potential cumulative impact of various proposed renewable energy projects to be developed within the LM.

Temporary increase in tax revenue for government during construction	
Environmental Parameter	Government revenue: government obtains its revenue from collecting taxes and rates from the country's residents and business
Issue/Impact/Environmental	The impact will mostly take place when there is an increase in the

Effect/Nature	amount of tax on the salaries and wages of people, as well as payment of company taxes. The increase in employment opportunities and disposable income will also have an influence on the tax base as a result of investment on the proposed project.	
<i>Extent</i>	The impact will affect the entire country.	
<i>Probability</i>	The impact will certainly occur (>75% chance of occurrence).	
<i>Reversibility</i>	The impact is completely reversible.	
<i>Irreplaceable loss of resources</i>	The impact will not result in any loss of resources.	
<i>Duration</i>	The impact will last during construction, which will be extended to a short-term period.	
<i>Cumulative effect</i>	Considering surrounding renewable energy products, the cumulative impact could potentially be high	
<i>Intensity/Magnitude</i>	At a national level, the impact (increase in government revenue) will have a medium effect	
<i>Significance rating</i>	<p>Prior to mitigation measures: The anticipated impact will result in a medium positive effect.</p> <p>After mitigation measures: No mitigations measures exist and the significance of the impact will remain unchanged.</p>	
	Pre-mitigation impact rating	Post mitigation impact rating
<i>Extent</i>	4	4
<i>Probability</i>	4	4
<i>Reversibility</i>	1	1
<i>Irreplaceable loss of resources</i>	1	1
<i>Duration</i>	1	1
<i>Cumulative effect</i>	4	4
<i>Intensity/Magnitude</i>	2	2
<i>Significance rating</i>	+30 (Medium positive)	+30 (Medium positive)
Mitigation measures	<ul style="list-style-type: none"> No mitigation measures proposed 	

Sustainable increase in tax revenue for government during operations

Environmental Parameter	Government revenue: through the operations of the project, a contribution will be made to the government revenue, which will create an opportunity to improve the provision of basic services to the population in the local area.
Issue/Impact/Environmental Effect/Nature	Operations of the proposed facility will lead to the payment of various taxes and rates, which will benefit both national and local government authorities.
<i>Extent</i>	The impact will affect the entire country.
<i>Probability</i>	The impact will certainly occur.
<i>Reversibility</i>	The impact is reversible
<i>Irreplaceable loss of resources</i>	The impact will not result in the loss of any resources.

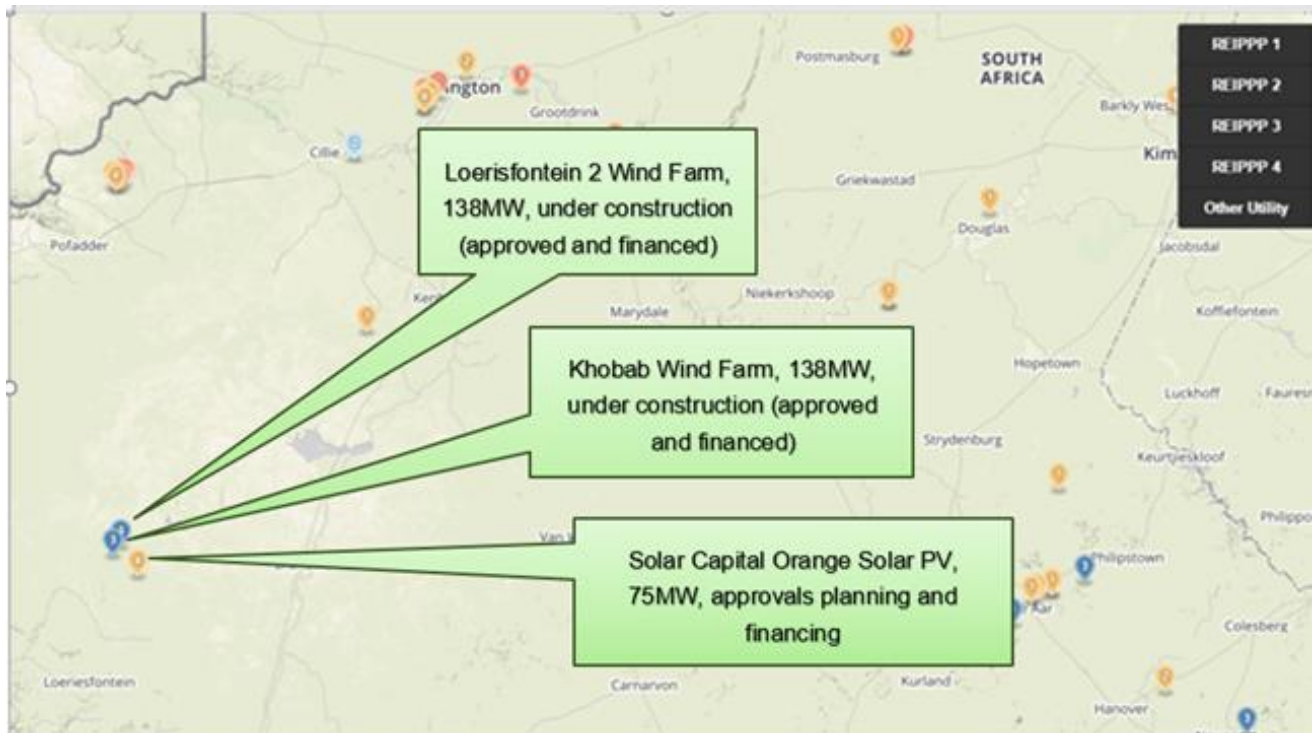
<i>Duration</i>	The impact is rated as long-term as it will last for the entire operational life of the development.	
<i>Cumulative effect</i>	Considering the projects that are to be developed in the area, the tax revenue will increase and the cumulative effect could be noticeable particularly from a local authority perspective.	
<i>Intensity/Magnitude</i>	The impact will potentially alter the living conditions of the population through government investment in social and economic infrastructure; thus, the impact is of a medium-sized intensity.	
<i>Significance rating</i>	<p>Prior to mitigation measures: The anticipated impact will have high positive effects.</p> <p>After mitigation measures: No mitigation measures exist to increase the intensity of the impact.</p>	
	Pre-mitigation impact rating	Post mitigation impact rating
<i>Extent</i>	4	4
<i>Probability</i>	4	4
<i>Reversibility</i>	1	1
<i>Irreplaceable loss of resources</i>	1	1
<i>Duration</i>	3	3
<i>Cumulative effect</i>	3	3
<i>Intensity/Magnitude</i>	2	2
<i>Significance rating</i>	+32 (High positive)	+32 (High positive)
Mitigation measures	<ul style="list-style-type: none"> No mitigation measures proposed 	

6 CUMULATIVE EFFECT ANALYSIS

6.1 Existing and planned developments in the area

In recent years, developers of various renewable energy projects have taken a notable interest in the area where the Graskoppies wind farm is proposed to be established. A likely contributing factor to this, is linked to the wind and solar energy potential of the region. Such developments, whether they are approved or are only at the proposal stage, need to be taken into consideration as they have a potential to create numerous positive or negative socio-economic impacts.

Positive impacts include the creation of employment opportunities, training and skills development, increased household income and standard of living as well as the potential for the creation of local business opportunities which have the capacity to stimulate the local economy. Negative cumulative socio-economic impacts include the possibility of altering the sense of place, an increase in social pathologies due to the influx of migrant workers and jobseekers thus exacerbating the pressure on basic services and social infrastructure. Projects near the proposed project site for the Graskoppies wind farm are depicted in Map 6-1 below, two of the projects (Loeriesfontein 2 and Khobab wind farms) are under construction whilst the third project (Solar Capital PV facility) has received authorisation and approval under the REIPPPP.



Map 6-1: Map for approved for construction renewable energy projects in the area as part of the REIPPPP

In the event that there is an addition to the currently existing projects depicted above, both positive and negative socio-economic impacts will be aggravated. As can be seen in **Ошибка! Источник ссылки не найден.Ошибка! Источник ссылки не найден.Ошибка! Источник ссылки не найден.** Table 6-1 below, five out of the eleven projects proposed to be built near the Graskoppies wind farm have

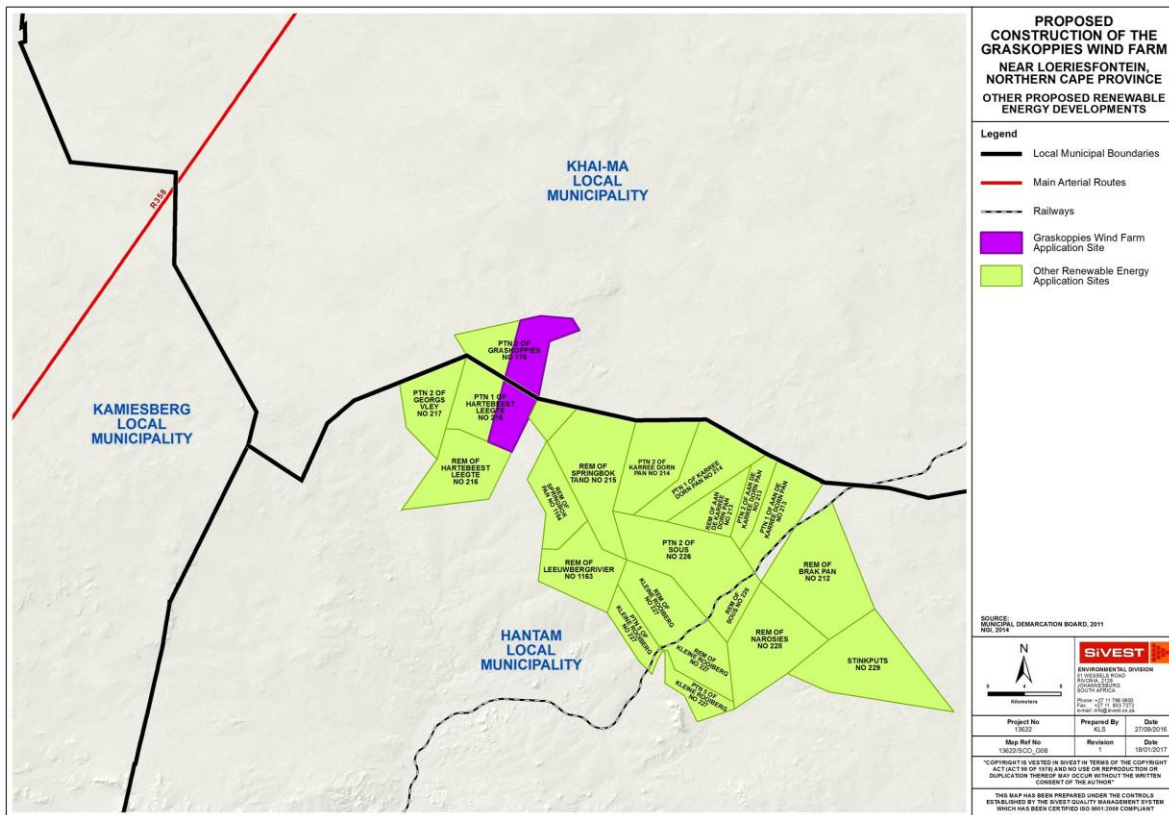
received authorisation. This means that the likelihood of their construction is high implying a significant cumulative impact to follow.

Table 6-1: Renewable energy projects in the area

Development	Current status of development	Proponent	Capacity	Farm details
Dwarsrug Wind Farm	Environmental Authorisation Issued	Mainstream Renewable Power	140MW	Rem of Farm Brak Pan 212 & Stinkputs No. 229
Hartebeest Leegte Wind farm	Environmental Impact Assessment (EIA) underway	Mainstream Renewable Power	235MW	Rem of Farm Hartebeest Leegte No.216
Loeriesfontein PV3 Solar Energy Facility	Environmental Authorisation Issued	Mainstream Renewable Power	100MW	Pt 2 of Farm Aan de Karree Doorn Pan No. 213
Hantam PV Solar Energy Facility	Environmental Authorisation Issued	Solar Capital (Pty) Ltd.	75MW	Rem of Narosies No.228
Ithemba Wind Farm	Environmental Impact Assessment (EIA) underway	Mainstream Renewable Power	235MW	<ul style="list-style-type: none"> Pt 2 of Graskoppies Farm No.176 P1 of Hartebeest Leegte Farm No.216
PV Solar Power Plant	Environmental Authorisation Issued	BioTherm Energy	70MW	Pt 5 of Farm Kleine Rooiberg No. 227
Kokerboom 1 Wind Farm	Environmental Impact Assessment (EIA) underway	Business Venture Investment No. 1788 (Pty) Ltd (BVI)	240MW	<ul style="list-style-type: none"> Rem of Farm Leerberggrivier No. 1163 Rem of Farm Kleine Rooiberg No. 227
Kokerboom 2 Wind Farm	Environmental Impact Assessment (EIA) underway	Business Venture Investment No. 1788 (Pty) Ltd (BVI)	240MW	<ul style="list-style-type: none"> Rem of Farm Springbok Pan No. 1164 Rem of Farm Springbok Tand No. 215
Kokerboom 3 Wind Farm	Environmental Impact Assessment (EIA) underway	Business Venture Investment No. 1788 (Pty) Ltd (BVI)	240MW	<ul style="list-style-type: none"> Rem of Farm Ann De Karree Doorn Pan No.213; Portion 1 of the Farm Karree Doorn Pan No.214 Portion 2 of Farm Karree Doorn Pan No.214
Wind Farm	Environmental Authorisation Issued, however project is no longer active	Mainstream Renewable Power	50MW	<ul style="list-style-type: none"> Portion 1 of the Farm Aan de Karree Doorn Pan 213

Xhai Boom Wind Farm	Environmental Impact Assessment (EIA) underway	Mainstream Renewable Power	235MW	<ul style="list-style-type: none"> Portion 2 of Georges Vley No.217
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The above-mentioned projects are illustrated in Map 6-2 below, which also assist in identifying their locations in relation to the proposed Graskoppies wind farm. The Khobab and Loeriesfontein 2 wind farms have been under construction since the year 2015 whilst the rest of the projects are yet to begin construction. Due to the fact that the timelines of the projects that have already received environmental authorisation and those that are currently under investigation are uncertain, two possible extreme scenarios could be foreseen assuming that all of these projects are implemented at a certain point in time in the future. The first scenario is premised on the assumption that all the projects will be developed at the same time, whilst the second extreme scenario would be that all projects are developed one after another. From the quantitative impacts perspective, both scenarios will lead to the same impact on the GDP-R, employment, and household income; however, they may have a different effect on the standard of living and the social pathologies of the local community due to the level of concentration of the potential impacts that could be created at any given point in time. The difference will lie in whether the impacts become concentrated (generated over a short period of time), or they all take place at the same time. Seeing that it is impossible to conclude with certainty, which of these options would be realised, for the purposes of this study, it is assumed that project are built at the same time.



Map 6-2: Location of other renewable energy projects (proposed and approved) in the area

6.2 Literature review sources

The following documents were reviewed in relation to the above-mentioned projects to identify the potential cumulative effect of the proposed development considering the existing and planned projects in the area.

Table 6-2: Reviewed literature concerning the selected developments in the area

Development	Reviewed report	Author	Date of release
Dwarsrug Wind Farm	Socio-economic Impact Study	Urban-Econ Development Economists	May 2015
Khobab Wind Farm	Socio-economic Impact Assessment Report	Master-Q Research	2 May 2012
Loeriesfontein 2 Wind Farm	Socio-economic Impact Assessment Report	Master-Q Research	2 May 2012
Loeriesfontein PV3 Solar Energy Facility	Socio-economic Impact Assessment Report	Master-Q Research	2 May 2012
Hartebeest Leegte Wind Farm	Socio-economic Impact Assessment Scoping Report	Urban-Econ Development Economists	November 2016
Hantam PV Solar Energy Facility	Not Available	N/A	N/A
Ithemba Wind Farm	Socio-economic Impact Assessment Scoping Report	Urban-Econ Development Economists	November 2016
PV Solar Power Plant	Draft Environmental Management Programme	Digby Wells	15 September 2015
Kokerboom 1 Wind Farm	Final Scoping Report	Aurecon	December 2016
Kokerboom 2 Wind Farm	Final Scoping Report	Aurecon	December 2016
Kokerboom 3 Wind Farm	Final Scoping Report	Aurecon	December 2016
Wind Farm	Socio-economic Impact Assessment Report	Master-Q Research	2 May 2012
Xha! Boom wind farm	Socio-economic Impact Assessment Scoping Report	Urban-Econ Development Economists	November 2016

6.3 Identification of cumulative effects

The following table summarises the key socio-economic impacts that were identified and analysed by other specialists for the above-mentioned projects. The table indicates the rating of the identified socio-economic impacts as proposed by the other specialists in their respective studies, and based on the combination of these ratings indicates the importance of the socio-economic impact from a cumulative effect perspective. Only cumulative effects that are expected to reach high importance level are included in further analysis.

Table 6-3: Reviewed literature concerning similar developments and impact rating

Capital	Environmental parameter	Description/impact	Rating by specialist	Identified importance
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Capital	Environmental parameter	Description/impact	Rating by specialist	Identified importance
Natural capital	Agricultural activities in zone of influence	Dwarsrug wind Farm: Impact on agricultural activities on the directly affected farms due to movement of vehicles and workers, and established infrastructure.	Low negative	Low-medium negative
		Kokerboom 1,2 & 3 wind farms: Transforming the land to industrial use will result in the loss of agricultural land.	Low negative	
	Access to resources for sustainable livelihood	Loeriesfontein PV3 Solar Energy Facility, Wind farm, Khobab wind farm, Loeriesfontein 2 wind farm: Site access and clearance of land can result in long term loss of land, resulting in a change in access to resources to sustain livelihoods.	Low negative	
Human capital	Temporary employment creation	Dwarsrug wind Farm: The establishment of the wind farm will create employment opportunities from direct, indirect and induced impacts.	Low positive	Medium-high positive
		Khobab & Loeriesfontein 2 wind farms Unemployed residents will benefit from being trained and receiving employment		
		Loerisfontein PV3 Solar Energy Facility and Wind Farm: It is estimated that the development will create a few temporary jobs		
		Hartebeest Leegte, Xha! Boom, Ithemba, Kokerboom 1,2 & 3 wind farms During the establishment of a wind farm, large numbers of workers are required for the duration of the construction phase.	Medium Positive	
Social capital	Skills development	Dwarsrug wind Farm: Long terms skills transfer & skills development will take place as a result of the establishment of the project.	Medium positive	Medium-high positive
		Hartebeest Leegte, Xha! Boom & Ithemba wind farms: Skills development can be expected to be enhanced as those who will receive employment will either be improving an existing skill or acquiring a new skill.	High positive	
		Khobab & Loeriesfontein 2 wind farms: The developer is most likely to include foreign experts to encourage knowledge transfer.	Low positive	
		Kokerboom 1,2 & 3 wind farms: There are many unemployed individuals who will benefit from being trained in a specific skill and employed.	Medium positive	
	Investment in local community	Dwarsrug wind farm: Project owners are required to spend a portion of their turnover on the upliftment of the community where the project is located.	Medium Positive	High Positive
		Hartebeest Leegte, Xha! Boom & Ithemba wind farms: Part of the IPPPP; project owners are required to allocate a percentage of the projects' revenue towards community development.	High Positive	
	Demographic	Hartebeest Leegte, Xha! Boom , Ithemba & Dwarsrug wind farms:	Medium negative	Medium negative

Capital	Environmental parameter	Description/impact	Rating by specialist	Identified importance	
	changes	An influx in migrant workers and increase in jobseekers is expected to ensue.			
		Koekerboom 1,2 & 3 Wind farms: The establishment of these wind farms present attractive job opportunities.	Low negative		
	Social pathologies	Dwarsrug wind farm: Increase in foot traffic results in an increase in social ills such as poor health, substance abuse, prostitution etc.	Medium negative		Medium-high negative
		Hartebeest Leegte, Xha! Boom, Ithemba wind farms: The increase in the number of construction workers is expected to cause a further increase in social pathologies.	High negative		
Cultural & Spiritual capital	Socio-cultural: Health and Safety	Khobab & Loeriesfontein 2 wind farm Construction workers employed by the developer increase the average no. of men in the vicinity thus increasing the incidence of communicable diseases.	High negative	High negative	
		Koekerboom 1,2 & 3 Wind farms: Impact of heavy vehicles including damage to roads, safety and health.	Low negative		
Physical capital	Sustainable increase in production & Temporary stimulation of GDP-R	Dwarsrug, Hartebeest Leegte, Xha!Boom & Ithemba wind farms: The initial capital injection will set of a range of value-adding activities resulting in the stimulation of GDP-R and long term production.	High positive	High positive	
	Added pressure on infrastructure	Hartebeest Leegte, Xha!Boom, Ithemba & Dwarsrug wind farms: An increase in the number of people in Loeriesfontein, could create additional pressure on the local municipality and aggravate service provision related challenges.	Medium negative	Medium negative	
Financial capital	Establishment of informal hospitality industry	Hartebeest Leegte, Xha!Boom & Ithemba wind farms: Formation of informal hospitality industry as a result of the increased demand for accommodation.	Medium positive	Medium positive	
	Increased household income & standard of living	Dwarsrug wind farm: New jobs that will be created will result in increased household income for benefitting individuals.	High positive	High positive	
		Hartebeest Leegte, Xha!Boom & Ithemba wind farms: Increase in household income expected to accrue due to job creation as well as skills development.	Low positive		
Political & Institutional capital	Increase in government revenue	Dwarsrug wind farm: Government obtains its revenue by collecting taxes and rates from the country's citizen's and business.	Low positive	Medium positive	
		Hartebeest Leegte, Xha!Boom & Ithemba wind farms: Government obtains its revenue from collecting taxes and rates from the country's residents and business.	Medium positive		
		Wind Farm & Loeriesfontein PV3 Solar Energy Facility:	Low positive		

Capital	Environmental parameter	Description/impact	Rating by specialist	Identified importance
		Increased central and local tax income.		

The Department of Environmental Affairs and Tourism's guidelines (DEAT, 2004) suggest that the identification of cumulative effects should focus on important and meaningful issues as "it is not practical to analyse the cumulative effects of an action on every environmental receptor". Furthermore, it is advised that the analysis should focus on "what is needed to ensure long-term productivity or sustainability of the resource" (DEAT, 2004). In light of the above, and considering the range of socio-economic impacts predicted to ensue as a result of other planned developments in the area, only one negative cumulative effect was identified, which is expected to be of major importance and concern in the context of this project. This cumulative effect is the envisaged changes to health and safety (specifically infectious diseases such as STI's including HIV/AIDS) of the local communities, and specifically the residents of the town of Loeriesfontein. The assessment of this cumulative effect is provided further in the section.

6.4 Ranking of cumulative effects

The following table provides the rating of negative cumulative effects identified to be associated with the proposed project and considering the impacts that are expected to be exerted by other proposed developments in the area.

Negative health-related cumulative impacts	
Environmental Parameter	Negative health-related cumulative effects are expected as a result of multiple developments in the area in addition to the project in question
Issue/Impact/Environmental Effect/Nature	The establishment of two renewable energy projects in the area has had a negative effect on the health of the local community, as was revealed during the interviews. This was attributed to the influx of construction workers and in-migration of jobseekers. Considering the number of other projects that could be developed in the area, the situation could be exacerbated both in terms of the magnitude, as well as the duration. Health-related impacts that are envisaged include drug abuse, alcohol abuse, spread of communicable diseases, and unwanted pregnancies.
<i>Extent</i>	The potential negative socio-economic cumulative effect will mainly be local community specific, but could potentially extend beyond the local area in the event that people infected by any of the communicable diseases and viruses relocate to an area outside of the local area before getting treatment.
<i>Probability</i>	The impacts will likely occur (Between a 50% to 75% chance of occurrence)
<i>Reversibility</i>	The impact is partly reversible.
<i>Irreplaceable loss of resources</i>	The impacts will not result in any loss of resources.

<i>Duration</i>	The impacts will have a medium-term effect.	
<i>Cumulative effect</i>	The impacts will result in significant cumulative impacts.	
<i>Intensity/magnitude</i>	The impacts will possibly alter the quality, use and integrity of the system but the system will continue to function in a moderately modified way and will still maintain the general integrity.	
<i>Significance rating</i>	The impact will be negative low during both before and after mitigations.	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	2
Probability	3	3
Reversibility	2	2
Irreplaceable loss	1	1
Duration	2	2
Cumulative effect	4	4
Intensity/magnitude	3	2
Significance rating	-42 (Medium Negative)	-28 (Low Negative)
Mitigation measures	<ul style="list-style-type: none"> • The project developer should appoint a service provider or local NGO to develop, implement and manage an STI & HIV/AIDS prevention programme and other educational campaigns. The service provider or NGO should specialise in these fields and should have sufficient experience with similar work. • The prevention programme and educational campaigns should extend to the local community and should pay special attention to vulnerable groups such as women and youth. • The project developer should engage with other companies planning to establish renewable energy facilities in the area to optimise their efforts in educating the local community and implementing preventative programmes. 	

7 CONCLUSION

Mainstream Renewable Power South Africa (Pty) Ltd proposes the development of Graskoppies wind farm, with the capacity to generate 235 MW, near Loeriesfontein in the Namakwa DM located in the Northern Cape Province.

Relevant national, provincial, and local government policies reveal that the development of RE technologies is strongly supported by government. It is seen as the means to diversify the energy mix in the country, achieve climate change commitments, and stimulate economic development in the country while creating new employment opportunities. Indeed, the assessment of the proposed project revealed that stimulation of the economy, job creation, increased household income, and growing government revenue are among the positive impacts that can ensue from the proposed project during both construction and operational phase. The local municipality is expected to benefit specifically from the proposed development due to its small economic base and a large unemployment rate. However, the project is also expected to result in a number of negative socio-economic impacts, most of which will be applicable to the construction phase only, but could notably worsen the health of the local communities, reduce access to social services and economic infrastructure locally, and increase the incidence of social ills if not adequately mitigated. The ratings of both positive and negative impacts are provided below.

Table 7-1 Summary of construction and operation phase impacts

Impact	Significance rating with no mitigation	Post mitigation significance rating
Construction phase		
Temporary employment creation	Medium positive (36)	High positive (52)
Skills development and training	High positive (51)	High Positive (54)
Impact on health	Medium negative (42)	Medium negative (39)
Change in demographics due to migration	Medium negative (32)	Medium negative (30)
Increase in social pathologies	Medium negative (48)	Medium negative (30)
Investment in local community	High positive (45)	High positive (45)
Impact on personal safety and stock theft	Low negative (26)	Low negative (20)
Change in sense of place	Low negative (26)	Low negative (24)
Temporary increase in production and temporary stimulation of GDP-R	High positive (54)	High positive (54)
Demand for social facilities	Low negative (28)	Low negative (26)
Added pressure on basic services	Low negative (28)	Low negative (26)
Temporary increase in household income	Low positive (26)	Medium positive (39)
Establishment of informal hospitality industry	Medium positive (45)	Medium positive (45)
Temporary increase in government revenue	Medium positive (30)	Medium positive (30)
Operation phase		
Sustainable employment creation	Low positive (28)	Low positive (28)
Skills development and training	Low positive (18)	Low positive (19)
Sustainable increase in production and GDP	Medium positive (40)	Medium positive (40)
Sustainable increase in household income	Low positive (13)	Low positive (13)
Increase in government revenue	Medium positive (32)	Medium positive (32)

Overall, considering the current knowledge of the socio-economic environment where the proposed project is to be developed and the envisaged socio-economic impacts that could be exerted by the facility during its construction and operation, it can be reasonably concluded that the project should be approved for the development. However, considering that a number of other similar facilities has already been proposed for the establishment in the same local municipality, mitigation of the negative impacts of the project will need to be a prerequisite for its approval. This specifically refers to the mitigations measures proposed to address the potential negative impacts on health, social services, economic infrastructure and crime.

ANNEXURE A: IMPACT RATING CRITERIA AND METHODOLOGY

The rating system will be applied to the potential impact on the receiving environment and includes an objective evaluation of the mitigation of the impact. Impacts will be consolidated into one rating. In assessing the significance of each issue, the following criteria is used:

NATURE		
Include a brief description of the impact of environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted upon by a particular action or activity.		
GEOGRAPHICAL EXTENT		
This is defined as the area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales and as such bracketing ranges are often required. This is often useful during the detailed assessment of a project in terms of further defining the determined.		
1	Site	The impact will only affect the site
2	Local/district	Will affect the local area or district
3	Province/region	Will affect the entire province or region
4	International and National	Will affect the entire country
PROBABILITY		
This describes the chance of occurrence of an impact		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence).
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).
REVERSIBILITY		
This describes the degree to which an impact on an environmental parameter can be successfully reversed upon completion of the proposed activity.		
1	Completely reversible	The impact is reversible with implementation of minor mitigation measures
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
4	Irreversible	The impact is irreversible and no mitigation measures exist.
IRREPLACEABLE LOSS OF RESOURCES		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resource.	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.

3	Significant loss of resources	The impact will result in significant loss of resources.
4	Complete loss of resources	The impact is result in a complete loss of all resources.
DURATION		
This describes the duration of the impacts on the environmental parameter. Duration indicates the lifetime of the impact as a result of the proposed activity		
1	Short-term	The impact and its effects will either disappear with mitigation or will be mitigated through natural process in a span shorter than the construction phase (0 – 1 years), or the impact and its effects will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium-term	The impact and its effects will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long-term	The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10 – 50 years).
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered transient (Indefinite).
CUMULATIVE EFFECT		
This describes the cumulative effect of the impacts on the environmental parameter. A cumulative effect/impact is an effect which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other similar or diverse activities as a result of the project activity in question.		
1	Negligible Cumulative Impact	The impact would result in negligible to no cumulative effects
2	Low Cumulative Impact	The impact would result in insignificant cumulative effects
3	Medium Cumulative impact	The impact would result in minor cumulative effects
4	High Cumulative Impact	The impact would result in significant cumulative effects
INTENSITY / MAGNITUDE		
Describes the severity of an impact		
1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/ component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).

3	High	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	Very high	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired (system collapse). Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.

SIGNIFICANCE

Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. This describes the significance of the impact on the environmental parameter. The calculation of the significance of an impact uses the following formula:

(Extent + probability + reversibility + irreplaceability + duration + cumulative effect) x magnitude/intensity.

The summation of the different criteria will produce a non-weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.

Points	Impact Significance Rating	Description
6 to 28	Negative Low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
6 to 28	Positive Low impact	The anticipated impact will have minor positive effects.
29 to 50	Negative Medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
29 to 50	Positive Medium impact	The anticipated impact will have moderate positive effects.
51 to 73	Negative High impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
51 to 73	Positive High impact	The anticipated impact will have significant positive effects.
74 to 96	Negative Very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
74 to 96	Positive Very high impact	The anticipated impact will have highly significant positive effects.

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16 October 2017

To whom it may concern

RE: SOCIO-ECONOMIC SPECIALIST'S LETTER IN RESPONSE TO PROPOSED CHANGES TO THE GRASKOPPIES WIND FARM

1. Introduction

This letter is written in response to the proposed changes made by the project proponent, Mainstream Renewable Power (Pty) Ltd, South Africa. The proposed changes are specific to the 235MW Graskoppies Wind Farm to be developed near Loeriesfontein in the Northern Cape Province.

The following table outlines the key changes that are proposed to be made to the scope of the project and that were considered in assessing the implications on the socio-economic environment.

Table 1: Proposed changes to the project scope

Aspect	Original scope	Revised scope
No. of turbines for final layout	70	47
Turbine range	2-5 MW	4-8 MW
Export capacity	235 MW	235 MW
Material for turbine towers	Steel	Steel and Concrete
Buildable area	----	Reduced from original

2. Comparative Assessment

Considering the proposed changes by the project proponent, there is a possibility that the significance of positive and negative impacts identified during the Environmental Impact Assessment (EIA) phase may be affected and may result in the assessment of impacts different to that presented in the original socio-economic impact assessment study dated July 2017. Since the extent of the changes cannot be easily predicted, it is essential to undergo a comparative analysis exercise which takes into consideration the original significance rating per impact and the possible accompanying changes. This is done for both the construction and operation phase impacts in the sections below.

2.2.1 Assessment of changes of impacts during construction phase

The following table presents the list of socio-economic impacts that were identified to take place during the construction phase originally, and the ratings thereof given in the original assessment and considering the expected changes to the scope of the project (i.e. reviewed rating).

Table 2: Assessment of changes of socio-economic impacts during construction

Impact	Status	Original rating	Expected changes versus original rating	Reviewed rating
Temporary employment creation	Positive	Medium positive (39)	Minor change- slight reduction	Medium positive (36)
Skills development and training	Positive	High positive (51)	Minor change - slight reduction	Medium positive (48)
Impact on health	Negative	Medium negative (42)	No change	Medium negative (42)
Change in demographics due to migration	Negative	Medium negative (32)	No change	Medium negative (32)
Increase in social pathologies	Negative	Medium negative (48)	No change	Medium negative (48)
Investment in local community	Positive	High positive (45)	No change	High positive (45)
Impact on personal safety and stock theft	Negative	Low negative (26)	No change	Low negative (26)
Change in sense of place	Negative	Low negative (26)	Minor change - improvement	Low negative (24)
Temporary increase in production and temporary stimulation of GDP	Positive	High positive (54)	Minor change – some increase	High positive (54)
Demand for social facilities	Negative	Low negative (28)	No change	Low negative (28)
Added pressure on basic services	Negative	Low negative (28)	No change	Low negative (28)
Temporary increase in household income	Positive	Low positive (26)	No change	Low positive (26)
Establishment of informal hospitality industry	Positive	Medium positive (45)	No change	Medium positive (45)
Temporary increase in government revenue	Positive	Medium positive (30)	No change	Medium positive (30)

An assessment of the effects of the proposed changes in the final layout during the construction phase has resulted in the following changes to identified socio-economic impacts:

- Temporary employment creation:** The proposed change of the **reduction in the total number of turbines** from the original 70 to 47 will most likely reduce the number of person-years required to complete the construction of the wind farm and will also result in the lower number of employment opportunities made available on-site and off-site. It should be noted, however, that the reduction in the number of jobs available during construction will not be proportional to the reduction in the number of turbines included in the project. The use of concrete slabs and steel materials for towers (versus steel owners only) may off-set some of the direct employment losses, which could mean that there will be a greater number of indirect jobs created than originally envisaged. The lower number of direct employment opportunities created on-site, though, will mean a lower employment of labour from the local communities. As it stands, the original layout of 70 turbines was envisioned to avail 29% or 123 Full Time Equivalent jobs to local labour, which is likely to decrease with the change in the scope of the project. Considering that this is often semi-skilled labour, the reduction in the

number of turbines means that less locals will receive employment opportunities. However, since the actual duration of the construction phase has not changed, the overall significance rating will remain the same with a slight reduction in the cumulative impact.

- **Skills development training:** With the expectation that a lower number of people will receive on-site employment during the construction phase, it is sensible to deduce that less people will receive on-the-job training than originally envisaged. The outcome of this is a reduced cumulative impact, however, the impact significance rating will remain the same.
- **Change in sense of place:** The reduction in the number of turbines coupled with the increase in the turbine range means that less turbines will be concentrated in the immediate project site. The resulting implication of this change is a slight improvement in the change in sense of place, which is a positive change compared to the original project scope; however, it will not affect the rating of the impact and it will remain of low significance.
- **Temporary increase in production and temporary stimulation of GDP:** The reduction in the total number of turbines for the final layout of the wind farm potentially means that the demand for goods (which induce the production of supporting industries) is expected to decrease. This is because less equipment will be needed to assemble the wind turbines. However, a significant portion of investment planned to be spent on turbines would involve imports of key components that cannot be manufactured in south Africa, which means that the reduction in the number of turbines will not necessarily result in the proportional reduction of local spend during construction. Moreover, the effect could actually be positive since the revised project plans involve the use of both steel and concrete for the turbine towers, which could stimulate the demand for concrete and offset the potential reduced demand for other goods and services associated with the smaller number of turbines to be included in the project. The increased demand for concrete will also possibly increase production in province. The overall impact significance rating will however, remain the same.

2.2.2 Assessment of changes of impacts during operation phase

The following table presents the list of socio-economic impacts that were identified to take place during the operation phase originally, and the expected changes to the ratings thereof given the envisaged changes to the project scope compared to the original one.

Table 3: Assessment of changes of socio-economic impacts during operations

Impact	Status	Original rating	Expected changes	Reviewed rating
Sustainable employment creation	Positive	Low positive (28)	No change	Low positive (13)
Skills development and training	Positive	Low positive (18)	No change	Low positive (16)
Sustainable increase in production and GDP	Positive	Medium positive (40)	No change	Medium positive (40)
Sustainable increase in household income	Positive	Low positive (13)	No change	Low positive (13)
Increase in government revenue	Positive	Medium positive (32)	No change	Medium positive (32)

As can be seen from the above, the proposed changes will not result in any change in the significance ratings of socio-economics impacts to ensue during operations. This is premised on the fact that the overall export capacity of the wind

farm will remain the same (235 MW), which means that the operational activities initially planned during the EIA phase will remain the same, i.e. number of employees, accompanying skills required, and operating expenditure.

2.3 Mitigation measures

In view of the envisioned changes to the final layout of the wind farm, this section assesses the initial mitigation measures and their relevance. Where necessary, additional measures are included to further mitigate the impact. It should be noted that this exercise will not be applied to the impacts to ensure during the operation phase as none of the impacts will be affected by the proposed changes.

Table 4: Proposed changes and additions to mitigations measures

Construction phase			
Impact	Original mitigation measures	Applicable	Additional mitigation measures
Temporary employment creation	<ul style="list-style-type: none"> • Draft legal and binding enforcements stipulating that unskilled positions be allocated to local labourers • Subcontract to local construction companies • Consult with local authorities to manage job expectations and ensure that all eligible workers are informed of the opportunities 	Yes	<ul style="list-style-type: none"> • The project proponent should provide learnerships to locals apart from the on-the-job training for employed individuals. This will address the issues of the reduced employment and skills development opportunities by increasing the chances of local labour to receive employment when a similar development is established in the region.
Skills development training	<ul style="list-style-type: none"> • Contracts ensuring that on-the-job training is included and enforced as a condition for the development of this project • To improve the chances of skills development, contractors are encouraged to provide learnerships and encourage further knowledge sharing 	Yes	<ul style="list-style-type: none"> • It is advisable that investment into skills development of the local community occurs prior the start of project's operations. As such it is recommended that training provided by the project proponent should not only be limited to the people receiving formal employment, but also those who desire to receive such skills. This will ensure that the local labour has a competitive advantage over job-seekers from outside areas.
Change in sense of place	<ul style="list-style-type: none"> • Adhere to the mitigation measures proposed by other environmental 	Yes	<ul style="list-style-type: none"> • None

Construction phase			
Impact	Original mitigation measures	Applicable	Additional mitigation measures
	specialists (noise, visual, etc.) <ul style="list-style-type: none"> Ensure the mitigation measure proposed to limit the influx of people and the prolonged negative effects of the migrants staying in the community after the construction are implemented 		
Temporary increase in production and temporary stimulation of GDP	<ul style="list-style-type: none"> Where feasible, local procurement of labour, goods, and services must be practised to maximise benefit to the local economy 	Yes	<ul style="list-style-type: none"> None

3. Final Impact Statement

3.1 Key Findings

Following a careful assessment of the impact of the proposed changes to the final layout and scope of the wind farm, it can be inferred that no changes to the significance ratings of socio-economic impacts are expected during both construction and operation phases. Some changes to the socio-economic impacts identified to ensue during construction may take place, which include the temporary employment creation, skills development and training, change in sense of place as well as the impact on production and GDP. However, the expected changes to the assessment categories for these impacts will be insignificant and will not affect the overall rating of these impacts. Mitigation measures suggested in the initial report are still relevant and as such, none will be withdrawn. Additional mitigation measures to the affected impacts are included in the mitigation measure table above.

3.2 Areas to be avoided

During the interviews with the directly and indirectly affected farm owners, concerns were raised regarding the need to avoid the destruction of the veld area especially during the project site demarcation and construction activities. The sentiment attached to the veld by most of the farm owners is because the veld serves as a source of food for the sheep. Besides this concern, there are no other significantly important areas that will need to be avoided. It should also be noted that the reduced number of wind turbines to be included in the project is also likely to be more acceptable by the affected parties due to the lower chances and smaller areas of veld that may be impacted by construction activities.

3.3 Summary of positive and negative impacts and associated risks

The introduction of the Renewable Energy related development is strongly supported by national, regional, and local government spheres. This is because such development is often seen to diversify the energy mix in the country, achieve climate change commitments, and stimulate economic development in the country while creating new employment opportunities. Indeed, the assessment of the proposed project revealed that stimulation of the economy, job creation, increased household income, and growing government revenue are among the positive impacts that can

ensue from the proposed project during both construction and operational phases, and this will still be the case considering the revised scope of the project. Although the number of turbines to be built will be reduced, the local municipality is still expected to benefit from the proposed development due to its small economic base and a large unemployment rate. However, several negative socio-economic impacts that have been identified in the original assessment will remain and will still need to be mitigated. Most of these impacts are applicable to the construction phase, but could have long-term negative effects by notably worsening the health of the local communities, reducing access to social services and economic infrastructure locally, and increasing the incidence of social ills if not adequately mitigated.

Overall, considering the current knowledge of the socio-economic environment where the proposed project is to be developed and the envisaged socio-economic impacts that could be exerted by the facility during its construction and operation, it can be reasonably concluded that the project, in its revised scope, should still be approved for the development. However, considering that several other similar facilities have already been proposed for the establishment in the same local municipality, commitment to mitigation of the negative impacts of the project will need to be a prerequisite for its approval.

Yours sincerely,



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