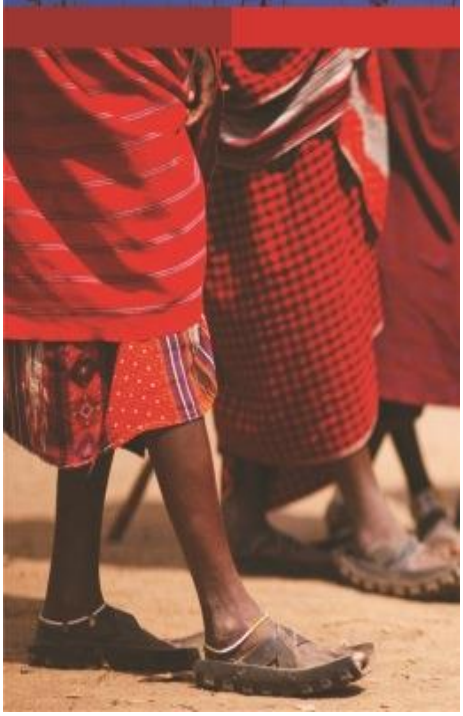

DIGBY WELLS
ENVIRONMENTAL

Namane Generation Independent Power Plant, near Lephalale, Limpopo

Draft Scoping Report

Project Number:

NAM3428

Prepared for:

Namane Generation (Pty) Ltd

November 2015

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This document has been prepared by Digby Wells Environmental.

Report Type:	**Draft Scoping Report**
Project Name:	**Namane Generation Independent Power Plant, near Lephalale, Limpopo**
Project Code:	**NAM3428**

Name	Responsibility	Signature	Date
Xanthe Taylor	Project Administrator		November 2015
Barbara Wessels	1st Reviewer		November 2015
Lucy Koeslag	2nd Reviewer		November 2015

EXECUTIVE SUMMARY

Background Information

Namane Generation (Pty) Ltd (Namane) is proposing the construction of an Independent Power Producer (IPP) power plant on the farm Duikerpan 249LQ in the Waterberg District of the Limpopo Province (the Project). The property is located approximately 60 km west of Lephalale. This power plant will be in line with the South African Department of Energy (DOE) 2 500 MW Coal Baseload IPP Procurement Programme. The Temo Coal Mine, proposed by Temo Coal Mining (Pty) Ltd (Temo), adjacent to the proposed Project has been identified to have the appropriate grade coal (lower-bench-coal) to be used in fuelling the 660 MW power plant (600 MW net power injection into the grid).

Namane is currently undergoing the necessary processes to obtain Environmental Authorisation in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEMWA) for the power plant and associated infrastructure (including the transmission line route(s)). This draft Scoping Report was prepared in support of the integrated NEMA application and will be submitted for public review and to the competent authority, the Department of Environmental Affairs (DEA). This Report focuses on the infrastructure and activities associated with the construction and operation of the power plant.

The proposed Project will combust low-grade coal sourced from the lower benches (bench 5 to bench 10) of the Temo Coal Mined, for the generation of electricity. Electricity generated will be supplied into the National Grid for offtake as part of the National Baseload IPP Procurement Programme or alternately to any other consumer.

The objective of the Scoping Phase is to investigate the potential impacts of the Project activities on the receiving environment, based on a desk-top level survey. The potential impacts have been used to assess potential alternatives in terms of the placement of the power plant, power generation, water resources, etc.

Farm Name:	Duikerpan 249LQ
Application Area (Ha):	320 ha
Magisterial District:	Waterberg District Municipality
Distance and direction from nearest town:	10.4 km north of Steenbokpan 60 km west of Lephalale
21 digit Surveyor General Code	T0LQ00000000024900000

Regulatory Process

An integrated Environmental Authorisation application was submitted to the DEA in terms of the requirements of NEMA and NEMWA for the activities associated with the power plant, transmission line(s) and other related infrastructure.

Other applications for various environmental approvals which will be applied for prior to undertaking the relevant activities for the Project are listed below:

- Water Use Licence in terms of the National Water Act, 1998 (Act No. 36 of 1998) approved by the Department of Water and Sanitation;
- Atmospheric Emissions Licence (AEL) in terms of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEMAQA) approved by the Limpopo Department of Economic Development, Environment and Tourism (LEDET); and
- Approval in terms of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) from the South African Heritage Resources Agency (SAHRA).

Other relevant legislation, regulations and standards will also be taken into consideration during the application process.

Project Activities/Components

The following aspects of the Project will be assessed as part of the EIA phase of the Project:

- Site clearing and earthworks including the laydown and storage areas;
- Construction and operation of the ash dump;
- Infrastructure development such as administrative buildings, workshop, warehouse, support buildings, storage facilities, stores and foundations;
- Construction of a campsite and accommodation facilities (construction phase only), medical care and amenities, potable water, sanitary and sewer utilities, sewage and waste water treatment plants, electrical utility interconnection and storm water management infrastructure;
- Main power plant building, including a central control room;
- Construction and maintenance of transmission lines;
- Coal storage yard and loading facilities;
- Access and internal roads;
- Water storage reservoir for raw water supply; and
- Effluent treatment and disposal system.

Specialist Consideration

Based on the nature and extent of the proposed magnetite mining operations as well mineral processing through a concentrator plant the following specialist studies were deemed appropriate for the EIA process. The specialist studies have also been identified based on the existing environment of the proposed project site. Refer to Table 1 below.

Table 1: Specialist studies

Biological Assessments	Physical Assessments	Social Assessments
Fauna and Flora Assessment (including avi-fauna)	Soils and Land Capability	Socio-Economic Assessment
Aquatic Ecology Assessment	Wetlands Delineation	Stakeholder Engagement
	Hydrology Assessment	Visual Assessment
	Hydrogeology Assessment	Heritage/Archaeological Assessment
	Air Quality Assessment	Baseline Community Health Assessment
	Noise Assessment	
	Rehabilitation and Closure Planning	

Stakeholder Consideration

A Public Participation Process (PPP) has been initiated, which is central to the investigation of environmental and social impacts, as it is important that stakeholders who are affected by the Project are given an opportunity to identify concerns and to ensure that local knowledge, needs and values are understood and taken into consideration as part of the impact assessment process. Comments made by all stakeholders will be included in the Comment and Response Report (CRR) and used to refine the scope of specialist studies that will be commissioned as part of the EIA. The table below presents a summary of the PPP activities undertaken during to date as part of the Scoping phase of the project.

Table 2: PPP activities undertaken to date for the Scoping phase

Activity	Details	Reference in Report
Identification of stakeholders	A stakeholder database was developed which includes I&APs from various sectors of society, including directly affected and adjacent landowners, in and around the proposed project area.	Appendix A Stakeholder database
Distribution of announcement letter and Background Information Document (BID)	A BID, announcement letter with Registration and Comment Form was emailed and posted to stakeholders on Tuesday, 3 November 2015.	Appendix B Announcement Documents
Placing of newspaper advertisement	An English advert was placed in the Mogol Post on Friday, 6 November 2015.	Appendix C Advertisement
Putting up of site notices	English site notices were put up at the proposed project site, local libraries and municipal offices on Thursday, 5 November 2015 at: ▪ Lesedi Village, Steenbokpan; and ▪ Lephalale Local Municipality Public Library. A site notice placement map and report were also developed to indicate geographically the various site notice locations.	Appendix D Site Notice Placement map Site Notice Report
Announcement of Scoping Report	Announcement of availability of the Scoping Report was emailed and posted to stakeholders together with the formal project announcement on Tuesday, 3 November 2015. Copies of the Scoping Report are available at: ▪ Lesedi Village, Steenbokpan; and ▪ Lephalale Local Municipality Public Library. The Scoping Report is also available on www.digbywells.com and will be made available the Public Meeting. *(30-day comment period for the Scoping Report: Friday, 13 November to Monday, 14 December 2015)*	Appendix B Announcement Documents
Stakeholder Meeting	A Public Meeting will be undertaken as follows: Mogol Club (Cnr George Wells and Nelson Mandela Drive, Onverwacht) on. Friday, 27 November 2015 from 10:00 – 12:00.	

Activity	Details	Reference in Report
Announcement of finalised Scoping Report	Announcement of availability of the finalised Scoping Report will be emailed and posted to stakeholders together with a Comment Sheet and will be available on www.digbywells.com (Public Documents).	
Obtained comments from stakeholders	Comments, issues of concern and suggestions received from stakeholders will be captured in the CRR.	

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LIST OF ACRONYMS

ABA	Acid Base Accounting
ACC	Air Cooled Condenser
AEL	Atmospheric Emissions Licence
APPA	Atmospheric Pollution Prevention Act, 1965 (Act 45 of 1965)
AQG	Air Quality Guidelines
ASTM	American Society for Testing and Methods
AWS	Automatic Weather Station
BID	Background Information Document
CARA	Conservation of Agricultural Resources Act
CBO	Community Based Organisation
CFBC	Circulating Fluidised Bed Combustors
cHIA	community Health Impact Assessment
CITES	Convention on International Trade In Endangered Species
DAFF	Department of Agriculture, Forestry and Fisheries
DoE	Department of Energy
DEA	Department of Environmental Affairs
Digby Wells	Digby Wells Environmental
DTM	Digital Terrain Model
DWA	Department of Water Affairs
EAP	Environmental Assessment Practitioner
EC	Electrical Conductivity
EHA	Environmental Health Areas
EHS	Environmental, Health and Safety
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
EMP	Environmental Management Plan
FBC	Fluidised Bed Combustion
FEPA	Freshwater Ecological Priority Areas
FRAI	Fish Response Assessment Index
GCV	Gross Calorific Value
GDP	Gross Domestic Product
GIS	Geographic Information System
GVA	Gross Value Added
HIA	Heritage Impact Assessment

I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IEA	Integrated Environmental Authorisation
IFC	International Finance Corporation
IHAS	Invertebrate Habitat Assessment System
IHI	Index of Habitat Integrity
IUCN	International Union for the Conservation of Nature
LEDA	Limpopo Economic Development Agency
LEGDP	Limpopo Employment, Growth and Development Plan
LM	Local Municipality
MACWAP2	Mokolo and Crocodile River (West): Water Augmentation Project
MAE	Mean Annual Evaporation
mamsl	Metres above mean sea level
mbgl	Metres below ground level
MEC	Member of Executive Council
MIRAI	Macroinvertebrate Response Assessment Index
ML	Megalitre
Mtpa	Million tons per annum
MW	Megawatt
NAG	Nett Acid Generating
NEMA	National Environmental Management Act
NEM:AQA	National Environmental Management: Air Quality Act
NEM:BA	National Environmental Management: Biodiversity Act
NEM:WA	National Environmental Management: Waste Act
NFPA	National Fire Protection Association
NGO	Non-Governmental Organisation
NID	Notice of Intent to Develop
NPEAS	National Protected Areas Expansion Strategy
NWS	National Water and Sanitation
PAH	Polycyclic Aromatic Hydrocarbons
PF	Pulverised Fuel
PCD	Pollution Control Dam
PES	Present Ecological State
PHC	Primary Health Care
PM	Particulate Matter
ppb	Parts per billion

PPP	Public Participation Process
PRECIS	Pretoria Computerised Information System
RHP	River Health Program
SAAQIS	South African Air Quality Information System
SAHRA	South African Heritage Resource Agency
SAHRIS	South African Heritage Resources Information System
SANAS	South African National Accreditation Systems
SANBI	South African National Botanical Institute
SANS	South African National Standards
SASS	South African Scoring System version 5
SDF	Spatial Development Framework
SMS	Short Message Services
SPLP	Synthetic Precipitation Leachate Procedure
STI	Sexually Transmitted Infections
TSP	Total Suspended Particulates
TSS	Total Suspended Solids
VIA	Visual Impact Assessment
VOC	Volatile Organic Compounds
WARMS	Water Registration Management Systems
WBPA	Waterberg-Bojanala Priority Area
WHO	World Health Organisation
WMA	Water Management Area
WTP	Water Treatment Plant
WULA	Water Use Licence Application
XRD	X-Ray Diffraction
XRF	X-Ray Fluorescence

1 Introduction

Namane Generation (Pty) Ltd (Namane) is proposing the construction of an Independent Power Producer (IPP) power plant on the farm Duikerpan 249LQ in the Waterberg District of the Limpopo Province (the Project). The property is located approximately 60 km west of Lephalale. This power plant will be in line with the South African Department of Energy (DOE) 2 500 MW Coal Baseload IPP Procurement Programme. The Temo Coal Mine, proposed by Temo Coal Mining (Pty) Ltd (Temo), adjacent to the proposed Project has been identified to have the appropriate grade coal (lower-bench-coal) to be used in fuelling the 660 MW power plant (600 MW net power injection into the grid). The power plant will also be located within a proposed rail loop which Temo will apply for which will allow Temo to load export-grade coal and transport it via rail to the Richards Bay Coal Terminal.

On 19 December 2012, the Minister of Energy issued three Determinations in terms of section 34 of the Electricity Regulation Act, 2006. In terms of the first determination, an additional 3 200 megawatts (MW) of energy, was to be procured from renewable sources. The second Determination dealt with Medium Term Risk Mitigation and the proposed procurement of 800 MW, of new generation capacity from Industrial co-generation energy sources. The third Determination was for the procurement of additional Baseload energy to supply the national grid. The additional Baseload energy requirement as per Ministerial Determination includes:

- 2 500 MW to be generated from coal utilising Pulverised Fuel (PF) and Fluidised Bed Combustion (FBC) technology, in accordance with the capacity allocated to “Coal (PF, FBC, Imports)”, under the heading "New build", for the years 2014 to 2024, in the IRP 2010-2030;
- 2 652 MW (baseload or mid merit) to be generated from Natural Gas (which includes Liquefied Natural Gas or Natural Gas delivered by pipeline from a Natural Gas Field); and
- 2 609 MW to be generated from Hydro energy sources.

Namane is therefore in the process of applying to construct, operate (and eventually decommission) a power plant to provide electricity as per the above programme, or as an alternative to any other consumers.

Digby Wells Environmental (Digby Wells) has been appointed by Namane to undertake the Environmental Impact Assessment (EIA) and associated studies for the proposed 660 MW coal-fired thermal power plant. The farm Duikerpan 249LQ on which the power plant will be constructed is not owned by Namane, however negotiations are underway with the farm owner to purchase the property.

The proposed Project will combust coal sourced from the lower benches (bench 5 to bench 10) utilising this low-grade coal from the proposed Temo Coal Mine for the generation of

electricity. The Temo Coal Mine has an approved Mining Right, reference number LP30/5/1/2/2/199MR and Environmental Authorisation with the reference number 12/1/9/2-W55.

The Temo Coal Mine will be located on farm Verloren Valey 246LQ; adjacent to the farm earmarked for the power plant. Electricity generated will be supplied into the national grid as part of the National Baseload IPP Procurement Programme or to any other consumer.

The rationale behind Namane's intention to construct the power plant is that the power plant would contribute to the IPP Coal Baseload Procurement Programme, subject to preferred bidder status being reached and the power plant would act as a means of utilising low grade coal from the Temo Coal Mine for the generation of electricity.

For the Project to go ahead, Environmental Authorisation from the Department of Environmental Affairs (DEA) in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), as amended, is required.

The Environmental Impact Assessment/Environmental Management Plan (EIA/EMP) phases will also require a Water Use Licence Application (WULA), in accordance with Section 21 and 40 of the National Water Act, 1998 (Act No. 36 of 1998) (NWA), to be submitted to the Department of Water and Sanitation (DWS).

The foreseen waste management activities in accordance with Section 20 (b) of the National Environmental Management Waste Act, 2008 (Act No. 59 of 2008) (NEM:WA), require a waste licence to be obtained. The EIA Phase will support an application for a waste licence, to be submitted to DEA.

In addition, the EIA Phase will also support the application for an atmospheric emissions licence in terms of the National Environmental Management: Air Quality Act, 2004 (Act No 39 of 2004) (NEM:AQA), to be submitted to an air quality official, from the Limpopo Department of Economic Development, Environment and Tourism (known as LEDET).

1.1 The Proposed Project

The footprint of infrastructure, including the power plant, associated infrastructure and ash dump to be constructed as part of the proposed Namane IPP project will cover an area of approximately 200 ha.

The proposed power plant will include the following infrastructure:

- Main power plant area
  - Main Plant House for two units including a central control room for both units;
  - Auxiliary plant buildings, including administration building and warehouse;
  - Other operational support buildings;

- Maintenance workshops and storage facilities including electrical and instrument workshops and stores, and machine shop;
- Laboratory area for both routine testing and specialised analysis and investigation; and
- High voltage switchyard.

- Associated Main Infrastructure
  - In-plant coal stock yard and storage;
  - Limestone storage silo and shed area;
  - Stack;
  - Coal conveyors;
  - Water supply pipelines (temporary and permanent);
  - Medical Centre, and Amenities including potable water; sanitary and sewer utilities; electrical utility interconnection; telephone utilities;
  - Sanitary sewage treatment plant and disposal;
  - Access road and internal roads;
  - Ash handling and disposal systems and ash dump (proposed and future) (120 ha);
  - Ash dump runoff ponds;
  - Water storage reservoir for raw water supply;
  - Raw water treatment plant; and
  - Zero liquid effluent discharge/evaporation ponds.

1.2 Details of the Applicant

Namane Generation is part of the Namane Group which owns the subsidiary; Temo Coal (Pty) Ltd. Temo has an approved coal mining operation alongside the proposed location of the power plant and associated infrastructure which is not yet operational. The quality of coal currently that will be extracted at the Temo Coal Mine is of a lower quality and cannot be sold directly to Eskom. Namane Energy has identified a use for this coal by constructing a thermal IPP using Circulating Fluidised Bed (CFB) combustion technology to generate power which will be supplied back into the national grid. The details of the applicant are contained in (Table 1-1).

Table 1-1: Applicant Details

Name of Applicant:	Namane Generation (Pty) Ltd.
Contact Person:	Jan Britz
Postal Address:	Private Bag 2001 Menlyn Pretoria
Telephone No.:	+27 12 346 4662
Fax No.:	+27 12 346 4771

1.3 Details of the Environmental Assessment Practitioner

Digby Wells is experienced in environmental management and assessment and is familiar with the EIA requirements of the NEMA and other legislation relevant to this Project. The company is well known for its integrity and independence and for its skill in assisting Interested and Affected Parties (I&APs) to participate in the EIA process.

Barbara Wessels of Digby Wells is the lead Environmental Assessment Practitioner (EAP) for this Project. Ms Wessels has nine years' experience as a consulting environmental scientist and EIA/EMP project manager.

Neither Digby Wells, nor Ms. Wessels, has any vested interest in the Project or Applicant Company.

1.4 Decision Making Authority

In terms of the NEMA 2014 EIA Regulations, no listed activity associated with the proposed Project may commence without a favourable environmental authorisation.

The DEA is the competent authority for EIA applications from Independent Power Producers (IPP), and thus is responsible for the review of all documentation associated with the EIA process as well as the decision making.

An integrated application has been submitted to the DEA which incorporates the requirement of both NEMA and NEM:WA.

1.5 Objectives of this Scoping Report

The purpose of this draft scoping report is to provide background information on the proposed Project and outline the scope of work proposed for the environmental impact phase of the NEMA and NEMWA process. In addition, the scoping report aims to:

- Identify the relevant policies and legislation relevant to the activity;

- Motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
- Identify and confirm the preferred activity and technology alternative through an impact and risk assessment and ranking process;
- Identify and confirm the preferred site, through a detailed site selection process, which includes an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment;
- Identify the key issues to be addressed in the assessment phase;
- Agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and
- Identify suitable measures to avoid, manage or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

The scoping report will be used as a guide for the compilation of the EIA and the EMP. All registered I&APs will be afforded the opportunity to review these reports, once the EIA phase has been completed and the EIA/EMP made available to the public for review.

2 Legal Requirements

2.1 National Environmental Management Act, Act No. 107 of 1998

This section introduces the South African principle legislation in terms of which the proposed IPP Project must be authorised prior to any construction activities commencing.

The NEMA EIA Regulations, 2014 were published in GN R982 on 04 December 2014. Together with the NEMA EIA Regulations, the Minister also published the following listing notices in terms of sections 24 and 24 D of the NEMA:

- Regulation GN R983 Listing Notice 1, which sets out a list of activities which may not commence without environmental authorisation from the competent authority and which must follow the basic assessment procedure as provided for in regulation 19 to 20 of the NEMA EIA Regulations;
- Regulation GN R984 Listing Notice 2, which sets out a list of activities which may not commence without environmental authorisation from the competent authority and

which must follow the scoping and EIA procedure as provided for in regulation 21 to 25 of the NEMA EIA Regulations; and

- Regulation GN R985 Listing Notice 3, which sets out specific listings per provincial area which may not commence without environmental authorisation from the competent authority and which must follow the basic assessment procedure as provided for in regulation 19 to 20 of the NEMA EIA Regulations

The implications for any new project is that should any of the proposed activities fall within the activities listed in GN R983, GN R984 and GN 985, either a basic assessment or an EIA will be required by the DEA to obtain the authorisation required for the commencement of the activity.

The following Listed Activities were included in the NEMA application for the proposed IPP Project (Table 2-1).

Table 2-1: NEMA Listed Activities

Activity Number	Listed Activity	Project Activity description
GNR 983 Listing Notice 1		
Activity 9	*The development of infrastructure exceeding 1000 metres in length for the bulk transportation of water or storm water-* *(i) with an internal diameter of 0,36 metres or more; or* *(ii) with a peak throughput of 120 litres per second or more;* *excluding where-* *(a) such infrastructure is for bulk transportation of water or storm water or storm water* *drainage inside a road reserve; or* *(b) where such development will occur within an urban area.*	Water supply and storage infrastructure will be required on site yet the extent of the water requirement on site is currently still under investigation and will be confirmed during the Scoping Phase.

Activity Number	Listed Activity	Project Activity description
Activity 24 (ii)	*The development of-* *(i) a road for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or* *(ii) a road with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres;* *but excluding-* *(a) roads which are identified and included in activity 27 in Listing Notice 2 of 2014; or* *(b) roads where the entire road falls within an urban area.*	A permanent access road will need to be constructed and maintained throughout the operational and decommissioning phase of the IPP.
Activity 27 (i);	*The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for-* *(i) the undertaking of a linear activity; or* *(ii) maintenance purposes undertaken in accordance with a maintenance management plan.*	Clearing the site (removal of vegetation, establishing access route, etc.) prior to the commencement of construction. This activity will have to be confirmed once the Specialist Studies have been completed and a vegetation delineation has been compiled.
GNR 984 Listing Notice 2		

Activity Number	Listed Activity	Project Activity description
Activity 2	*The development and related operation of facilities or infrastructure for the generation of electricity from a non-renewable resource where the electricity output is 20 megawatts or more.*	The IPP is projected to generate 660 MW of power which will be fuelled by lower grade coal sourced from the neighbouring mine.
Activity 6	*The development of facilities or infrastructure for any process or activity which requires permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent, excluding –* *activities which are identified and included in Listing Notice 1 of 2014;* *(ii) activities which are included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act,*	A water use licence will be required for Ash handling and disposal systems and ash dump; Ash dump runoff ponds; Water storage reservoir for raw water supply and evaporation ponds. An Atmospheric Emissions Licence will be required for the Power Plant.

Activity Number	Listed Activity	Project Activity description
Activity 7 (iii)	*The development and related operation of facilities or infrastructure for the bulk transportation Notice:* *of dangerous goods- 3;* *(i) in gas form, outside an industrial complex, using pipelines, exceeding 1000 metres in length, with a throughput capacity of more than 700 tons per day;* *(ii) in liquid form, outside an industrial complex, using pipelines, exceeding 1000 metres in length, with a throughput capacity of more than 50 cubic metres per day; or* *(iii) in solid form, outside an industrial complex, using funiculars or conveyors with a throughput capacity of more than 50 tons day.*	At this stage, it is assumed that coal will be transported from the neighbouring mine via a conveyor belt.
Activity 9	*The development of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex.*	Transmission lines associated with the proposed power plant will most likely require a 400 kV capacity, although 132kv options are also currently being explored

Activity Number	Listed Activity	Project Activity description
Activity 11	*The development of facilities or infrastructure for the transfer of 50 000 cubic metres or more water per day, from and to or between any combination of the following -* *(i) water catchments;* *(ii) water treatment works; or* *(iii) impoundments;* *excluding treatment works where water is to be treated for drinking purposes.*	Water supply and storage infrastructure will be required on site yet the extent of the water requirement on site is currently still under investigation and will be confirmed during the Scoping Phase.

Activity Number	Listed Activity	Project Activity description
Activity 28	*Commencing of an activity, which requires an atmospheric emission license in terms of section 21 of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004),* *excluding -* *(i) activities which are identified and included in Listing Notice 1 of 2014;* *(ii) activities which are included in the list of waste management activities published in* *terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act 2008 applies; or* *(iii) the development of facilities or infrastructure for the treatment of effluent, wastewater or sewage where such facilities have a daily throughput capacity of 2000 cubic metres or less.*	Due to the pollution associated with a coal-operated IPP, an Atmospheric Emissions Licence will be applied for in terms of the NEM:AQA.

2.2 National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)

The waste management activities in respect of which a Waste Management Licence is required in accordance with Section 20 (b) of the NEM:WA were published in November 2013 as a schedule which is divided in three categories, namely Category A, B and C:

- Category A describes waste management activities which will result in a Basic Assessment Process being required to be carried out according to the EIA

regulations made under Section 24(5) of NEMA as part of the application for a waste management licence;

- Category B describes waste management activities which will result in an Environmental Impact Assessment process being required as is stipulated in the EIA regulations made under Section 24(5) of NEMA as part of a waste management licence application;
- Category C describes waste management activities which must adhere to the following:
  - Norms and Standards for Storage of Waste, 2013; or
  - Standards for Extraction, Flaring or Recovery of Landfill Gas; or
  - Standards for Scraping or Recovery of Motor Vehicles, 2013.

Table 2-2: Identified Waste Activities

Activity Number	Listed Activities	Project Activity Description
Category A		
Activity 2	*The sorting, shredding, grinding, crushing, screening or bailing of general waste at a facility that has an operational area in excess of 1 000m^2*	Storage of used turbine oil.
Activity12	*The construction of facilities for activities listed in Category A of this Schedule (not in isolation to associated activity).*	Construction of facilities for the activities listed.
Category B		
Activity 1	*The storage including the temporary storage of hazardous waste in lagoons.*	Course ash will be stored in an ash dump on site.

2.3 Environmental Management: Air Quality Act 39 of 2004

The NEM:AQA came into effect on 11 September 2005 in terms of GN R898 (GG 28016 of 9 September 2005), with the exclusion of sections 21, 22, 36 to 49, 51(1) (e), 51(1) (f), 51(3), 60 and 61. The Atmospheric Pollution Prevention Act, 1965 (Act No 45 of 1965) (APPA) was repealed and all omitted sections of the NEM:AQA finally came into effect on 1 April 2010 (GN R220 of 26 March 2010 published in GG 33041).

The concept of licensing listed processes in Schedule II of APPA has been retained in the NEM:AQA. Section 21 provides that the Minister or MEC may publish a list of activities which may result in atmospheric emissions and which the Minister or MEC reasonably believes has or may have a significant detrimental effect on the environment, including health, social conditions, economic conditions, ecological conditions or cultural heritage.

On 31 March 2010 (GN R248, GG 33064) the Minister of Water and Environmental Affairs, published a list of activities and associated minimum emission standards identified in terms of Section 21(1)(a) of the NEM:AQA. These listed activities and minimum emission standards came into effect on 1 April 2010.

A coal fired power plant is a listed activity under the NEM:AQA. This "list of activities", indicates activities which may result in atmospheric emissions, which have or are likely to have a significant detrimental effect on the environment, including health, social conditions, economic conditions or cultural heritage.

2.3.1 Waterberg Priority Area

In terms of Chapter 4 of NEM:AQA:

“18. (1) The Minister or Member of Executive Council (MEC) may, by notice in the Gazette, declare an area as a priority area if the Minister or MEC reasonably believes that:

(a) ambient air quality standards are being, or may be, exceeded in the area, or another situation exists which is causing, or may cause, a significant negative impact on air quality in the area; and

(b) the area requires specific air quality management action to rectify the situation…”

The Waterberg priority area has been duly gazetted. The proposed plant falls within the gazetted area

2.4 Additional Legislation

The EIA process is not only subject to the terms and regulations of the NEMA, NEM:WA, NWA and NEM:AQA but must also comply with other applicable South African laws and guidelines relevant to the project. The applicable legislation includes, but is not limited to the following:

National legislation and regulations:

- Conservation of Agricultural Resources Act, 1983, (Act No. 43 of 1983);
- Constitution of the Republic of South Africa Act, 1996, (Act No. 108 of 1996);
- Hazardous Substances Act, 1973, (Act No. 15 of 1973);
- Limpopo Environmental Management Act, 2003, (Act No.7 of 2003);
- National Heritage Resources Act, 1999, (Act No. 25 of 1999);
- National Environment Management: Biodiversity Act, 2004, (Act No. 10 of 2004); and
- Promotion of Access to Information Act, 2000, (Act No. 2 of 2000).

Guideline documents include but is not limited to:

- Department of Environmental Affairs and Tourism (DEAT) Air Quality Guidelines;
- South African National Standards (SANS) 10103:2004 The Measurement and Rating of Environmental Noise with Respect to Land Use, Health, Annoyance and to Speech Communication;
- SANS 1929:2005 Edition 1.1 – Ambient Air Quality Limits for Common Pollutants;
- DWAF: Minimum Requirements Guideline for the Handling, Classification and Disposal of Hazardous Waste, 1998;
- DWAF: Minimum Requirements Guideline for the Water Monitoring at Waste Management Facilities;
- South African Water Quality Guidelines Series 1996; and
- Limpopo Internal Strategic Perspective, Department of Water Affairs and Forestry, 2004.

3 Project Description and Motivation

3.1 Project Location

The project area for the power plant is located on the farm Duikerpan 249LQ which has a total area of 1 047.8 hectares (ha). The coordinates for the centre of the project area are 23° 35’ 45.987” S and 27° 17’ 25.857” E. The Project is situated in the Waterberg Coalfield area.

(Appendix A) illustrates the regional setting of the project area.

The project area falls within the Lephalale Local Municipality and the Ellisras Magisterial District. The nearest settlement is Steenbokpan situated approximately 10 km south of the project area. The nearest major town is Lephalale (formerly Ellisras) situated approximately 44.9 km east-south-east of the project area.

3.1.1 Regional Setting

The Project will be located within the Waterberg Coalfield area, in the Limpopo ProvincezSouth Africa. (LIST OF PLANS

Plan 1, Appendix A). This region is largely undeveloped and is characterised by undisturbed Bushveld, associated with game farming, hunting, tourism and agriculture.

3.1.2 Local Setting

The Project area is situated within the Lephalale Local Municipality, Waterberg District. The Limpopo River, which forms the international boundary between South Africa and Botswana, borders the Project area. The Project is planned to be located entirely within the farm Duikerpan 249LQ which is currently used for agriculture. The location of the IPP is alongside the remaining extent of Verloren Valey 246LQ where the Temo Coal Mine will be located.

The closest towns and settlements, as well as their direct distance and direction from the project area are summarised in Table 3-1. All distances are straight line distances measured from the edge of the project area to the centre of the towns / settlements unless otherwise stated.

Table 3-1: Closest Towns and Settlements

Name	Country	Type	Direct Distance	Direction
Steenbokpan	South Africa	Settlement	10.4 km	S
Stockpoort	South Africa	Settlement	17.6 km	NNE
Dovedale	Botswana	Settlement	24.1 km	WNW
Kudumatse	Botswana	Settlement	24.6 km	NW
Makwate	Botswana	Settlement	31.7 km	N
Maropong	South Africa	Settlement	32.7 km	ESE
Onverwacht	South Africa	Settlement	39.7 km	ESE
Lephalale	South Africa	Major Town	44.9 km	ESE

The nearest regional route is the R510 between Lephalale and Stockpoort approximately 16.5 km north-east of the project area. The D175 district road between Steenbokpan and Stockpoort runs approximately 4.8 km west and 7.4 km north of the project area. The D2286 district road starts 4.9 km west of the project area. The D1675 district road is 8.7 km south and the D2001 district road is 12.8 km east of the project area respectively.

3.1.3 Affected and Surrounding Properties

The power plant will be on the farm Duikerpan 249LQ and the adjacent landowner information is indicated in Table 3-2 and Plan 3 (Appendix A).

Table 3-2: Land Owner Information

Farm	Portion	Owner
Directly Affected		
Duikerpan 249LQ	RE	Steenkamp Daniel Hermanus
Adjacent		
Matopi 705	RE	Sasol Mafutha Mining (Pty) Ltd
Matopi 705	RE	Wandering Star Trading 20 (Pty) Ltd
Verloren Valey 246LQ	RE	Mr Louw and Mrs Elizabeth Swanepoel
Twistpan 265	RE	Steenkamp Gerhardus Albertus
Gruisfontein 230	RE	Prostart Traders 136 (Pty) Ltd
Groenfontein 250	2	Sasol Mafutha Mining (Pty) Ltd
Groenfontein 250	2	Wandering Star Trading 20 (Pty) Ltd
Vlakfontein 264	RE	Sasol Mafutha Mining (Pty) Ltd
Vlakfontein 264	RE	Wandering Star Trading 20 (Pty) Ltd
Tambootievley 261	RE	Wandering Start Trading 20 (Pty) Ltd
Nieuw Holland 247	RE	Steenkamp Gerhardus Albertus

3.2 Project Description

The South African Department of Energy (DOE) is in the process of procuring 2 500 MW from independent producers as part of the Coal Baseload Independent IPP Procurement Programme. Each bid from independent producers is capped at 660 MW (600 MW net power injection to the grid). Namane commissioned RSV ENCO Consulting (Pty) Limited (RSV) to investigate the potential economic viability of Namane participating in the DOE base load IPP Procurement Programme. RSV has since compiled a techno–economical study which has highlighted various options for Namane to consider.

Namane intends to construct a coal-fuelled IPP power plant on the farm Duikerpan 249LQ, in the Waterberg, Limpopo Province. The Temo Coal Mine, proposed by Temo will supply the appropriate grade coal (lower-bench-coal) to be used in fuelling the 600 MW power plant.

The farms Verloren Valey 246LQ, Duikerpan 249LQ and Portion 1 of Kleinberg 252LQ, and a portion of the farm Japie and a portion of the farm Hans 713LQ are the subject of a Mining Right, Reference LP 199 MR (the Mining Right) held by Temo. Temo also holds an Environmental Authorisation for the mining related activities. These activities will all be located on the farm Verloren Valey 246LQ. The preferred location for the power plant is within a proposed rail loop (currently in the application phase) which is to be used to allow export-grade coal to be transported to the Richards Bay Coal Terminal. The rail loop is located in the northern half of Duikerpan with an internal surface area of approximately 320 ha.

The proposed design for the power plant uses Circulating Fluidised Bed (CFB) combustion technology and due to the water-scarce nature of the Waterberg region, the design is proposed to use dry-cooling technology to reduce the water resource requirement for the IPP. Dry-cooling will reduce the overall efficiency of the power plant but will also reduce the use of water. Namane is in the process of confirming that the lower bench coal reserve can be partially processed to produce both low sulphur and near optimal quality coal for use in a CFB boiler.

Namane intends to dispose of the ash that will be generated by the operation of the power plant onto an ash dump. The ash dump will also be located on the farm Duikerpan 249LQ and will have a life of 30 years (same as that of the power plant).

The details of the power plant grid connection solution will be decided upon in conjunction with the necessary input from Eskom. The power plant is likely to be integrated into the Eskom transmission network at 400 kV voltage level, although 132 kV distribution option is also being considered. Namane is currently investigating the alternatives for these connection lines; however, three options have been preliminarily identified and these are:

- 400 kV Option 1: Connect to the Matimba-Spitskop circuit one (the existing Matimba - Spitskop line loop in and out the Namane power plant);
- 132 kV Option 2: Connect to the proposed future distribution network; and
- 400 kV Option 3: Alternative connection to the Matimba-Spitskop circuit one (the existing Matimba - Spitskop line loop in and out the Namane power plant).

The proposed alternatives for both the 132 kV lines and 400 kV lines may potentially include the following farm portions listed in Table 3-3 (refer also to Plan 4b in Appendix A), however, the affected farms will have yet to be confirmed.

Table 3-4: Land Owner Information

Farms	Portion	Affected
WYNBERG 215	RE	Directly Affected - Distribution Lines
PENTONVILLE 216	RE	Indirectly Affected - Distribution Lines
CANADA 229	RE	Indirectly Affected - Distribution Lines
GRUISFONTEIN 230	RE	Directly Affected - Distribution Lines
DRAAI OM 244	RE	Directly Affected - Transmission Lines
SWELPAN 245	RE	Directly Affected - Transmission Lines
VERLOREN VALEY 246	RE	Directly Affected - Transmission Lines
NIEUW HOLLAND 247	RE	Directly Affected - Transmission Lines
DUIKERPAN 249	RE	Directly Affected - IPP
GROENFONTEIN 250	2	Indirectly Affected - IPP
TAMBOOTIEVLEY 261	RE	Indirectly Affected - IPP
VLAKFONTEIN 264	RE	Directly Affected - Transmission Lines
VLAKFONTEIN 264	2	Directly Affected - Transmission Lines
TWISTPAN 265	RE	Directly Affected - Transmission Lines
WILDEBEESTVLAKTE 268	1	Indirectly Affected - Transmission Lines
KLEINPAN 269	RE	Directly Affected - Transmission Lines
HOUWHOEK 270	RE	Directly Affected - Transmission Lines
GROOTE-ZWART-BULT 290	RE	Directly Affected - Transmission Lines
GROOTDOORN 292	RE	Directly Affected - Transmission Lines
GROOTDOORN 292	1	Directly Affected - Transmission Lines
GROOTDOORN 292	2	Directly Affected - Transmission Lines
GROOTDOORN 292	4	Indirectly Affected - Transmission Lines
THEUNISPAN 293	RE/2	Directly Affected - Transmission Lines
THEUNISPAN 293	RE/8	Directly Affected - Transmission Lines
THEUNISPAN 293	10	Directly Affected - Transmission Lines
THEUNISPAN 293	RE/11	Indirectly Affected - Transmission Lines
THEUNISPAN 293	12	Indirectly Affected - Transmission Lines
THEUNISPAN 293	RE/19	Directly Affected - Transmission Lines
THEUNISPAN 293	20	Directly Affected - Transmission Lines
THEUNISPAN 293	22	Directly Affected - Transmission Lines
THEUNISPAN 293	23	Directly Affected - Transmission Lines
THEUNISPAN 293	25	Directly Affected - Transmission Lines
VANGPAN 294	RE	Directly Affected - Transmission Lines
VANGPAN 294	2	Indirectly Affected - Transmission Lines
STEENBOKPAN 295	1	Directly Affected - Transmission Lines
SLANGKOP 296	RE	Directly Affected - Transmission Lines
SLANGKOP 296	1	Directly Affected - Transmission Lines
ZANDBULT 300	RE	Directly Affected - Transmission Lines
KAMEELBULT 301	RE	Directly Affected - Transmission Lines

Farms	Portion	Affected
MINNAARSPAN 322	RE	Directly Affected - Transmission Lines
TOEZICHT 323	2	Directly Affected - Transmission Lines
ZYVERBULT 324	RE	Directly Affected - Transmission Lines
ZYVERBULT 324	2	Indirectly Affected - Transmission Lines
MOOIPAN 325	RE	Directly Affected - Transmission Lines
SCHULDPADFONTEIN 328	RE	Indirectly Affected - Transmission Lines
SCHULDPADFONTEIN 328	1	Directly Affected - Transmission Lines
SCHULDPADFONTEIN 328	2	Directly Affected - Transmission Lines
PAARDEVLEY 329	1	Directly Affected - Transmission Lines
DOORNLAAGTE 353	RE	Directly Affected - Transmission Lines
ROOIPAN 355	RE	Directly Affected - Transmission Lines
ROOIPAN 355	2	Directly Affected - Transmission Lines
ZANDHEUVEL 356	RE	Directly Affected - Transmission Lines
ZANDHEUVEL 356	1	Directly Affected - Transmission Lines
ZANDHEUVEL 356	3	Directly Affected - Transmission Lines
ROOIPAN 357	RE/1	Directly Affected - Transmission Lines
ROOIPAN 357	5	Indirectly Affected - Transmission Lines
ZANDNEK 358	RE	Directly Affected - Transmission Lines
RHENOSTERPAN 361	2	Directly Affected - Transmission Lines
RHENOSTERPAN 361	3	Directly Affected - Transmission Lines
RHENOSTERPAN 361	5	Directly Affected - Transmission Lines
RHENOSTERPAN 361	6	Directly Affected - Transmission Lines
NAAUWPOORT 363	RE	Directly Affected - Transmission Lines
KLIPKLOOF 365	2	Directly Affected - Transmission Lines
LELIEFONTEIN 672	RE	Directly Affected - Transmission Lines
LELIEFONTEIN 672	1	Directly Affected - Transmission Lines
MATOPI 705	RE	Directly Affected – Distribution Lines

The Project will also require the following authorisations:

- Water Use Licence;
- Atmospheric Emissions Licence;
- Environmental Management Plan; and
- Waste Management Licence.

The proposed layout of the preliminary infrastructure on site is included in Plan 4b, Appendix A.

3.2.1 Main Plant and Equipment

The footprint of infrastructure, including the power plant, associated infrastructure and ash dump to be constructed as part of the proposed Namane IPP project will cover an area of approximately 200 ha.

The proposed power plant will include the following infrastructure:

- Main power plant area
  - Main Plant House for two units including a central control room for both units;
  - Auxiliary plant buildings, including administration building and warehouse;
  - Other operational support buildings;
  - Maintenance workshops and storage facilities including electrical and instrument workshops and stores, and machine shop;
  - Laboratory area for both routine testing and specialised analysis and investigation; and
  - High voltage switchyard.
- Associated Main Infrastructure
  - In-plant coal stock yard and storage;
  - Limestone storage silo and shed area;
  - Stack;
  - Coal conveyors;
  - Water supply pipelines (temporary and permanent);
  - Medical Centre, and Amenities including potable water; sanitary and sewer utilities; electrical utility interconnection; telephone utilities;
  - Sanitary sewage treatment plant and disposal;
  - Access road and internal roads;
  - Ash handling and disposal systems and ash dump (proposed and future) (120 ha);
  - Ash dump runoff ponds;
  - Water storage reservoir for raw water supply;
  - Raw water treatment plant; and
  - Zero liquid effluent discharge/evaporation ponds.

3.2.2 Civil Works to be Conducted

The following civil works will be conducted as part of the proposed Project:

- Site clearing and earthworks including the laydown and storage areas;
- Administrative workshop, warehouse, support buildings and foundations;
- Maintenance workshops and stores/storage facilities including electrical and instrument workshops and stores;
- Construction campsite and accommodation facilities (construction phase only), medical care and amenities, potable water, sanitary and sewer utilities, sewage treatment plant, electrical utility interconnection;
- Main power plant building, including a central control room;
- Coal storage yard;
- Coal loading facilities;
- Drainage and sewage reticulation systems;
- Access and internal roads;
- Water storage reservoir for raw water supply;
- Effluent treatment and disposal system;
- Sewage treatment plant;
- Waste water treatment plant; and
- Ash disposal facility

3.2.3 Power Plant Footprint

This Project is still in the early design phase and therefore the approximate footprint for the power plant, including associated infrastructure, is 200 ha. The infrastructure layout plan is currently being developed to confirm the exact space requirements, footprint and location of the power plant and associated infrastructure.

3.2.4 Construction Power Supply

Power will either be sourced from the local power supply associated with the Temo Coal Mine or alternatively diesel generators will be used on site.

3.2.5 Emergency Electricity Supply

In the case of power failure on site, it is proposed that diesel generators will be used. The exact capacity required is currently under investigation by Namane.

3.2.6 Access to the Project Site

An access road to the power plant will be constructed from the D175, which is located along the western boundaries of Duikerpan and Verloren Valey. It is anticipated that the access route will be via Verloren Valey.

3.2.7 Operating Regime

The power plant will be operational 24 hours per day, seven days a week all year round except during routine or unplanned maintenance.

3.2.8 Water Requirement and Availability

There are currently different sources of bulk water supply identified for the IPP development:

- Any possible redundant water from the Temo Coal Mine, which will have it 's own Water Treatment Works (WTW) and Waste Water Treatment Works (WWTW).
- Dedicated feed from the MCWAP water scheme, which is envisaged to become operational in 2021
- Dedicated feed from treated effluent water from neighbouring towns, and
- Groundwater supply from projects in the area(client discussions are in progress).

3.2.9 Ash Disposal Area

Coal-fired thermal power plants generate the greatest amount of solid wastes due to the relatively high percentage of ash in the fuel. The large volume solid wastes generated are fly ash and bottom ash. The ash will be deposited on the ash dump which will be located on the farm Duikerpan 249LQ and the footprint is expected to be 120 ha. Ash will be transported from the power plant to the ash dump either via conveyor belts or trucks.Namane will also investigate a future option of backfilling ash mixed with discard or overburden back into the open mine pits. Separate permission would be sought from the DEA and DWS in order to undertake this process.

3.2.10 Fire Protection System

Fire protection will consist of outdoor and indoor firefighting systems and fire detection/alarm system to be installed in all buildings and equipment in the plant area. Various types of firefighting systems, such as water fire extinguishing, CO2 fire-extinguishing, dry chemical powder and foam fire extinguishing; will be selected to provide an appropriate fire protection.

3.2.11 Fuel Availability, Transportation and Requirement

3.2.11.1 Coal Quality

The coal seam present in the project area varies in quality. The upper zone coal is more reactive than the lower zone coal (seam 5 and lower), and the lower zone coal is not suitable to be sold to Eskom. Therefore the lower bench coal will be the target product for the power plant. The raw coal sampled from the site has a calorific content of 11.62 MJ/kg, however, the cost associated with using the raw coal is too high, and therefore, this coal will have to be processed, particularly to reduce the Nitrous Oxide emissions.

3.2.11.2 Coal Requirement

Depending on the overall processing of coal, the power plant will require between 3 007 238 tonnes 3 696 110 tonnes per annum, however, the amount of coal anticipated to be mined in a year is approximately double the annul requirement for the power plant.

3.2.11.3 Limestone

Limestone will be used to reduce the sulphur content of the coal during the burning process, by absorbing the released sulphur. The limestone will be imported and the annual requirement (also dependent on the type of coal processing) will be between 108 166 tonnes per annum and 167 006 tonnes per annum.

3.2.12 Process Effluents

The power plant shall be a zero liquid effluent discharge facility. All wastewater streams will be treated in the waste water treatment plant and reused where possible (e.g. dust suppression) with solid waste disposed of on the ash dump.

3.2.13 Effluent and Waste Treatment

The power plant will be a zero liquid effluent discharge facility. All waste and wastewater streams (including sewerage, oily and storm water) will be collected and treated in a dedicated sewage treatment system and waste water treatment plant in accordance with World Bank EHS guidelines. The treated water from the sewage treatment system and the waste water treatment plant will be collected and reused where possible (e.g. dust suppression, ash dump maintenance, etc.). Treated water which cannot be reused will be discharged to and evaporated in an evaporation pond. Treated solid waste and sludge will be disposed of on the ash dump. The power plant ash dump and disposal areas will be designed for the safe long-term storage of all special waste and effluents arising from the operation of the power station that cannot be recycled.

3.2.14 Domestic Waste

Other solid wastes generated at the power plant will be stored at a temporary hazardous and general waste transfer station. These waste facilities will not trigger the requirement for a waste licence and will be managed as a Category C waste which must comply with the Norms and Standards for Storage of Waste, 2013.

Category C wastes include:

- The storage of general waste at a facility that has the capacity to store in excess of 100m3 of general waste at any one time, excluding the storage of waste in lagoons or temporary storage of such waste.
- The storage of hazardous waste at a facility that has the capacity to store in excess of 80m3 of hazardous waste at any one time, excluding the storage of hazardous waste in lagoons or temporary storage of such waste.

3.2.15 Employment Opportunities

During the construction phase approximately 3 000 people will be employed. The operational phase is expected to employ approximately 200 people.

3.3 Power Generation Process

The design of the proposed IPP is still underway and will be finalised during the course of the EIA process. However, the principles of operation are similar to those found in many other thermal power stations located worldwide. Coal is combusted in a boiler to generate steam. Once the steam reaches a certain temperature and pressure, it is then passed through a steam turbine for expansion which in turn creates rotational energy which then can drive an electrical generator. The principles of operation are shown in the diagram below (Figure 3-1).

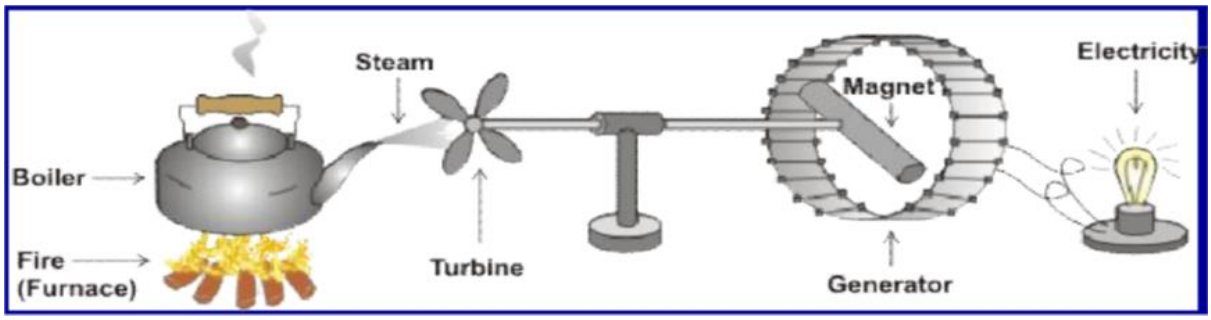


Figure 3-1: Power generation process

The boiler proposed for this plant is known as a CFBC Boiler. The reason for the name is that within the boiler chamber, air, along with coal and limestone, is blown into the combustion chamber to create a continuous circulating motion which keeps the coal

suspended in the combustion area allowing for greater combustion efficiencies of the low grade coal. This boiler is suitable for this application due to its robust operating nature and its ability to combust low grade quality coals. It also has the added advantages of producing lower SO_2 emissions since the sulphur gets absorbed by the limestone within the furnace, and lower NO_X emissions due to the inherent lower operating temperature of the boiler.

Therefore, CFBC boiler evolving technology is a very efficient method of generating low-cost electricity while generating electricity with low emissions and environmental impacts.

Apart from the main energy cycle of the boiler, steam turbine and generator, a typical power plant will also consist of other large components also required for operation. These include the coal handling system; condensers; limestone storage; ash collection; water treatment plant; electrical reticulation; Distributed Control System (DCS); fuel oil and draft air/gas systems.

The figure below gives a high level overview of the typical operation for a CFBC power plant (Figure 3-2).

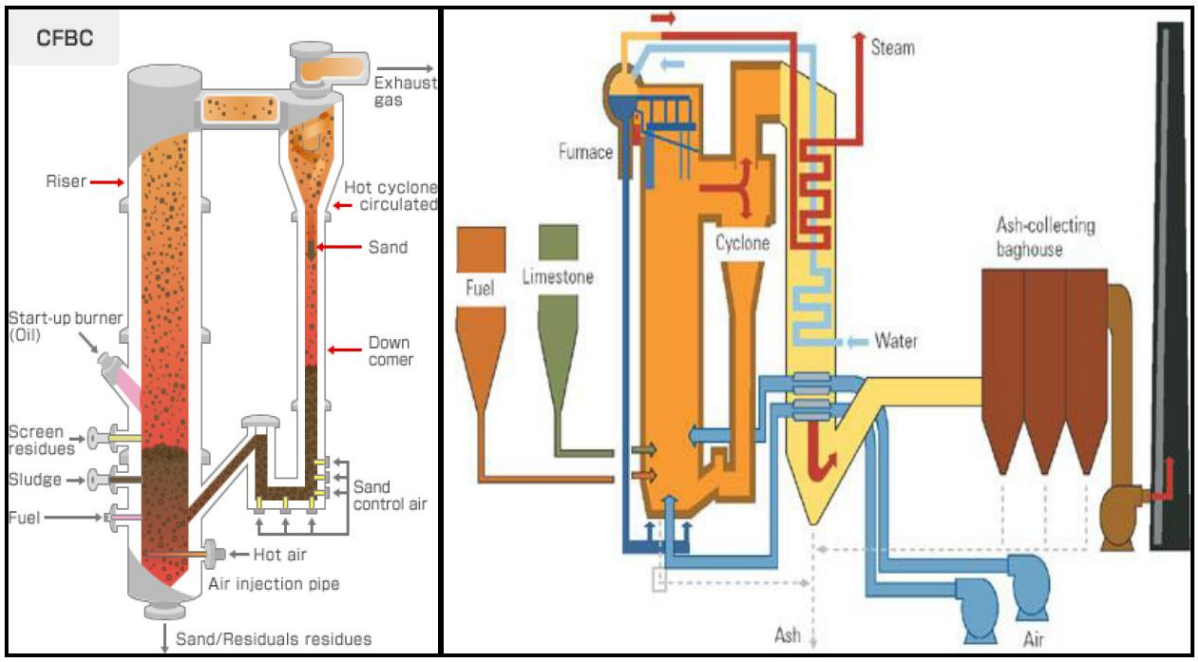


Figure 3-2: General layout of a CFBC boiler (source RSV ENCO)

3.4 Project Motivation

In October 2012 the DOE received “concurrence” from the National Energy Regulator of South Africa (NERSA) for a Ministerial determination opening the way for the procurement of 7761MW of baseload capacity from IPPs between then and 2025. The primary aim of the determination process was to leverage IPP investment to deal with South Africa’s current and anticipated electricity supply/demand imbalances.

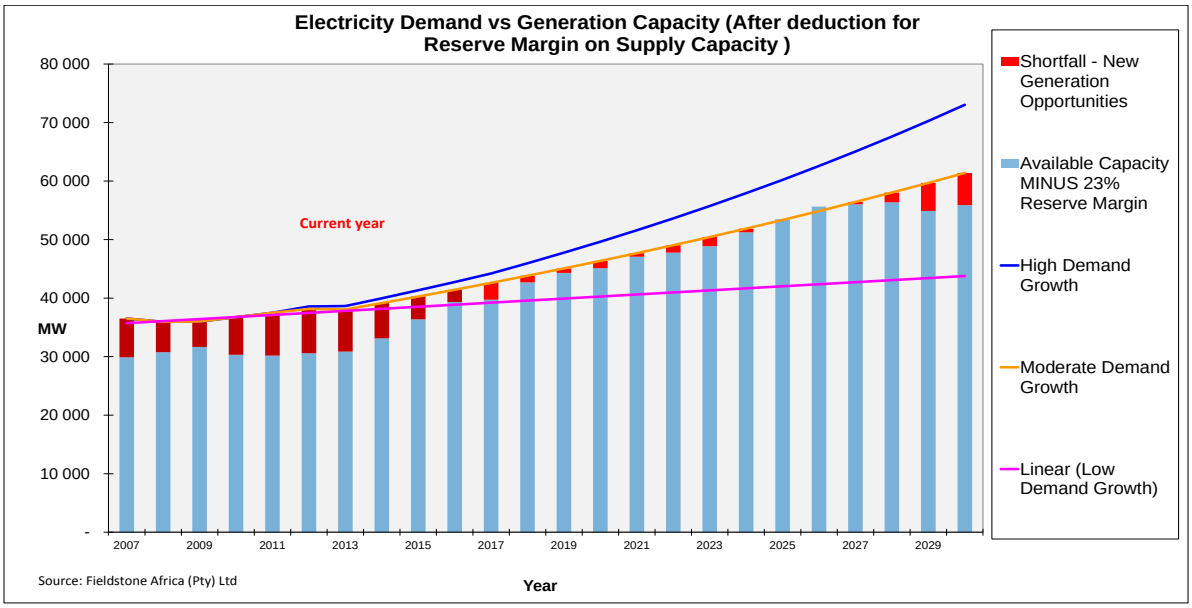


Figure 3-3: Electricity demand versus generation capacity (source: Fieldstone Africa)

In early March 2012 the DOE and the National Treasury issued a Request for Information (RFI) from potential developers of cogeneration facilities, as well as those coal-fired power stations, natural gas facilities and imported hydropower opportunities that could be introduced into the country's stressed power system before March 2019.

The following allocations were then made for base load capacity based on responses to the RFI issued in March 2012.

The Ministerial determination was published in the Government Gazette on 19 December 2012. The Minister of Energy issued three Determinations in terms of section 34 of the Electricity Regulation Act, 2006. In terms of the first Determination, an additional 3200MW of energy was to be procured from renewable sources. The second Determination dealt with Medium Term Risk Mitigation and the proposed procurement of 800MW, of new generation capacity from Industrial Cogeneration energy sources. The third Determination was for the procurement of additional Baseload energy.

- Additional Baseload energy requirement as per Ministerial Determination :
  - 2 500 MW to be generated from coal utilising PF and FBC technology, in accordance with the capacity allocated to "Coal (PF, FBC, Imports)", under the heading "New build", for the years 2014 to 2024, in the IRP 2010-2030;
  - 2 652 MW (baseload or mid merit) to be generated from Natural Gas (which includes Liquefied Natural Gas or Natural Gas delivered by pipeline from a Natural Gas Field); and
  - 2 609 MW to be generated from Hydro energy sources.

In June 2013 the DOE made a fresh call for potential developers of baseload and cogeneration electricity facilities to register their projects by 12th July 2013 to aid it in the design of procurement processes based on the published Ministerial determinations.

Namane owns the Temo Coal Resource which is situated in the Lephalale area of the Limpopo province in South Africa. A Pre-Feasibility Study (PFS) conducted on behalf of Namane by Parsons Brinkerhoff in April 2013 provided a mine plan and development schedule for a 16 Mtpa mine. The study included plans for a large double stage wash plant for the production of an export grade product and a middling's product for Eskom Power Station feed as well as a single stage wash plant which was designated to wash a product only for the Eskom Power Plant market. In the Bankable feasibility study and during optimisation the project team has seen that the best solution is to identify some of the coal for use in boilers of CFBC technology (of which Eskom has none) which was found to be the preferred combustion technology for most of the bidders in the South African Department of Energy's 2 500 MW Coal Baseload IPP program. This project also allows for optimal use of the coal resource.

3.5 Project Schedule

It is envisioned that construction of the power plant will commence in 2017, and require approximately five years to construct. Once operational, the power plant is anticipated to be in use for 30 years.

3.6 Project Activities

The activities related to the proposed power plant have been categorised into three project phases: construction, operation and decommissioning. The activities identified to take place in each of these three phases are outlined in Table 3-5.

Table 3-5: Activities associated with the Project

Construction phase activities
Employment of workers for construction and procurement of construction materials
Site clearing (removal of vegetation)
Temporary storage of construction materials and hazardous material
Topsoil removal and stockpiling
Construction of access road
Increased vehicular activity on access roads (D175)

Construction phase activities
Construction of IPP infrastructure, including associated infrastructure and coal stock yard
Construction of ash dump
Construction of ponds: effluent pond and coal pile runoff pond and ash dump runoff ponds
Water storage for construction
Generation and removal of domestic and hazardous waste
Recruitment, procurement of goods and services and employment.
Operation phase activities
Employment of workers and procurement of goods
Storage of fuel and lubricants
The storage of coal
Storage of limestone
Power generation.
Operation of fuel depot and hazardous waste storage and removal.
Water abstraction, reticulation around site, storage of water and water treatment.
Operation of pollution control dam and storm water management systems.
Management of stockpiles and berms.
Housing of workforce at the residential village.
Management of sewage and waste water.
Ongoing rehabilitation of ash dump and landfills.
Generation, transport and storage of waste.
Transport of discard, ash and brine water.
Ongoing monitoring of social and environmental aspects.
Continuous implementation of the management plans.
Operation of power plant and associated infrastructure
Pipeline transportation of sewage and water (including storm water)
Vehicular activity on access roads and D175 main road
Transport of limestone
Generation and removal of domestic and hazardous waste

Construction phase activities
Operational use of ash dump
Transport of ash to ash dump by truck/conveyor
Furnace and stack operations
Temporary storage of hazardous waste
Decommissioning phase activities
Retrenchment of staff
Demolition of power plant and associated infrastructure
Rehabilitation of area
Generation and disposal of demolition waste
Rehabilitation of access road

3.7 Infrastructure not covered by this Application

Namane plan to construct the proposed power plant with a rail loop which will service the neighbouring Temo Coal Mine. This proposed rail loop is still in the application phase however, the approximate internal footprint of the loop measures at 320 ha. The rail loop infrastructure will impact the final placement of infrastructure related to the power plant but the rail loop does not form part of this application.

4 Alternatives Considered

Alternatives are different means of meeting the general purpose and need of a proposed activity. Alternatives help identify the most appropriate method of developing the project, taking into account location or site alternatives, activity alternatives, process or technology alternatives, temporal alternatives or the no-go alternative. Alternatives also help identify the activity with the least environmental impact.

4.1 Site Location Alternatives

At present, no alternatives have been considered for the location of the power plant, as the present proposed location on the farm Duikerpan 249LQ, is located directly adjacent to the Temo Coal Mine. Duikerpan, and more specifically the northern section of the property, is the only area available to Namane where the power plant and its associated infrastructure will not result in the sterilisation of resources. The nature of the coal resource is such that it can only be mined with open cast methods. This limits the available space to place infrastructure without sterilising the resource.

4.2 Water Requirement and Availability

Considering constraint in availability of water in the Waterberg region, air cooled condenser and fin fan coolers for all boiler and turbine coolers are proposed thereby reducing water consumption to the minimum. Based on the water scarcity, dry-cooling is the preferred cooling method for this project and is discussed below:

There are three basic cooling technology alternatives:

- *Once through cooling* requires a large body of water, such as a large river or reservoir, as a source of cooling water. This is not available for the proposed power plant;
- *Wet cooling* is a preferred technology because of its favourable capital cost and performance impacts. However, large amount of makeup water is required due to the evaporation in the cooling tower which is not available for this Project; and
- *Dry cooling* is accomplished by either an indirect or direct dry cooling method. For the purpose of this project, indirect dry cooling will be used.

Based on the above reasons, it is recommended that dry cooling be the preferred option for this Project. This will be assessed further into the EIA phase of the Project.

Direct cooling utilises exhaust steam from the turbine flowing to the dry cooling elements. Heat from the steam is removed by air which is blown over the finned heat exchanger by forced draft fans, causing the steam to condense to water. The cooled steam is pumped back to the boiler for reuse in the process.

An indirect dry cooling system uses cold water from the cooling tower which flows through the condenser tubes, where the steam from the turbine passes over them. The steam is condensed and pumped back to the boilers whilst the resulted heated water is pumped back to the cooling tower or radiator banks. Heat exchangers inside the cooling towers/radiator banks cool the heated water before it flows back to the condenser tubes.

4.3 Process Alternatives

4.3.1 Combustion Technology Alternatives

As the opportunity is based on coal utilisation, the alternatives considered relate to coal combustion only.

The CFBC boiler technology was chosen over a traditional Pulverised Coal boiler primarily due to the capability for superior fuel flexibility with the capability of firing a wide range of solid fuels with varying heating values, ash content, and moisture content. Slagging and fouling tendencies are minimised in CFBC units because of the low combustion temperatures. In addition, sulphur dioxide emissions can be controlled from a CFBC without

the use of external scrubbers and nitrous oxide emissions from CFBC units are inherently lower than a Pulverised Coal boiler.

4.3.2 Coal Processing Alternatives

To reduce emissions from the burning of lower grade coal, three options to process the coal were assessed by RSV ENCO. The purpose of assessing coal processing options was to assess how well the Calorific Value (CV) of coal could be improved, reduce the sulphur content as well as maintain a cost effective product to be supplied to the power plant. To generate the coal specifications, borehole data was filtered according to certain cut-off criterion to determine the initial destination of the coal. The three scenarios that were considered involved the following processing options:

4.3.3 Ash Disposal Alternatives

There are three possibilities for ash disposal, namely:

- Above-ground ash dumping*:* This process involves the disposal of the ash by means of stacking and spreading on a piece of ground, so as to create an ash dump. The operational dump site would be continuously rehabilitated with topsoil and re-vegetated as it develops, until it reaches the end of its life.
- In pit ash disposal*:* An alternative to above-ground ash dumping would be in pit ash disposal into the open pit of the Temo Coal Mine. It is suggested that layers of ash and waste material would result in better seepage quality resulting from lower water content of the waste materials beneath a thick surface ash layer. However, this option has to be explored further; and
- The sale of the ash*:* Fly ash could be used in the concrete mix as a pozolan, as it improves concrete performance, making it stronger, more durable, and more resistant to chemical attack.

Namane intends to dispose of the ash on a permanent ash dump, however, the option to dispose of the ash in the open pit at the neighbouring Temo Coal Mine during backfilling may be considered at a later stage if such a practice is proven to be safe.

4.3.4 Ash Dump Alternatives

Namane will require an area of 120 ha to accommodate the ash dump. At present, two potential sites for the ash dump have been identified, both of which are located on Duikerpan 249LQ. The ash dump could potentially be placed alongside the power plant footprint within the rail loop; however, it is best to have some distance between the power plant and the ash dump. The alternate location which has been preliminarily identified is to the east of the rail loop. Further design detail is required for the overall project to decide the final placement of the ash dump.

4.3.5 No-Go Alternative

The 'No-go' alternative is the option of not constructing the power plant. If the Project were not to proceed:

- The demand for Eskom's energy consumption will continue;
- Economic activity, skills development and available jobs will not be created (locally, provincially and nationally);.

At this stage, there is no negative outcome predicted by this Project that will outweigh the benefit of electricity supply. This project also allows for practical use of lower bench coal as opposed to the coal being discarded.

5 Scoping Process

5.1 Environmental Process

The project is currently in the Development phase, during which an integrated Environmental Authorisation application in terms of NEMA and NEM:WA has been completed and submitted to the DEA. The timeframes for the environmental authorisation process are presented in Figure 5-1.

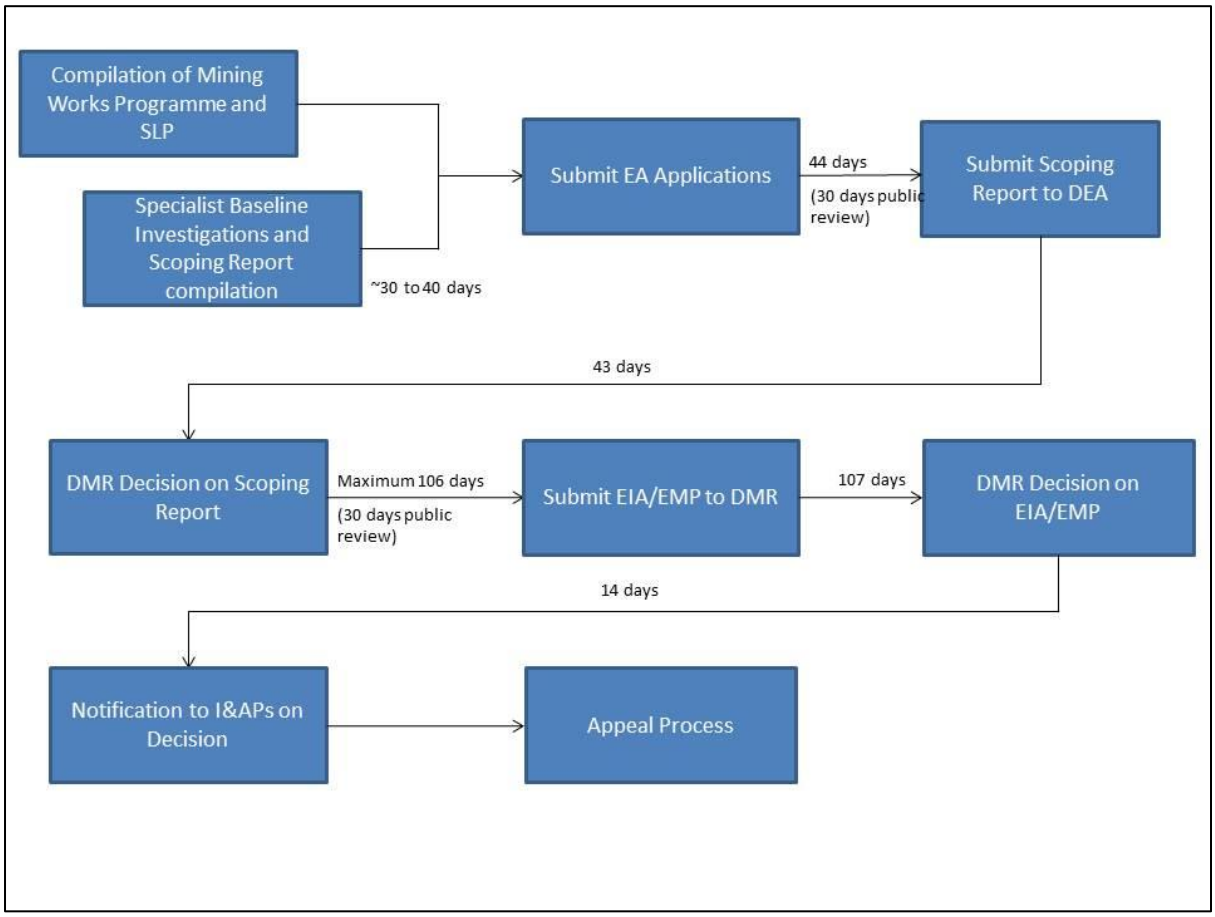


Figure 5-1: EIA Process Timeframe

5.2 Technical Scoping Report

5.2.1 Desktop Assessment/Evaluation

A desktop assessment was conducted to obtain information and gain an understanding of the Project, the receiving environment and the regulatory requirements. Information has primarily been obtained from the client and the technical engineering team. Additional sources of information have been obtained from the reliable internet sources and other power plant related studies previously conducted which are available in the public domain.

5.2.2 Site Visit

Some Specialists site inspections have already been conducted with the rest planned for December 2015 and January 2016.

5.2.3 Impact Identification

Impact assessments will be informed by the initial desktop investigations, and confirmed through the site inspections and the resultant reports. However, potential impacts have been identified based on the general knowledge of the area and are discussed in Section 8.

5.2.4 Scoping Report and Terms of Reference for Specialist Studies

The Scoping Phase (and eventual EIA Phase) is informed by South African legislation.

6 Public Participation Process

The Public Participation Process (PPP) is designed to provide Interested and Affected Parties (I&APs) with the opportunity to evaluate the proposed project, to provide the needed inputs and to receive feedback from the project team and/or proponent. I&APs represent relevant sectors of society and various relevant organs of state. The section to follow provides an overview of the PPP and describes what consultation activities have been undertaken to date and includes the next steps as part of the environmental regulatory process.

6.1 Objectives of Public Participation

The PPP objectives for the environmental regulatory process have been set out below:

- To ensure that I&APs are informed about the proposed project;
- To provide I&APs opportunity to engage and provide comment on the proposed project;
- To draw on local knowledge by identifying environmental and social concerns associated with the proposed project;
- To involve I&APs with identifying methods in which concerns can be addressed;
- To verify that stakeholder comments have been accurately recorded; and
- To comply with the legal requirements.

The three main phases during which I&APs are engaged as part of the environmental regulatory process, are detailed below.

6.1.1 Scoping Phase

During the Scoping Phase, the following core PP activities are undertaken:

- Stakeholders were identified, and the database continually updated;
- Background Information Document (BID) and letter was distributed together with the placement of adverts and site notices;

- The environmental Scoping Report and associated documentation is available for public comment;
- Consultation with I&APs will be undertaken; and
- Suggestions and concerns will be obtained from I&APs.

6.1.2 Impact Assessment Phase

For the Impact Assessment Phase the following main consultation activities will be undertaken:

- Feedback about the specialist studies conducted and mitigation measures proposed during I&AP consultation will be provided;
- Opportunity will be provided to I&APs to comment on specialist findings, impacts assessments and recommendations;
- The EIA/EMP report will be made available for public comment; and
- I&AP will verify the accurate capturing of comments raised and responses provided.

6.1.3 Decision-Making Phase

With completion of the Impact Assessment Phase registered I&APs will be notified of the decision made by the relevant competent authorities regarding the Project.

6.2 Public Participation Methodology

The proposed methodology being implemented for the PPP is in line with the prescribed environmental regulatory requirements as described in the Introduction (Section 6.1).

6.3 Scoping Phase

6.3.1 Identification of Stakeholders

To ensure a proper representation of stakeholders interested in or affected by the proposed Project, the following identification methods were used to develop the stakeholder database:

- Windeed and desktop searches were conducted in and around the project area to verify landownership and obtain contact details;
- Responses from the newspaper advertisement and site notices;
- Responses from the Background Information Document (BID) and notification letter made available to stakeholders; and
- Networking with stakeholders in order to identify additional stakeholders interested in or affected by the proposed project.

Stakeholders for the Project are grouped into the following categories:

- **Government:** National, Provincial, District and Local authorities;
- **Landowners:** Directly affected and surrounding landowners;
- **Land occupiers:** Directly affected and surrounding land occupiers;
- **Communities:** Surrounding communities;
- **Non-Governmental Organisations (NGOs):** Environmental and social organisations;
- **Agriculture:** Associations or organisations focussed on agricultural activities;
- **Parastatals:** Semi-government institutions; and
- **Business:** Small and medium enterprises and formal organisations.

A stakeholder database has been compiled which will be updated throughout the environmental regulatory process. Affected adjacent landowners are listed in Table 3-3.

6.3.2 Public Participation Scoping Phase Activities

Table 6-1 provides more detail about the consultation activities undertaken thus far, including where the draft Scoping Report has been made available for public comment.

Table 6-1: Public locations for draft Scoping Report review

Activity	Details
Identification of stakeholders	A stakeholder database was developed which includes I&APs from various sectors of society, including directly affected and adjacent landowners, in and around the proposed project area.
Distribution of announcement letter and BID	A BID, announcement letter with Registration and Comment Form was emailed and posted to stakeholders on Tuesday, 3 November 2015.
Placing of newspaper advertisement	An English advert was placed in the Mogol Post on Friday, 6 November 2015.
Putting up of site notices	English site notices were put up at the proposed project site, local libraries and municipal offices on Thursday, 5 November 2015 at: ▪ Lesedi Village, Steenbokpan; and ▪ Lephalale Local Municipality Public Library. A site notice placement map and report were also developed to indicate geographically the various site notice locations.

Activity	Details
Announcement of Scoping Report	Announcement of availability of the Scoping Report was emailed and posted to stakeholders together with the formal project announcement on Tuesday, 3 November 2015. Copies of the Scoping Report are available at: ▪ Lesedi Village, Steenbokpan; and ▪ Lephalale Local Municipality Public Library. The Scoping Report is also available on www.digbywells.com and will be made available the Public Meeting. *(30-day comment period for the Scoping Report: Friday, 13 November to Monday, 14 December 2015)*
Stakeholder Meeting	A Public Meeting will be undertaken as follows: Mogol Club (Cnr George Wells and Nelson Mandela Drive, Onverwacht) on. Friday, 27 November 2015 from 10:00 – 12:00.
Announcement of finalised Scoping Report	Announcement of availability of the finalised Scoping Report will be emailed and posted to stakeholders together with a Comment Sheet and will be available on www.digbywells.com (Public Documents).
Obtained comments from stakeholders	Comments, issues of concern and suggestions received from stakeholders will be captured in the Comments and Responses Report (CRR).

6.4 Public Participation during Impact Assessment Phase

It is anticipated that the consultation process to be implemented for the Impact Assessment phase will be similar to the process commenced for the Scoping phase. The premise of activities is to adhere to various legislative requirements for consultation and that a single, integrated process is followed. This will limit stakeholder fatigue and ensure that stakeholders are presented with a single view of the full project and EIA information. It is envisaged that the process will commence in January / February 2016 during which another Public Meeting will be held.

Stakeholder comments gathered during the Scoping phase and outcomes from the meetings will be closely considered for further consultation activities and inclusion for specialist studies (where applicable). The main emphasis of stakeholder meetings as part of this phase will be to share results of the specialist impact studies completed and the associated suggested mitigation measures and recommendations.

6.5 Decision-Making Phase

The DEA and LEDET, as competent authorities for the Environmental Authorisation process and Emissions Licence respectively, will issue a decision about the Environmental Authorisation for the Project. This decision must be communicated to stakeholders as prescribed under the NEMA 2014 Regulations. As such, notification to stakeholders will be done by means of a letter via email and post, and placement of an advertisement in the relevant newspaper(s).

6.6 Comments received from public to date

Table 6-2 and Table 6-3 below are a summary of the comments received from I&APs prior to the Draft Scoping Report being published, including the relevant responses to each comment.

Table 6-4: Interested and Affected Parties

Interested and Affected Parties		Date of comments received	Issues raised	EAPs response to issues as mandated by the applicant	Consultation Status (Consensus dispute, not finalised, etc.)
Name of Individual	**Consulted**				
Landowners					
Heinrich Weldon Schönfeldt Landowner	Written Comment	09 November 2015	As a neighbouring farm owner, this will impact our farming and activities severely.	Digby Wells will investigate all potential impacts to adjacent landowners. Mitigation measures for each impact will be included in the Environmental Management Plan which Namane Generation must adhere to. Long-term monitoring programmes will also be developed for each phase of the Project (construction, operation and decommissioning phase). Impacts which may extend further than the power plant (i.e., air pollution, ground and surface water, etc.) will be studied by the relevant qualified specialists and their findings will be included in the Environmental Impact Report.	Not finalised.

Interested and Affected Parties		Date of comments received	Issues raised	EAPs response to issues as mandated by the applicant	Consultation Status (Consensus dispute, not finalised, etc.)
Name of Individual	Consulted				
Heinrich Weldon Schönfeldt Landowner	Written Comment	09 November 2015	As stated above we are direct neighbours, noise pollution, dust pollution, water pollution and the possibility of squatting, sewage are the main issues.	Digby Wells will investigate all potential impacts to adjacent landowners. Mitigation measures for each impact will be included in the Environmental Management Plan which Namane Generation must adhere to. Long-term monitoring programmes will also be developed for each phase of the Project (construction, operation and decommissioning phase). Impacts which may extend further than the power plant (i.e., air pollution, ground and surface water, etc.) will be studied by the relevant qualified specialists and their findings will be included in the Environmental Impact Report.	Not finalised.
Heinrich Weldon Schönfeldt Landowner	Written Comment	09 November 2015	A buffer zone of farms should be bought out.	The power plant and associated activities will require approximately 200 hectares and will be positioned on the northern portion of Farm Duikerpan, alongside the approved Temo Coal Mine. The remaining areas of Farm Duikerpan will	Not finalised.

Interested and Affected Parties		Date of comments received	Issues raised	EAPs response to issues as mandated by the applicant	Consultation Status (Consensus dispute, not finalised, etc.)
Name of Individual	Consulted				
				remain excluded from the power plant activities. Due to the development plans for the area and existing mining rights/environmental authorisations already obtained or in progress by other companies, it might not be possible to have such a buffer zone around the project area. Alternatives means to buffer the possible impacts will be investigated.	
Heinrich Weldon Schönfeldt Landowner	Written Comment	09 November 2015	Farming with cattle and wildlife; there is also hunting and general leisure. All of these activities take place on the farm.	The construction of a power plant will create a visual impact to the surrounding area, however; other impacts to health and the biophysical environment will be assessed, mitigation measures put in place, as well as long-term monitoring to avoid or mitigate potential impacts to neighbouring farms.	Not finalised.
Heinrich Weldon Schönfeldt Landowner	Written Comment	09 November 2015	Farming with cattle and wildlife. There is also hunting and	The construction of a power plant will create a visual impact to the surrounding area, however; other impacts to health and the biophysical	Not finalised.

Interested and Affected Parties		Date of comments received	Issues raised	EAPs response to issues as mandated by the applicant	Consultation Status (Consensus dispute, not finalised, etc.)
Name of Individual	Consulted				
			general leisure.	environment will be assessed, mitigation measures put in place, as well as long-term monitoring to avoid or mitigate potential impacts to neighbouring farms.	
Heinrich Weldon Schönfeldt Landowner	Written Comment	09 November 2015	Features you need to be aware of are wildlife and groundwater.	A qualified Geohydrologist, Fauna Specialist, Flora Specialist, Avifauna Specialist and Wetland Specialist have been appointed to conduct Environmental Impact Assessments for this Project, on all affected farms. This involves a desktop assessment of the area, a visit to the site of the power plant and surrounding areas, as well as compiling a report with appropriate mitigation measures which Namane Generation must adhere to.	Not finalised.
Heinrich Weldon Schönfeldt Landowner	Written Comment	09 November 2015	Yes, entrance road will be negatively affected.	An access road connected to the D175 will be required and the site entrance will comply with the necessary legal requirements. The preferred option to transport coal to the power plant is via a	Not finalised.

Interested and Affected Parties		Date of comments received	Issues raised	EAPs response to issues as mandated by the applicant	Consultation Status (Consensus dispute, not finalised, etc.)
Name of Individual	Consulted				
				conveyor and not by road.	
Heinrich Weldon Schönfeldt Landowner	Written Comment	09 November 2015	A buffer zone of farms should be achieved.	The power plant and associated activities will require approximately 200 hectares and will be positioned on the northern portion of Farm Duikerpan, alongside the approved Temo Coal Mine. The remaining areas of Farm Duikerpan will remain excluded from the power plant activities. Due to the development plans for the area and existing mining rights/environmental authorisations already obtained or in progress by other companies, it might not be possible to have such a buffer zone around the project area. Alternatives means to buffer the possible impacts will be investigated.	Not finalised.
SDJ De Villiers Lategan Viljoen Pretorius Attorneys (representing Hardus	Written Comment	11 November 2015	Negative to area currently occupied by farmers.	Digby Wells will investigate all potential impacts to adjacent landowners. Mitigation measures for each impact will be included in the Environmental Management Plan which Namane Generation	Not finalised.

Interested and Affected Parties		Date of comments received	Issues raised	EAPs response to issues as mandated by the applicant	Consultation Status (Consensus dispute, not finalised, etc.)
Name of Individual	Consulted				
Steenkamp)				must adhere to. Long-term monitoring programmes will also be developed for each phase of the Project (construction, operation and decommissioning phase). Impacts which may extend further than the power plant (i.e., air pollution, ground and surface water, etc.) will be studied by the relevant qualified specialists and their findings will be included in the Environmental Impact Report.	
SDJ De Villiers Lategan Viljoen Pretorius Attorneys (representing Hardus Steenkamp)	Written Comment	11 November 2015	Negative to landowners, negative to environment health.	Digby Wells will investigate all potential impacts to adjacent landowners. Mitigation measures for each impact will be included in the Environmental Management Plan which Namane Generation must adhere to. Long-term monitoring programmes will also be developed for each phase of the Project (construction, operation and decommissioning phase). Impacts which may extend further than the power plant (i.e., air	Not finalised.

Interested and Affected Parties		Date of comments received	Issues raised	EAPs response to issues as mandated by the applicant	Consultation Status (Consensus dispute, not finalised, etc.)
Name of Individual	Consulted				
				pollution, ground and surface water, etc.) will be studied by the relevant qualified specialists and their findings will be included in the Environmental Impact Report.	
SDJ De Villiers Lategan Viljoen Pretorius Attorneys (representing Hardus Steenkamp)	Written Comment	11 November 2015	Farming adjacent to mines and power stations not viable.	Digby Wells will investigate all potential impacts to adjacent landowners. Mitigation measures for each impact will be included in the Environmental Management Plan which Namane Generation must adhere to. Long-term monitoring programmes will also be developed for each phase of the Project (construction, operation and decommissioning phase). Impacts which may extend further than the power plant (i.e., air pollution, ground and surface water, etc.) will be studied by the relevant qualified specialists and their findings will be included in the Environmental Impact Report.	Not finalised.
SDJ De Villiers	Written	11 November	Land is used for	The impact to the soil, land use and land	Not finalised.

Interested and Affected Parties		Date of comments received	Issues raised	EAPs response to issues as mandated by the applicant	Consultation Status (Consensus dispute, not finalised, etc.)
Name of Individual	Consulted				
Lategan Viljoen Pretorius Attorneys (representing Hardus Steenkamp)	Comment	2015	farming.	capability is being investigated by a qualified Soil Specialist and the findings of the investigation will be included in the Environmental Impact Report.	
SDJ De Villiers Lategan Viljoen Pretorius Attorneys (representing Hardus Steenkamp)	Written Comment	11 November 2015	Activities take place on each farm.	In consultation with SDJ De Villiers Lategan Viljoen Pretorius Attorneys to clarify nature of query. The response will be included in the Final Scoping Report.	Not finalised.
SDJ De Villiers Lategan Viljoen Pretorius Attorneys (representing Hardus Steenkamp)	Written Comment	11 November 2015	There is no water, heritage sites, rare plants or animals.	Thank you for the comment.	Not finalised.
SDJ De Villiers Lategan Viljoen Pretorius Attorneys (representing Hardus	Written Comment	11 November 2015	Environmental features can be found on Duikerpan, Niew	All environmental aspects relevant to this Project are undergoing an environmental impact assessment and the results thereof will be included in the Environmental Impact Report.	Not finalised.

Interested and Affected Parties		Date of comments received	Issues raised	EAPs response to issues as mandated by the applicant	Consultation Status (Consensus dispute, not finalised, etc.)
Name of Individual	Consulted				
Steenkamp)			Holland.	Please refer to the Specialist Studies being undertaken for the Environmental Impact Assessment process.	
Xander Neethling Eskom Distribution	Written Comment	5 November 2015	Existing and future Infrastructure and connection of the IPP supply to Eskom Network needs to be considered.	The IPP will be connected to the Eskom grid as part of the Department of Energy Baseload Programme. This will take in discussion with Eskom.	Not finalised.

Table 6-5: Interested Parties

Interested Parties		Date of comments received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and/or responses were incorporated
Name of Individual	**Consulted**				
Teboho Sebogodi Centre for Environmental Rights NPC	Written Comment	05 November 2015	Who is dealing with the Atmospheric Emissions Licence?	Digby Wells has been appointed to compile the Atmospheric Emissions Licence (AEL) Application. Studies in support of the AEL have commenced.	Not finalised.
Teboho Sebogodi Centre for Environmental Rights NPC	Written Comment	05 November 2015	Who is dealing with the Water Use Licence?	Digby Wells Environmental has been appointed to compile the Water Use Licence Application.	Not finalised.
Teboho Sebogodi Centre for Environmental Rights NPC	Written Comment	05 November 2015	Who is the licensing authority for the Atmospheric Emissions Licence?	The Limpopo Department of Economic Development, Environment and Tourism is the Competent Authority for the AEL Application.	Not finalised.

Interested Parties		Date of	Issues raised	EAPs response to issues as	Section and
Teboho Sebogodi Centre for Environmental Rights NPC	Written Comment	05 November 2015	Please also indicate whether you have commenced with applications for the above-mentioned licences.	The compilation of the documentation and related specialist investigations have commenced.	Not finalised.

7 Status of the Receiving Environment

7.1 Climate

7.1.1 Regional Climate

Lephalale experiences hot summers and mild winters. Summer season experiences long and dry afternoons, with an average sunshine duration of 65%, and moderate summer evening temperatures. During the winter, temperature can drop to 3.7°C on average in July. The average annual rainfall is between 350 mm to 400 mm, normally occurring during the mid-summer period.

7.1.2 Temperature

Annual mean temperature for the area is of 31°C, estimated from Lakes MM5 data for the project site. The monthly maximum and average temperatures are depicted in Figure 7-1 and Table 7-1 respectively. The month of November recorded the highest temperature with 36°C and the month of July recording the lowest (24°C).

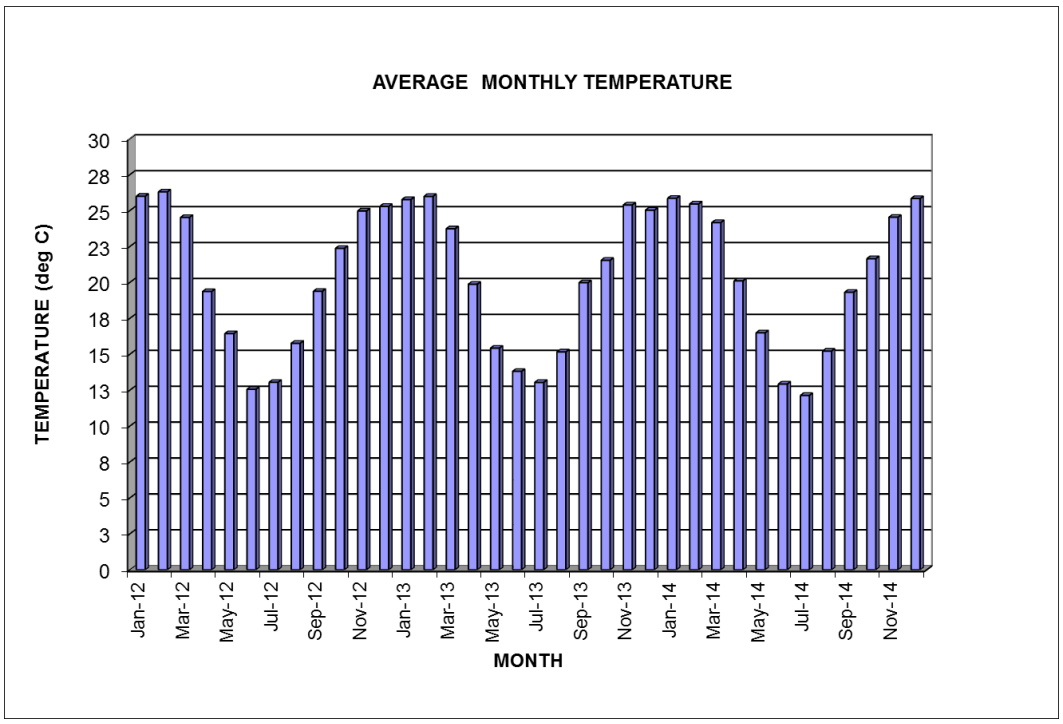


Figure 7-1: Average monthly temperature (2012-2014)

Table 7-1: Average monthly temperature (2012 - 2014)

Temp(°C)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Monthly Maximum	34	35	34	31	28	25	24	28	32	34	36	34	31
Monthly Average	26	26	24	20	16	13	13	15	20	22	25	25	20

7.1.3 Relative Humidity

The annual maximum and average relative humidity are given as 100% and 63% respectively. The monthly maximum relative humidity remains above 55% for the entire year. The monthly relative humidity for the period 2012 to 2014 is presented Figure 7-2 and Table 7-2.

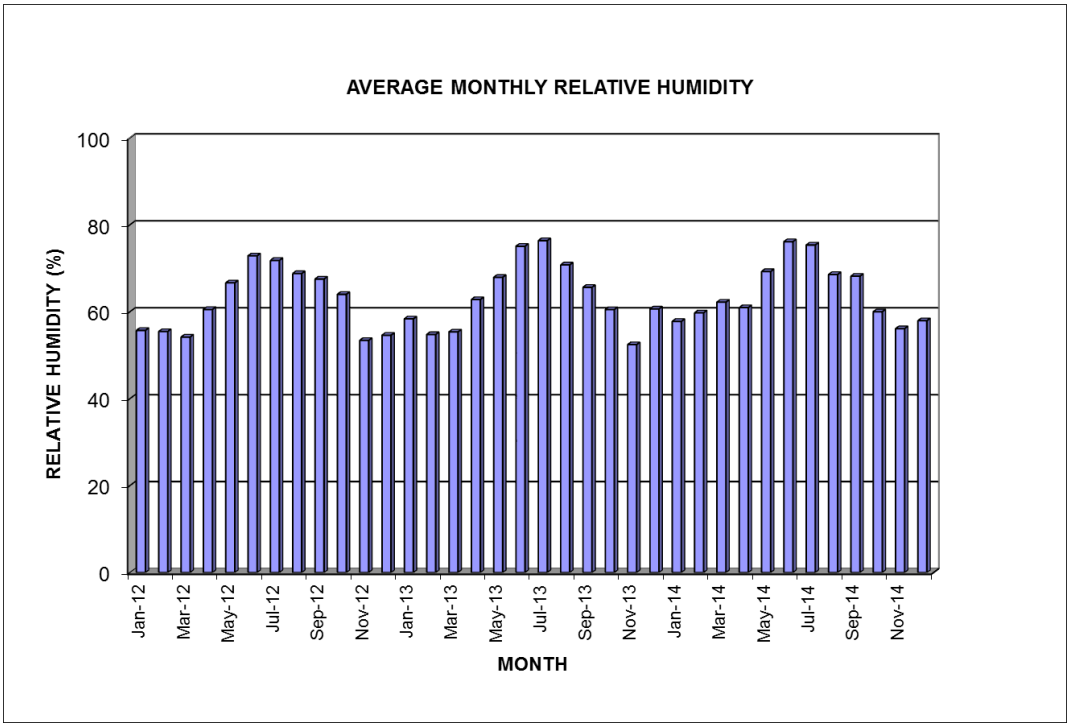


Figure 7-2: Average monthly relative humidity (2012-2014)

Table 7-2: Average monthly relative humidity (2012-2014)

Relative Humidity (%)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Monthly Maximum	100	99	100	100	100	100	100	100	100	100	97	99	100

Monthly Average	57	56	57	61	68	75	75	69	67	61	55	58	63

7.1.4 Precipitation

Precipitation for the three year period (2012-2014) was considered. Total and average monthly rainfall for the project area of 692 mm (maximum) and 44 mm (minimum) were reported. The averages observed for each month over the three year period under survey are depicted in Figure 7-3 below and Table 7-3.

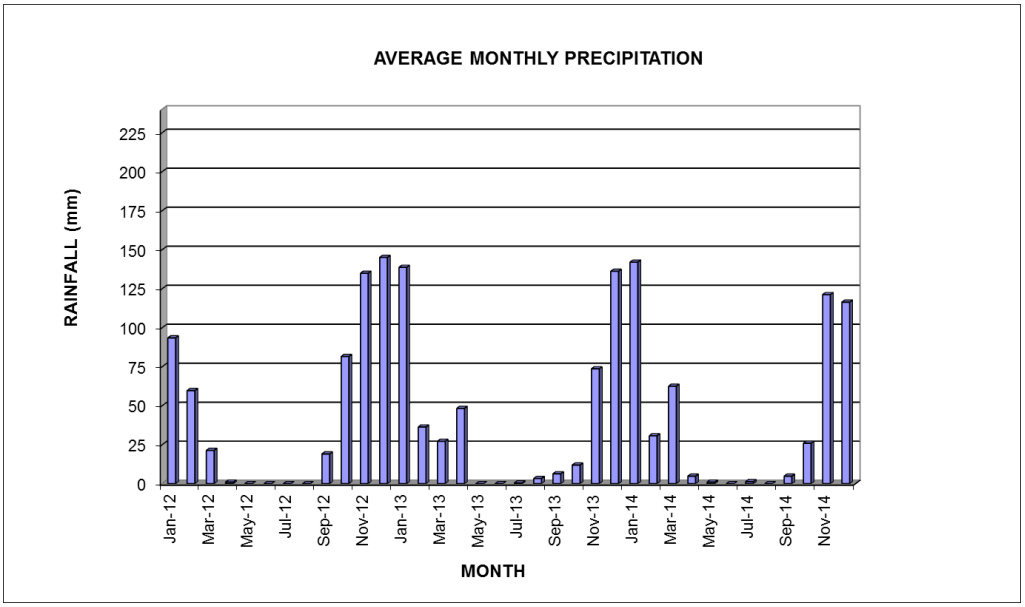


Figure 7-3: Average monthly precipitation (2012 -2014)

Table 7-3: Average monthly precipitation derived from the project area modelled data (2010-2012)

Precipitation (mm)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Total monthly Rainfall (maximum)	141	73	47	48	1	0	1	3	19	82	135	144	692
Average total monthly rainfall	124	61	27	18	0	0	1	1	10	42	112	129	44

7.1.5 Evaporation

The annual maximum, minimum and average evaporation rates measured by the South African Weather Service (SAWS) for the period 1983 to 1987 of 2 364.9 mm, 2 118.9 mm and 2 662.4 mm are reported. The highest monthly average evaporation (268 mm) occurs in January (Figure 7-4 and Table 7-4). The monthly minimum evaporation ranges between 241 mm in January and 88 mm in June.

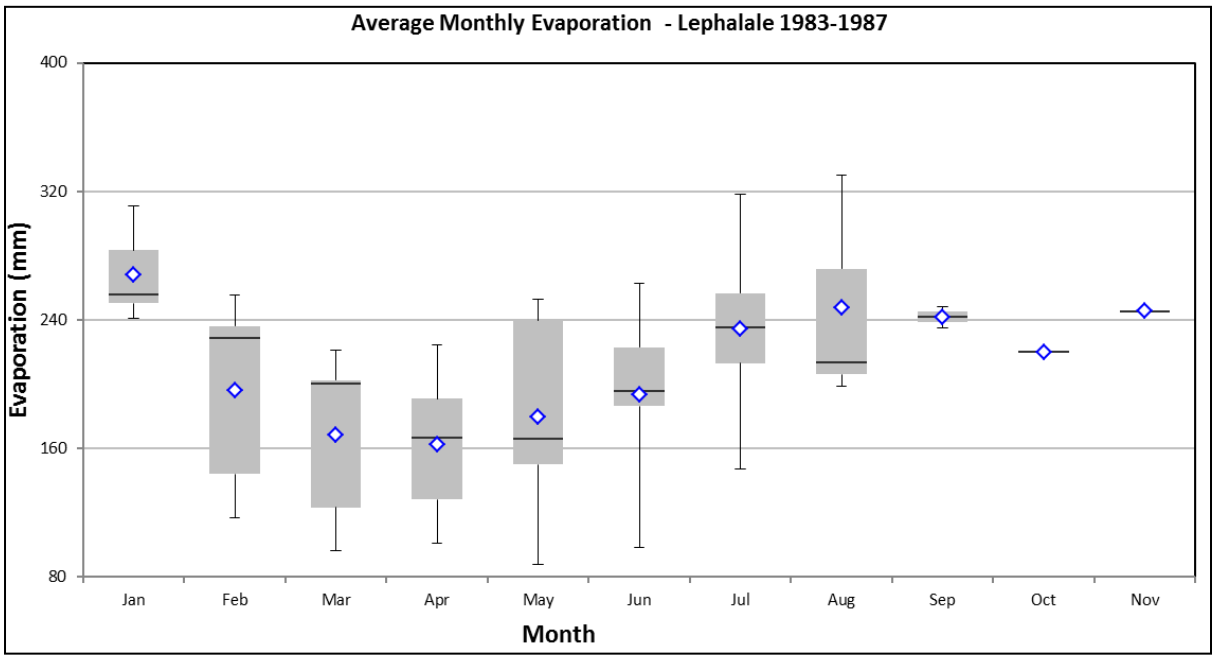


Figure 7-4: Average monthly evaporation for Lephalale S-Pan Evaporation Station (1983 – 1987) (Source: SAWS)

Table 7-4: Maximum, minimum and mean monthly evaporation rates for the Lephalale (Symon's Pan) S-Pan Evaporation Station (1983 – 1987) (Source: SAWS)

Evaporation (mm)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Max.	311	256	221	224	144	123	101	191	253	263	330	245	2662
Min.	241	229	200	167	117	88	99	147	186	235	196	214	2119
Ave.	268	240	208	196	130	103	100	164	215	244	266	232	2365

7.1.6 Mean Monthly Wind Direction and Speed

The spatial and annual variability in the wind field for the project area calculated is shown in Figure 7-5 below. The predominant wind direction is from the northeast (NE) and east northeast (ENE) respectively. The percentages of wind from the NE and ENE are ~30% and

24% respectively. Wind speed greater that ≥ 5.4 m/s occurred for about ~9% throughout the three year period.

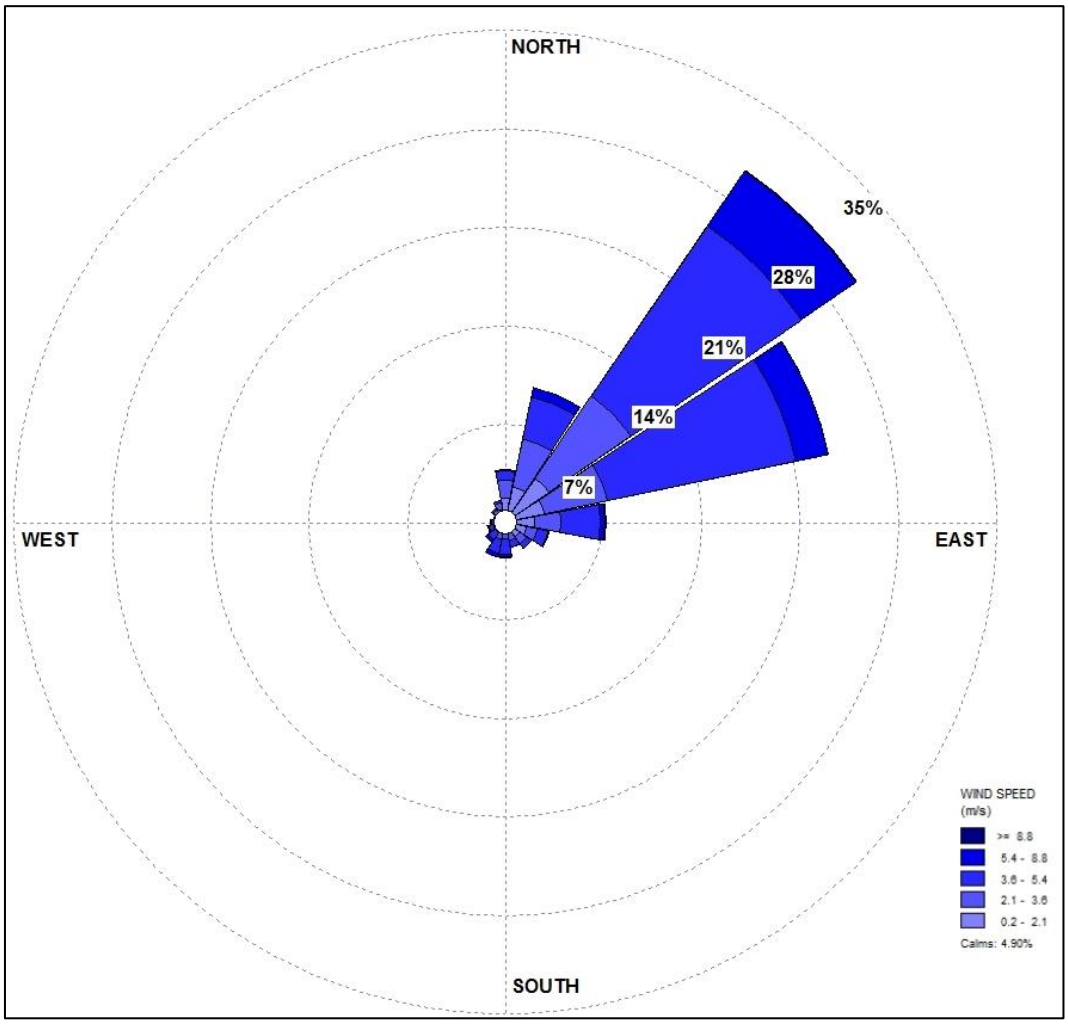


Figure 7-5: Surface wind rose

7.2 Topography and Visual/Aesthetic Character

The project area and surrounds are relatively flat. The topographical model indicates that the elevation of the project area decrease from 871 metres above mean sea level (mamsl) in the south-east to 858 mamsl in the north-west. Plan 7 (Appendix A) illustrates the topographical model and features of the project area.

The project area has gentle slopes of less than 1°. Plan 7 (Appendix A) illustrates the slope model of the project area. The slope aspect / direction of the project area is in a north-westerly direction towards the Limpopo River. Plan 8 (Appendix A) illustrates the aspect model of the project area.

The relatively flat topography is expected to provide only minimal screening of the Project. According to Mucina and Rutherford (2012) the dominant vegetation type of the project area and surrounds is Limpopo Sweet Bushveld characterised by grassland, bushed and trees (often Acacia dominated). The vegetation in the project area and surrounds is relatively dense and has an average height of 5 metres (m). This vegetation type is expected to provide some screening of the roject.

7.3 Air Quality

7.3.1 Air Quality Baseline

Major atmospheric pollutants in the Project area near Steenbokpan in Limpopo will be influenced by the local and regional pollutants sources, which will include:

- Power plants (existing and proposed) in the region;
- Mining and related infrastructure; and
- Farming.

The proposed project has potential to exacerbate ambient air quality loading in the area due to the emission of particulate matter from the construction and operational phases, including gaseous emissions from the operation of the power plant which will be associated with stack emissions ranging from NOx, SOx, CO, and particulate matter.

7.3.1.1 Baseline

Ideally, dust fall and particulate matter (PM_{10}) monitoring should have commenced in the project area to establish the background scenario in the area. Hence, data measured at the Waterberg-Bojanala Priority Area (WBPA) Air Quality Monitoring Station (AQMS) in Lephalale, some 43 km east of project area hosted by South African Air Quality Information System (SAAQIS) and owned by the DEA. The following pollutants from SAAQIS were used to assess background conditions:

7.3.1.1.1 PM_{10}

Figure 7-6 shows PM_{10} for the period January 2013 to November 2015. The ambient PM_{10} concentration in the area is within the current NEM:AQA Standard of 75 µg/m^3. Although the graph showed exceedances, it was difficult to quantify in the absence of raw data. Irrespective of the aforementioned, it is obvious that the permissible frequency may have been exceeded (four times within a year). In general, the area is within compliance for most of the time.

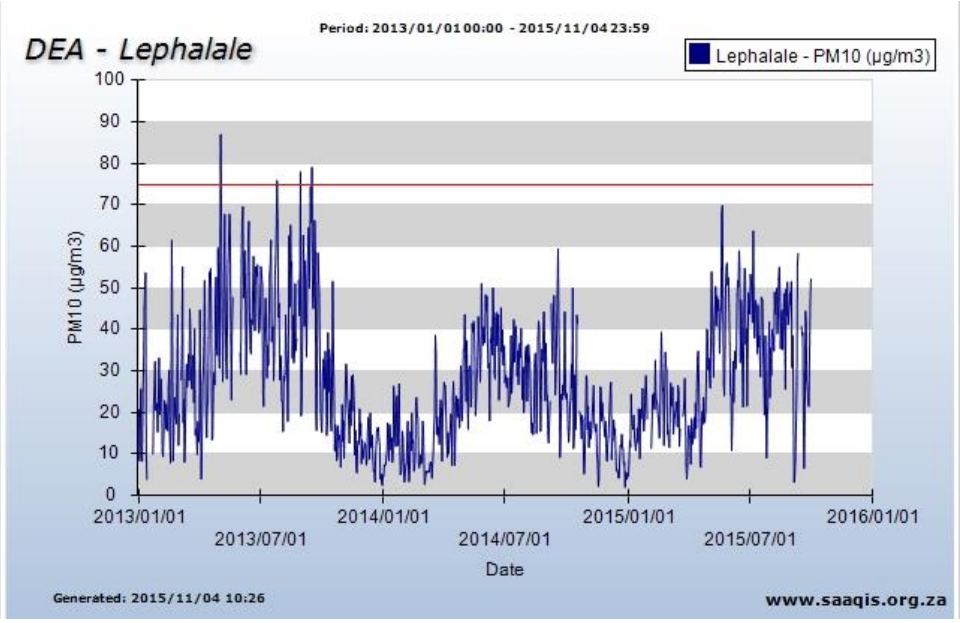


Figure 7-6: PM_{10} (24 hour averaging) at Lephalale AQMS

7.3.1.1.2 $PM_{2.5}$

The $PM_{2.5}$ concentrations measured at the AQMS in Lephalale for the period January 2013 to November 2015 is presented in Figure 7-7. The ambient $PM_{2.5}$ concentration in the area is in compliance with the current NEM:AQA Standard of 65 µg/m^3. Based on this data, it can be seen that the permissible frequency of exceedance (four times within a year) was not violated for the period under investigation.

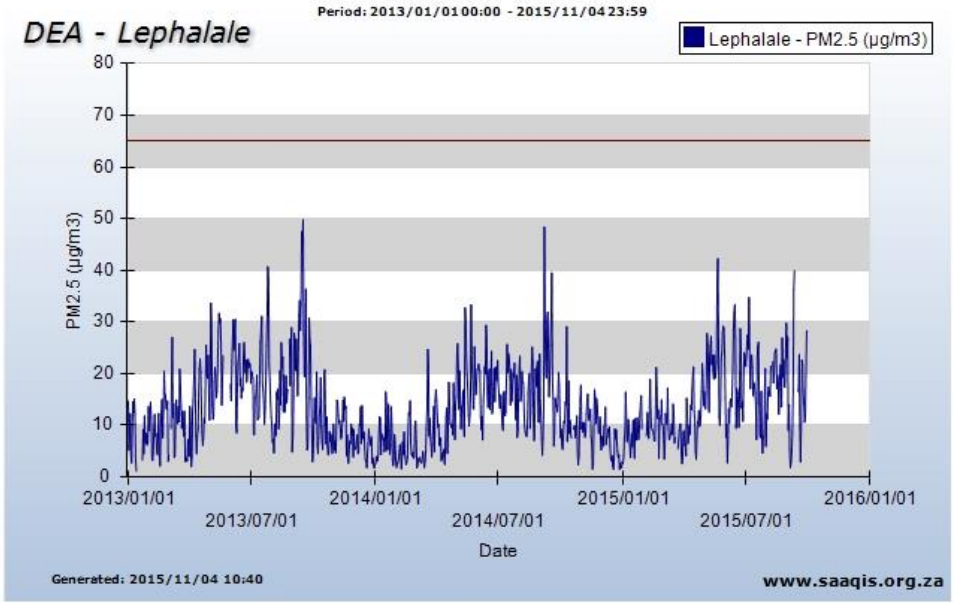


Figure 7-7: $PM_{2.5}$ (24 hour averaging) at Lephalale AQMS

7.3.1.1.3 SO_2

The ambient SO_2 concentration measured at the AQMS in Lephalale for the period January 2013 to November 2015 is presented in Figure 7-8. The SO_2 24-hours levels are well within the regulatory limit value. No exceedances of the current NEM:AQA Standard of 48 ppb was observed. Based on this data, it can be seen that the permissible frequency of exceedance (four times within a year) was not violated for the period under investigation.

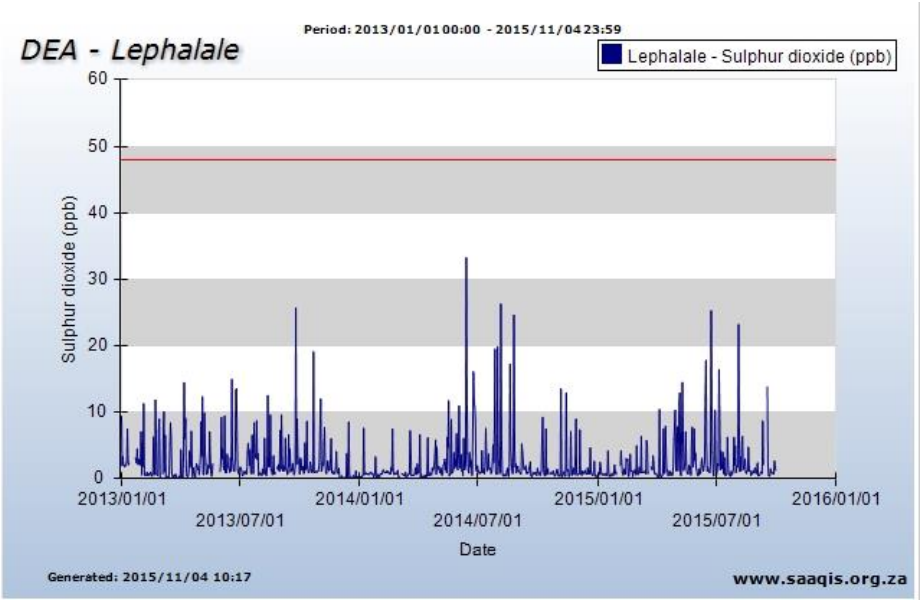


Figure 7-8: SO_2 (1 hour averaging period) at Lephalale AQMS for 2012 period

The ambient concentration of NO_2 measured at the AQMS in Lephalale for the period January 2013 to November 2015 is presented in Figure 7-9. Levels are well within the NEM:AQA Standard of 106 ppb. Some exceedances were observed in May 2014, with concentration reaching a high of ~190 ppb.

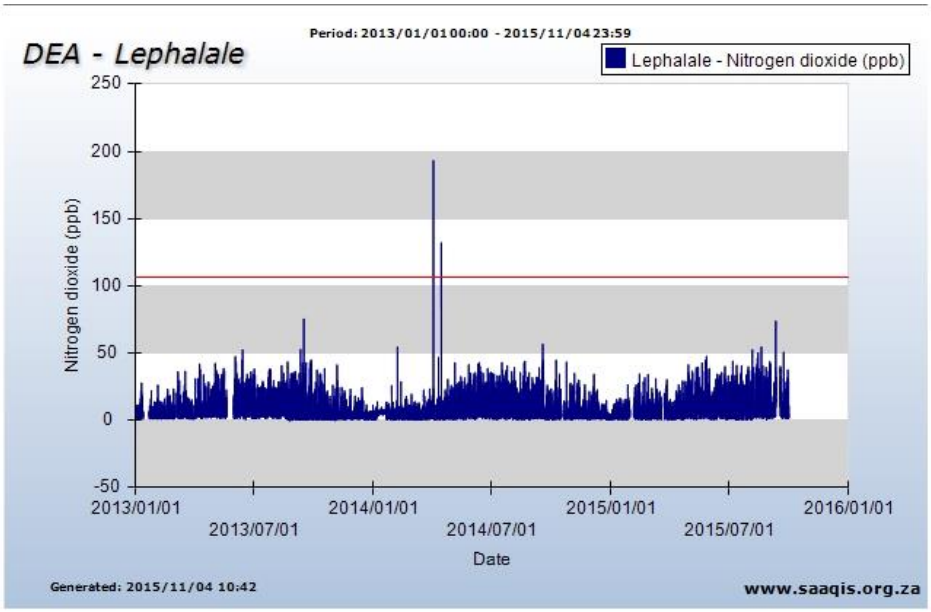


Figure 7-9: NO_2 (1hr averaging period) at Lephalale AQMS for 2012 period

The concentration of Carbon Monoxide measured at the AQMS for the period January 2013 to November 2015 is presented in Figure 7-10. The levels are with the regulatory standard with no exceedance observed for the period under survey.

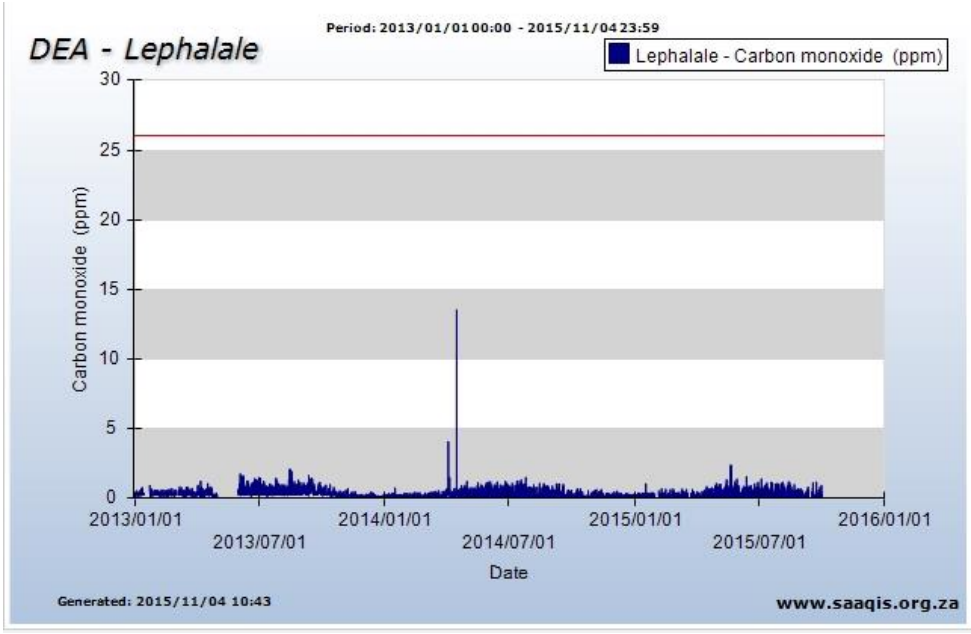


Figure 7-10: CO (1 averaging period) at Lephalale AQMS

7.4 Geology

The coal deposit at the Temo Coal Mine (where the coal will be sourced for the power plant) is hosted in Karoo Supergroup formations which rest unconformably on the Waterberg Group and pre-Waterberg rocks.

The coal seams in the area form part of the Upper (Volksrust formation) and Middle Ecca (Vryheid formation) with an average coal thickness of 115 m. The Upper Ecca is on average 60 m thick and comprises interblended shale and bright coal successions whilst the Middle Ecca, on average 50 m thick, forms the lower part of the coal deposit and contain dull coal, carbonaceous shale, as well as grit and sandstone.

The Waterberg coal field is fault-bounded along its northern and southern limits. The Eenzaamheid fault, with a displacement of at least 250 m, forms the southern boundary, whilst the northern boundary is formed by the Zoetfontein fault. The Daarby fault, with a displacement of 250 m, divides the Waterberg coal field into two areas: a shallow western area where it is possible to obtain the coal through open pit mining methods and a deep north-eastern area where the coal occurs at a depth of 250 m below surface. Although this coal field covers a relatively small surface area, it is one of South Africa`s most important coal fields in terms of *in-situ* reserves. The coalfield extends west across the Limpopo River into Botswana, where it is known as the Mmamabula Coalfield.

7.4.1 Stratigraphy

The Waterberg coalfield is subdivided by the Daarby fault that delineates a shallower western part and a deeper north eastern part. Only a few dolerite dykes are present in the south-eastern portion of the coalfield and no sill features have to date been encountered in any exploration borehole. A typical stratigraphic column of the coal deposit is presented in Figure 7-11.

The classical units of the Karoo sedimentary sequence are present in the coalfield and hence, the same nomenclature is applied.

The geological formations of interest to the project include the Grootegeluk and Vryheid Formations of the Ecca Group which contain 11 coal-bearing zones representing a stratigraphic thickness of approximately 120 m. The Grootegeluk Formation consists of seven zones of finely intercalated bright coal and mudstone bands and lamina. The Vryheid Formation consists of carbonaceous mudstones at the top and medium-coarse sandstones toward the base, with four inter-bedded and prominent coal seams.

7.4.2 Coal Deposit

The coal deposit forms part of the Waterberg Coalfield and consists of 11 coal-bearing zones numbered from No. 1 at the base to No. 11 at the top, containing various seams of coal of varying quality interspersed with waste rock.

The upper seven coal zones (Zone 5 to 11) occur up to a depth of 80 m and the individual seams vary in thickness from 7 m to 14 m. The highest quality coals are found in Zone 8 to Zone 11, which have a semi-soft coking coal yield. The remainder of the zones yield a low grade thermal coal suitable for local power generation.

The lower four coal zones occur up to a depth of 125 m and are predominantly dull coal with minor carbonaceous mudstone intercalations which are mined as thermal coals.

The total coal resource is estimated at 1500 Mt of *in situ* coal. All the coal found in Zone 2 to Zone 11 are indicated to be economically viable, but the initial focus of mining is on Zone 6 to Zone 11 (Namane Energy correspondence, 2010).

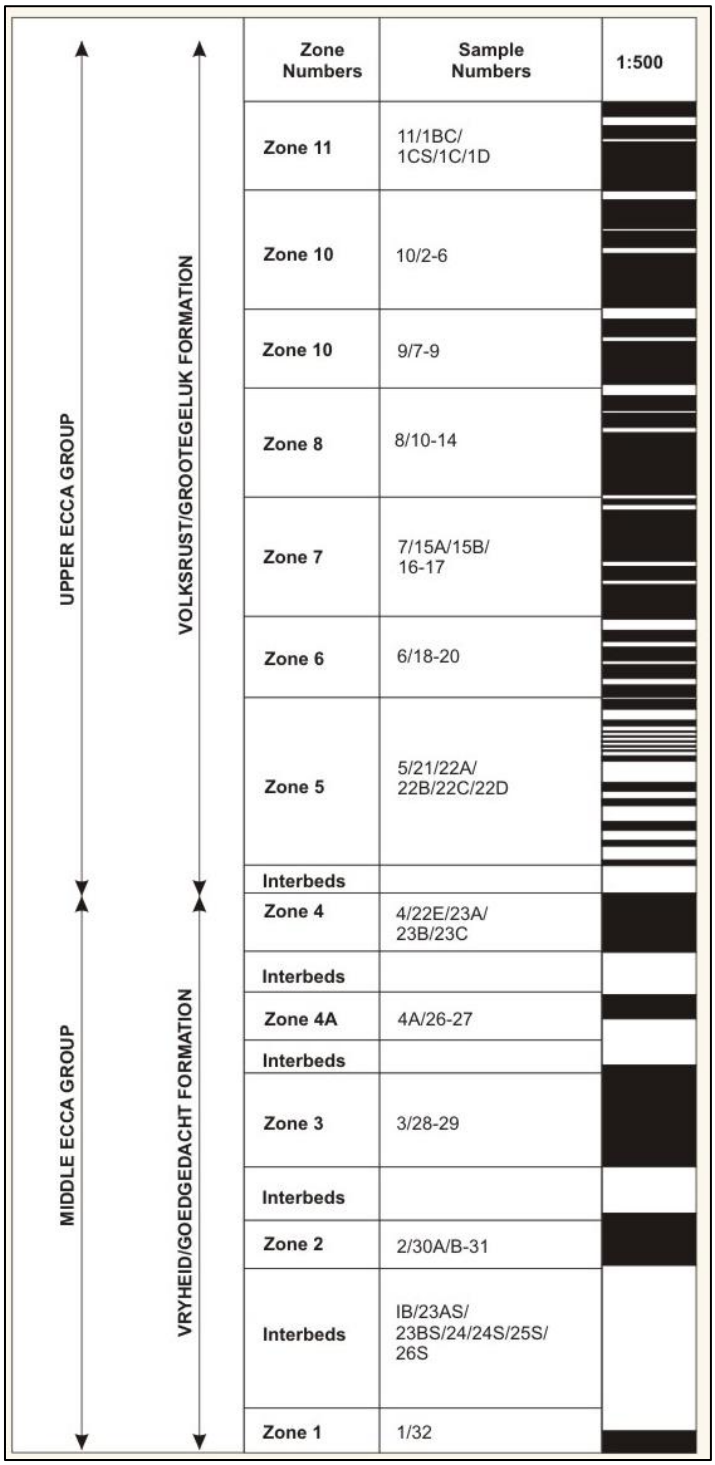


Figure 7-11: Stratigraphy of the Waterberg coal zones (Temo Coal, 2010)

7.5 Noise

The Project is situated in a rural area. The SANS 10103:2008 guidelines for rural district limits is 45 dBA (daytime) and 35 dBA (night time). Baseline noise measurements undertaken in 2011 for the Temo Mining Right Application, indicate that the average daytime ambient levels are between 32 dBA and 41 dBA, with the night time levels measuring between 32 dBA and 39 dBA. The overall ambient soundscape is indicative of a rural area.

7.6 Soils

7.6.1 Dominant Soil Forms

The dominant soil forms noted include deep regic sands of the Namib form that exhibit varying colour (pale yellow and brown to red) and well sorted texture with less than six (6%) percent clay for the most part, to fine grained sandy loams with apedel structure, poor organic carbon content and less than 12% clay. These include soils of the Plooysburg and Kimberley forms where the “C” horizon is associated with a carbonate (hard or soft) and deep sandy loams with slightly higher clays and saprolite that comprise Hutton and Clovelly form soils.

The shallower and more clay rich soils comprise materials that are influenced by the presence of evaporites as the inhibiting underlying horizon. These include the Etosha, Gamoep, Tukulu and Oakleaf forms, with smaller but significant areas of Montagu and Addo forms. The presence of wetness within the profile is of significance, and although subtle and often obscured by the influence of the aeolian sands, these soils are of importance to the ecological diversity of the area.

7.6.2 Soil Properties

7.6.2.1 Fertility

Based on background information (no results received as yet) it is reported that the soils are inherently low in calcium and magnesium, have low to very low concentrations of organic carbon and return lower than average quantities of potassium and sodium. The soils are prone to erosion (low clay and organic carbon), albeit that the topography is extremely flat a factor that tempers the erosion index to low.

7.6.2.2 Land Use

The land is confined almost exclusively to low intensity livestock grazing and game farming. Small areas are cultivated to animal feed.

7.6.2.3 Land Capability

The land capability is rated as low intensity grazing land potential and/or wilderness potential in terms of the Chamber of Mines classification system.

7.7 Fauna and Flora

7.7.1 Vegetation and Flora

7.7.1.1 Acacia Name Change – An Important Note Regarding Taxonomy

The International Code of Botanical Nomenclature, the official botanical names authority, made a decision in July 2005 to reserve the name *Acacia* for Australian species only. Both Africa and Australia had been sharing the genus name for two distinctly different groups of species and a final call had become a necessity. The *Acacia* name change has been a matter of dispute for over a decade but it is important to note that the change is now official. The reasons for voting *Acacia* as an Australian type were numerous, primarily owing to the fact that over 1000 *Acacia*'s (many that are endemic) are to be found in Australia, making up the largest genus in the country. In addition, the *Acacia* has significant cultural and traditional value as a symbol in the Australian coat of arms. A taxonomic revision of African *Acacia*'s is underway and all species will be renamed into either *Vachellia* or *Senegalia* (in brackets after each species name in this report). The *Acacia* name is maintained for the purpose of this report.

7.7.1.2 Regional Vegetation

The Project area falls within the Limpopo Sweet Bushveld as described by Mucina and Rutherford (2006) (Plan 10, Appendix A). This vegetation type occurs within the Limpopo Province at an altitude of 700 m to 1 000 m. The vegetation extends across the border, into Botswana. The vegetation consists of plains, which are traversed by several tributaries of the Limpopo River. Vegetation consists of short, open woodland. Areas which have been disturbed are dominated by thickets of Blue Thorn (*Acacia (Vachellia) erubescens*), Black Thorn (*Acacia (Senegalia) mellifera*) and Sickle Bush (*Dichrostachys cinerea*) (Mucina and Rutherford, 2006).

Tall trees include Ankle thorn (*Acacia (Vachellia) robusta*) and Black Monkey Thorn (*Acacia (Senegalia) burkei*). Smaller trees include Blue Thorn (*Acacia (Vachellia) erubescens*), *Acacia (Senegelia) cinerea, Acacia (Vachelia) nilotica, Acacia (Senegalia) senegal, Albizia anthelminitica, Boscia albitrunca, Combretum apiculatum,* and *Terminalia sericea.*

Some preliminary field work was done for the preferred site, which determined that the vegetation was similar to the description provided by Mucina and Rutherford (2006). Four major vegetation types occur in the Project area. Three of these are types of Bushveld with

different dominant species, and the fourth the very distinctive wetland vegetation of the ephemeral pans. The four identified vegetation communities are:

- *Acacia* Thornveld;
- *Combretum* woodland;
- *Terminalia* woodland; and
- Ephemeral Pan Vegetation.

7.7.1.3 Species of Special Concern

7.7.1.3.1 IUCN Read Data Species

The preferred power plant site lies within two Quarter Degree Square namely 2327CA and 2327CB. According to the PRECIS, no Red Data species are expected to occur for the Quarter Degree Square for the site. Acacia erioloba (Camel Thorn); however, is listed as Declining.

7.7.1.3.2 Protected Trees

A number of National protected tree species (National Forests Act, 2001[Act No 12 of 2001) were identified within the preferred site (Table 7-5). Further to this, additional protected species listed under the Limpopo Environmental Management Act, 2003, Act No. 7 of 2003 (LEMA), may occur.

For the removal or disturbance of any of these trees, a tree removal permit will be applied for from the Department of Agriculture, Forestry and Fisheries (DAFF).

Table 7-5: Protected Tree Species likely to be found in the Proposed Project Site

Family	Scientific Name	Common Name	Red Data Status
Capparaceae	*Boscia albitrunca*	Shepherds Bush Tree	Least concern (protected)
	Sclerocarya birrea	Marula	Least concern
Combretaceae	*Combretum imberbe*	Leadwood	Least concern (protected)
Fabaceae	*Acacia (Vachellia)erioloba*	Camel Thorn	Declining

7.7.2 Fauna

Fauna expected to occur on site include assemblages within terrestrial and wetland ecosystems: mammals, birds, reptiles, amphibians and invertebrates. Each of these assemblages occurs within unique habitats, the ecological state of these habitats directly

relates to the number of species found within them. The main habitats occurring in the project area are bushveld plains and pans with little altitudinal variation.

7.7.2.1 Mammals

The variety of vegetation types occurring in the area of interest ensures an ecologically diverse assemblage of plant species which in turn supports a variety of mammal species.

Of the mammal species expected to occur around the Project area, twenty three have been assigned a South African Red Data status. These species are listed in the Table 7-6 below.

Table 7-6: Red Data mammal species likely to be found on the Project site

Common Name	SA Red List Status	IUCN Status
African Weasel	Data Deficient	Lower Risk - least concern
Brown Hyena	Near Threatened	Lower Risk - near threatened
Bushveld Gerbil	Data Deficient	Least Concern
Darling's Horseshoe Bat	Near Threatened	Least Concern
Forest Shrew	Data Deficient	Least Concern
Geoffrey's Horseshoe Bat	Near Threatened	Least Concern
Greater Dwarf Shrew	Data Deficient	
Hippo	Vulnerable	Least Concern
Honey Badger	Near Threatened	Lower Risk - least concern
Least Dwarf Shrew	Data Deficient	Least Concern
Lesser Dwarf Shrew	Data Deficient	Least Concern
Lesser Grey-browned Musk Shrew	Data Deficient	Least Concern
Lesser Red Musk Shrew	Data Deficient	Least Concern
Reddish-grey Musk Shrew	Data Deficient	Least Concern
Rock Dormouse	Data Deficient	Least Concern
Rusty Bat	Near Threatened	Least Concern
Schreiber's Long-fingered Bat	Near Threatened	Near Threatened
Serval	Near Threatened	Least Concern
Short-eared Trident Bat	Critically Endangered	Vulnerable
Short-snouted Elephant-shrew	Data Deficient	Least concern
Single-striped Mouse	Data Deficient	Least Concern

Common Name	SA Red List Status	IUCN Status
South African Hedgehog	Near Threatened	Lower Risk - least concern
Spotted-necked Otter	Near Threatened	Least Concern
Sundevall's Leaf-nosed Bat	Data Deficient	Least concern
Swamp Musk Shrew	Data Deficient	Least Concern
Temminck's Hairy Bat	Near Threatened	Least Concern
Tiny Musk Shrew	Data Deficient	Least Concern
Water Rat	Near Threatened	Least Concern
Welwitsch's Hairy Bat	Near Threatened	Least Concern

The presence of these species will be determined during the field surveys planned for the EIA phase of the project.

7.7.2.2 Avifauna

Birds have been viewed as good ecological indicators, since their presence or absence tends to represent conditions pertaining to the proper functioning of an ecosystem. Bird communities and ecological conditions are linked to land cover. As the land cover of an area changes, so do the types of birds in that area (The Bird Community Index, 2007). Land cover is directly linked to habitats within the study area. The diversity of these habitats should give rise to many different species. According to the South African Bird Atlas Project (SABAP2), almost 300 species of birds have been identified in the area; the majority of these birds are comprised of bushveld species. All birds that could be present within the study area, 14 have been assigned a Red Data status, 25 further species are either endemic or near-endemic to South Africa. The Red Data species are listed in the Table 7-7 below.

Table 7-7: Red Data Avifauna species likely to be found on the Project site

Common Name	Scientific Name	SA Red List Status
Bateleur	*Terathopius ecaudatus*	Vulnerable
Bustard, Kori	*Ardeotis kori*	Vulnerable
Eagle, Martial	*Polemaetus bellicosus*	Vulnerable
Eagle, Tawny	*Aquila rapax*	Vulnerable
Falcon, Lanner	*Falco biarmicus*	Near Threatened
Flamingo, Greater	*Phoenicopterus ruber*	Near Threatened
Oxpecker, Red-billed	*Buphagus erythrorhynchus*	Near Threatened
Painted-snipe, Greater	*Rostratula benghalensis*	Near Threatened

Pratincole, Black-winged	*Glareola nordmanni*	Near Threatened
Stork, Marabou	*Leptoptilos crumeniferus*	Near Threatened
Stork, Saddle-billed	*Ephippiorhynchus senegalensis*	Endangered
Stork, Yellow-billed	*Mycteria ibis*	Near Threatened
Vulture, Lappet-faced	*Torgos tracheliotus*	Vulnerable
Vulture, White-backed	*Gyps africanus*	Vulnerable

7.7.2.3 Reptiles

Reptiles are ectothermic (cold-blooded) meaning they are organisms that control body temperature through external means. As a result reptiles are dependent on environmental heat sources. Due to this many reptiles regulate their body temperature by basking in the sun, or in warmer areas. Substrate is an important factor determining which habitats are suitable for which species of reptile. The presence of few rocky out crops within the study area could mean few reptile species are present.

Of the reptiles expected to occur on site (Strategic Environmental Focus, 2007), two have been assigned a Red Data status; and these species are listed in Table 7-8.

Table 7-8: Red Data Reptile Species likely to be found on the Proposed Project Site

Common Name	Scientific Name	SA Status
Aurora House Snake	*Lamprophis aurora*	Rare
Southern African Python	*Python natalensis*	Vulnerable

7.7.2.4 Amphibians

Amphibians are viewed be good indicators of changes to the whole ecosystem because they are sensitive to changes in the aquatic and terrestrial environments (Waddle, 2006). Most species of amphibians are dependent on the aquatic environment for reproduction (Duellman and Trueb 1986). Additionally, amphibians are sensitive to water quality and ultra violet radiation because of their permeable skin (Gerlanc and Kaufman 2005). Activities such as feeding and dispersal are spent in terrestrial environments (Waddle, 2006). According to Carruthers (2001), a number of factors influence the distribution of amphibians, but because amphibians have porous skin they generally prosper in warm and damp habitats. The presence of suitable habitat within the study area should provide a number of different species of amphibians.

According to Carruthers (2001), frogs occur throughout southern Africa. A number of factors influence their distribution, and they are generally restricted to the habitat type they prefer, especially in their choice of breeding site. The choices available of these habitats coincide with different biomes, these biomes in turn, are distinguished by means of biotic and abiotic

features prevalent within them. Therefore a collection of amphibians associated with the savanna biome will all choose to breed under the prevailing biotic and abiotic features present. Further niche differentiation is encountered by means of geographic location within the biome, this differentiation includes banks of pans, open water, inundated grasses, reed beds, trees, rivers and open ground, all of which are present within the area of interest. Red Data amphibians expected to occur on site are listed in the Table 7-9 below.

Table 7-9: Red Data amphibian species likely to be found on the Project site

Common Name	Scientific Name	Status
Giant Bullfrog	*Pyxicephalus adspersus*	Least concern
Golden Leaf-Folding Frog	*Afrixalus aureus*	Rare
Pickersgill's Reed Frog	*Hyperolius pickersgilli*	Rare

7.7.2.5 Invertebrates

Butterflies are a good indication of the habitats available in a specific area (Woodhall 2005). Butterflies are useful indicators as they are relatively easy to locate and catch, and to identify. It is for this reason that Lepidoptera will be used as the primary focus for the invertebrate survey.

Red Data species are listed in Table 7-10. The specific Red Data conservation status was not always known.

Table 7-10: Red Data butterfly species found in the Limpopo Province, some may occur on the Project site

Scientific Name	SA Red List Status
Alaena margaritacea	Critically Endangered
Aloeides stevensonii	Vulnerable
Anthene juanitae	Vulnerable
Dingana clara	Vulnerable
Dingana jerinae	Vulnerable
Erikssonia acraeina	Critically Endangered
Lepidochrysops lotana	Critically Endangered
Pseudonympha swanepoeli	Critically Endangered
Telchinia induna salmontana	Vulnerable

7.7.3 Sensitivity and Conservation Planning Tools

There are several assessments for South Africa as a whole, as well as on provincial levels that allow for detailed conservation planning as well as meeting biodiversity targets for the country's variety of ecosystems. These guides are essential to consult for development projects, and will form an important part of the sensitivity analysis. Areas earmarked for conservation in the future, or that are essential to meet biodiversity and conservation targets should not be developed, and have a high sensitivity as they are necessary for overall functioning. In addition, sensitivity analysis in the field based in much finer scale data can be used to ground truth the larger scale assessments and put it into a more localised context.

7.7.3.1 Threatened Ecosystems

The study area does not occur in any threatened ecosystems with the nearest (Lowveld Riverine Forest) occurring over 50 km away (Plan 11 Appendix A).

7.7.3.2 National Protected Areas Expansion Strategy (NPAES)

There are no areas earmarked for conservation within 30 km of the proposed development (Plan 11, Appendix A).

7.8 Hydrology

South Africa is divided into 19 Water Management Areas (WMA) (National Water Resource Strategy, 2004), managed by their own Catchment Management Agencies (CMAs). Each of the WMAs is made up of quaternary catchments which relate to the drainage regions of South Africa, ranging from A – X (excluding O). These drainage regions are subdivided into four known divisions based on size. For example, the letter A represents the primary drainage catchment; A2 for example will represent the secondary catchment; A21 represents the tertiary catchment and A21D would represent the quaternary catchment which is the lowest subdivision in the WR2005 manual. Each of the quaternary catchments have associated hydrological parameters including area, Mean Annual Precipitation (MAP) and Mean Annual Runoff (MAR) to name a few.

The Project area is located within the Limpopo Water Management Area (WMA 01) in the A4 secondary catchment and within the A41E quaternary catchment. This is upstream of the Matlabas River within the Matlabas sub-basin of the Limpopo River basin.

The surface water attributes of the affected catchments namely MAR, MAP and Mean Annual Evaporation (MAE) were obtained from WR2005 study and are summarised in Table 7-11.

Table 7-11: Summary of the surface water attributes of the A41E quaternary catchment

Catchment	Area (km^2)	MAP (mm)	MAR (mm)	MAR $m^3 * 10^6$	MAE (mm)
A41E	816	438	2.73	5.29	1950

The A41E quaternary catchment has a net area of 816 km^2, and has an MAR of 5.29 Million cubic meters (Mm^3). Runoff emanating from this quaternary catchment drains in a north-westerly direction via the non-perennial streams and drainage lines towards the Limpopo River.

Elevations in the A41E quaternary range from 990 mamsl at the highest point within the catchment to 830 mamsl at the outlet/lowest point of the catchment.

7.8.1 Rivers and Drainages

The Limpopo River is the only perennial river associated with this quaternary catchment and marks the boundary between South Africa and Botswana. Within this quaternary catchment there are few unnamed non-perennial streams and drainages that eventually feed into the Limpopo River. The project area is approximately 7 km from the Limpopo River.

An assessment of the 1:50 000 topographical maps gives an indication that the Project area does not have rivers within or traversing through the area. There are few pans located on some of the surrounding farm portions, which may be indicative of the relative flat topography.

7.8.2 Topography and Drainage

The relatively flat topography of the region leads to a trellis drainage pattern with small streams and drainages flowing into the Limpopo River at 90° angles. The streams are short in length with no major drainages in the area contributing to the flow of the Limpopo River; which is a perennial river. Small pans in the study area allows for static water bodies to exist during rain events and wet periods during the summer months with evapotranspiration from these pans being high. Inflow into the pans create a centripetal drainage pattern shaping the geomorphological environment with sediment transported during flood events depositing fine grained sands and silts in the pans (Vedanta IPP Scoping Report, Digby Wells 2013).

7.8.3 Water Use and Availability

7.8.3.1 Land Use

The project area is dominated by grazing land capability used mainly for cattle and game farming purposes. The region is characterised by low rainfall which contributes to low natural arable agricultural potential. The predominant land use in the Steenbokpan region is expected to be agriculture, dominated by grazing and game farming. This can be attributed to the low agricultural potential of the area due to the low rainfall and sandy soils present. It is expected that several wetlands are also present in the project areas. Usually wetland areas are over utilized by grazing cattle and game due to the abundance of vegetation.

The Project area and surrounds have an authentic African Bushveld sense of place and land uses in the region include game farming, tourism and agriculture as well as mining and power generation.

Characterised as historically rural, there is a smaller urban area including the towns of Lephalale and Onverwacht as well as the township of Marapong.

7.8.3.2 Water Use

From the DWS's water use register database (WARMS) that was obtained 16/07/2015, the registered water users in the A41E quaternary include Agriculture (irrigation and livestock watering) and mining. From the data base, mining within this quaternary are registered to extract from ground water while most of the Irrigation are registered to abstract from the Limpopo River.

Due to the importance of the Limpopo River as a shared watercourse between South Africa, Botswana, Zimbabwe and Mozambique, the allocation of water for any use has to be signed off by the Southern African Development Community (SADC) river basin commission. Furthermore, the reduced flow as a result of the increased abstractions in the agricultural sector, the high evaporation rate and the looming climate change impacts, the Limpopo River is not a readily available source of water for any developments in South Africa including critical sectors such as power generation (Digby Wells, Surface Water Specialist Report, 2013)

7.8.3.3 Water Supply

7.8.3.3.1 Local and Regional Aquifers

The local and regional aquifers can be divided into the following zones or hydraulic units:

- Unconfined alluvial aquifers along the Limpopo River that acts as temporary storage units holding water for brief periods before recharging into the underlying fractured rock aquifers;

- Unconfined aeolian[1] sand aquifers made up of the quaternary Kalahari sedimentary units;
- Fractured rock aquitard[2] made up of the shale and mudstone units of the Grootegeluk formation with storage and groundwater flow occurring along fractures and fissures;
- Coal seams are permeable aquifers with small units alternating with the less permeable mudstone layers. The coal seams can yield larger volumes of water than the mudstone layers, but water is usually of poor quality; and
- Dolerite dykes and sills forming aquicludes[3].

The mudstone and shale formations are usually low yielding aquifer units.

7.9 Geohydrology

7.9.1 Mineralogy and Geochemistry

The mineralogy of the region is dominated by felsic minerals in the sedimentary sequences, with pyrite and other minerals associated with coal deposits. The Grootegeluk coal formation is dominated by mudstones with the depositional environment also dictating high organic matter content decreasing upward through the formation (Faure *et al*., 1996). The lower Grootegeluk mudstones consist mainly of kaolinite and quartz with small amounts of apatite. The upper Grootegeluk layers are rich in quartz, kaolinite, montmorrilonite and smaller amounts of illite and microcline (Faure *et al*., 1996).

At the bottom of the Grootegeluk formation is a 2 m thick mudstone layer high in organic matter with traces of well crystallised kaolinite, siderite, calcite and apatite. The lower strata of the formation have the highest quality coal associated with globular pyrite and a wide range of trace elements (Faure *et al*., 1996; Wagner & Tlotleng 2012). The trace element distribution in the Grootegeluk coal seams is in concentration well above the global average with exceptionally higher concentrations of mercury (Hg), cadmium (Cd), arsenic (As) and selenium (Se) associated with the formation mechanisms of the coal and associated FeS_2 (Pyrite) (Wagner & Tlotleng 2012). The wide range of trace elements and their concentrations relate to fresh water depositional environmental rather than salt water. The upper formations of the project area are associated with calcite lenses. The geochemistry and possible trace element contamination will be addressed in the EIA phase with Acid base

[1] Wind-blown sand and weathering products

[2] A geological unit that is permeable enough to transmit water in significant quantities when viewed over large areas and long periods, but its permeability is not sufficient to justify production wells being placed in it

[3] A formation with a low permeability, important in controlling flow in adjacent overlying and underlying permeable formations

Accounting (ABA), Nett Acid Generating (NAG), X-Ray Diffraction (XRD), X-Ray Fluorescence (XRF) and Synthetic Precipitation Leachate Procedures being conducted on coal, ash and waste material.

7.9.2 Current Groundwater Usage

The groundwater levels within the study area vary between 11.8 and 41.9 m below surface. The east-west striking faults does not seem to have any barrier effects to groundwater flow as the groundwater levels on the northern side seem to be similar than the levels on the southern side of the faults. No major groundwater abstraction takes place within the study area. The groundwater levels are shallow (average 21 m below surface) and with the current spacial distribution of boreholes it is not possible to identify any groundwater flow barriers.

A hydrocensus was conducted by Digby Wells in 2011 and the results are shown in Table 7-12. Out of the 26 boreholes identified during the hydrocensus:

- 3 boreholes are used for game watering only;
- 6 boreholes are used for livestock watering;
- 3 boreholes are used for human drinking and livestock watering;
- 7 boreholes are used for cattle and game watering; and
- The remaining 7 boreholes are unused.

Table 7-12: Summary of the Hydrocensus Information

Site ID	Cartesian X (m)	Cartesian Y (m)	Type	Farm and Farm Portion	Groundwater level	Equipment	Use
VLV1	-2609990	24437	Borehole	Verloren Valley 246-LQ	21.08	Submersible pump	Drinking water and Livestock watering
VLV2	-2609328	25641	Borehole	Verloren Valley 246-LQ	No access	Mono pump	Livestock watering
VLV3	-2608203	25392	Borehole	Verloren Valley 246-LQ	19.52	None	None
VLV4	-2608960	22518	Borehole	Verloren Valley 246-LQ	No access	Windpump	None
DKP1	-2609875	29318	Borehole	Duikerpan 249-LQ	24.65	Windpump	Livestock watering
DKP2	-2611437	29943	Borehole	Duikerpan 249-LQ	41.92	Windpump	None
DKP3	-2612257	29150	Borehole	Duikerpan 249-LQ	21.84	Mono pump	Livestock watering
SARF1	-2605481	37535	Borehole	Kleinberg 252 LQ, Hans 713 LQ & Japie 714 LQ	27.14	Submersible pump	Drinking water and Livestock watering
SARF2	-2610791	34888	Borehole	Kleinberg 252 LQ, Hans 713 LQ & Japie 714 LQ	14.02	None	None
SARF3	-2606719	36124	Borehole	Kleinberg 252 LQ, Hans 713 LQ & Japie 714 LQ	19.59	Submersible pump	None
SARF4	-2609395	36085	Borehole	Kleinberg 252 LQ, Hans 713 LQ & Japie 714 LQ	11.82	Windpump	None
SARF5	-2609885	34992	Borehole	Kleinberg 252 LQ, Hans 713 LQ & Japie 714 LQ	No access	Windpump	Game watering
SARF6	-2609886	35039	Borehole	Kleinberg 252 LQ, Hans 713 LQ & Japie 714 LQ	12.61	Windpump	None
TP01	-2611600	24825.48	Borehole	Twispan 265 LQ	Unable to measure	Submersible pump	Cattle and game watering
TP02	-2610835	26985.54	Borehole	Twispan 265 LQ	Unable to measure	Submersible pump	Cattle and game watering
TP03	-2611989	27312.31	Borehole	Twispan 265 LQ	Unable to measure	Submersible pump	Game watering
TP04	-2613245	27677.05	Borehole	Twispan 265 LQ	Unable to measure	Submersible pump	Game watering

Site ID	Cartesian X (m)	Cartesian Y (m)	Type	Farm and Farm Portion	Groundwater level	Equipment	Use
TP05	-2613045	25229.85	Borehole	Twispan 265 LQ	Unable to measure	Submersible pump	Cattle and game watering
WP01	-2609107	40122	Borehole	Wolwepan 253 LQ	Unable to measure	Submersible pump	Cattle and game watering
WP02	-2608725	38677	Borehole	Wolwepan 253 LQ	Unable to measure	Wind pump	Cattle and game watering
WP03	-2608701	38735	Borehole	Wolwepan 253 LQ	22.54	Wind pump	Cattle and game watering
WP04	-2608447	38435	Borehole	Wolwepan 253 LQ	19.29	Solar pan with submersible pump	Cattle and game watering
GRUIS 1	-2608856	27794	Borehole	Gruisfontein 230 LQ	19.405	submersible pump and external generator	Domestic and livestock
GRUIS 2	-2607017	26860	Borehole	Gruisfontein 230 LQ	17.205	submersible pump and external generator	Livestock
GRUIS 3	-2606024	27779	Borehole	Gruisfontein 230 LQ	14.61	submersible pump and external generator	Livestock
GRUIS 4	-2606264	29288	Borehole	Gruisfontein 230 LQ	17.25	submersible pump and external generator	Livestock

7.9.3 Baseline Groundwater Quality

Seven groundwater samples from the hydrocensus were sent to Regen Waters for water quality analysis in 2011 by Digby Wells. The results are displayed graphically in Piper (Figure 7.12) and Expanded Durov (Figure 7.13) diagrams. Piper and Expanded Durov diagrams were created using the Windows Interpretation System for Hydrologists (WISH).

From the Piper diagram (Figure 7.12) the samples plot predominantly in the right quadrant indicating old stagnant water, with high salt loads. Sample SARF4 plots in the lower quadrant, indicating a dynamic water type dominated by sodium bicarbonate. Sample VLV3 plots in the upper quadrant dominated by magnesium sulphate – indicative of possible external pollution impacts.

The Expanded Durov diagram (Figure 7.13) confirms the dominance of sodium bicarbonate in sample SARF4. Sample SARF5 indicates a sodium-chloride dominance with sample VLV3 indicating no dominant anion or cation in composition. The remainder of the samples plot in field six and are sodium and / or sulphate dominant.

7.9.3.1 Class I – Recommended operational limit

Groundwater quality was evaluated by comparing the borehole samples the SANS 241: 2005 standard for human drinking. This will be updated to the SANS 241:2015 during the EIA study.

Samples VLV1, VLV2 and DKP1 all fall within the recommended operational limit of water quality standards, and therefore no threat to human health or the environment is expected. These boreholes are all located south of the east-west trending faults transecting the area. The boreholes located on the northern side of these faults all indicated elevated salt concentrations and all fall within the Class II range.

7.9.3.2 Class II – Maximum allowable for limited duration

Samples SARF1 and SARF5 are classified as Class II water quality according to the SANS 241: 2005 guidelines, with elevated nitrate, chloride, sodium, fluoride and manganese respectively. At the current concentrations, the effects will be purely aesthetic and no adverse health or environmental effects are expected.

Boreholes VLV3 and SARF4 contains very high levels of iron and ammonium respectively, both exceeding the maximum allowable SANS 241: 2005 guideline. This water is not suitable for domestic use.

The elevated element concentrations may be due to naturally elevated concentrations as derived from the natural erosional processes of the underlying formations. The only external impacts may be associated with the elevated nitrate and ammonium concentrations identified in borehole SARF4.

The ammonium cation is a positively charged polyatomic cation with the chemical formula NH_4^+. It is formed by the protonation of ammonia (NH_3). Ammonium cation is found in a variety of salts such as ammonium carbonate, ammonium chloride, and ammonium nitrate. Most simple ammonium salts are very soluble in water. Ammonium ions are a waste product of the metabolism of animals. In mammals it is converted in the urea cycle to urea, because urea is less toxic and can be stored more efficiently. Ammonium is an important source of nitrogen for many plant species, especially those growing on hypoxic soils. However, it is also toxic to most crop species and is rarely applied as a sole nitrogen source. Ammonium nitrate is commonly used in agriculture as a high-nitrogen fertilizer.

The boreholes located within the Grootegeluk Formation all indicate water qualities within the acceptable Class I range. The elevated water qualities are associated with boreholes located within the Eendragtpan Formation to the north of the east-west striking faults. It is typically iron, manganese, fluoride and chloride that are present in elevated concentrations.

Due to the limited groundwater quality data available, it was not possible to make conclusions regarding historical water quality trends over time.

7.9.4 Water Level and Flow Direction

Under natural condition groundwater flow mimics the topography and subsequent regional surface water flow direction. The topography in the study area is relatively flat, dipping at a very gentle slope towards the Limpopo River located to the northwest of the site.

Other factors that have to be taken into account in the conceptual groundwater flow model include the presence of dykes that occur within the project area, potentially causing barrier effects to groundwater flow.

Depth to groundwater level within the proposed mining area ranges between approximately 11 and 42m, with an average of 21m. It has to be taken into consideration that the depths to groundwater levels, as well as flow directions and gradients may be impacted by the mine operations. Natural groundwater flow directions within the zone of influence of the mine dewatering will be re-directed to be centred towards the pit area. In

areas outside the zone of influence of the mine (the power plant) dewatering it can be expected that depth to groundwater level will be much shallower.

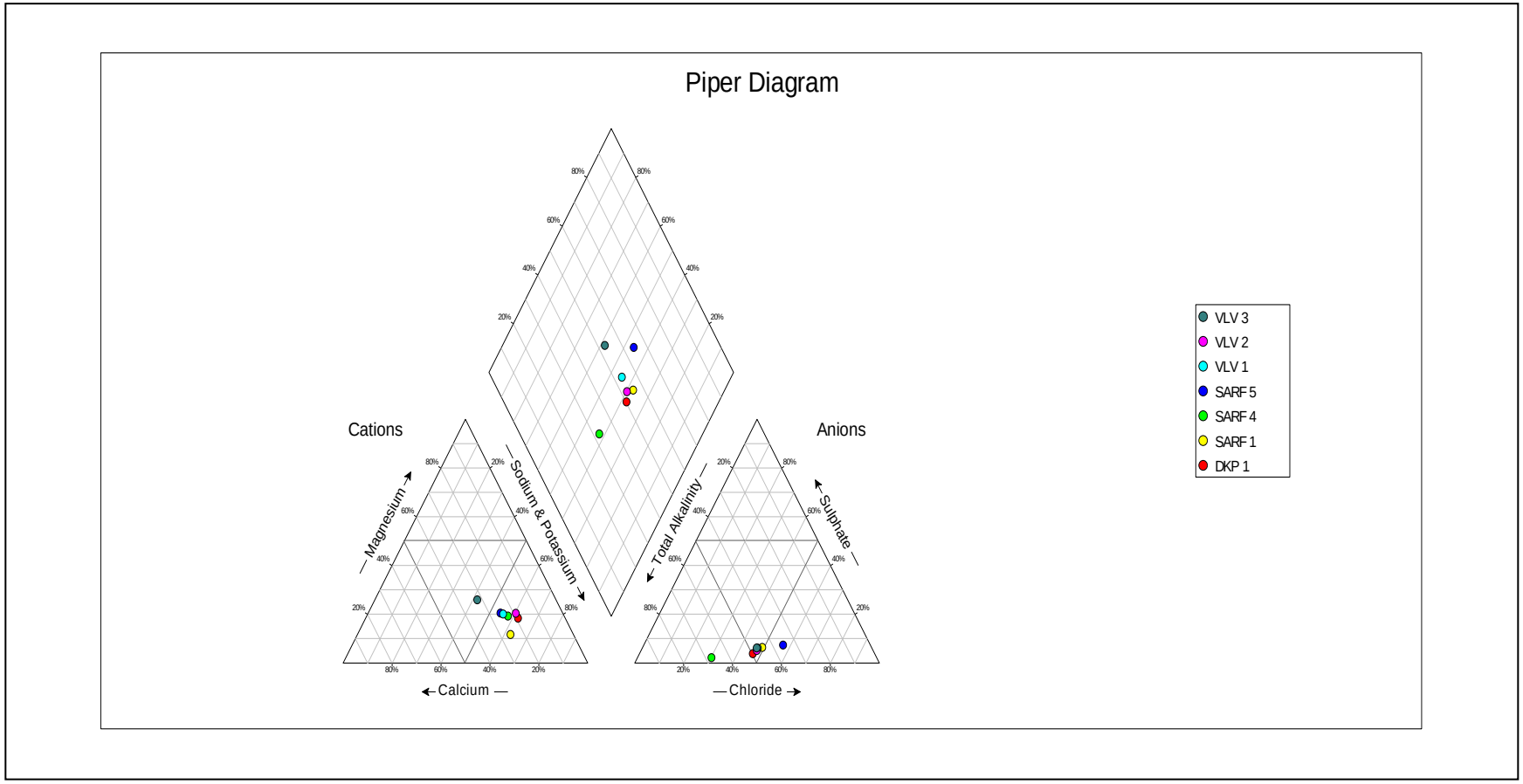


Figure 7.12: Piper diagram representing hydrocensus data

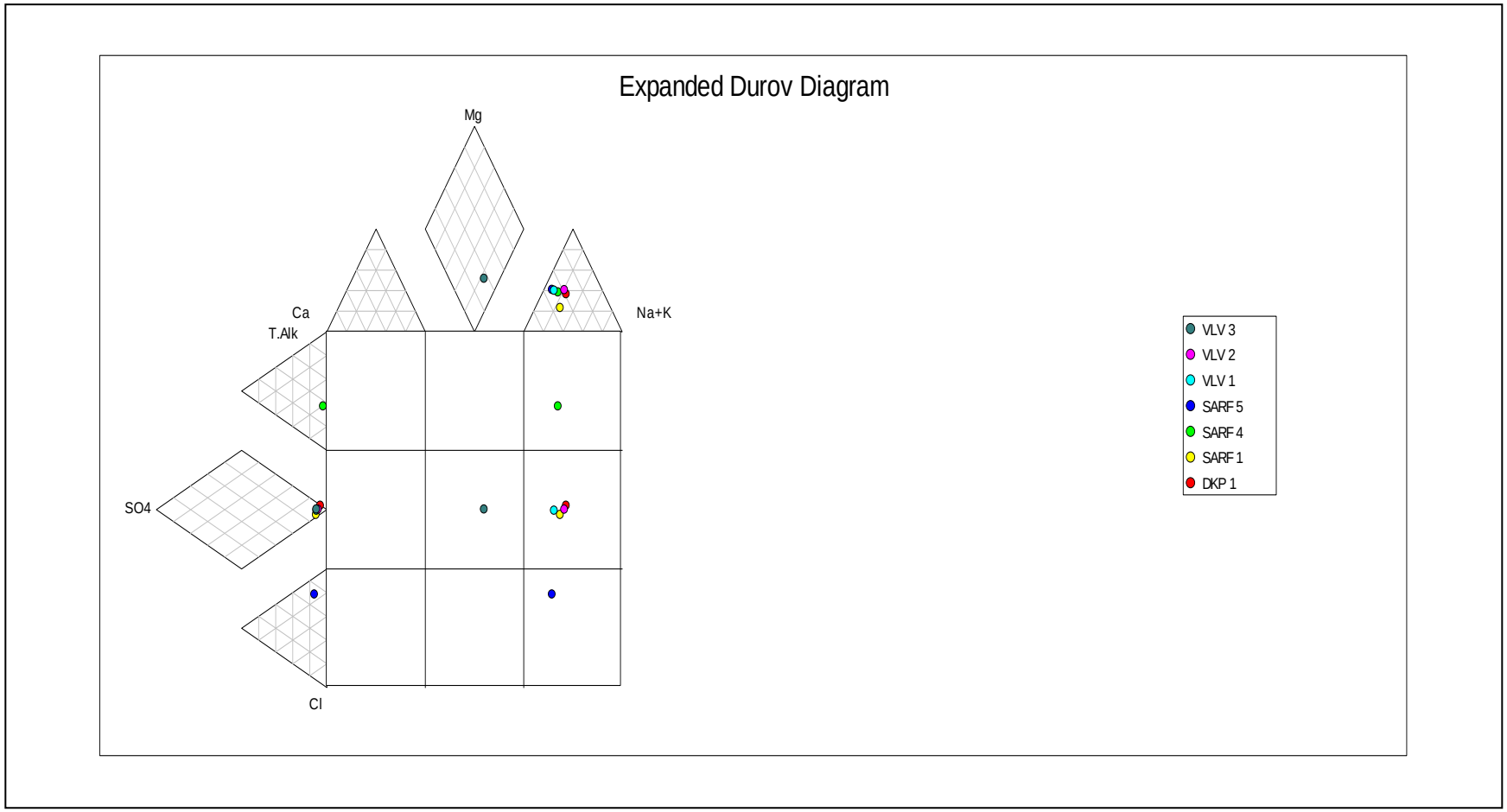


Figure 7.13: Expanded Durov diagram representing the hydrocensus data

7.10 Aquatics

7.10.1 Location and Rivers Potentially Effected

The primary drainage feature associated with the proposed project is the Limpopo River within the Sub-Quaternary-Reach (SQR) A41E-00126 which is inside the A41E quaternary catchment of the Limpopo WMA.

The catchment area of the Project lies adjacent to the above-mentioned SQR and therefore rainfall and seepage from the project area will influence the A41E-00126 SQR.

7.10.2 Basic Aquatic Habitat Features

The typical habitat of the Limpopo River within the A41E-00126 SQR is dominated by sandy substrates with intermittent bedrock boulders. Typically, where bedrock is present at the surface, impoundments have been constructed for agricultural irrigation schemes. Based on this, deep pools are typically associated with these bedrock features. However, during high rainfall periods these impoundments overflow creating riffle habitats which are inhabited by a variety of rheophillic species.

Based on previous studies within the A41E-00126 SQR, periods where complete inundation of the river bed takes place is limited to periods around February and June. Thereafter the river is generally dry except for intermittent shallow pools and impoundments. Previous studies have found highly variable flows which are unpredictable at times (Digby Wells, 2014).

7.10.3 Ecological Status

Kleynhans (1999) identified the overall ecological status of the Limpopo River as being moderately modified (class C). The modified status is primarily due to large instream modification from heavy agricultural abstraction and the presence of several impoundments. Water quality within the SQR has been found to be fair with contaminants generally reflecting pollutants emanating from irrigation return flows.

Typically, riparian habitats within the considered SQR is largely natural, with primary modifying drivers being inundation from flooded regions (due to weirs) and terrestrial encroachment due to restricted flows.

Although, instream habitat modification is dominant ichthyofaunal features are natural and the river has been found to support a diverse fish community. Due the diverse nature of the fish community as well as the sensitive nature of the pools inhabited by these fish, the A41E-00126 SQR can be regarded as a sensitive river, especially to further water quantity modification.

7.11 Wetlands

A desktop wetland delineation was undertaken including information gathered for the Temo EIA, to identify and classify all the wetland areas within the Project area. Based on the findings of the desktop study, a single hydro-geomorphic (HGM) wetland unit was identified within the study boundary, namely: ephemeral pan/depression wetlands.

7.11.1 Non-Perennial Pans

The non-perennial pans are characterised by a circular or rounded shape resulting from the swirling winds and a low mound beyond their shorelines on the downwind side were soil lifted by wind action has been deposited over aeons. Water accumulates in the depression of the non-perennial pans owing to a generally impervious calcrete underlying layer which prevents the water draining away. The non-perennial pans become seasonal water holes following intensive thundershowers. Excessive grazing, trampling, digging, and burrowing by animals in the edges of the pans inhibit vegetation growth and expose the substrate to destructive wind actions. The removal of soil by wind actions deepens and helps to maintain the basin of the non-perennial pans (Allan, *et. al.,* 1995). According to Kotze *et al.* (2007) pans are usually isolated from streams and because of their position in the landscape the opportunity for attenuating flows is limited, however, because of their inward draining nature they do capture runoff and as a result they reduce the volume of surface water that would otherwise reach the stream during storm flow conditions. According to Goudie and Thomas (1985) and Marshall and Harmse (1992) pans are not considered locations for the trapping of sediment, as many pans originate from the removal of sediment by wind, thus creating what are referred to as deflation basins.

The species occurring in these pans are mainly hydrophilic grass species and cyperoid grass species. Some of the habitat specific faunal species that are known to occur in some of the non-perennial pans within the project area include the African Bullfrog (*Pyxicephalus adspersus*). Furthermore, these pans are known to support migratory water fowl such as Saddle-billed Stork *(Ephippiorhynchus senegalensis)*.and Yellow-billed stork *(Mycteria ibis)* and a number of seasonal migratory wading species that would periodically stop at these pans for feeding.

7.12 Cultural and Heritage

As a result of previous impact assessments and studies conducted within the project area, the cultural landscape of the study area can be categorised by the scatterings of Middle Stone Age (MSA) occurrences, Late Stone Age (LSA) accumulations Late Farming Community (LFC) settlements, and, and historical settlements including the town of Lephalale and surrounding farming communities.

7.12.1 Regional and Local Study Area

7.12.1.1 Geology and Palaeontological Sensitivity

The regional geology of the project area and surrounds is dominated by the sedimentary sequences of the Karoo Supergroup (Ellisras Basin) that are mainly covered by the Kalahari sands. The sediments of the Ellisrus Basin were deposited by a range of depositional environments from glaciolacustrine represented by the Waterkloof Formation through lacustrine, delta front, alluvial fan, fluvial and floodplain (swamp) environments of the overlying formations ending with the Clarens Formation comprising of an aeolian depositional environment. The diverse range of depositional environments results in an assortment of sedimentary lithologies ranging from conglomerates to mudstones (Johnson, Anhaeusser, & Thomas, 2006).

The proposed project area and site boundaries fall within the Ellisras basin known for its large coal deposits in the Waterberg Coalfield (See Table 7-13). The local site geology is covered by quaternary sediments of the Kalahari sand formations with the top geological strata being the purplish-red mudstones of the Eendragtpan Formation in the Ellisras Basin. The Grootegeluk and Swartrant Formations underlay the Eendragtpan Formation are the most important economic units in the Ellisras Basin (Johnson, Anhaeusser, & Thomas, 2006). The Grootegeluk Formation comprises numerous thick coal seams alternating with carbonaceous mudstone and shale which cyclically repeats over a maximum formation thickness of 110 m. The coal seams and sedimentary layers of the formation were formed during a tectonically stable phase of the basin formation where poorly drained swamps formed on the floodplain of an abandoned delta, creating depositional environments conducive to the formation of peat. Underlying the Grootegeluk Formation, coal seams occur as part of the basal units of the upper-zone of the Swartrant Formation which alternate with mudstone and sandstone. This basal unit attains a maximum thickness of 13 m and represents a crevasse-splay deposit comprising small channel and isolated swamps environments (Johnson, Anhaeusser, & Thomas, 2006).

Fossil flora (*Glossopteris*) are found within the mudstones of the Grootegeluk and Swartrant Formations and are of global importance as they are rare and have contributed to a great deal of debate within the research community (Adendorff, et al., 2002; Prevec, 2012).

The Limpopo River is the only major river system, which is located to the north of the project area, with occasional wetlands occurring in the channel of this watercourse. Perennial pans and small perennial drainage channels are present throughout the greater surface area. The formation of calcrete is common among these perennial features (Johnson, Anhaeusser, & Thomas, 2006).

Table 7-13: Lithographic units and fossil sensitivity (adapted from Johnson *et al.* 2006 and SAHRIS[4])

Ma	Eon	Era	Lithostratigraphic Units		Lithology	Sensitivity	Fossils
Before and after 250	Phanerozoic	Palaeozoic - Mesozoic	Karoo Supergroup	Ellisras Basin	Eendragtpan Formation	Low	None
Before 250		Palaeozoic			Grootegeluk Formation	Very High	Glossopteris coal flora
					Swartrant Formation	Very High	Glossopteris coal flora

[4] http://www.sahra.org.za/sahris/fossil-heritage-layer-browser accessed 23/04/2015

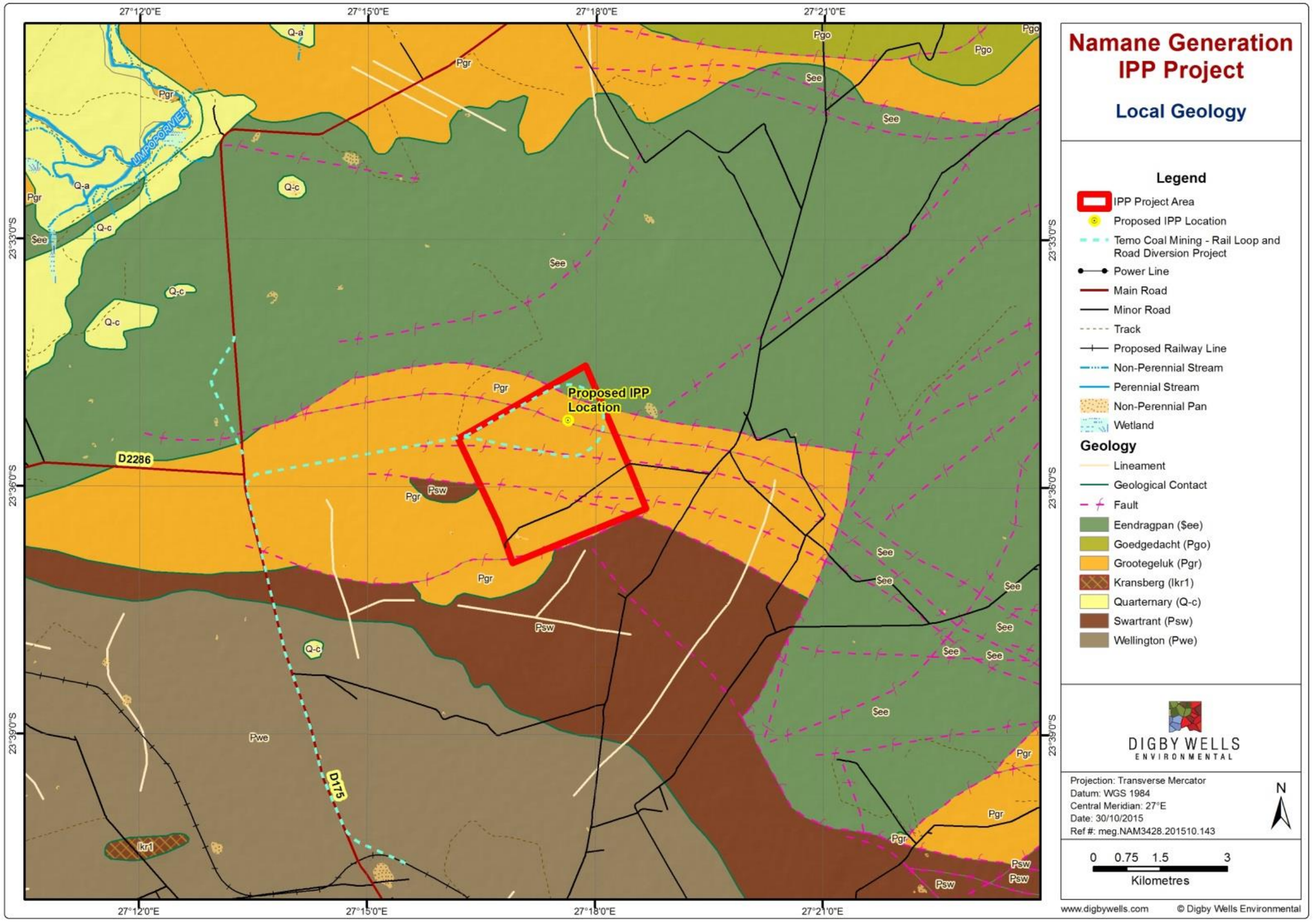


Figure 7-14: Geology of the study area

7.12.1.2 The Stone Age

The archaeological evidence from the Study Area suggests that the area has been inhabited since the Early Stone Age (ESA) and MSA. Finds include ESA and MSA scatters such as the Acheulean hand-axe reported on by Nel (2012). The ESA and MSA finds are commonly associated with water sources such as the Limpopo River and pans. The LSA is associated with the San (Bushmen) hunter-gatherers who are known to have been active in the region. LSA sites are often found in association with Bushmen rock art and engravings. One such site is Nelson's Kop which is situated approximately 30 km east near the Grootegeluk Mine and where rock engravings of animal spoor, cupules and other incisions were found. Another example would be the Riverslee Engraving site located across the Limpopo River in Botswana, approximately 23 km from the project area. The Riverslee site consists of sandstone pavements measuring 50 m x 100 m with several panels of engravings of animal spoor, human footprints, cupules or cup marks and oval-shaped grooves (Van der Ryst, Lombard, Biemond, & Master, 2004).

Surface accumulations of MSA and LSA lithics have been recorded throughout the region, however, these finds are commonly not found *in situ* and provide limited contextual information. Several MSA artefact scatters were identified within the calcrete layers surrounding the many pans within the region.

A total of 113 MSA sites have been identified in previous HIAs within 20 km of the project area (Fourie, 2009; Pistorius, 2010; Huffman & Van der Walt, 2011; Nel, 2011a; Nel, 2011b; Karodia & Higgitt, 2013). See Appendix B for the full site list. These surface scatters included, MSA flakes, points and cores, and LSA flakes. Stone Age lithics have been identified in close proximity to pans within the region. Some lithics have been found *in-situ* within layers of calcrete around the edge of the pan (Nel, 2011a).

7.12.1.3 Farming Communities

The LSA is followed by Farming Community occupation (also known as the Iron Age). The Farming Community is characterised by both Early and Late Farming Community (EFC and LFC) ceramic traditions, however the majority of sites in the local municipality are LFC sites. LFC sites are characterised by (1) cattle posts identified along escarpments and (2) briefly occupied settlements identified close to the tillable soil along the Limpopo River (Huffman & van der Walt, 2010). It has been suggested that the cattle posts are associated with the *Letsibogo* ceramic-users who may have been the baKaa, as suggested by the ethnographic evidence (Schapera, The Tswana, 1953; Biemond, 2011; Huffman T. N., 2007; Huffman & van der Walt, 2010). The *Letsibogo* ceramics, which date between 1500 CE and 1700 CE, are characterised by lines of punctates separated by black and red zones (Huffman T. N., 2007; Huffman & van der Walt, 2010; Biemond, 2011).

The LFC transition to the Historical Period is characterised by the emergence of large agricultural settlements associated with the baTswana. Extensive archaeological excavations (2011 – 2012) for the proposed Boikarabelo coal mine on the farms Kalkpan 243 LQ, Witkopie 238 LQ and Zeekoevely 421 LQ indicate that the baTswana

occupation of the area may have been brief (Nel, 2012). As demonstrated in the history of the baKwena, periods of political turbulence caused disruptions during the 18th and 19th centuries (Schapera, 1980). It is these disruptions that are suggested to be the cause of the ephemeral remains of the archaeological sites (Nel, 2012).

A total of 86 LFC sites have been identified through previous HIAs within 20 km of the study areas (Fourie, 2009; Fourie, 2010; Huffman & Van der Walt, 2011; Nel, 2011a; Nel, 2011b; Karodia & Higgitt, 2013). See Appendix B for the full site list. The majority of these sites are surface scatters of potsherds (mostly *Letsibogo* and *Madikwe* ceramic facies), cattle kraals, grain bins, slag fragments and grinding stones.

7.12.1.4 Historical Period

The historical period is commonly associated with contact between white Europeans with LFCs, and consequent *written* records. The closest large town is Lephalale which was established in 1960. It was originally called Ellisras after the two original farm owners Patric Ellis and Piet Erasmus who settled in the area in the 1930's (Lephalale Municipality, 2013).

A total of four historical sites and 31 Built Environment sites have been identified within 20 km of the project as a result of previous HIAs in the area. (Fourie, 2009; Pistorius, 2010; Huffman & Van der Walt, 2011; Nel, 2011a; Nel, 2011b; Karodia & Higgitt, 2013). See Appendix B for the full site list. The built environment sites include historical farmsteads and farmhouses and churches. The historical sites include surveyor posts and middens. An additional 25 burial grounds that range from historical times to more recent times have been identified within 20 km of the project area.

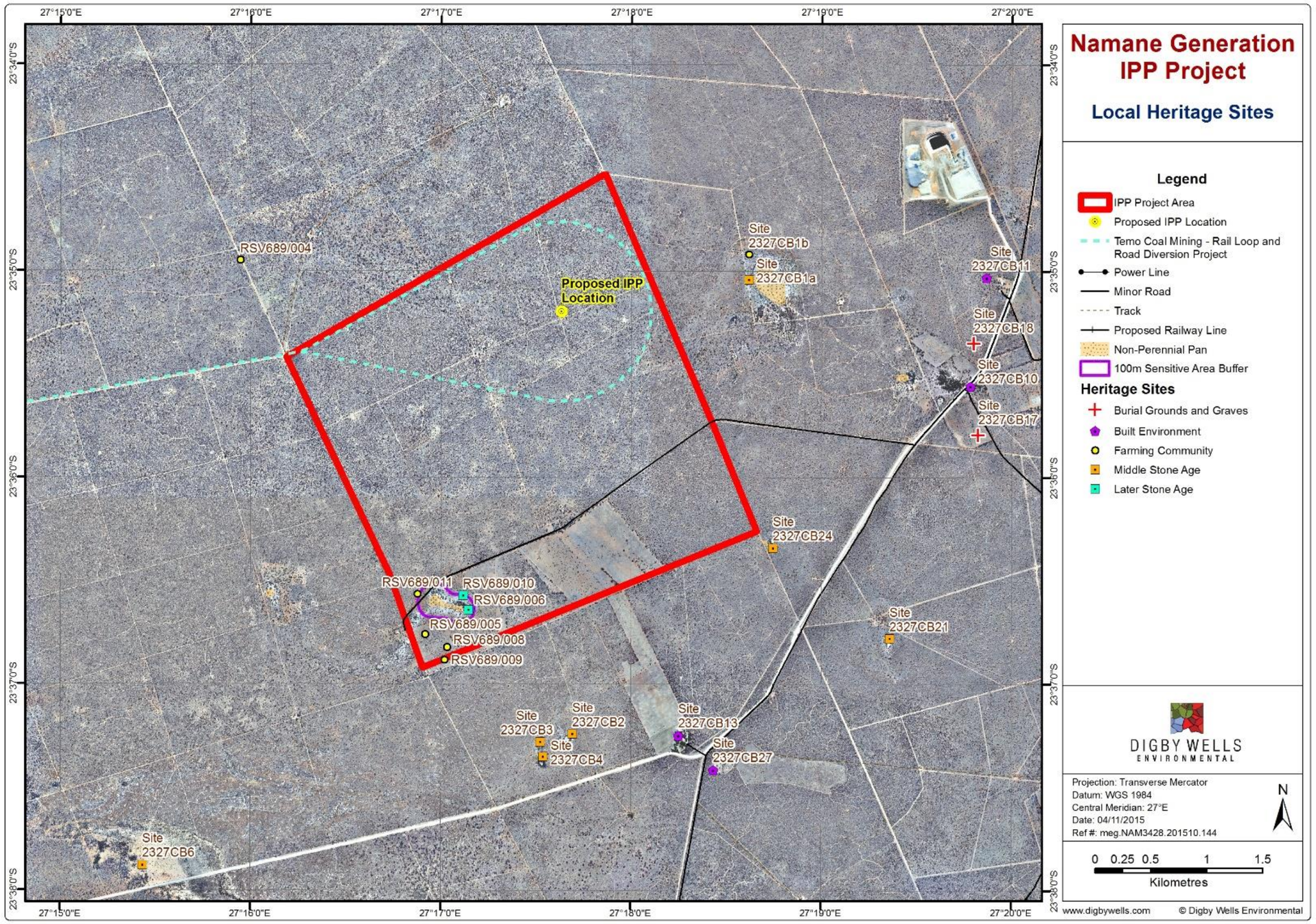


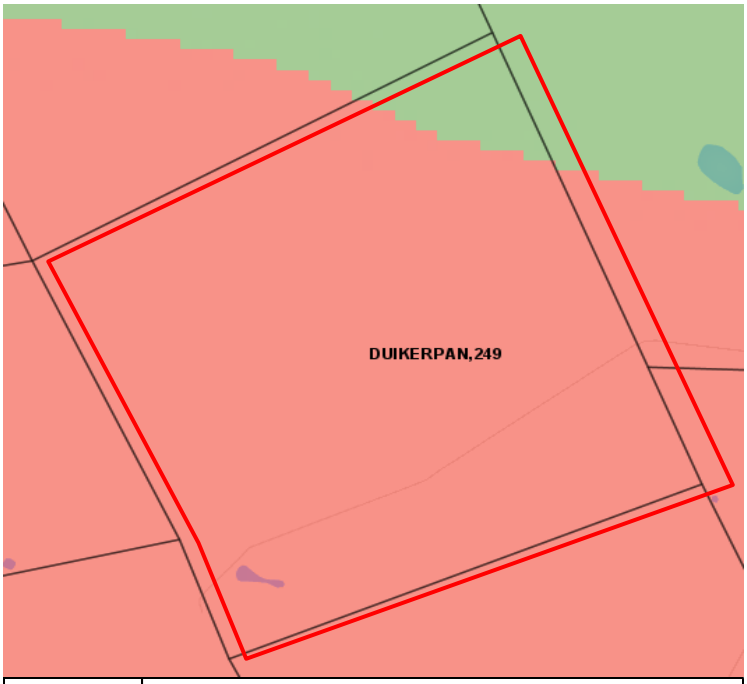
Figure 7-15: Identified heritage resources as a result of the qualitative data collection

7.12.2 Site Specific Study Area

7.12.2.1 Geology and Palaeontological Potential of the Study Area

According to the SAHRIS PalaeoSensitivity Map, the Project area is located in an area of moderate to very high palaeontological sensitivity as depicted in Figure 7-16 below (SAHRIS, 2014). The Grootegeluk and Eendragtpan Formations underlay the project area. As stated above in section 7.12.1.1, the Grootegeluk Formation is highly significant due to the potential for *Glossopterid* coal flora fossils to occur within this formation. The Eendragtpan Formation does not hold the potential for fossils; and therefore its sensitivity is lower.

The likelihood that the proposed IPP development will impact on palaeontological sensitive geological strata is very low: infrastructure will be developed above ground and any ground clearing will be limited to the upper soil layers. As the development will be above ground, no palaeontological impacts are envisaged. The IPP site specific project area will be surveyed for any rocky outcrops or ridges during the site reconnaissance to confirm this.



Sensitivity	Required action
Very High	Field assessment and chance finds protocol required
High	Desktop study to determine necessity of field assessment
Moderate	Desktop study
Low	No palaeontological studies necessary, but chance finds protocols are required
Insignificant/zero	No palaeontological studies necessary or chance finds protocols are required
Unknown	At minimum, a desktop study

Figure 7-16: Palaeontological sensitivity of the study area

7.12.2.2 Stone Age

Three Stone Age surface scatters have been identified within the site specific study area, recorded in a previous HIA (Nel, 2011a). One of these occurrences was located around a pan and included MSA and LSA scrapers, flakes, blades, cores and chunks. The artefacts were found in-situ eroding out of the calcrete layers surrounding the edge of the pan (Nel, 2011a).

7.12.2.3 Farming Communities

A total of five LFC sites have been identified within the site specific project area, recorded in a previous HIA (Nel, 2011a). These sites include surface scatters with no associated archaeological features or structures. One of these scatters displayed potsherds with red burnish, possibly indicating a Sotho-Tswana or Letaba type ceramic facies (Nel, 2011a).

7.12.2.4 Historical Period

The farm Duikerpan 249LQ was known as Duikerpan 1487 in 1902 as depicted in Figure 7-17 below. A historical wagon path is present on the 1902 map approximately 4.8 km east of the project area.

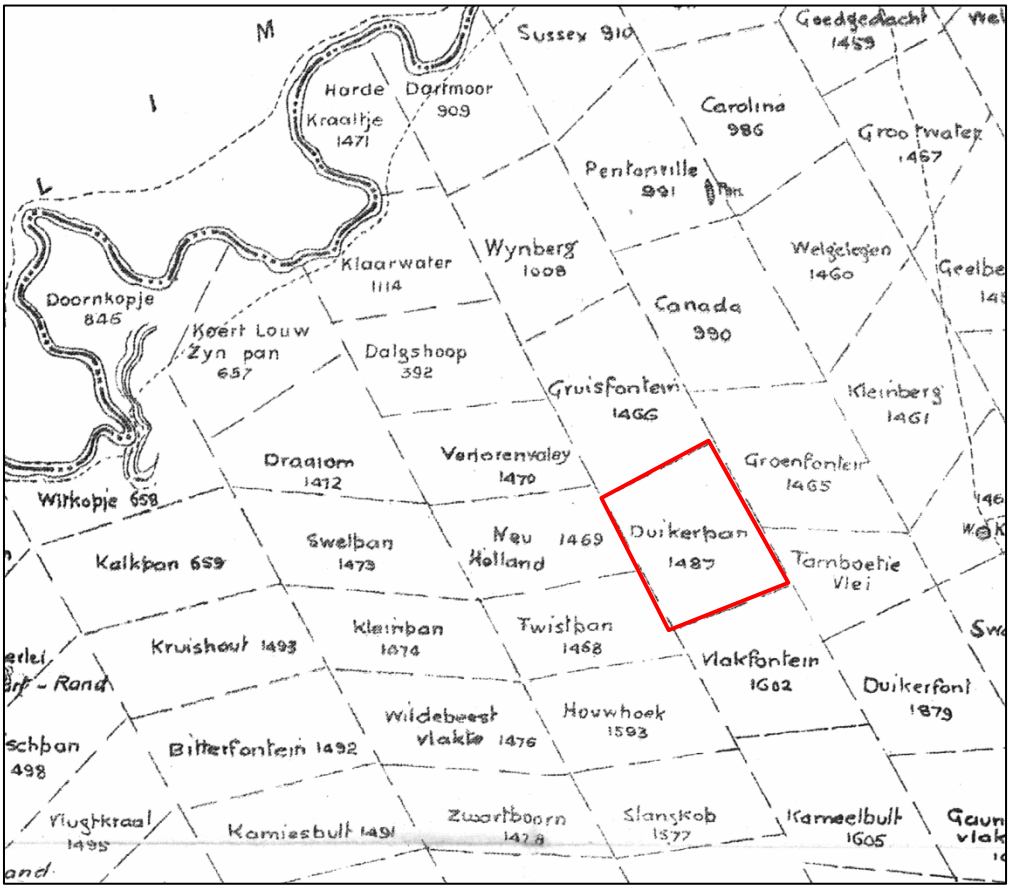


Figure 7-17: 1902-1909 Map of the Project area

No indications of human settlement can be identified on the 1948 historical aerial photograph (See Figure 7-18 below). The pan in the south west corner of the property is present and seems to contain some water and seems to have extensive calcrete outcrops (white patches). Additionally, there are no agricultural fields present within the project area, so it is assumed these were developed later. There is a track running from north to south on the western border of the property, showing that there was human movement through the project area (See Figure 7-18). The 1969 aerial photograph shows the development of agricultural fields in the southern side of the property and residential dwellings (See Figure 7-19).

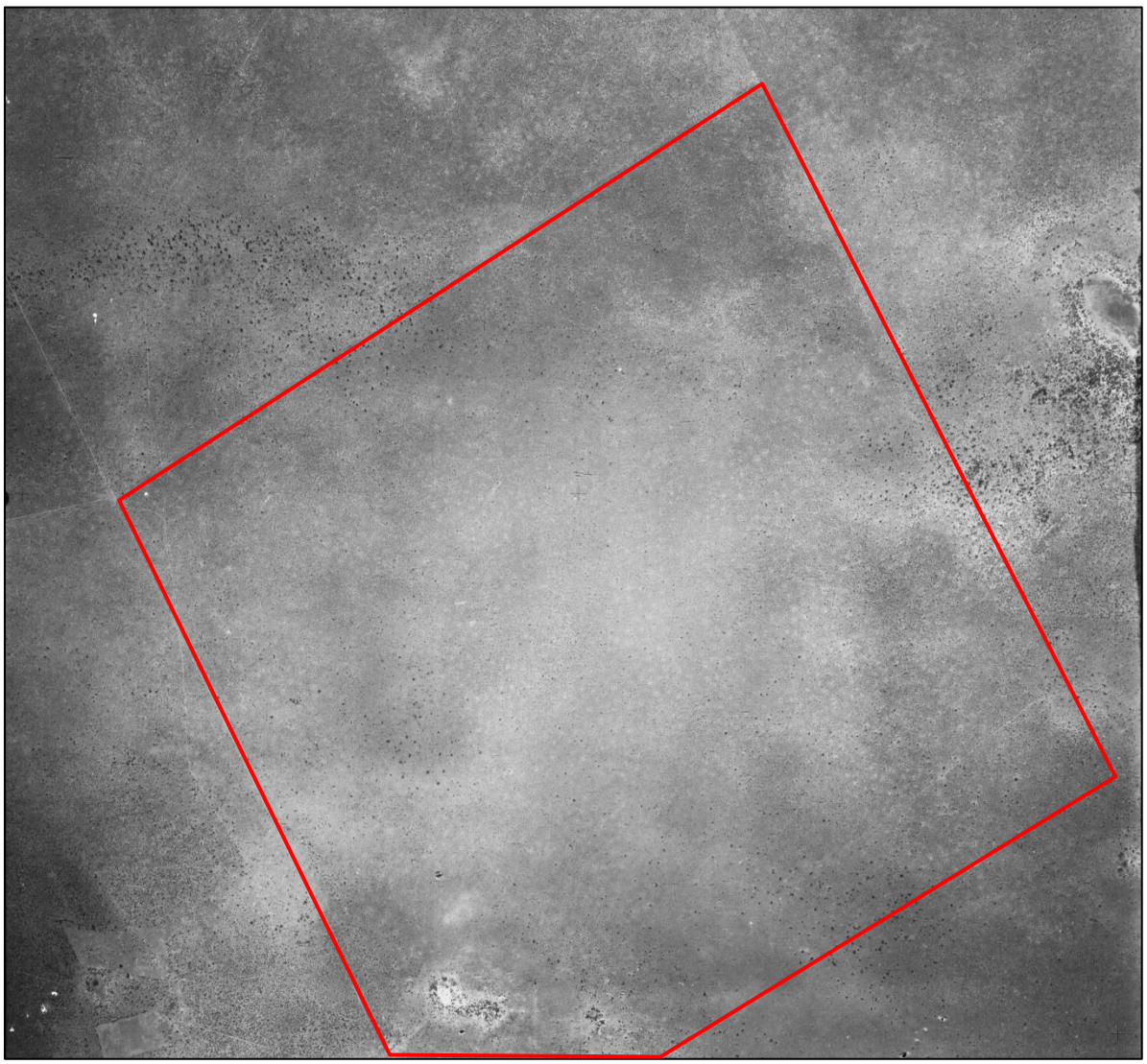


Figure 7-18: Project area in 1948

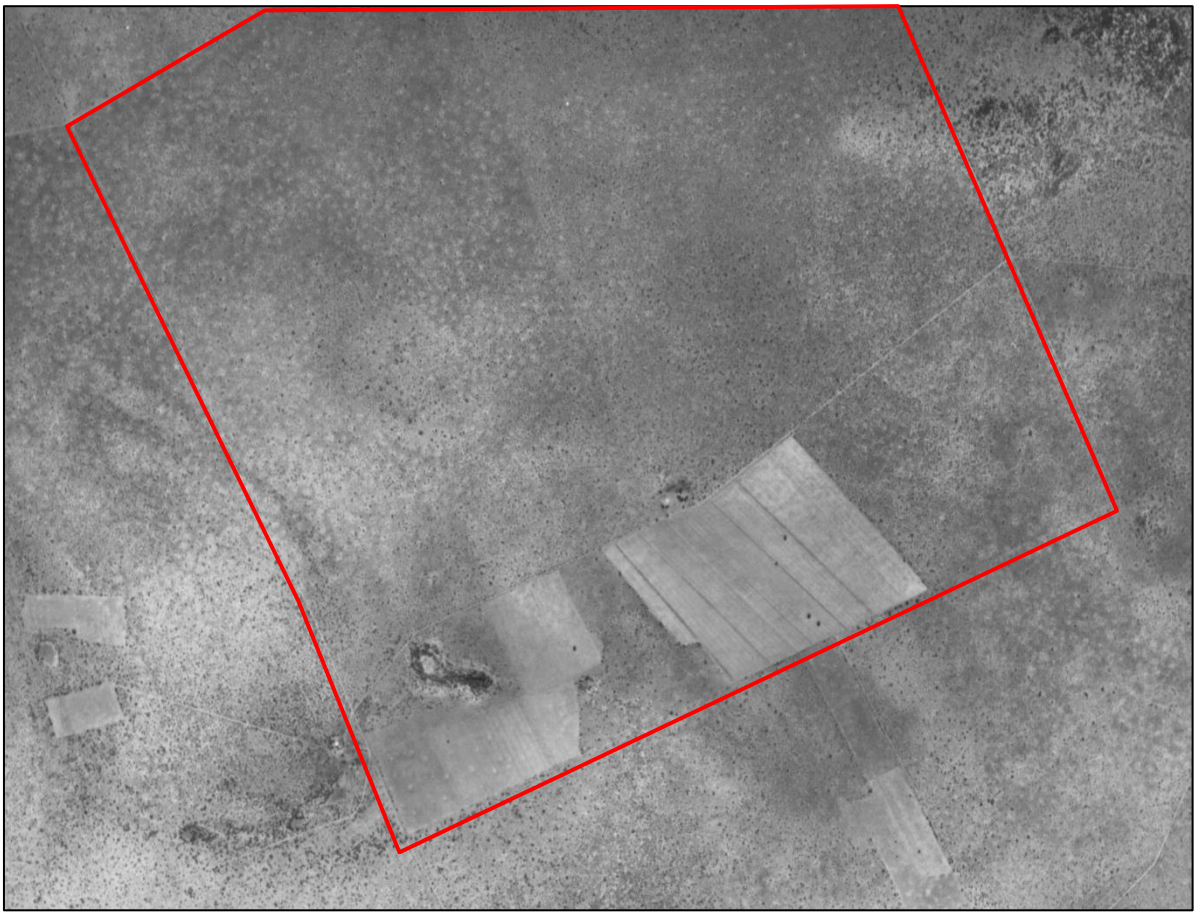


Figure 7-19: Project area in 1969

7.13 Socio-Economic Characteristics

The baseline profile of the project's receiving socio-economic environment is presented in this section. For the purposes of this scoping report three study areas were defined, namely:

- The regional study area (the Lephalale Local Municipality (LLM));
- The local study area (Ward 3 of the LLM). This is where the proposed project will be located; and
- The site-specific study area, which is the anticipated project footprint. Information on this study area will be finalised once the Social Impact Assessment (SIA) team has visited the project site and consulted with directly affected parties.

The selection of the three study areas will be reviewed during the impact assessment phase of the SIA. Where applicable, the socio-economic trends in the respective study areas are compared against trends in larger administrative areas such as the Limpopo Province, which provides additional context for interpretation.

7.13.1 Regional Study Area

Government recognises the Waterberg Coalfields as a future growth point with mining as the primary economic activity. Policy documents of the Limpopo Province, the Waterberg District Municipality (WDM) and the LLM, all recognise that the Waterberg is facing major economic developments within the Limpopo Coal, Energy and Petrochemical Cluster.

The Limpopo Employment, Growth and Development Plan (2009-2014), recognised that the development of the coal, energy and petrochemicals cluster is critical to the achievement of its employment, growth and development objectives. The Plan states that the Waterberg has comparative and competitive advantages in agriculture, mining and tourism, with the tourism comparative advantage almost evenly distributed in all six local municipalities.

The tourism sector is also targeted by the LLM as a development priority to stimulate job creation and economic growth in the local eco-tourism sector. Mining, industrial and urban development in the greater Lephalale area is however impacting on existing game farming and eco-tourism activities. The need for clarity on government's long-term plans in respect of the development of the Waterberg Coalfield is highlighted in the Environmental Management Framework (EMF) for the WDM.

The Medupi Power Station only started to deliver electricity in 2015 and more units will come online in due course. This development will require doubling of the Grootegeluk Mine and its beneficiation plant by 2012. A petrochemical production facility in Lephalale is also under consideration to utilise chemical grade material. These developments, in combination with proposed mining developments in the region, will place a heavy burden on municipalities for the provision municipal infrastructure and services.

Lephalale Town has been identified as a Provincial Growth Point by the Limpopo Province Spatial Development Framework (SDF). The town covers some 33 km^2 and houses more than 18 000 people in roughly 5 000 housing units. Spatially, the town forms three distinct nodes, namely Onverwacht, Lephalale central town and Marapong. Vast tracts of land exist between these nodes which will enable further town development through infill development. However the extension of bulk and reticulation services to the dispersed smaller settlements poses severe problems (Lephalale SDF, 2009).

Several key strategic objectives are recommended in the Lephalale Local Economic Development (LED) Plan. These are:

- Promoting the Coal and Petro-chemical Cluster;
- Supporting livestock farmers on communal land;
- Growing the tourism and recreation industry;
- Assisting the informal sector; and
- Improving service delivery.

In order to achieve these objectives, the above LED Plan includes programmes and projects to provide housing, social infrastructure, skills development, local supply chain development, as well as development of by-products and waste products from mining/coal beneficiation.

As was mentioned, the tourism sector is targeted by the LLM as a development priority to stimulate job creation and economic growth in the local eco-tourism sector. The LLM area has also been defined by the Limpopo Growth and Development Strategy as the coal mining and petrochemical cluster. Mining, industrial and urban development in the greater Lephalale area is impacting on existing game farming and eco-tourism activities.

7.13.1.1 Demographic Characteristics

The LLM has a total population of 115 767 in 2015, which accounts for 17% of the District's population and 17% of its household. Its population density is six persons per km^2. This low density is consistent with the rural nature of most of LLM with most of the population being concentrated in towns (e.g. Lephalale Town). Table 14 shows a breakdown of the population per settlement based on figures from 2009.

It is estimated that the LLM has grown at a rate of 35% between 2001 and 2011, with growth concentrated in and around the town of Lephalale (Lephalale IDP, 2012/2013). According to official census data of 2001 and 2011, the number of households in Lephalale has increased from 20 277 in 2001 (with an average household size of 3.5 persons) to 29 880 households in 2011 with an average household size of 3.9. This increase necessitates the development of additional social services and municipal infrastructure, which are already under pressure. It is widely recognised by available local, district and regional government policies and plans that service delivery and infrastructure provision in the LLM is poor and insufficient.

The LLM likewise shows steadily increasing average ages, which could reflect the gradual industrialisation of the area since 1996. The latter would have attracted increasing numbers of working-aged people into the area. Marapong Township did not exist in 1980 but it had approximately 5 600 inhabitants in 2001 and 26 200 in 2011 (GSA, 2013), an indication of rapid population influx and urbanisation.

Table 14: Spatial classification of population in the LLM (2009)

Settlement Classification	Number of Units/Explanation	Population Dec 09
Lephalale Provincial Growth Point	Ellisras (Lephalale), Onverwacht, Marapong	29 000
Thabo Mbeki Municipal Growth Point	Thabo Mbeki Township Witpoort	4 300
Seleka Population Concentration Point	3 Villages	13 200
Setateng Population Concentration Point	3 Villages	15 200

Settlement Classification	Number of Units/Explanation	Population Dec 09
Local Service Points	Tom Burke, Marnitz	1 000
Small Rural Villages	31	33 600
Steenbokpan Informal Settlement	1	1 000
Mmamojela Park Informal Settlement	1	2 000
Farms	600	12 996
Total		**112 296**

Source: Lephalale LM IDP 2012/2013

While the LLM as a whole has been experiencing net out-migration, the town of Lephalale has experienced a significant influx of people over the last few years due to the industrial development activities taking place. However, the development-induced influx into Lephalale may not be reflected in population statistics, as much of this influx has involved construction activities with a temporary influx of workers during the construction periods.

Table 15: Population growth in Lephalale town between 1980 and 2011

Settlement	1980	2001	2011
Lephalale (Ellisras-Old Town)	1 000	1 600	2 000
Onverwacht	2 000	8 000	15 600
Marapong	0	5 600	26 200
Total	**3 000**	**15 200**	**43 800**

Source: (StatsSA, 2013)

7.13.1.2 Age and Gender

Figure 7-20 shows the age and gender breakdown of the LLM. There are a large number of young, working age males in the municipality (ages 20-34 years). It exceeds the number of children under the age of 20 years. This difference could largely be attributed to the influx of male migrant workers who may have moved to the area following the many developments.

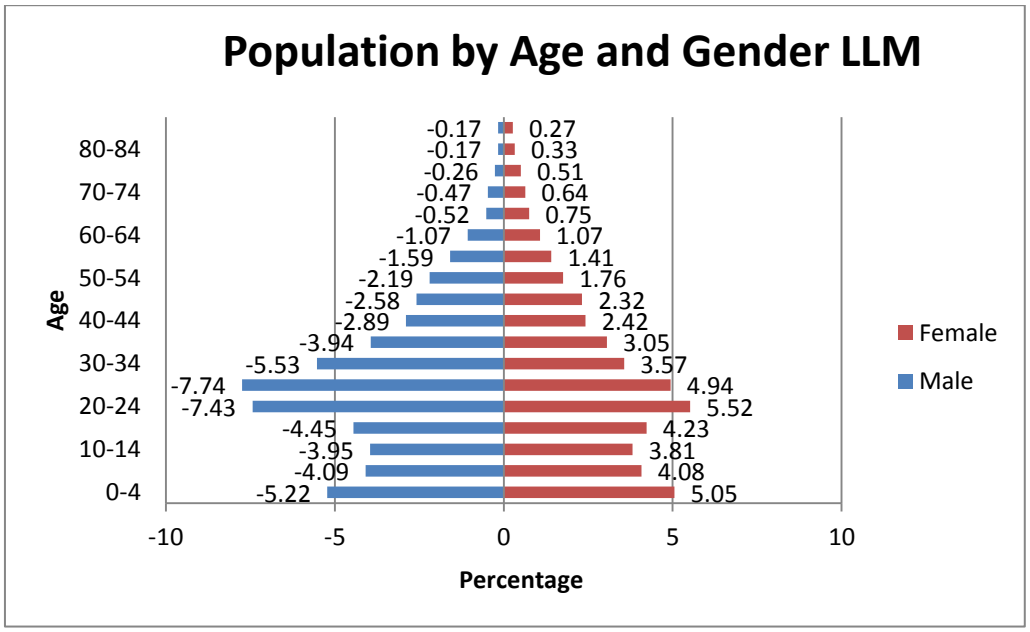


Figure 7-20: Age distribution within the LLM, 2015

Source: LLM IDP, 2015-2016

The proportion of Black Africans in the population of the LLM has increased steadily since 1999 and the majority of the LLM population is Black, followed by White, then Coloured and Indian/Asian.

Table 7-17: Population groups in the LLM (2011)

Population group	Percentage	Number
Black	90.7	104 964
Coloured	0.9	1 023
Indian or Asian	0.3	344
White	7.9	9 120
Other	0.3	317
Total	**100,0**	**115 767**

Source: (StatsSA, 2013)

7.13.1.3 Education

The level of education in LLM can be described as low, as only 19% of the population aged 20 and older has a matric qualification and 6% has higher education. The largest proportion of this population (35%) has some secondary education.

The LLM shows a steady increase in educational levels, which is consistent with increasing industrialisation. There are 59 schools in the LLM. Of these, 53 are primary schools, one is a secondary school, and five are combined primary and secondary schools (WDM, 2015). A comparison between the number of children of school-going age and the available schools indicates that if all children are to attend school within the local municipality, each primary school would have to accommodate over 300 learners, while each secondary school would have to accommodate some 1 560 learners. This highlights the fact that educational facilities are inadequate to accommodate the whole school-going population.

7.13.1.4 Migration

The LLM has experienced a net out-migration between 2005 and 2007, with its population shrinking at about 2% per year. The population decline was part of a more general national trend of migration out of rural municipalities towards more urban ones (Urban Econ , 2012). However, Lephalale Town has experienced a significant influx of people since 2007 due to industrial development activities taking place. The full extent of development-induced influx to the LMM may not be clearly reflected in population statistics, as much of this development has, thus far, involved construction activities that imply temporary influx of workers (including from outside of the country) and employment that is most likely captured in other parts of the country.

The figure below illustrates the number of people that migrated into the LLM (2001 to 2011) according to the province from which they migrated during their last move. It shows that people migrating to the LLM are mainly from within the Limpopo Province. The second most common place of migrant origin is outside South Africa, followed closely by Gauteng. Other provinces were excluded from the table due to the negligible population numbers (StatsSA, 2013).

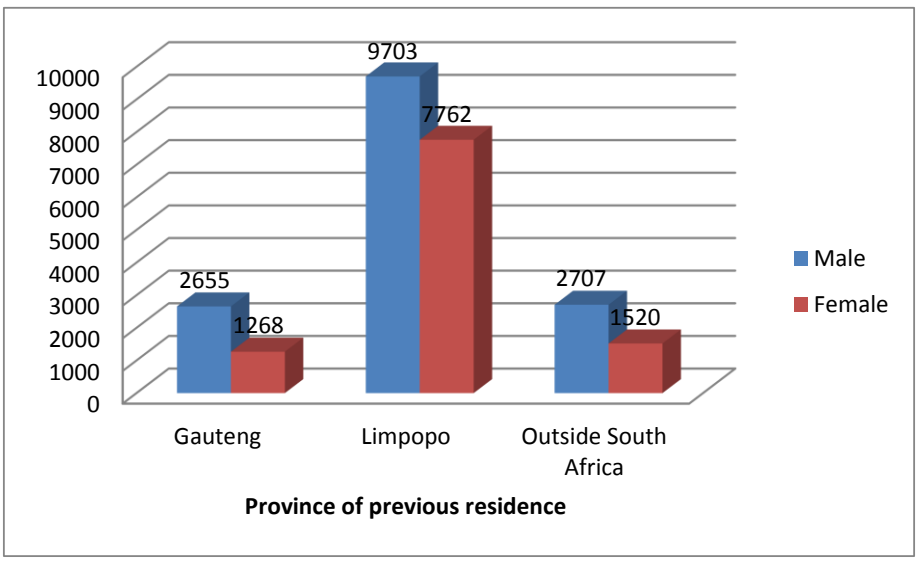


Figure 7-21: Migration into LLM

Source: (StatsSA, 2013)

7.13.1.5 Overview of the Economy

According to the Waterberg EMF (2010), the largest contribution to the Gross Domestic Product (GDP) of the WDM comes from the mining sector, with a share of almost half (49%) of the GDP in the district, followed by the finance sector (11%). Again, although mining is the biggest contributor to the GDP, it is not the largest contributor to employment, providing only 16% of total employment. The agricultural sector provides almost 27% of the employment opportunities within the WDM but is one of the smallest contributors to total GDP (3%) of the district.

The Waterberg District contributes almost 30% of the Limpopo Province agricultural activity. The mining and quarrying sector grew by 23.4% between 2005 and 2010. The rapid rate in which mining created employment between 2001 and 2007, signals a trend that mining will become one of the biggest employers in the WDM in the near future.

Eco-tourism is currently the largest sector within the tourism industry within the WDM, with business tourism growing rapidly due to the developments taking place in the area. Game farming plays an important role in the local eco-tourism sector. According to the LLM's LED Plan (2008), hunting is the dominant attraction in the region and accounts for 31% of visitors to the area. However, rapid industrial development puts pressure on tourism activities and industry stakeholders are concerned that the game farming and eco-tourism sectors are not taken into consideration by the planned developments are planned (Waterberg EMF, 2010).

Relative to both the national and the Limpopo Province economies, the LLM economy has a higher per capita Gross Value Added (GVA), indicating a stronger economy in comparison to the other areas. In 2010, the per capita GVA in the LLM was equal to R82 485 in current prices, which was much higher than that for the Limpopo Province (R33 057). The national per capita GVA was R48 146 in 2012 prices (Urban Econ , 2012).

The contributions to GVA of the various sectors of the economy show that more than 70% of the local economy resulted from mining activities, specifically coal mining. These activities are dependent on the demand for coal by the local energy generating sector. The expanding mining sector has been the main stimulant of growth in the LLM economy in the past few years, while the mining and quarrying sector has trebled in size between 2005 and 2010.

The contribution of the mining sector to the GVA outweighs its contribution to employment creation. The tertiary sector, on the other hand, is far more significant in terms of the number of jobs created (more than half of all jobs in the LLM are in this sector) than in terms of its contribution to GVA.

Table 7-18: Gross Value Added of the LLM economy, 2005 and 2010

Sectors	2005	2010	Compounded Average Growth Rate 2005-2010
	R million		%
Primary sector	**1 289.4**	**3 319.1**	**20.8%**
Agriculture, forestry & fishing	187.7	171.0	-1.8%
Mining and quarrying	1 101.7	3 148.1	23.4%
Secondary sector	**462.0**	**229.5**	**-13.1%**
Manufacturing	98.7	63.3	-8.5%
Electricity, gas & water	318.6	124.7	-17.1%
Construction	44.7	41.5	-1.5%
Tertiary sector	**1 049.3**	**862.2**	**-3.9%**
Wholesale and retail trade	250.4	195.7	-4.8%
Transport & communication	204.3	193.1	-1.1%
Finance & business	296.9	230.4	-4.9%
Social & personal services	66.2	52.7	-4.4%
General government	231.5	190.2	-3.9%
TOTAL Gross Value Added	**2 800.7**	**4 410.7**	**3.9%**

Source: (Urban Econ , 2012)

7.13.1.6 Labour Force

Almost two thirds of the working age population in the LLM were not economically active in 2010. Of the available labour force, 23% were unemployed, as against 20.4% in the WDM. Table 7-19 below illustrates the importance of mining and agriculture in employment creation, although both sectors showed a downward trend in 2009. Reliance on employment from the mining sector is higher in the LLM than in other areas in Limpopo (12% of jobs in 2012), or in South Africa as a whole (where it accounted for only 5% of jobs) (Urban Econ , 2012).

Table 7 - 19: Labour force sStatistics, 2010

Indicators	South Africa	Limpopo	WDM	LLM
Working-age population	32 011 442	3 288 076	403 773	55 544
Non-economically active	15 754 899	2 125 961	219 028	34 173
Labour force	16 256 543	1 162 115	184 744	21 371
Employed	12 041 486	798 252	147 065	16 341
Unemployed	4 215 057	363 863	37 679	5 030
Unemployment rate	25.9%	31.3%	20.4%	23.5%
Labour participation rate	50.8%	35.3%	45.8%	38.5%

Source: (Urban Econ , 2012)

Table 7-20: Employment per Sector for LLM 2008-2010

Sector	2008	2009	2010	2010 (%)
Agriculture, Forestry and Fishing	3633	2938	3392	14.0
Mining and Quarrying	4004	3812	4467	27.3
Manufacturing	805	677	628	3.8
Electricity, Gas and Water	851	927	1001	5.8
Construction	842	775	641	3.9
Wholesale and retail trade , catering and accommodation	3569	3165	3188	19.5
Transport, storage and communication	666	665	671	4.1
Community, social and personal services	2658	2451	2219	13.6
Finance, insurance, real estate & business services	799	678	673	4.1
General Government	1457	1394	1463	9.0
Total	**19,283**	**17,481**	**17,243**	**100.0**

Source: LLM IDP 2012/2013

7.13.1.7 Land Tenure

Three forms of land tenure exist within the LLM. The first involves private ownership, which is the most prevalent form and applies to Lephalale Town, local service points and all farms. Second, involves communal ownership, comprising rural population concentration points and villages. The third is a 'deed of grant' which applies to Marapong. Approximately 14% of the land in the LLM is currently either owned by the state or held in trust by the chiefs of various communities. The LLM owns very little land which represents a challenge as the pressure for development in Lephalale Town creates upward pressures on the urban land market (LLM, 2015). Within the LLM, about 198 000 ha (14.1%) of land are subject to land claims (2010). There were 102 outstanding land claims in 2010. Apart from these land claims there are 344 land redistribution projects, covering an area of 62 590 ha (LLM, 2015).

Contributing to the spatial development challenges of the LLM is the presence of low income earners and job seekers. The relatively high land cost in and around Lephalale Town could force the poor and the low middle class to the outskirts of town, which could lead to informal settlement and illegal squatting.

7.13.1.8 Income Levels

The average monthly household income in the LLM was R13 086 in 2011, which was more than the national average household income. Average household incomes in LLM grew at a Compounded Average Growth Rate (CAGR) of 10.7% in real terms between 2005 and 2010. According to the LLM IDP, 15.5% of households in the municipality earned no income and 45.3% earned less than R9 600 per year in 2011. In 2015, 12.5% of households earned no income and 22% earn less than R9 600 as indicated in the table below.

Table 7-21: Annual household income, LLM (2011-2015)

Income Categories	Number of Households 2011	Percentage	Number of Households 2015	Percentage
No Income	4 305	15.5	3 745	12.5
R1- R4 800	5646	20.3	958	3.2
R4 801-R9 600	6937	25.0	1 876	6.3
R9 601-R19 200	4000	14.4	4 876	16.3
R19 2001-R38 400	2368	8.5	6 046	20.2
R38 401-R76 800	1942	7.0	4 608	15.4
R76 801- R153 600	1601	5.8	3 354	11.2
R153 601-R307 200	633	2.3	2 358	7.9
R307 201-R614 400	148	0.5	1 417	4.7
R614 401-R1,228 800	58	0.2	445	1.5

Income Categories	Number of Households 2011	Percentage	Number of Households 2015	Percentage
R1,228 801-R2,457 600	53	0.2	126	0.4
R2,457 601- or more	38	0.1	68	0.2
Total	**27 756**	**100**	**29 877**	**100.0**

Source: LLM IDP 2012/2013

7.13.1.9 Local Community Health

The Waterberg District's 2009 'Burden of Disease' (BoD) profile was considered from an analysis of the causes of death. An analysis of the 'Years of Life Lost' after redistribution of deaths by four broad cause groups,' reflects that the highest proportion of Years of Life Lost in the WDM was due to communicable diseases (in conjunction with maternal, perinatal and nutritional conditions) (35.4%), followed by non-communicable diseases (27.7%). HIV and TB (24.5%) ranked third whilst the lowest proportion (12.4%) of Years of Life Lost was due to injuries.

Human Immunodeficiency Virus (HIV) and acquired immunodeficiency syndrome (AIDS) are major contributors to the disease burden in South Africa and have had a severe effect on the social and economic fabric of South Africa. The high prevalence of HIV and AIDS in the WDM is a possible threat to the district's growing economy. In order to detect HIV infection early, the public health sector provides HIV counselling and testing for pregnant women to prevent mother-to-child transmission.

The number of HIV/AIDS infections within the LLM is considered high, with a prevalence estimation of 30.4% in 2010 (LLM IDP, 2012/13). The prevalence is the highest among the youth, with 33 % of the young people between the ages of 25 to 29 years being infected.

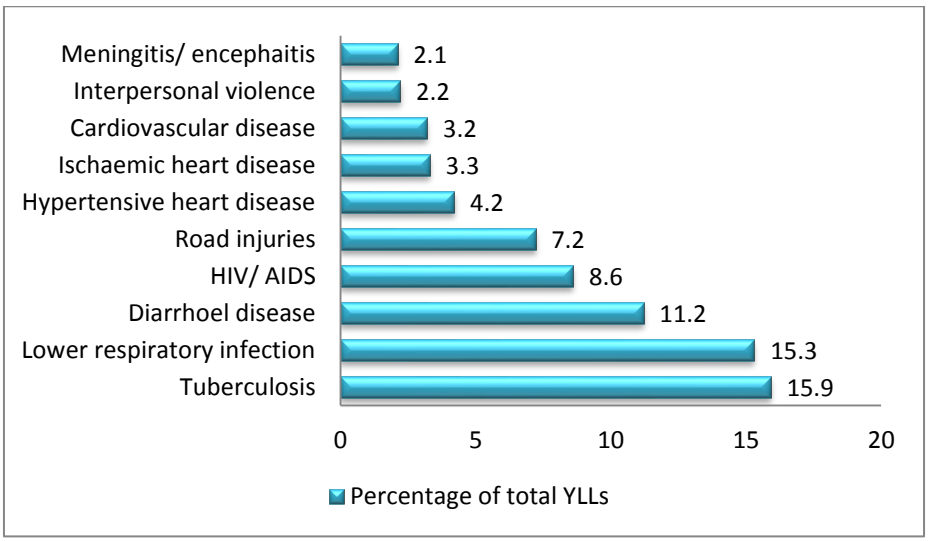


Figure 7-22: Leading causes of Years of Life Lost (Waterberg District) (IDP 2012/13)

Source: (StatsSA, 2013)

There are three hospitals (two public and one private) and six clinics in the LLM. Witpoort Hospital serves as the referral health facility for Abbotspoort, Seleka and Shongoane clinics. Lephalale Hospital is the referral health facility for Marapong and the Lephalale Town clinic. Mobile primary health care services are provided to settlements that are more than 10km away from any health facility in the LLM.

Health care challenges include the attraction and retention of skilled medical personnel as a result of geographic location and lack of affordable accommodation. In addition, the influx of people to the WDM and the LMM has put additional pressure on referral centres. According to the WDM IDP, members of the community are not confident about services provided at primary health care centres. Patients also often seek medical attention when they are at an advanced stage of ailment, which result in high mortality rate in both children and adults. The WDM IDP highlights the lack of adequate financial resources for the acquisition of advanced medical equipment.

7.13.1.10 Service Delivery

According to the LLM's latest IDP (2011-2016) and SDF (2012), there have been substantial improvements in the development of social and community infrastructure within the LLM, although there are still significant backlogs that prevent household access to acceptable water, sanitation and electricity supply. These backlogs are mostly experienced in informal settlements and those residing in rural areas.

7.13.1.10.1 Electricity

Despite the LLM being declared the Limpopo Coal and Energy Petrochemical Cluster, the Waterberg IDP (2011/2012) confirms that there is currently an electrical supply deficit in the area. This is partially related to challenges and costs associated with establishing electricity transmission and distribution infrastructure in low population density areas that are dominant in the LLM. The backlog in electrical supply is expected to be eradicated upon the industrial development of the LLM, and the latter will also improve service delivery of electricity at the provincial and national levels.

Electricity for the LLM is supplied from Eskom at 11 kV via the main Lephalale Substation at Onverwacht. The maximum electricity demand already exceeds supply and various options for upgrading the network are being investigated (LLM, 2015). According to the LMM SDF, causes of poor electricity provision include the high cost of establishing Regional Electricity Distributors; as well as the dispersed nature of rural settlements within the municipality which increases the cost of service provision.

Since 2008, the load growth for the municipal area has increased by 200%. The current load growth, based on applications for new connections, is estimated at approximately 10 MVA/a over the next five years for existing and planned reticulated area.

7.13.1.10.2 Waste Management and Sanitation

Only 26.6% of households in LLM currently receive waste removal services. There are two permitted landfill sites and an unknown number of non-registered landfill sites in the LLM, all of which are located in rural areas. Approximately 85% of the local population have access to a flush/chemical/pit toilet (WDM, 2015).

The primary form of household refuse removal in the LLM is through households having a refuse dump on their property (44%). This is closely followed by 41% of all households who have refuse removed by the local authority or a private company.

Immediate upgrading of the sanitation infrastructure is required as 94% exceeds 20 years (WDM, 2015). The municipalities' lack of capacity to provide public waste removal services, landfill sites and sanitation services resulted in some projects developing their own waste management and disposal facilities.

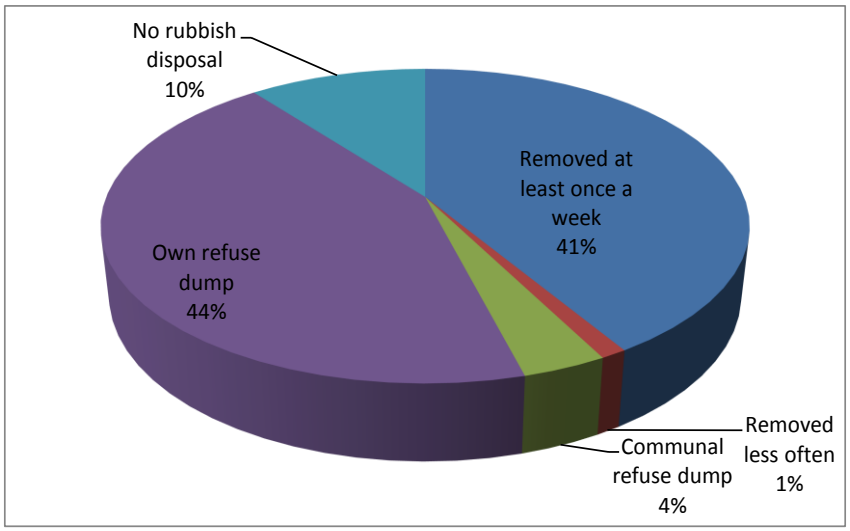


Figure 7-23: Access to refuse removal services (LLM)

Source: (StatsSA, 2013)

7.13.1.10.3 Water Supply

The relative scarcity of water in the WDM has been recognised by all groups and sectors as a key issue for future development. Supply is already insufficient and will not be able to meet the increased demand resulting from the construction of new power stations and mining activities. The region usually receives low rainfall and the shortage of freely available water is considered a major cause for land use conflict between low-intensity uses (game farming and hunting, agronomy and conservation) and high-intensity uses (mining, power generation and urban development) (Waterberg EMF, 2010).

The LLM is a severely water stressed area with a high demand to supply ratio. Rainfall is low and the increasing demands for industry and ecotourism development have the potential to put strain on surrounding areas. The LLM is designated as a Water Service Authority and Water Service Provider. Water supply for the urban areas of LLM originates from the Mokolo

Dam. Grootegeluk Coal Mine originally built the main supply lines, pump station, balancing dam and water purification works in the urban area. The supply and maintenance of the dam is done by Grootegeluk Mine but this function will be transferred to the Department of Water Affairs.

In the case of Marapong, which is situated near Temo Coal Mine and power plant, purified water is supplied by Matimba Power Station. Although the LLM has benefited from the investments made by Exxaro and Matimba in the past, there is a concern that as water service authority, and considering long term development implications, the municipality should have ownership of infrastructure required to provide water and sanitation services to Marapong. The LLM has an updated Water Service Development Plan, which was adopted in 2009.

Approximately 67% of households in the LLM have access to piped water. This is a marked increase since Census 2001 when 59% of households within the municipality had access to piped water. The LLM water infrastructure only allows for a limited reserve yield allocated for development expansion within its area. This could create a constraint on such development if water supply constraints are not addressed (Waterberg IDP, 2015). The Mokolo Crocodile Water Augmentation Project (MCWAP) is expected to assist with the demand for additional water supply.

According to the LLM IDP (2015), 85% of households in rural areas obtain their water from surface sources and boreholes. Approximately 73.3% of the rural population has access to water that has to be carried or carted from 200 m or closer and 16.7% has access to water that is carried/carted from 200 to 500 m away from point of use.

7.13.1.10.4 Sanitation

According to Census 2011 statistics, 45% of households in the LLM have access to a latrine (flush, chemical and/or pit latrine). An additional capacity of 10MC/d is required by the Water Treatment Works to meet projected demands, while immediate upgrading of the sanitation infrastructure is required (WDM, 2015).

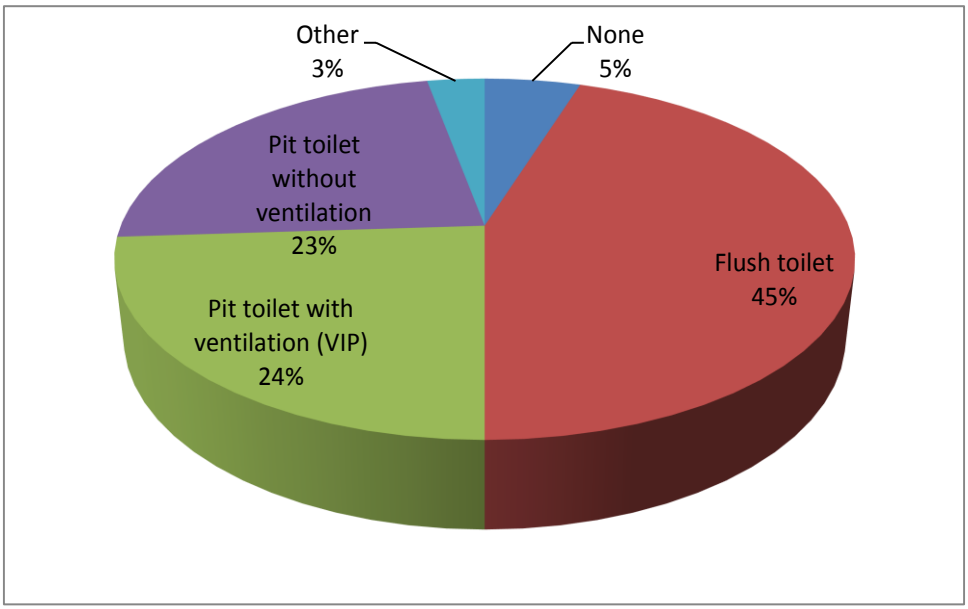


Figure 7-24: Sanitation facilities in LLM (LLM)

Source: (StatsSA, 2013)

7.13.1.10.5 Public Transport and Transport Infrastructure

Public transport in the form of buses, taxis and trains are available in the region, yet they do not meet the requirements of the current working population. There are twelve taxi routes in Lephalale serviced by five taxi associations. The bus service provides the LLM with a fleet of 155 vehicles at three terminals. The WDP IDP recognises that the majority of roads used by public transport are gravel and often below standard, requiring upgrading, improved storm water management, lighting, parking and other general road infrastructure. Nearly 90% of the population travel on foot, which is an indication of the rural nature and low income levels of people in the LLM.

7.13.1.10.6 Road Networks

Roads within the LLM are adequately connected with district, provincial and national roads. However, most road systems are in disrepair and eroded, being insufficient to handle the increased traffic that mining and other industrial developments created. This is especially the case with regard to the R33, which runs through Lephalale town and is the busiest route in the district (WDM, 2015).

7.13.1.10.7 Housing Provision

As a result of increased industrial development and population growth in the LLM, there is an increased demand for housing, with the current housing backlog estimated at 20,575 units. This accounts for 29% of the housing backlog in the WDM (WDM, 2015). Approximately 22% of this backlog is linked to the development of industrial, energy and mining projects in the LLM.

The backlog in housing provision and increased population size expected due to the influx of migrant labourers to the energy and industrial cluster will exacerbate current pressures on basic service delivery, particularly with regard to the growth of informal settlements (WDM IDP, 2011/2012). This increasing housing backlog has given rise to the establishment of numerous informal settlements, which are generally found adjacent to development nodes, such as mining projects and areas such as Mmamojela Park just outside of Lephalale Town.

Between 2001 and 2011 there was an increase in informal housing in the broader LLM area of approximately 20% (GSA, 2013). The LLM has seen a decline in traditional housing and a subsequent increase in formal and informal housing and an increase in the average size of houses between 1996 and 2011. It has also experienced a decline in the average household size from 4.2 in 1996 to just below 4. This is an indication of a shift towards urbanisation.

Lephalale town covers 33 km2 and houses more than 18 000 people in approximately 5 000 housing units. Spatially, the town forms three distinct nodes, namely Onverwacht, Lephalale and Marapong. Vast tracts of land exist between these nodes, which could enable compact town development through infill development. However the extension of bulk and reticulation services to dispersed small settlements poses severe problems (LLM, 2015).

Most households within the LLM live in formal dwelling structures (83%), while 16% live in informal structures. Formal dwellings comprise houses and other structures made of brick and/or concrete. Informal dwellings mainly constitute free-standing shacks and structures in backyards that are situated in squatter camps and on farms.

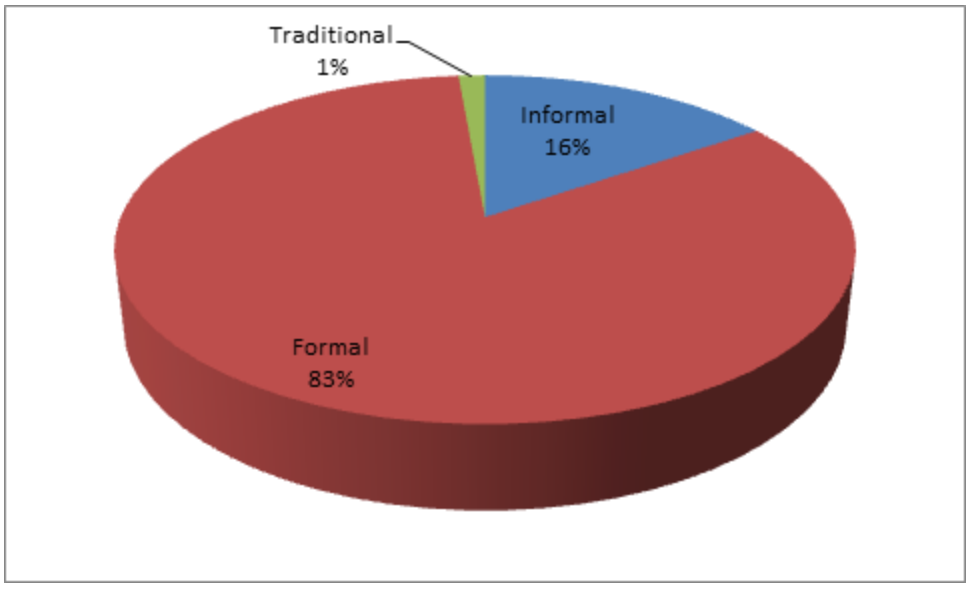


Figure 7-25: Type of Main Dwelling (LLM)

Source: (StatsSA, 2013)

7.13.2 Local Study Area

The Project will be located in Ward 3 of the LLM, which comprises mainly agricultural farms and game farms/reserves. It is important to point out that ward boundaries for the LLM have

changed regularly since 2001. In 2006 and 2009, for example, the Project would have been located in Ward 2, and in 2000 it would have been located in Ward 1. The shapes and sizes of these wards also differ for the years 2000, 2006, 2009 and 2011, which means that socio-economic datasets aggregated to ward level are not readily comparable if they originate from different years.

The shape of Ward 3 resembles that of a wheel, with Wards 1, 2, 4 and 5 situated in the middle and Ward 3 forming the outer layer/sections. The ward area is largely rural containing numerous farmsteads and gaming and lodging facilities. Settlements include Monte Christo, Elmeston, Hermanusdoring and Oranjefontein. Steenbokpan/Lesedi is the largest settlement in Ward 3 with an estimated population of 2 200 people in 2012. A few smaller settlements occur just outside of Ward 3, such as Villa Nora and Beauty on the eastern side. There are several primary schools in Ward 3 but no secondary schools.

Satellite imagery shows that commercial agriculture takes place at Overyssel and along the southern part of the Matlabas River. However, there are several mountainous areas in Ward 3, making agricultural production and human habitation difficult. Satellite imagery shows that there are no industrial developments in Ward 3.

7.13.2.1 Population

The population of Ward 3 was estimated at 11 138 in 2011, which is nearly 10% of the total LLM population (Cencus 2011). Males account for 57% of the population and females account for 43%. The proportion of males is significantly higher (by approximately 5%) than in the LLM. This suggests that either there are more work opportunities in Ward 3 than in the rest of LLM, or Ward 3 is a convenient place to live while working elsewhere or looking for work elsewhere. This difference could partly be due to an influx of males into Steenbokpan who are seeking job opportunities at the mines (where work is usually more suited to males than females. Most other job opportunities are on the agricultural and game farms. Figure 7-26 demonstrates the predominance of males in Ward 3, particularly in the peak working age groups ranging from 20 to 44

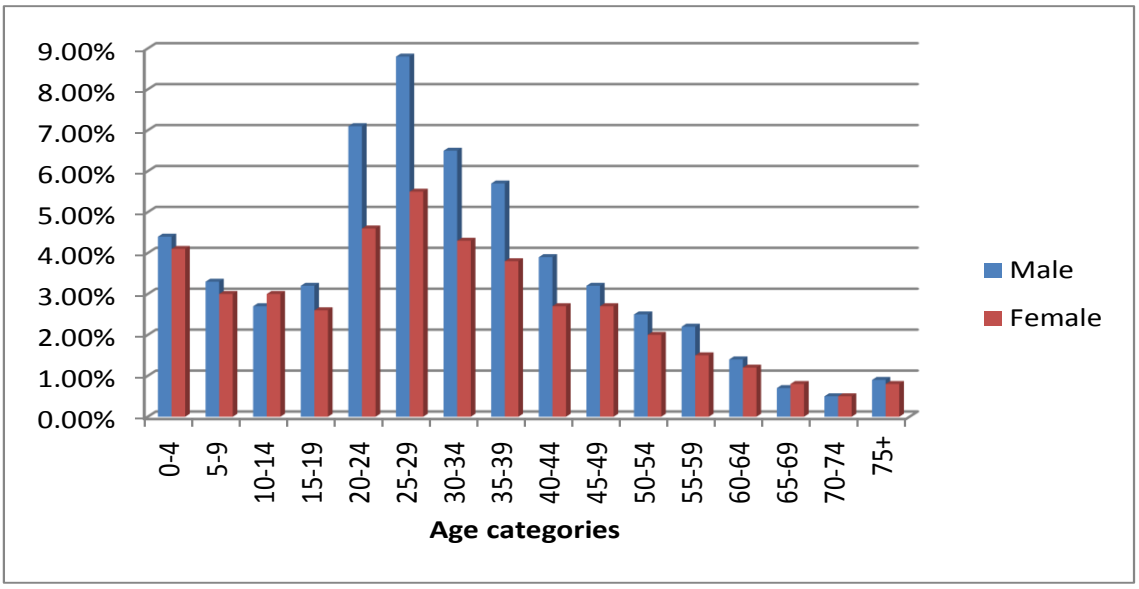


Figure 7-26: Age distribution within Ward 3

Source: (StatsSA, 2013)

Ward 3 has a larger White population than the LLM as a whole (12.5% versus 7.9%), while the Black population still forms the majority. The number of Indian/Asians is negligible.

Table 7-22: Population groups in Ward 3 (2011)

Population group	Percentage	Number
Black	86.6	9 644
Coloured	0.4	39
Indian or Asian	0.1	9
White	12.5	1 387
Other	0.5	59
Total	**100.0**	**11 138**

Source: (StatsSA, 2013)

7.13.2.2 Migration

It seems that migrants in the local study area, who moved from within South Africa, mostly moved within the Limpopo Province, while others came from Gauteng Province. The majority however, came from outside South Africa, mostly from the SADC region. This is likely due to the close proximity of Ward 3 to the South Africa-Botswana border. Other provinces were excluded from the table below due to their negligible contribution to in-migration. The 2011 Census results show that very few of these migrants came with children aged 0 to 14 years.

The majority of migrants were male. It can be assumed that their families remained at their regular or original places of residence, making migrants' stay in Ward 3 non-permanent. It can furthermore be assumed that they moved into the area to take advantage of the growing

job opportunities at the mines and power stations within the LLM. However, it is not certain how many of the migrants are temporary workers only.

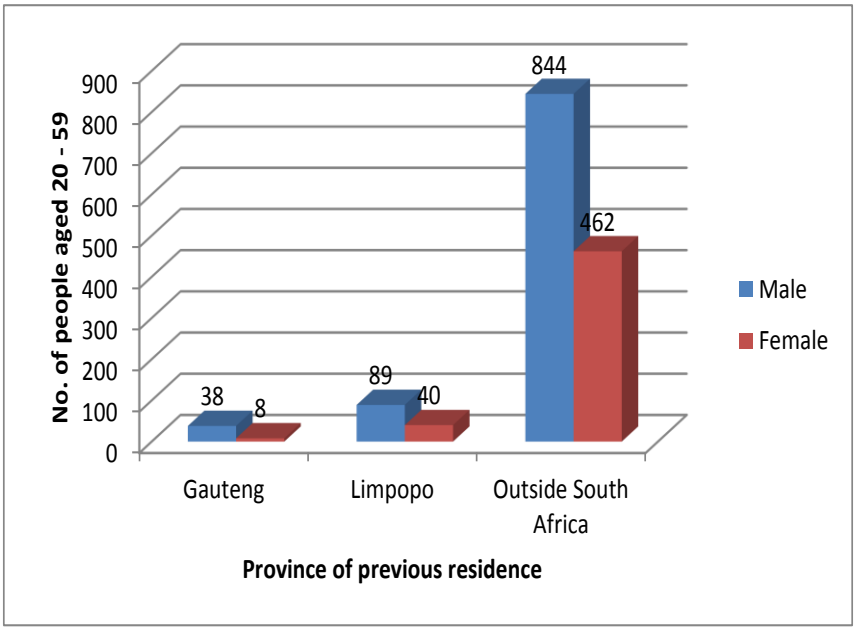


Figure 7-27: Migration into Ward 3

Source: (StatsSA, 2013)

7.13.2.3 Education

The level of education in Ward 3 can be described as low as only 14% of the population over the age of 20 passed matric – compared to 19% in the LLM, 22% in Limpopo Province and approximately 28% across the country. The majority has either some secondary or some primary education. Ward 3 is largely rural and secondary schools are often too far away for lower income families to afford to send their children to secondary school.

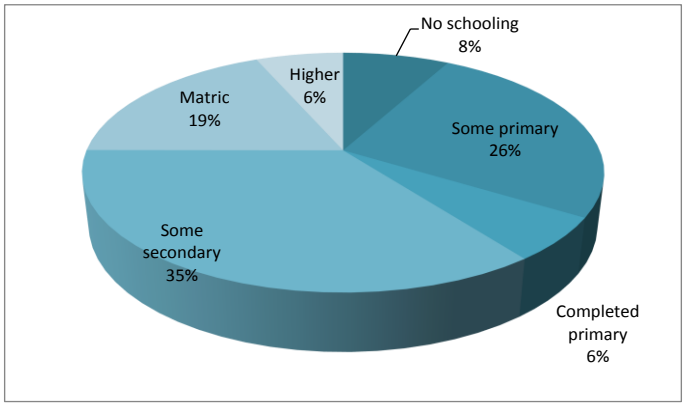


Figure 7-28: Highest level of education for those aged 20 and older, LLM

Source: (StatsSA, 2013)

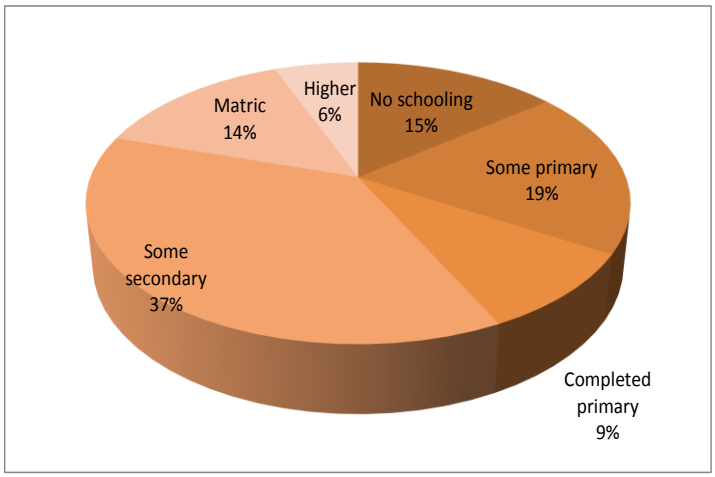


Figure 7-29: Highest level of education for those aged 20 and older, Ward 3

Source: (StatsSA, 2013)

7.13.2.4 Land Tenure

About forty six percent of households in Ward 3 live on properties rent-free. This likely refers to people living in Steenbokpan/Lesedi and those working on farms in the surrounding areas, where workers and their families often live on the employer's land rent-free. Landowners may not always be aware of exactly who lives in these farmworker homesteads and so there tends to be more people than just employees and their immediate families living there.

Landowners often provide housing structures and household services to their workers. The levels of these services are therefore at the discretion of the landowners.

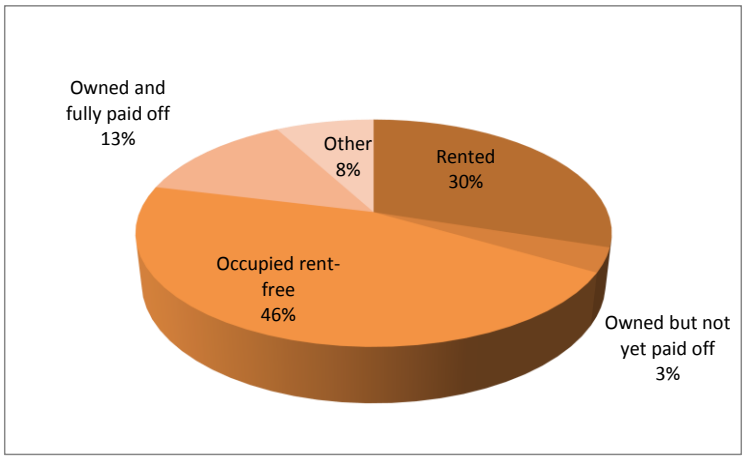


Figure 7-30: Tenure status of households, Ward 3

Source: (StatsSA, 2013)

7.13.2.5 Labour Force

The economically active population in Ward 3 comprises approximately 6 600 people. The level of employment in Ward 3 is high, with 93% of the economically active population reportedly being employed, despite low levels of education in Ward 3. This is considerably higher than the national figure of 70% (StatsSA, 2013). The high level of employment could partly be as a result of the low educational levels that are required to work in agriculture and game farming. Most of the required skills are likely learned on-the-job. The same may apply to some landowners who may have learned the trade from their parents while growing up.

7.13.2.6 Income Levels

The bulk (54%) of the Ward 3 population earns between R9 601 and R38 200 annually, with 16% earning up to R 76 400 and 13% over that amount. Only 6.3% of the Ward 3 population has no income, compared to 15.5% within the LLM. Ward 3 also displays greater financial stability (indicated by the 93% employment), than can be found throughout the LMM. This is mostly due to employment opportunities on farms (including farms), and possibly also due to the growth in the mining sector, with mines and power plants located just outside Ward 3.

Table 7-23: Level of annual household income (Ward 3)

Income Categories	Number of Households	Percentage of Households
No income	186	6.3
R 1 - R 4800	65	2.2
R 4801 - R 9600	133	4.5
R 9601 - R 19 600	790	26.8
R 19 601 - R 38 200	849	28.8
R 38 201 - R 76 400	483	16.4
R 76 401 - R 153 800	238	8.1
R 153 801 - R 307 600	118	4.0
R 307 601 - R 614 400	55	1.9
R 614 001 - R 1 228 800	13	0.4
R 1 228 801 - R 2 457 600	9	0.3
R 2 457 601 or more	6	0.2
Total	**2945**	**100.0**

Source: (StatsSA, 2013)

7.13.2.7 Electricity

Electricity is the main source of energy for cooking and lighting in Ward 3. However, the use of electricity for cooking (45.7%) is almost equal to the use of wood (44.3%). Candles are the second most common source of energy for lighting (29%) in Ward 3. Although incomes are higher in Ward 3 than in the LLM, access to services in Ward 3 is relatively low, largely due to the rural nature of the area.

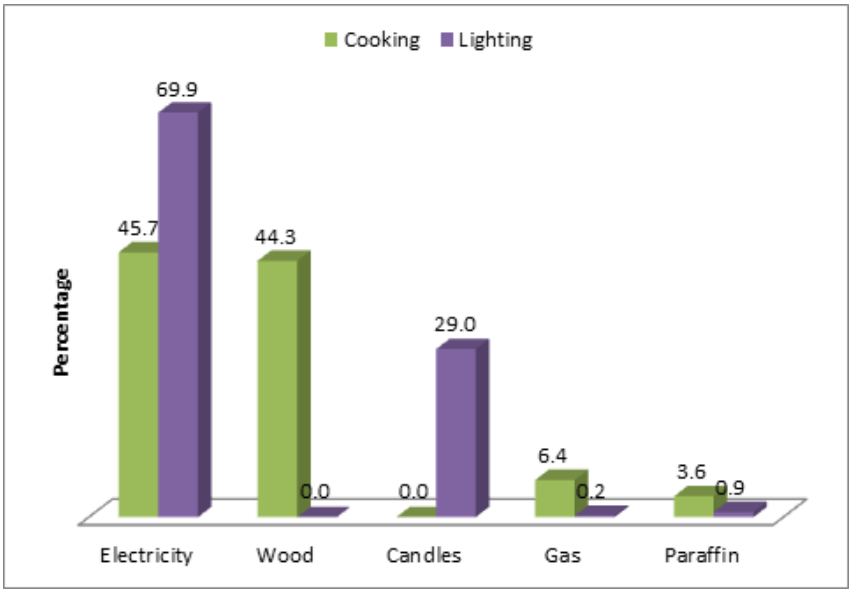


Figure 7-31: Sources of energy for cooking and lighting

Source: (StatsSA, 2013)

7.13.2.8 Water Supply

Boreholes are the most common source of water in Ward 3 (69%). This is largely due to the rural nature of the area, which consists mostly of farmlands.

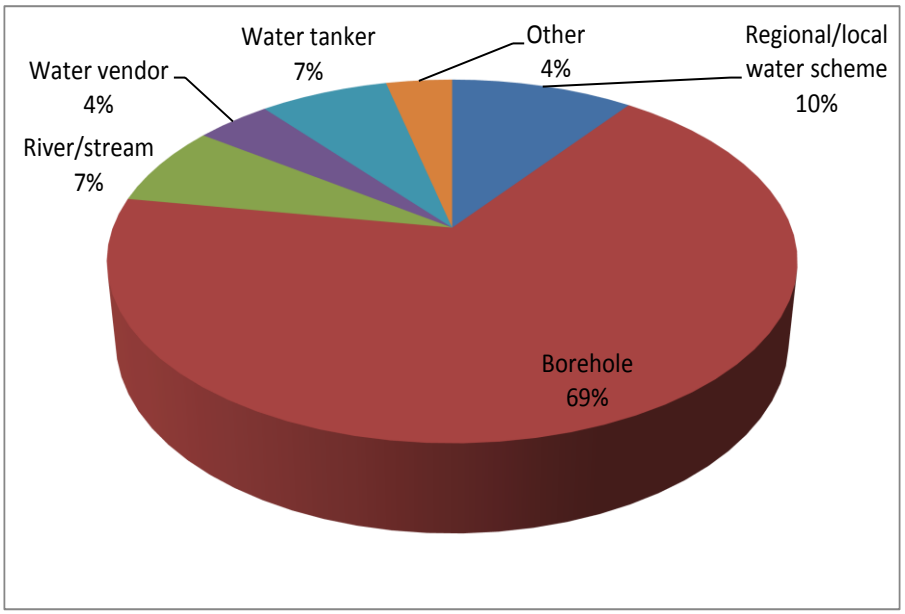


Figure 7-32: Sources of household water supply

Source: (StatsSA, 2013)

7.13.2.9 Sanitation

Only 42% of households in Ward 3 have access to flush toilets; however this is higher than the provincial average of 22%. Households in Ward 3 that have pit latrines without ventilation account for 31%. This is lower than the provincial average where 53% of the population use pit latrines without ventilation (Waterberg IDP, 2011/2012).

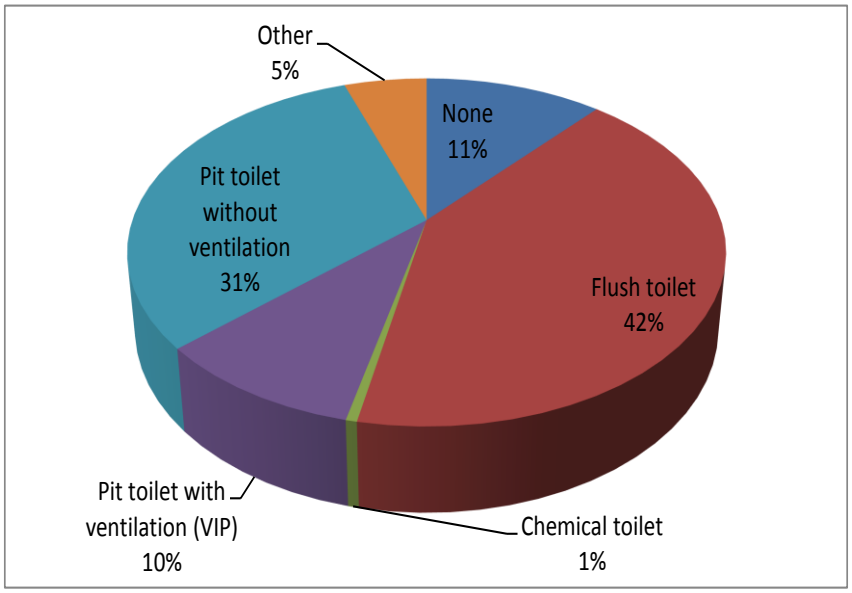


Figure 7-33: Sanitation facilities in Ward 3

Source: (StatsSA, 2013)

7.13.2.10 Refuse Removal

Formal waste removal is lacking in Ward 3, while 63% of the population have created their own refuse dumps, and only 16% have it removed weekly. Communal dumps are used by 8% of the population. Farm households often have an arrangement with the LLM to collect their waste, which is likely represented by the 16% above.

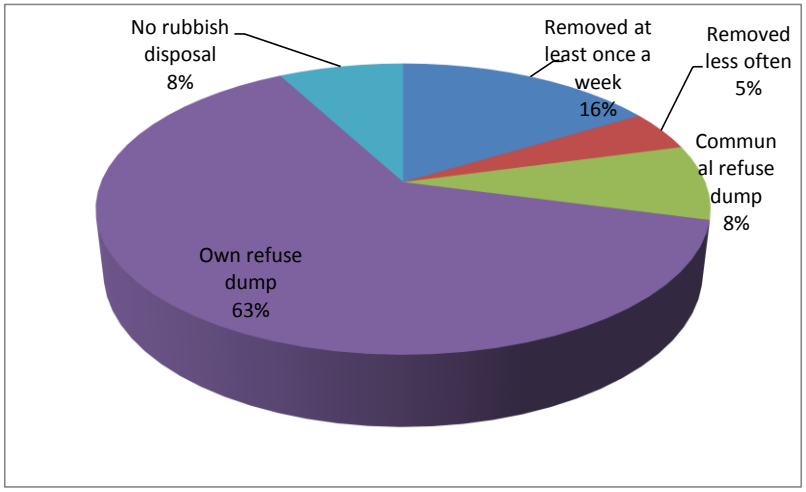


Figure 7-34: Access to refuse removal services (Ward 3)

Source: (StatsSA, 2013)

7.13.2.11 Housing Provision

The majority of households in Ward 3 (76%) live in formal structures. Informal dwellings are occupied by 20% of households. Informal housing in Ward 3 is 4% higher than in the LLM. This is likely due to the influx of jobseekers into the Ward. Housing in Lesedi represents a mix of formal and informal housing.

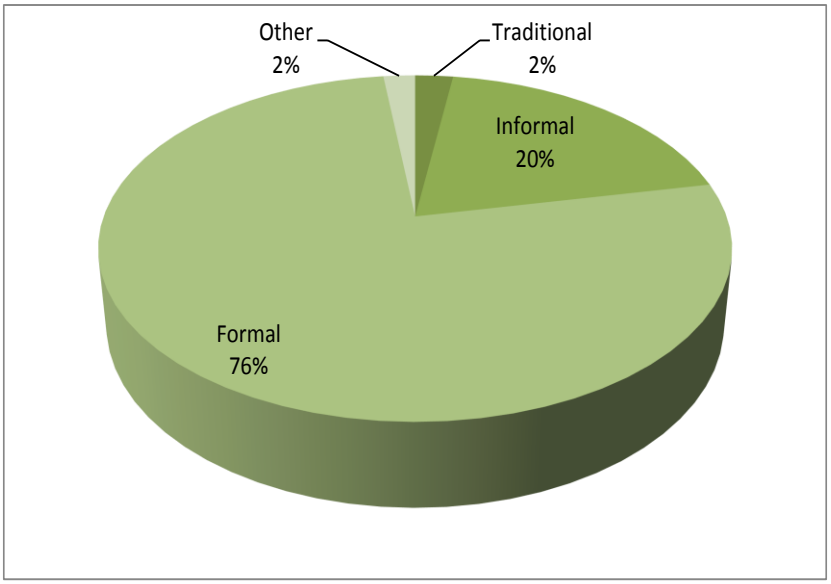


Figure 7-35: Type of main dwelling, Ward 3 (Stats SA, 2013)

7.13.2.12 Road Network

The nearest regional route to the Project is the R510 between Lephalale and Stockpoort about 16.5 km north-east of the project site. The D175 district road between Steenbokpan and Stockpoort runs approximately 4.8 km west and 7.4 km north of the project area. The D2286 district road starts 4.9 km west of the project area. The D1675 district road is 8.7 km south and the D2001 district road is 12.8 km east of the project area respectively. The R510 regional route is used by tourists travelling to Botswana.

According to current planning the project will require a road diversion which will entail the realignment of the D175 road to follow the western border of the farm Verloren Valey. The servitude for the road is located on the farm Draai Om 244LQ which is owned by ResGen South Africa (Pty) Ltd.

7.13.2.13 Steenbokpan/Lesedi

Steenbokpan refers the small town with its cluster of shops and other facilities, while Lesedi refers to the immediately adjacent township located on public land. Steenbokpan includes a few shops, a bar, a general dealer, contractor housing, a church and a community centre. Lesedi has experienced population in-migration during the past years. The residential area was established out of a need for greater security of tenure for farmworkers at Steenbokpan and surrounding farms. Most residents live there year-round. The LLM has allocated funds for low cost housing in Steenbokpan/Lesedi, but development has been put on hold because of mining developments that may take place in the area.

During 2011, Digby Wells conducted a random sample survey in Lesedi to gauge the socio-economic circumstances of households and farmworkers. The sample of the survey was 120 individuals. The information provided below was taken from the above survey (information will be updated during the assessment phase of the SIA).

Steenbokplan/Lesedi is located approximately 25 km from the Project area and falls within the LLM. It is anticipated that this settlement will be affected by the proposed Project (also in conjunction with other planned developments (e.g. Boikarabelo)). According to the LLM IDP (2015) Steenbokpan/Lesedi is one of three functional zones in the “Focus Area 3” in the IDP. Ore bodies exist within this area and it has therefore been declared a mining zone; however this will likely result in some opposition as a result of other current land uses.

The population of Lesedi was estimated at about 1 000 in 2009, although indications are that this is an underestimate due to continuous population influx into the township. In 2014, the LLM Ward Councillor for Ward 3 estimated that the population of Lesedi was about 2 200. The population is relatively young, with the majority falling between the ages of 21 and 40. Females dominate the age categories of 41 to 65, as well as the 21 to 25 and 31 to 35 age categories; unlike in Ward 3 where males dominate nearly all the age categories. Males are particularly dominant in the 36 to 40 age group, as well as the 0 to 20 age groups.

In 2011, most children from Lesedi and surrounding farms attended Lerekhureng Combined School, which is approximately four kilometres outside the township. For school grades ten to twelve, children had to go to Marapong or Lephalale Town. According to the survey, 60% of the township population have some secondary education (either completed secondary or some secondary) while one third has primary school education (either completed primary or some primary). Tertiary education, however, was mainly lacking, with 3 per cent attending college (Digby Wells, 2011).

Information received in 2014 from the Ward Councillor for Ward 3, highlighted the socio-economic challenges faced by the population of Lesedi. These include poor living conditions, low school attendance, high unemployment rate, social ills and high prevalence of HIV/AIDS. According to the Councillor, a refuse removal service is provided at Steenbokpan, but a new landfill site will be needed to accommodate the development of various infrastructures.

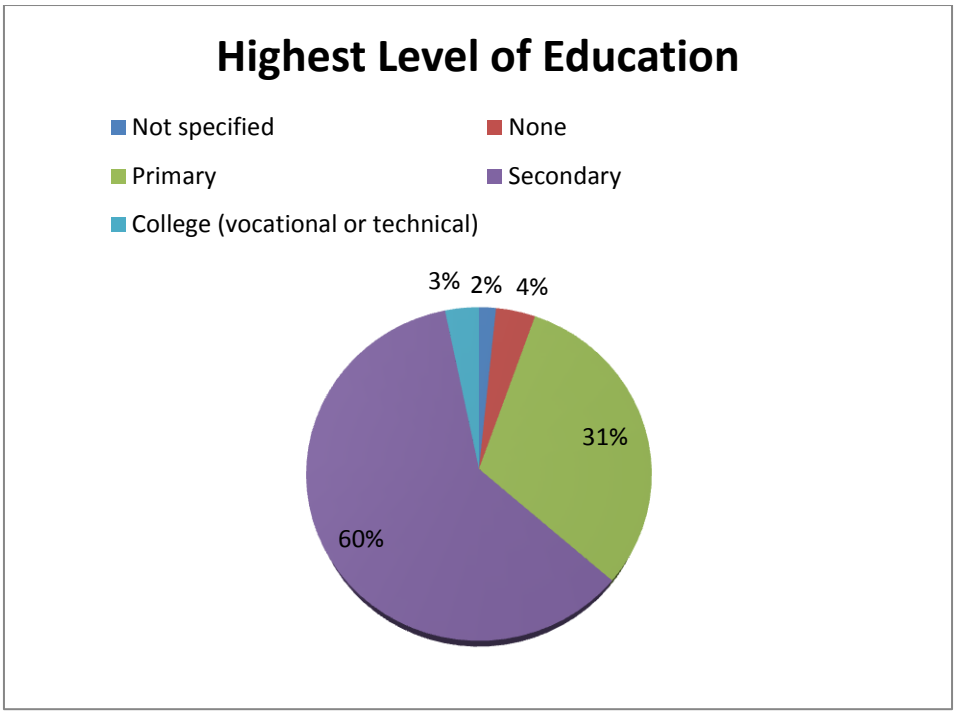


Figure 7-36: Highest level of education in Lesedi Township

Source: Digby Wells, 2012

The aforementioned survey established that 53% of the respondents are unemployed and 11% had formal wage employment, excluding domestic work and gardening (22%). Only 3% were involved in own farming. The remaining 11% consisted of negligible numbers of other occupations.

Water provision was generally by means of municipal standpipes inside households' yards (60%), with some households using borehole water (27%). Water was piped to households from a nearby reservoir. Seven per cent reported getting water from their neighbours; the remaining 6% comprised negligible numbers of other forms of water provision. The survey

established that none of the houses in Lesedi had electricity while nearly half the households had ventilation improved pit latrines that were supplied by the LLM.

In 2011 that alcohol abuse was a major problem within the community. The LLM IDP (2015) recorded that Steenbokpan/Lesedi had a housing demand of between 300 and 454 housing units in 2009. It is expected that this backlog has increased significantly since then.

7.13.3 Site-Specific Study Area

At the time of writing the social scoping report, the SIA team has not yet visited the project site area. Information provided below is therefore of a general nature and will be augmented after the site visits and stakeholder consultations have been completed.

The Project is located within Ward 3 of the LMM on the farm Duikerpan 249 LQ. The farms Verloren Valey 246 LQ, Duikerpan 249 LQ and Portion 1 of Kleinberg 252 LQ, as well as a portion of the farm Japie XX LQ and a portion of the farm Hans 713 LQ are the subject of a Mining Right held by Temo Coal Mining (Pty) Limited (Temo Coal), a subsidiary of Namane.

The landscape consists predominantly of undulating flat plains. The area is characterised by undisturbed Bushveld, game farming, hunting, tourism and livestock farming. Human activity is represented by farmhouses and associated facilities (garages, workshops and boreholes), game lodges, hunting camps, farmworker houses, cattle kraals and water points.

The farm Duikerpan 249 LQ is owned by Mr D.A. Steenkamp. Table 7-16 lists the farms immediately adjacent to the project site.

Table 7-164: Landowners immediately adjacent to the Project

Name of Farm Property	Owner
Verloren Valley 246	MA Swanepoel
Gruisfontein 230	Prostart Traders 136 (Pty) Ltd
Nieuw Holland 247	GA Steenkamp
Twistpan 265	GA Steenkamp
Vlakfontein 264	Sasol Mafutha Mining (Pty) Ltd Wandering Star Trading 20 (Pty) Ltd
Tambootievley 261	Wandering Start Trading 20 (Pty) Ltd
Groenfontein 250	Sasol Mafutha Mining (Pty) Ltd Wandering Star Trading 20 (Pty) Ltd
Matopi 705	Sasol Mafutha Mining (Pty) Ltd Wandering Star Trading 20 (Pty) Ltd

Sasol has developed a bulk sample pit on the farm Groenfontein approximately 2.5 km east of the project area.

7.14 Community Health Status

South African Legislation does not include a community Health Impact Assessment (cHIA), and therefore, the International Finance Corporation's (IFC) Performance Standards (PS), PS 4: Community Health and Safety, is used as a best practice guideline. The applicability of this PS will be determined during the formal risk assessment and impact identification phase which will be done as part of the EIA. The following information is provided as a high level baseline.

7.14.1 Baseline Health Status

7.14.1.1 Burden of Disease

The Waterberg District's 2009 BoD profile is considered from an analysis of the causes of death. This is above the South African mean of 30.2% and a long way from the internationally recognisable standard of 10%. Of the unusable classifications, 21.6% of deaths were assigned to 'ill-defined' causes and 11.6% to 'garbage codes'. An analysis of the Years of Life Lost (YLLs) after redistribution of the deaths by four broad cause groups reflects that the highest proportion of YLLs was due to communicable diseases (together with maternal, perinatal and nutritional conditions) (35.4%), followed by Noncommunicable diseases (27.7%). HIV and TB (24.5%) ranked third whilst the lowest proportion (12.4%) of YLLs was due to injuries (*ibid.*).

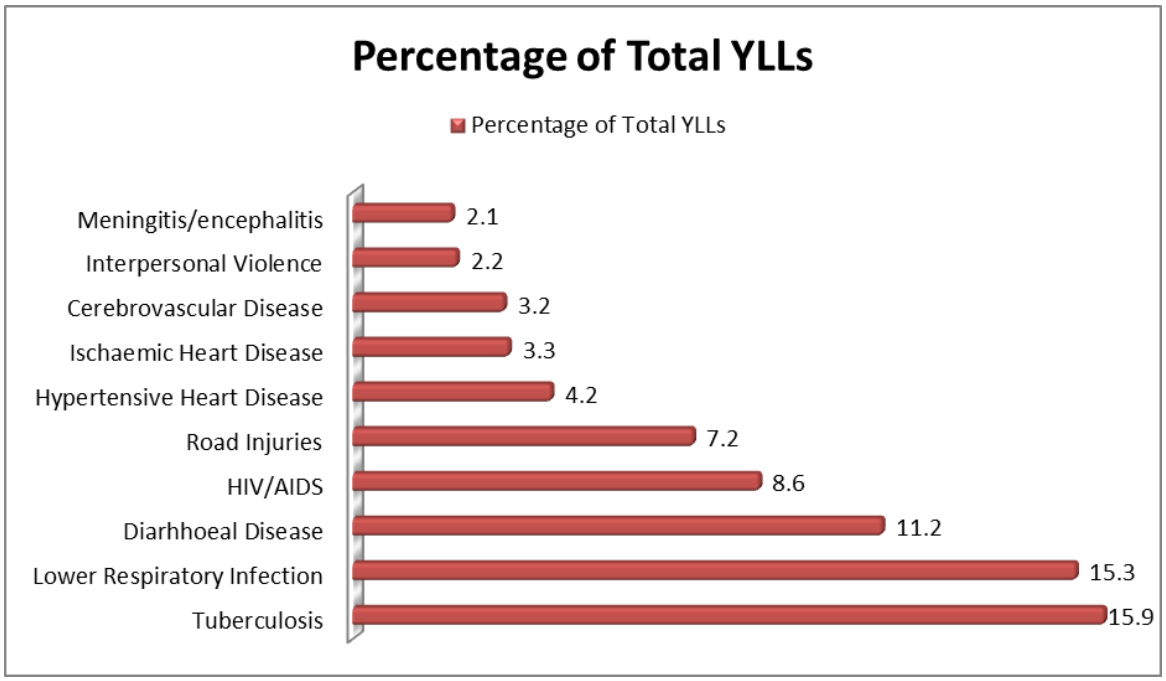


Figure 7-37: Leading causes of YLLs: LP – DC36: WDM

7.14.1.2 Primary Healthcare Facilities in Lephalale LM

There are three hospitals (two public and one private) and six clinics in the Municipal area. Witpoort hospital serves as a referral health facility for Abbotspoort, Seleka and Shongoane clinics. Ellisras Hospital is the referral health facility for Marapong and Ellisras town clinic. Mobile primary health care service is provided to settlements which are more than 10 km away from any health facility within the Municipality.

Health care challenges include the attraction and retention of skilled personnel as a result of geographic location and lack of affordable accommodation. In addition, the influx of people into the municipality, as a result of economic development, has put more pressure on the referral centres. According to the IDP, members of the community are not confident about the services provided at primary health care centres. The IDP also highlights the lack of adequate financial resources for acquisition of advanced medical equipment's. Patients seek medical attention when they are at an advanced stage of ailment and this leads to a high mortality rate in children and adults.

7.14.1.3 Usable Bed Utilisation Rate

The usable Bed Utilisation Rate (BUR) is a process indicator (identifies activities related to the functioning of the health system) that is also a measure of efficiency. The BUR reflects how many of the usable beds in a hospital were occupied over a given time period, usually a year. A low BUR value for a given hospital may indicate that there is little or no need for the hospital in the particular community or area. Another explanation could be that the community chooses not to use the hospital for any number of reasons.

In contrast, a high BUR could indicate that patients are spending too long in the hospital and not being discharged appropriately or it could mean that there are insufficient beds to cater for the needs of the population.

The national BUR was 67.2% in 2011/12. The majority of Limpopo districts exceeded the national rate and the national target (*ibid.*).Waterberg district has 1.3 district hospital beds per 1 000 population, higher than both the provincial and national averages of 0.8 and 0.7 respectively. The bed utilisation rate was 61.4%, the lowest in the province, with an average length of stay of 4.5 days (*ibid.*).

7.14.1.4 HIV/AIDS

HIV and AIDS is major contributor to the disease burden in South Africa and have had a severe effect on the social and economic fabric of South Africa. To detect HIV infection early, the public health sector provides HIV counselling and testing to pregnant women to prevent mother-to-child transmission. During 2011/12, 98.8% of pregnant women were tested for HIV (Day *et al*., 2012). The Limpopo province reflected coverage of 101.6%, which is over the 100% Department of Health's annual target. Statistics

- The antenatal client HIV 1st test rate dropped from 100.9% in 2010/11 to 99.4% in 2011/12 in the Waterberg District.

- The antenatal client HIV 1st test positive rate decreased slightly from 24% in 2010/11 to 21.7%.
- The antenatal client HIV prevalence (routine data) was 26.7% and in line with the 2010 HIV Antenatal Sero-prevalence Survey rate of 26.1% (*ibid.*).
- The rate of antenatal clients initiated on HAART was 64%, well below the national average of 80.4%.

The distribution rate for male condoms increased from 10.8 condoms per male (15 years and older) in 2010/11 to 27. This rate was above the provincial average of 19.7 condoms (Day *et al*., 2012).

Limpopo had the third lowest HIV prevalence in the country at 8.8% (Shisana et al., 2009). The antenatal HIV prevalence for Waterberg District was 24% (Day et al., 2012).

7.14.1.5 Tuberculosis

In 2010, there were 184.6 smear positive tuberculosis (TB) cases per 100 000 people in Limpopo, which remained the lowest incidence in South Africa. The TB cure rate in Limpopo was 70.3% in 2009, which was close to the national average of 71.1%. Waterberg District had the highest TB incidence in Limpopo, but also has the worst outcomes, with a smear conversion rate of only 55.6%, a low cure rate of 62.4% coupled with a high defaulter rate of 13.2%. There were 681 cases per 100 000 of TB in Waterberg District in 2011. In the same year, new HIV positive patients who had a confirmed TB rate was 14.4% (Day *et al*., 2012).

7.14.1.6 Malaria

Malaria is endemic in three South African provinces, and is more prevalent in specific districts than others. Limpopo is one of these provinces. Malaria is a seasonal disease and quarterly monitoring of the incidence rate may not reflect disease trends accurately. Table depicts the number of malaria deaths in Limpopo. Limpopo is endemic to malaria, and transmission is distinctly seasonal, with most cases reported during the summer rainy season between September and May. Most cases are reported in December, due to the movement of people between malaria areas outside the province and areas under control within the province.

There were 253 reported cases of malaria in the province between October and December 2012. This was a decrease from 504 during the same period in 2011 and 1,744 in 2010. The mean case fatality rate from malaria in South African has been reported to be about 1.1% per season. The incidence of malaria in Waterberg District between 1998 and 2005 was about 30.9 per 100,000 person years. The mean number of cases reported per season is about 190 while the mean number of reported deaths per season is 1.1 (Gerritsen *et al*., 2008). The Department of Health and Social Development regularly sprays households, with

300 000 houses sprayed[5] (Indoor Residual Spraying (IRS)) between October and December 2012 (Politicsweb, 2012).

Table 7-25: Number of deaths due to Malaria in Limpopo, 1997 – 2009

Year	Number of Deaths
1997	170
1998	160
1999	380
2000	324
2001	377
2002	359
2003	359
2004	313
2005	296
2006	183
2007	59
2008	80
2009	570
Source: Mortality and causes of death in South, 1997-2009; Findings from the death notification, Statistics South Africa	

There has been a decline in malaria cases in Limpopo with 848 cases notified during the period of April 2012 to February 2013, compared to 2 991 malaria cases notified during the previous year (SAGNA, 2013).

7.14.1.7 Child Health

Immunisation is an essential intervention to protect children against vaccine-preventable diseases. During 2011/12 the national full immunisation coverage rate for children under the age of one was 95.2%, which exceeded the annual target of 95%. The Limpopo Province, again, exceeded the national target (*ibid.*).

Immunisation is one of the most effective health care interventions to prevent serious illnesses and death in young children. Immunisation has a significant impact on morbidity and mortality rates and plays a critical role in efforts to achieve MDG 4 to reduce child mortality rates by two-thirds by 2015, compared to the 1990 baseline. The Limpopo Province ranked in the top 10 (in 2010/11) and showed large increases in immunisation rates over the past five years. Malaria statistics particular to the Waterberg District are listed below:

[5] Indoor Residual Spraying is the application of a long-lasting residual insecticide to potential malaria vector resting surfaces such as internal walls, eaves, and ceilings of all houses or structures (including animal shelters) where such malaria vectors might come into contact with the insecticide (WHO, 2013).

- The immunisation coverage under one year in the Waterberg District increased from 80.6% in 2010/11 to 86.9% in 2011/12.
- Over the same period the pneumococcal vaccine 3rd dose coverage increased from 80% to 103.2%, the rotavirus second dose coverage increased from 82.8% to 109.6% and the measles first dose under one year coverage increased from 90.4% to 103.5%.
- The indicators that have numerators greater than the denominators resulting in coverage rates of more than 100% may indicate data quality issues.
- The measles 1st to 2nd dose drop-out rate increased dramatically from 4.0% to 21.2% (*ibid.*).

7.14.1.8 Non-Communicable Diseases

Non-Communicable Diseases (NCD) plays an important role in the overall burden of disease in the Limpopo Province. Strokes, chronic lung disease, heart disease, hypertension and diabetes are all mentioned in the top 20 disease burdens in the province (Bradshaw *et al*., 2004). There is very little information in the public domain related to NCD at the district level. The diabetes mellitus and hypertension detection rate in Waterberg District in 2010 was estimated to be between 0.1 and 0.2% (Day et al., 2012). The hypertension detection in the Waterberg District was 0.1% and the mental health case load was 0.8%, the lowest in the province and below the national average of 1.4% (*ibid.*).

7.14.1.9 Communities of Concern

The major settlement in the area is Marapong, some 47 km in the southeast direction from the Project area. Other smaller communities such as Steenbokpan and Stockpoort are likely to be affected. On the Botswana side, Dovedale, Magothla and Kudumatse are other sensitive receptors. It is however observed that isolated household are scattered around the area, presumably farm houses. Both Marapong and Lephalale are located at reasonable distances where impacts are likely to be minimal from the power plant.

8 Potential Environmental Impacts

Impact identification forms an integral part of the EIA process, as per the NEMA, and serves as a guideline according to which specialist studies can be conducted. The EIA will classify the impacts per phase of the Project so as to determine the sensitivity of the impact through the life of the Project.

This will be followed by the identification and formulation of mitigation measures which are intended to avoid unnecessary damage to the environmental and socio-economic resources and receptors, safe-guard valued or finite resources, natural areas, habitats and ecosystems, and to protect humans and their associated social environment.

The following section describes the potential environmental impacts which have been identified at a baseline investigation level.

8.1 Air Quality

8.1.1 Construction Phase

The construction phase for the proposed Project will comprise land clearing, scraping and development of the power plant and associated infrastructure. In order to determine the level of impacts, atmospheric emissions and predicted airborne pollutant concentrations and dust fallout rates associated with the proposed development will be assessed.

During this phase different activities ranging from soil stripping, handling and storage; transportation of workforce and materials; as well as site preparation and construction work will be conducted. Dust generation will be a prominent feature of these activities.

The other significant source of pollutants is associated with gaseous emissions from construction vehicles i.e. NOx and SO_2 (considered negligible). The construction phase will be short term, as such fugitive emissions during this phase were considered negligible. It is unlikely that emissions from the construction phase will exceed the current South African standard for any criteria pollutants, because of the relatively small and localised nature of construction-related activities.

8.1.2 Operational Phase

Untarred roads are known to contribute a higher percentage to particulate matter emissions measured during the operational phase. This can be exacerbated during windy periods (Cowherd et al., 1988). Since the coal and overburden will be hauled from the pit, suspension of dust from wheels, erosion of dust during transfer and handling of material and storage will height ambient concentrations and dust deposition rates in the area.

Impacts associated with the operational phase will be assessed with AERMOD dispersion model. Pollutants of interest attributed to likely sources such as blasting, haul roads, discard dumps, storage facilities and top soil stockpile include:

- Particulate Matter PM_{10} (particulate matter with an aerodynamic diameter of less than 10 µm);
- Particulate Matter $PM_{2.5}$ (particulate matter with an aerodynamic diameter of less than 2.5 µm);
- Total Suspended Particulates (TSP).

Predicted ground level concentration depicting daily and annual concentrations due to emissions from proposed mining operations will be compared to the relevant standards i.e. South African National Ambient Air Quality Standard in order to assess compliance both within and outside the project boundary.

All the simulations generated will assume worst case scenario, assuming that all sources of pollutants are subject to wind erosion and without mitigation measures. Any mitigation measures that will be applied will reduce the impact of pollution sources on the surrounding ambient atmosphere.

8.1.3 Decommissioning Phase

The decommissioning phase will be short-term, as removal of infrastructure will only disturb a small area. Since the process of reshaping and restructuring the top of the discard facilities is going to be temporary, impacts on air quality will be minimal.

8.1.4 Cumulative Impacts

To assess cumulative impacts, the baseline concentration of individual pollutants is required. The predicted emission attributed to the proposed Project will be added to arrive at the future concentration. It is worth mentioning that the combined impact is greater than the individual project in isolation. Existing sources of emissions in the area are:

- Power plant;
- Mining;
- Vehicles;
- Household fuel combustion (coal, wood); and

- Veld fires.

The aforementioned sources will have cumulative effect on regional pollutant signature in the proposed Namane project area. It is worth mentioning that the other sources i.e. cumulative impacts of anticipated pollutants will not be assessed, as this is a stand-alone study.

8.2 Geohydrology

Based on experience in the area, preliminary impacts for the Project area have been identified. These preliminary impacts are listed below and will be investigated during the EIA process:

- Availability of water supply to the proposed Project, as well a potential negative drawdown and quality impacts on existing water supplies;
- Current water quality for domestic water supply to local users, as well as the work force on the Project, with naturally high TDS, EC, Cl, Na and F concentrations in the groundwater;
- Groundwater and surface water quality contamination from coal stock piles and the ash dump;
- Water quality for domestic water supply to local users, as well as the work force on the proposed Project, with naturally high TDS, EC, Cl, Na and F concentrations in the groundwater; and
- Potential trace element contamination during dewatering with potential release of Hg and as into the system.

8.3 Hydrology

Activities in the construction phase include site clearing, development of haul roads, stockpiling of topsoil, increased vehicular movement, transportation and storage of construction materials including hazardous chemicals and hydrocarbon containing materials as well as the use/consumption of water and generation of human waste.

The actual construction of the plant will also entail constructing associated infrastructure including the ash dump, reservoirs, dirty water conveyance, containment facilities etc.

These activities have the potential to impact negatively on surface water quality and quantity.

8.3.1 Surface Water Quantity

The clearance of the site for construction purposes will result in topsoil isolation berms being constructed around the site, which will result in the reduction of the runoff reporting to the surface water catchment, since all precipitation falling on the site will be contained and classified as dirty.

8.3.2 Surface Water Quality

The dust created during site clearance and from vehicular movement will result in increased solids and turbidity in the runoff. There is also an increased potential for soil erosion on site and on the topsoil isolation berms. This may have the potential to increase the solids and turbidity of the runoff into the Limpopo River.

Water contamination may occur as a result of runoff emanating from the contaminated surfaces within the power plant reporting into the Limpopo River.

Human activity will generate waste including general (paper, glass, plastic and cans) and biological sewage waste. The handling and disposal of such waste must be managed appropriately, as this poses a risk to the surface water environment.

The plant operation will result in the generation of ash which requires effective management and disposal. The water required for operating the plant must ensure certain quality criteria.

General waste such as glass, cans, paper, steel and metal and the biological waste from sewage produced on site will also require appropriate handling and disposal. The cumulative impacts from operation through to post-closure phase must be assessed and managed effectively, as power plant operations take place over relatively long periods of time.

During the operational phase significant impacts on the water quality may be the result of the handling and disposal of the various forms of the waste. These impacts may be cumulative as a result of the long-term nature of operating a power plant. Of particular significance are the following types of waste generated:

- Ash from the power plant which may result in salinity and/or acidic water around the ash dump;
- Sewage;
- Hazardous and/or toxic chemicals; and
- Hydrocarbon containing material such as used oil and grease.

8.4 Wetlands

Disturbances to the identified wetland areas as well as the surrounding lands as a result of the proposed development will result in encroachment by alien and invasive species. The encroachment by alien and invasive species will result in the degradation of habitat and loss of wetland integrity.

Further to this, the boundaries of ephemeral pans should be delineated to avoid loss of wetland area.

8.5 Fauna and Flora

The construction of the proposed IPP would lead to direct impacts through the loss of plant communities, loss of biodiversity and loss of ecosystem functions.

Construction of the proposed IPP infrastructure will lead to the direct loss of the vegetation of the area. There are four different vegetation types identified at this preliminary stage, both will be affected by the construction phase of the IPP. Anticipated impacts to biodiversity include:

- Loss of *Acacia* Thornveld;
- Loss of *Combretum* woodland;
- Loss of *Terminalia* woodland;
- Loss of Ephemeral Pan Vegetation and
- The loss of Red Data and Protected flora and fauna species associated with these vegetation types.

Ecosystem function is the measure of the combined functioning of the vegetation and associated species, faunal habitats and wetlands, all of which result in the ecosystem health. The construction of the power plant will affect the ecosystem function in two main ways. The first is the fragmentation of the ecosystem, which will occur with large land surface changes. This goes hand in hand with edge effects, which change the composition of the ecosystem on the edge of structures such as buildings and roads. The introduction of alien invasive species will also occur, and impacts of these on ecosystem function are certain. Anticipated impacts to ecosystem functioning includes:

- Fragmentation and edge effect, and
- Alien vegetation colonisation.

8.6 Soil, Land Capability and Land Use

The impact on the soils will be primarily form the physical placement of infrastructure for the power plant, ash dams and other infrastructure. Secondary impacts arise from the deposition of heavy metals from the stack downwind from the power plant. The primary impact would include:

- Loss of the original spatial distribution of soil types and natural soil horison sequences;
- Loss of original topography and drainage pattern;
- Loss of original soil depth and soil volume;
- Loss of the natural functioning of the soil;
- Loss of soil due to erosion; and

- Sediment accumulation (pollution) of streams and water bodies.

The land use and land capability would be impacted through the changes in land use.

8.7 Socio-Economic

The proposed project will represent an intrusion into the surrounding social environment, which could impact on surrounding communities in various ways. Based on the information collected during the scoping phase, several potential positive and negative socio-economic impacts on the socio-economic living conditions of directly affected land owners and farm residents, surrounding communities and the regional economy have been identified. These potential impacts are briefly discussed below and summarised in Table 17. Cross-border and cumulative impacts will be considered throughout the SIA.

Several other specialist investigations are being conducted as part of the EIA process. The potential impacts on air quality, noise, water supply, as well as traffic and visual impacts are discussed in more detail in the relevant specialist sections of this scoping report. The impact assessment phase of the SIA will include a review of these specialist studies to assess the social implications of the impacts identified.

It is emphasised that this section only provides an initial identification of socio-economic impacts based on a review of available literature. These impacts will be confirmed, updated and assessed in detail during the assessment phase of the SIA.

Table 17: Summary of Potential Impacts

Cause of impact	Aspects	Impact
Effects on the local economy	Positive aspects	Employment during construction.
		Employment during operation.
		Multiplier effects on the local economy.
	Negative aspects	Dependency on the Project for sustaining the local economy.
		Loss of existing and potential tourism and hunting opportunities.
Impacts on physical environment	Positive aspects	Improved availability and/or access to services for local population.
	Negative aspects	Health, safety and security impacts.
		Disruption of daily movement patterns. Changes in land use.
Population influx	Positive aspects	Increased markets for local entrepreneurs.
	Negative aspects	Negative impacts related to construction camp.
		Increased social pathologies.

Cause of impact	Aspects	Impact
		Community resistance.
		Increased pressure on local services/resources.
		Growth of informal settlements.
Impact on surrounding farms	Negative impacts	Visual, noise, air and water pollution Loss of sense of place Decrease in property values Impact on livelihoods and economic activity

8.7.1 Social Implications of Environmental Impacts

Other specialist investigations conducted as part of the scoping phase identified a number of environmental impacts that could have direct social consequences. The most pertinent of these are briefly discussed below.

8.7.1.1 Air Quality and Noise

The Project will present a number of air pollution sources that could have a negative impact on ambient air quality and downwind communities if unmanaged. During the SIA phase, potential impacts associated with dust and noise pollution will be further investigated.

8.7.1.2 Water Supply

The current water balance for the broader project area is dictated by basic human needs, the required ecological reserve and industrial demands. There is already a water scarcity in the area and the development of the Project, as well accelerated population influx and human settlement, could worsen the situation.

8.7.1.3 Visual Impacts

The Project is expected to have negative topographical and visual impacts on the receiving environment. The potential visual receptors within the project area and surrounds include residents of farmhouses, farm workers and tourists visiting the nearby game lodges. Topography changes as a result of the power plant could degrade the visual aesthetic of the area and could also affect tourism.

8.7.1.4 Heritage Impacts

The Heritage Impact Assessment will determine if there will be potential impacts on heritage sites and graves within the immediate project area. The Heritage Impact Assessment will identify the affected parties and consult them with regard to suitable mitigation measures.

8.7.2 Anticipated Positive Social Impacts

8.7.2.1 Employment Creation

Employment creation is generally an important direct benefit of mining and associated developments, but too often also the source of unrealistic expectations and even conflict among work seekers and local communities. The SIA will pay particular attention to measures that will enhance local employment benefits, as well as risks such as population influx and raised expectations.

Both national laws and international best practise require that preference should be given to local employment. While it is likely that contractors will make use of their own workforce, the onus is on the Project to maximise local employment.

8.7.2.2 Procurement of Goods and Services

The construction and operation of the power plant will require the large-scale procurement of goods and services. This is expected to stimulate the regional economy. Local businesses may also benefit such as accommodation services, caterers and security services.

8.7.2.3 Economic Benefits through Multiplier Effects

The Project could result in several economic benefits for local communities through direct employment and multiplier effects that result from capital expenditure during the construction and operational phases. Furthermore, the Project will also result in macro-economic benefits although relatively diluted, through the payment of royalties and taxes.

Increased expenditure and disposable income generally provide new business opportunities for micro- and small businesses in communities; provided they are formalised and able to meet the procurement requirements of the Project. Similarly, the projected monthly wage bill will also inject cash into the local economy for both the formal and informal retail and service sectors and downstream secondary industries to take advantage off. Hence, people may benefit from indirect employment as a result of the Project. The Project also has the potential to contribute to local socio-economic development, through its corporate social investment.

8.7.3 Anticipated Negative Social Impacts

8.7.3.1 Loss of Existing and Potential Tourism and Hunting Opportunities

Nature-based tourism and trophy hunting take place on some of the farms surrounding the proposed Project. Generally, these activities draw significant numbers of visitors; and make an important contribution to the local economy, while also providing a livelihood for farmers and their workers. The socio-economic impact of the proposed Project on these livelihoods will be assessed during the impact assessment phase of the SIA.

8.7.3.2 Health, Safety and Security

Safety and security impacts associated with the Project include potential increases in crime (e.g. stock theft/poaching/burglaries), following the daily presence of construction workers. The potential influx of jobseekers (and their families), entrepreneurs and opportunists could exacerbate the situation.

Expected increases in traffic volumes and road crossings associated with the Project, may impact negatively on the safety of road users and pedestrians. Furthermore, people entering the project area, particularly during construction, will pose a safety risk for both the project and trespassers.

Potential impacts on the health and safety of host communities will be investigated during the assessment phase of the SIA. These include health issues connected to HIV/AIDS and sexually transmitted diseases, while expected increases in noise and air pollution may also pose health risks to construction workers and farm residents. Exposure to potential health risks for farm workers will also be assessed.

8.7.3.3 Sense of Place

It is commonplace that the introduction of large development projects in, especially a rural setting, will visually impact on the receiving environment. Moreover, the presence of such activities and associated changes in land use are likely to change the rural character of the area. People affected by these changes may experience an altered sense of place which is often intensified by perceptions around health, safety and security.

While population density in the project area is low, it is likely that affected farm owners and their families, as well as resident farm workers, will experience an altered sense of place to which some may find it difficult to adapt.

8.7.3.4 Disruption of Movement Patterns

Project activities and proposed project infrastructure will impact on some local roads. Any additional traffic induced during the construction and operational phases of the Project may disrupt daily movement on these roads. Disruption in travelling patterns may also result from the fencing-off of the construction sites.

8.7.3.5 Land Acquisition and Displacement

It was not possible during the scoping exercise to determine the number of people currently resident on the farms surrounding the project site. However, development of the Project may require land acquisition and related buy-out of properties, as well as potential resettlement and/or compensation of farm workers. The SIA will identify and assess in detail the potential displacement impacts associated with the Project.

8.7.3.6 Population Influx

Population influx to the project area is possible given the potential for local employment, as well as other (perceived or real) socio-economic benefits associated with the Project. Influx includes jobseekers and their families, informal service providers, as well as business people who would hope to profit from the presence of a construction workforce. The development of other proposed projects in the area will increase the risk of population influx and associated impacts. Already, the Steenbokpan informal settlement experiences uncontrolled growth as a result of existing and planned developments in the area.

While population influx could have positive impacts (for example, increased markets for local entrepreneurs), this influx may also result in many negative impacts, such as the presence of construction camps; increased social pathologies, conflict between local communities and migrants, increased pressure on local resources, services and infrastructure, as well as the growth of informal settlements. The SIA will investigate the potential impacts and/or risks associated with population influx into the immediate project area, as well as into surrounding communities such as Steenbokpan. Given the close proximity of the Project to the Botswana border, potential trans-boundary impacts will also be addressed.

8.7.3.7 Dependency on the Project for Sustaining the Local Economy

As was indicated in the baseline description, the local economy is heavily dependent on the mining and power generation sectors (for employment creation and economic investment) with tourism an important additional contributor to the local economy. The project is expected to contribute significantly to economic development in the local and district municipal areas. However, eventual decommissioning of the project will also have negative impacts in terms of loss of employment/retrenchment, as well as the negative consequences for areas and local economies that have not invested in economic diversification.

This impact will be cumulative with regard to job losses, the closing down of businesses, and decrease in local investment and spending resulting in an overall economic slow-down. Loss of employment and an economic downturn may also result in increases in social pathologies such as crime, prostitution and substance abuse.

8.7.4 Cumulative Impacts

Cumulative impacts are impacts that could act together with other impacts (including those from concurrent and/or planned future third party activities), resulting in an incremental effect on both natural and social resources, processes and socio-economic conditions. Cumulative impacts usually relate to large-scale rather than site-specific impacts, and have a tendency to increase the intensity of impacts already predicted for the Project.

The potential cumulative impacts associated with the project are listed in Table 18 below. Together with other developments taking place in the broader project area, the Project could contribute towards and accelerate changes to the socio-economic environment which would not necessarily have been the case if developments would operate in isolation. The SIA will include an assessment of potential cumulative impacts in terms of their social implications.

Table 18: Potential Cumulative Impacts

Nature	Direction of change	Extent of impact
Improved standard of living through increased employment, local business development and improved public infrastructure and community services and facilities (the latter will be dependent on government and private-sector contributions)	Positive	Local and district
Improved quality of live and community health through contributing to a cleaner environment	Positive	Local and district
Urban sprawl, housing backlog and/or growth of informal settlements.	Negative	Local and district
Added pressure on local public service delivery and infrastructure, including roads, water and sewage treatment works, schools, police services and waste management facilities.	Negative	Local and district
Community disruption and impact on social cohesion as a result of population influx, the presence of a non-local workforce, lack of services and facilities, and potential political dynamics/leadership challenges.	Negative	Local and district
The use of non-local labour, due to unavailability of local skilled workers causing tension in local communities as a result of the expectation that the Project should provide local employment.	Negative	Local
Greater competition for natural resources, in particular water and agricultural land.	Negative	Local
Possible increase in poverty in the area due to water scarcity/pollution, greater influx of job seekers and inability of the economy to absorb job seekers or to generate local employment.	Negative	Local and district
The visual impact of mining and industrial developments, and associated changes in land use, are significant and imprint an industrial character onto the rural landscape.	Negative	Local and district
Increased pressure on water resources to maintain the reserves required to supply basic human and ecological needs.	Negative	Local and district
Compounded effects of lighting, noise, traffic, water and groundwater abstraction and physical reduction in habitat has cumulative impacts on the social and biophysical environment.	Negative	Local and district
Potential impact on climate change	Negative	Local, regional and national

8.8 Health Impacts

Power generation is a significant source of pollutants that can impair human health and the environment, including sulfur dioxide (SO2), nitrogen oxide (NOx), and mercury. Currently there is no established community in close proximity to the proposed Project. However, should the proposed Project proceed; this could result in an influx of people. All surrounding farms are privately owned, therefore, an influx of people would be into Steenbokpan, located approximately 20km away.

The potential health impacts will occur during both the construction and operation phases of the Project. Cross-border impacts will be considered throughout the community Health Impact Assessment (cHIA).

The main health impact as a result of the proposed Project is as a result of air emissions.

8.8.1 Potential Health Impacts as a Result of Air Emissions

When emitted into the atmosphere, SO2 and NOx react with water and other compounds to form various acidic compounds, fine particles, and ozone. These pollutants can remain in the air for days or even years. Prevailing winds can transport them hundreds of miles, often across state and national borders. The pollutants then fall to the earth in either a wet form (rain, snow, and fog) or a dry form (gases and particles). Impacts include impaired air quality; damage to public health; degradation of visibility; acidification of lakes and streams; harm to sensitive forest and coastal ecosystems; and accelerated decay of materials, paints, and cultural artefacts such as buildings, statues, and sculptures nationwide.

Mercury, a product of coal-burning, can be deposited locally or it can be transported through the atmosphere for days to years before being deposited into water bodies. Once mercury reaches lakes, rivers and oceans, it can be transformed into methylmercury and bio-accumulate in the food chain. This results in predatory fish and fish-eating birds and mammals accumulating mercury concentrations millions of times higher than what is found in the water or air.

Health implications associated with possible air pollutants from the proposed IPP, during the operational phase, are discussed based on conclusions from past and current studies:

8.8.1.1 Particulates

Airborne particulate matter encompasses a complex mixture of organic and inorganic substances, which can either be mixture of solid, liquid or solid and liquid particles suspended in the atmosphere. The size compositions in the environments tend to be divided into two: coarse (PM_{10}) and fine particles ($PM_{2.5}$) and vary in origin.

Short-term and long-term health effects associated with exposure to PM are detailed in the table below (Table 8-19).

Table 8-19: Short-term and long-term health effects associated with exposure to PM (WHO, 2004)

Pollutant	Short-term exposure	Long-term exposure
Particulate matter	▪ Lung inflammatory reactions ▪ Respiratory symptoms ▪ Adverse effects on the cardiovascular system ▪ Increase in medication usage ▪ Increase in hospital admissions ▪ Increase in mortality	▪ Increase in lower respiratory symptoms ▪ Reduction in lung function in children ▪ Increase in chronic obstructive pulmonary disease ▪ Reduction in lung function in adults ▪ Reduction in life expectancy ▪ Reduction in lung function development

8.8.1.2 Nitrogen Oxides

NOx are a primary pollutants emitted from the combustion of stationary sources (heating, power generation) and from motor vehicles. Nitrogen dioxide is formed through the oxidation of nitric oxide in the atmosphere. Health effects due to exposure to nitrogen oxides include changes in the pulmonary function and effects in the lung and other organs such as the spleen and liver.

8.8.1.3 Sulphur Dioxide

Health effects associated with exposure to SO_2 are mainly associated with the respiratory system. Being soluble, SO_2 is readily absorbed in the mucous membranes of the nose and upper respiratory tract (Maroni et al., 1995).

8.9 Topography and Visual/Aesthetic Character

The proposed Namane IPP Project is expected to have negative topographical and visual impacts on the receiving environment. A change in land use from natural Bushveld will change the topography, visual aesthetic and sense of place of the project area. The construction of the proposed Namane IPP Project involves changing the natural features of and adding man-made features to the topography / surface and will therefore have negative topographical and visual impacts on the project area and surrounds. Changing the topography and visual aesthetics of an area will cause negative impacts on the other sensitive environmental, social and cultural aspects of the receiving environment. Topography change as a result of the proposed power plant and ash dump will degrade the visual aesthetic of the area and could also affect tourism

8.9.1 Topography

8.9.1.1 Construction Phase

The construction phase will be characterised by the construction of the power plant and associated infrastructure as well as the development of the ash dump. This phase is expected to have negative impacts on the topography. Features will be added to the topography and this will alter the natural topographical functioning of the flat landscape. The power plant and associated infrastructure will cover a small area and is expected to have a moderate negative impact on the topography. The ash dump will cover a large area and is expected to have a significant negative impact on the topography.

8.9.1.2 Operational Phase

The operational phase is characterised by the operation of the power plant and ash dump. This phase is expected to have negative impacts on the topography. The operation of the power plant is not expected to have an impact on the topography. The operation of the ash dump is expected to have a significant negative impact on the topography. The ash dump will cover a large area and will dramatically change the slope of the topography. This will affect surface and groundwater flows.

8.9.1.3 Decommissioning Phase

The decommissioning phase is characterised by rehabilitation activities. This phase is expected to have a neutral impact on the topography. Demolition of the power plant and associated infrastructure and rehabilitation of the ash dump is expected to have a neutral impact on the topography. Rehabilitation is a step in the right direction but the proposed Namane IPP Project is expected to permanently change the topography of the project area.

8.9.2 Visual

8.9.2.1 Construction Phase

The construction phase will be characterised by the construction of the power plant and associated infrastructure as well as the development of the ash dump. This phase is expected to have negative visual impacts on the receiving environment. The peaceful Bushveld sense of place will be disturbed by the increased traffic, people and noise of the construction activities. The establishment of infrastructure and the related construction activities will draw attention to the project area making receptors aware of the development. The power plant and associated infrastructure will cover a small area but the stacks could be very high and therefore it is expected that the power plant will have a very significant negative visual impact on the receiving environment. The ash dump will cover a large area and is expected to have a significant negative visual impact.

8.9.2.2 Operational Phase

The operational phase is characterised by the operation of the power plant and ash dump. This phase is expected to have negative visual impacts on eth receiving environment. The peaceful Bushveld sense of place will be disturbed by the bustling activities around the operating power plant. Steam from the cooling towers and smoke from the stacks of the power plant is expected to have a minor negative visual impact. The operation of the ash dump is expected to have a significant negative visual impact. Dust from the ash dump could draw attention to the area. The ash dump will continue to increase in size during the operational phase and this will add to the visual impact.

8.9.2.3 Decommissioning Phase

The decommissioning phase is characterised by rehabilitation activities. This phase is expected to have neutral visual impacts on the receiving environment. Demolition of the power plant and associated infrastructure and rehabilitation of the ash dump is expected to have a minor neutral visual impact. Rehabilitation will improve the overall negative visual impact of the proposed Namane IPP Project.

8.10 Noise Assessment

The potential impacts on the ambient noise levels that could arise from the proposed project activities are detailed below. The details of the exact activities of each phase will be used to rate the significance of the impacts associated with the project activities and the applicable mitigation measures will also be prescribed in the impact assessment phase. Based on the activities and potential impacts, a management plan will be developed as well as a monitoring programme.

8.10.1 Construction Phase

During the construction phase the clearing of the vegetation and construction of infrastructure may potentially impact on the ambient noise levels on the surrounding farms and communities. The vehicles and machinery involved in the above mentioned activities will be the main noise sources during the construction phase.

8.10.2 Operational Phase

During the operational phase the operation of the power plant is the main noise causing activity and may impact on the surrounding farms and communities. The main noise causing components during the operation of the IPP are the compressors and steam turbines.

8.10.3 Decommissioning Phase

During the decommissioning phase the demolition of infrastructure will be the main noise causing activities and may impact on the surrounding farms and communities. The vehicles and machinery involved in the decommissioning phase will be the main noise source.

8.11 Cultural and Heritage

At present, possible heritage impacts assume that any number of heritage resources may be present in the site specific study and development footprint areas. The types of heritage resources assumed to be present include Stone Age, Farming Community and historical sites, as well as burial grounds and graves. This assumption is based on available information at the time of this document being completed.

8.11.1 Construction Phase

The highest likelihood of changes to heritage resources is associated with activities that will be undertaken during the construction phase of the proposed project. Here, the potential negative impacts, such as damage or destruction, are the greatest.

The primary activity that will result in negative impacts on heritage resources will be ground clearing and removal of vegetation to prepare the development footprint area for construction. Subsequent to this, construction of facilities and infrastructure will also present significant risks to any resources that may exist, especially subsurface resources such as deeply deposited archaeological sites.

8.11.2 Operational Phase

During the operation phase of the proposed project, sources of risk to heritage resources are limited. The primary risk during the operational phase will be associated with the alteration of the sense-of-place of the project area through impacts caused by noise, dust, emissions and a visual impact.

8.11.3 Decommissioning Phase

No sources of risk to heritage resources are envisaged for the decommissioning phase of the project at this stage. However, if structures older than 60 or 100 years at the time of decommissioning exist, these may be impacted upon by decommissioning of the proposed project.

8.11.4 Unplanned Events and Low Risks

Unplanned events may occur on any project at any time. Based on the proposed project activities, potential unplanned events and the associated impacts and management measures have been identified and summarised in Table 8-120 below.

Table 8-120: Unplanned events and their management measures

Unplanned event	Potential impact	Mitigation/ Management/ Monitoring
Accidental exposure of unidentified heritage resources	Damage and/or destruction of heritage resources generally protected under section 34 to 36 of the NHRA	Chance Finds Procedures (CFPs) must be developed and included as a condition of authorisation that clearly describes the reporting process and appropriate management of the exposure of previously unidentified heritage resources. The established and defined CFPs must be implemented prior to any development taking place as part of the project activities.
Accidental damage to heritage resources caused by increase human traffic/presence	Damage and/or destruction of heritage resources generally protected under section 34 to 36 of the NHRA	Workers must be sensitised towards heritage resources and their significance. Heritage resources that are to be conserved in situ must have a Heritage Management Plan or Policy that outlines the on-going protection and monitoring of the heritage sites.

9 Cumulative Impacts

A cumulative impact assessment will be undertaken, by each specialist, for the EIA, based on the summation of the impacts resulting from proposed activities, associated with the proposed Project and other surrounding operations, and will consist of:

- Impacts from background sources;
- Impacts from the proposed site; and
- Impacts from proposed activities.

Future developments will also be taken into consideration where applicable.

10 Plan of Study for EIA Phase

10.1 Technical Process

The technical approach will be based on good industry practice, and will need to ensure compliance with the international requirements.

The following details the approach:

10.1.1 Impact Identification and Rating

The impact assessment methodology will be utilised during the subsequent EIA Phase for the proposed Project and will consist of two (2) phases, namely impact identification and impact significance rating.

Impacts and risks will be identified based on a description of the existing and proposed activities to be undertaken as part of the proposed Project. Once impacts have been identified, a numerical environmental significance rating process will be undertaken that utilises the probability of an event occurring and the severity of the impact as factors to determine the significance of a particular environmental risk.

The severity of an impact is determined by taking the spatial extent, the duration and the severity of the impacts into consideration. The probability of an impact is then determined by the frequency at which the activity takes place or is likely to take place and by how often the type of impact in question has taken place in similar circumstances.

Following the identification and significance ratings of potential impacts, mitigation and management measures will be incorporated into an Environmental Management Plan.

The significance rating process follows the established impact formula:

Significance = Consequence x Probability

Where

Consequence = Severity + Spatial Scale + Duration

And

Probability = Likelihood of an Impact Occurring

The matrix calculates the rating out of 147, whereby Severity, Spatial Scale, Duration and Probability are each rated out of seven as indicated in Table 10-1. The weight assigned to the various parameters for positive and negative impacts is provided for in the formula.

Impacts are rated prior to mitigation and again after consideration of the mitigation measure proposed in this EIA/EMP Report. The significance of an impact is then determined and categorised into one of four categories, as indicated in Table 10-3, which is extracted from Table 10-2. The description of the significance ratings is discussed in Table 10-4.

Table 10-1: Impact Assessment Parameter Ratings

Rating	Severity		Spatial scale	Duration	Probability
	Environmental	***Social, Cultural Heritage***			
7	Very significant impact on the environment. Irreparable and irreplaceable damage to highly valued species, habitat or ecosystem. Persistent severe damage.	Irreparable and irreplaceable damage to highly valued items of great cultural significance or complete breakdown of social order.	International The effect will occur across international borders	Permanent: No Mitigation No mitigation measures/ natural process will reduce the impact after implementation. The impacts are irreversible.	Certain/ Definite. The impact will occur regardless of the implementation of any preventative or corrective actions.
6	Significant impact on highly valued species, habitat or ecosystem. Significant management and rehabilitation measure required to prevent irreplaceable impact.	Irreparable damage to highly valued items of cultural significance or breakdown of social order.	National Will affect the entire country	Permanent: Mitigation Mitigation measures of natural process will reduce the impact.	Almost certain/Highly probable It is most likely that the impact will occur.
5	Very serious, long-term environmental impairment of ecosystem function that may take several years to rehabilitate	Very serious widespread social impacts. Irreparable damage to highly valued items	Province/ Region Will affect the entire province or region	Project Life The impact will cease after the operational life span of the project.	Likely The impact may occur.

Rating	Severity		Spatial scale	Duration	Probability
	Environmental	***Social, Cultural Heritage***			
4	Serious medium term environmental effects. Environmental damage can be reversed in less than a year	On-going serious social issues. Significant damage to structures / items of cultural significance	Municipal Area Will affect the whole municipal area	Long term 6-15 years	Probable Has occurred here or elsewhere and could therefore occur.
3	Moderate, short-term effects but not affecting ecosystem function. Rehabilitation requires intervention of external specialists and can be done in less than a month.	On-going social issues. Damage to items of cultural significance.	Local Local extending only as far as the development site area	Medium term 1-5 years to reverse impacts.	Unlikely Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur.
2	Minor effects on biological or physical environment. Environmental damage can be rehabilitated internally with/ without help of external consultants.	Minor medium-term social impacts on local population. Mostly repairable. Cultural functions and processes not affected.	Limited Limited to the site and its immediate surroundings	Short term Less than 1 year and completely reversible.	Rare/ improbable Conceivable, but only in extreme circumstances and/ or has not happened during lifetime of the project but has happened elsewhere. The possibility of the impact materialising is very low as a result of design, historic experience or implementation of adequate mitigation measures

Rating	Severity		Spatial scale	Duration	Probability
	Environmental	***Social, Cultural Heritage***			
1	Limited damage to minimal area of low significance that will have no impact on the environment. No irreplaceable loss of a significant aspect to the environment.	Low-level repairable damage to commonplace structures. No irreplaceable loss to cultural resources or social structure.	Very limited Limited to specific isolated parts of the site.	Immediate Less than 1 month to completely reverse impact.	Highly unlikely/None Expected never to happen.

Table 10-2: Probability Consequence Matrix

Significance									
		Consequence (Severity + Scale + Duration)							
		1	3	5	7	9	11	15	18	21
Probability / Likelihood	1	1	3	5	7	9	11	15	18	21
	2	2	6	10	14	18	22	30	36	42
	3	3	9	15	21	27	33	45	54	63
	4	4	12	20	28	36	44	60	72	84
	5	5	15	25	35	45	55	75	90	105
	6	6	18	30	42	54	66	90	108	126
	7	7	21	35	49	63	77	105	126	147

Table 10-3: Significance Threshold Limits

Significance		
High	108 - 147	
Medium-High	73 - 107	
Medium-Low	36 - 72	
Low	0 - 35	

Table 10-4: Significance Rating Description

Score	Description	Rating
≤35	An acceptable impact for which mitigation is desirable but not essential. The impact by itself is insufficient even in combination with other low impacts to prevent the development being approved. These impacts will result in either positive or negative medium to short term effects on the social and/or natural environment. The impacts will be reversible and not result in the loss if irreplaceable aspects.	Low / Negligible
36 - 72	An important impact which requires mitigation. The impact is insufficient by itself to prevent the implementation of the project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in either a positive or negative medium to long-term effect on the social and/or natural environment.	Medium-Low / Minor

Score	Description	Rating
73 - 108	A serious impact, if not mitigated, may prevent the implementation of the project (if it is a negative impact). These impacts would be considered by society as constituting a major and usually a long-term change to the (natural &/or social) environment and result in severe effects or beneficial effects	Medium-High / Moderate
>108	A very serious impact which, if negative, may be sufficient by itself to prevent implementation of the project. The impact may result in permanent change. Very often these impacts are immitigable and usually result in very severe effects, or very beneficial effects. Impacts will be irreplaceable and a high probability of being irreversible.	High / Major

10.1.2 Prepare Specialist Investigations

Specialist investigations will be conducted during the EIA Phase of this Project. The findings of these studies will be reflected in the EIA Report. The proposed terms of reference for each of these specialist investigations is indicated in Section 10.2. Cumulative impacts resulting from the proposed Project and other power stations in the area will be assessed by each specialist, and documented in the final EIA Report.

10.1.3 Draft EIA Report and EMP

Conclusions and/or recommendations resulting from the specialist studies will be integrated into an EIA report that will be updated as comments are received from I&APs. The Final EIA report together with a draft construction and operation EMP will be submitted to the DEA for environmental authorisation.

10.1.4 Environmental Management Plan

The role of the EMP is to assist the organisation in achieving its environmental objectives and fulfilling its commitment to the environment. The EMP will describe methods and plans to be executed to reduce environmental impacts, as well as identify indicators to assess the progress of the EMP.

The EMP will be implemented from site preparation through construction to operation to decommissioning, closure and finally post closure. Furthermore, there is a commitment to continuous and progressive rehabilitation as the project advances. In this regard, it is anticipated that monitoring and assessment of the ongoing rehabilitation will occur on a regular basis (variable depending on aspect to be monitored). The EMP will be legally binding and will be used as a tool by contractors, employees and management, to protect the physical and social environment.

The EMP will include the following information and plans:

- Objectives and Goals;
- Mitigatory Measures;
- Environmental Awareness Plan;
- Emergency Response Plan;
- Closure and Rehabilitation Plan; and
- Monitoring Plans.

Based on the impacts that are identified in the EIA section, the EMP will outline mitigation measures which aim to avoid, minimise or compensate for impacts that may be incurred as a result of the project. Where possible, project design alternatives will also be recommended to reduce the impact to I&APs. Monitoring programmes will also be outlined where relevant; these will be included in the various specialists' scope of work.

10.2 Specialist Investigations: Terms of Reference (ToR)

10.2.1 Geographic Information Systems

A Geographical Information System (GIS) is a digital cartographic tool capable of creating, integrating, storing, editing, analysing, sharing, managing and displaying geographically referenced information, with the final product being the creation of maps to aid in visual interpretation of the data. ArcGIS 10.2 will be used to capture, analyse and manage information in order to produce maps for the proposed Namane IPP Project.

The use of mapping in environmental work is integral, as maps provide the means through which an operation can be viewed within a spatial context. Data gathered in the field as well as existing data available for the project area can be visualised and assessed in an holistic manner. This process often reveals spatial relationships and interactions which would otherwise be undetected, which in turn may result in cost-saving solutions.

GIS analyses can be used to overlay the results of the specialist studies to determine the most suitable location and optimal footprint area or routing for the proposed infrastructure. These analyses take into account the sensitive areas identified by the specialist studies and a weighted analysis can be performed to place emphasis on more important aspects. Digby Wells has successfully employed this technique to assist with the design of numerous other projects.

10.2.2 Topography and Visual Impact Assessment

A Topography and Visual Impact Assessment (T&VIA) is a combined specialist study performed to identify the topographical and visual impacts of a proposed project on the surrounding environment. The proposed Namane IPP Project will be investigated in terms of the topographic and visual characteristics of the receiving environment.

10.2.2.1 Phase 1: Scoping

At a desktop level, aerial photography will be analysed to characterise the landscape. A Digital Elevation Model (DEM) will be created using ArcGIS 3D Analyst Extension, with contour and point relief data as inputs (Figure 10-1). The resultant DEM will be used to create slope and aspect models.

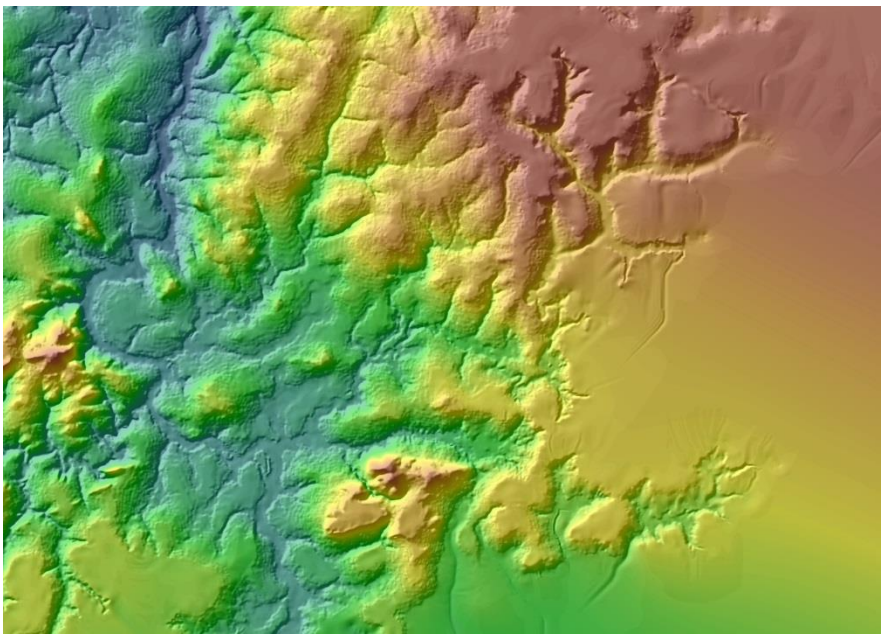


Figure 10-1: Example of a Digital Elevation Model (DEM)

The following are objectives for the baseline topography and visual study:

- Examine aerial photography available for the project area;
- Identify potential visual receptors that will may impacted on by the proposed project;
- Examine topographical, slope, and aspect models created in ArcGIS 3D Analyst Extension; and
- Describe the baseline topography and visual aspects of the project area in a specialist baseline report.

10.2.2.2 Phase 2: Impact Assessment

Photographs will be taken during a site visit and topographical features (natural and man-made), overall visual resources, the variety of landscape characters and sense of place attributes will be assessed.

The DEM created in Phase 1 will be used as an input to create a viewshed model using ArcGIS 3D Analyst Extension; this will be done to establish the degree of visibility that the proposed infrastructure is likely to have. The height of the proposed above ground infrastructure will be taken into consideration in the modelling process. Information gathered

during the site visit will be used to refine the viewshed. The concept of viewshed modelling is depicted in Figure 10-2.

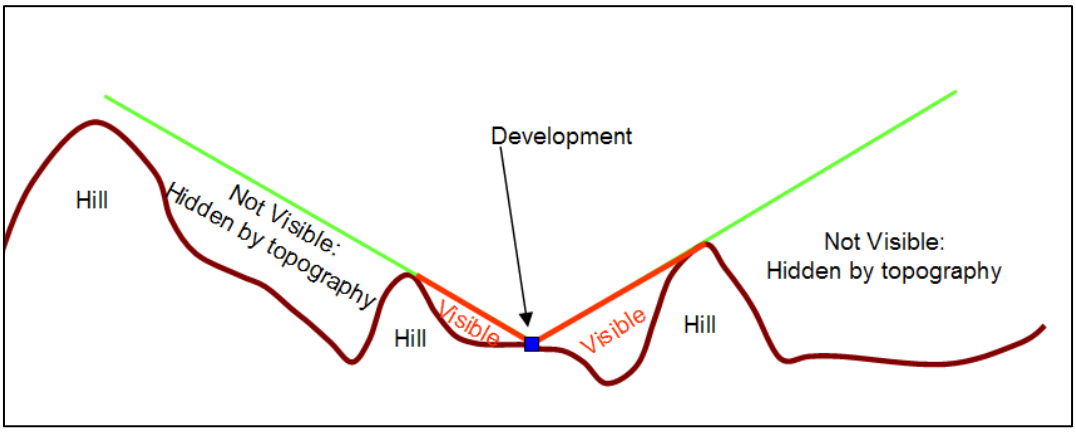


Figure 10-2: Theoretical Background to Viewshed Modelling

The following are objectives for the topography and visual impact assessment study:

- Create viewshed models in ArcGIS 3D Analyst Extension for daytime and night time scenarios;
- Identify sensitive visual receptors and key public viewpoints that will be impacted on by the proposed project, taking into account visibility aspects;
- Visit the project area to verify these models;
- Identify the impacts, pre- and post-mitigation that the proposed infrastructure will have on the topographical and visual landscape, by rating the scale, duration, severity and probability of the impacts occurring;
- Describe the current and post development topographical and visual aspects of the project area in a specialist report; and
- Provide mitigation measures and recommendations in an attempt to reduce the potential topographical and visual impacts.

10.2.3 Air Quality

Information obtained during the scoping report will be used for the following activities mentioned below:

10.2.3.1 Emissions Inventory

The establishment of the proposed IPP is likely to result in a range of emissions including SOx, NOx, and CO gases and PM being emitted into the atmosphere via the stack, as well as dust from the coal- and ash-handling operations, which could have an impact in terms of human health and will require a detailed assessment. Emissions will also be quantified for Arsenic, Cadmium, Mercury, Chromium, Lead, Nickel, Dioxin and Polycyclic Aromatic Hydrocarbons (PAH).

Compiling an emissions inventory for the construction, e.g. site clearance and earthworks, and operational phases of the project, taking into account emissions during routine conditions, including coal and ash storage and handling facilities, raw-materials handling, and stack emissions.

10.2.3.2 Dispersion Modelling

Activities that will be undertaken during the dispersion modelling will include:

- Potential emissions from the proposed IPP Project and associated sources will be modelled to determine the ambient air quality concentrations;
- The result of the dispersion modelling will be contour plots (maps) presenting the results of the assessment; and
- Comparison of the predicted concentrations will be made with the ambient monitoring data (if available) and with the SA air quality standards to determine compliance.

Dispersion models compute ambient concentrations as a function of source configurations, emission strengths and meteorological characteristics, thus providing a useful tool to ascertain the spatial and temporal patterns in the ground level concentrations arising from the emissions of various sources. All emission scenarios would be simulated using the USA Environmental Protection Agency's Preferred/Recommended Models: AERMOD modelling system (as of December 9, 2006, AERMOD is fully promulgated as a replacement to ISC3 model).

AERMOD modelling system incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain.

There are two input data processors that are regulatory components of the AERMOD modelling system: AERMET, a meteorological data pre-processor that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, and AERMAP, a terrain data pre-processor that incorporates complex terrain using USGS Digital Elevation Data. Other non-regulatory components of this system include: AERSCREEN, a screening version of AERMOD; AERSURFACE, a surface characteristics pre-processor, and BPIPPRIME, a multi-building dimensions program incorporating the GEP technical procedures for PRIME applications.

AERMOD model is capable of providing ground level concentration estimates of various averaging times, for any number of meteorological and emission source configurations (point, area and volume sources for gaseous or particulate emissions), as well dust deposition estimates. Analysis of modelling results will clearly show:

- The predicted zones of maximum incremental ground level impacts;
- The zone of maximum predicted cumulative ground level;

- The impact assessment will be undertaken looking at the operations of the proposed mine, as well as cumulative operations (based on available measured ambient air quality data if available);
- Evaluation of potential for human health and environmental impacts; and
- Evaluation of predicted air pollutant concentrations and deposition rates will be based on SA ambient air quality standards and guidelines.

10.2.3.3 Impact Assessment – Analysis and Interpretation

Dispersion simulations of ground level PM and gaseous emissions will be carried out. The anticipated and cumulative impacts of the activities on the ambient air quality of the area will also be identified and discussed.

Analysis of dispersion modelling to highlight:

- Predicted zones of maximum ground level impacts (PM and Gases);
- Number of times standards for criteria pollutants will be exceeded; and
- Recommendations of buffer zones and impact management zones.

10.2.3.4 Air Quality Monitoring Programme

Recommendations will be provided regarding the mitigation and management of the identified potential impacts in the form of a monitoring programme. This will include information on monitoring locations, parameters to be monitored and frequency of monitoring.

10.2.4 Noise Assessment

10.2.4.1 Aims and Objectives

The aim of the environmental noise scoping assessment is to highlight the potential impact from the construction, operational and decommissioning phases on the ambient noise levels at the surrounding noise sensitive receptors. The objectives are to consider the Project activities in relation to the distance of the relevant noise sensitive receptors.

10.2.4.2 Methodology and Scope of Work

The baseline information will be included in an environmental noise impact assessment report, along with the quantification of the noise sources that will be produced by the proposed power plant. The impacts of the power plant on the ambient noise levels of the area will be assessed by comparing the baseline information with the propagated noise levels from the proposed power plant. The propagated noise levels will be calculated by using the SANS 10357:2004 guidelines, which entail ‘The calculation of sound propagation by the Concawe method’. The report will also include recommended mitigation measures as well as recommended action plans.

10.2.5 Soil, Land Use and Agricultural

10.2.5.1 Methodology and Scope of Work

The project site will be traversed by vehicle and on foot. A hand soil auger will be used to survey the soil types present as well as to obtain soils samples.

Land capability will also be determined at soil survey positions. Survey positions will be recorded as waypoints using a handheld GPS. Other features such as existing open trenches and animal burrows will also be helpful to determine the soil depth.

The topsoil (0-30 cm) and subsoil (30-60 cm) of major soil groups will be sampled. It is estimated that at least 20 top and subsoil samples are needed. Samples will be analysed at a reputable soil laboratory for soil acidity, fertility and textural indicators.

10.2.5.2 Soil Survey

A reconnaissance study of the soils present on the proposed IPP will be conducted during a field visit. The site will be traversed by vehicle and on foot. A hand soil auger will be used to determine the soil type and depth. The soil will be augered to the first restricting layer or 1.5 m depth.

Survey positions will be recorded as waypoints using a handheld GPS. Other features such as existing open trenches are also helpful to determine soil types and depth. The soil forms (types of soil) found in the landscape will be identified using the South African soil classification system namely; Soil Classification: A Taxonomic System for South Africa (Soil Classification working group, 1991).

10.2.5.3 Soil Sampling

The topsoil (0–300mm) and subsoil (300–600mm) of the dominant soil forms will be sampled. Samples will be analysed for soil acidity, fertility and textural indicators as follows:

- pH (water);
- Extractable cations and Na, K, Ca, Mg (Ammonium Acetate);
- Cation exchange capacity;
- Carbon content;
- Phosphorus (Bray1); and
- Soil texture namely sand, silt and clay.

10.2.5.4 Agricultural Assessment

The agricultural assessment will be supplemented by the soils classification of land capabilities. These land capabilities will provide a base of what the optimal long term use for a soil is in the project area. These will be compared to current land uses, and the relevant farmers will be contacted and the following information will be obtained:

Yield data for various crops, input costs (fertilizer, pesticide, etc.), current grazing capacity, planting and harvest dates, problems experienced in the area will be obtained.

This data will then be used as a guideline in estimating the long term average yield of various land types as well as the average profits or losses, and/or the grazing capacity of pasture lands. Therefor land types can be given an economic value.

10.2.6 Fauna and Flora

10.2.6.1 Aims and Objectives

The presence of plants, mammals, birds, reptiles and terrestrial invertebrates will be investigated, with particular emphasis on those with Red Data status, as per SA legislation and IUCN data base. The presence of these species will be related to the vegetation units (habitats) classified during the floral survey. The influence of habitat diversity on species composition will be investigated. This survey will assess the potential Red Data habitats and indicate the probability that Red Data species actually occur in these habitats.

10.2.6.2 Methodology and Scope of Work

Data gathered for the scoping report will be used for the compilation of the specialist report for the EIA phase of the proposed development. The collofing will be completed:

- Record the plant species that occur within the study area based on field surveys;
- Record the animal species (mammals, reptiles, amphibians, birds and invertebrates (butterflies and baboon spiders) that occur within the study area based on field surveys;
- Identify which of these species are Species of Special Concern (SSC) based on the following lists:
  - International Union for the Conservation of Nature (IUCN) red data list;
  - The South African National Biodiversity Institute (SANBI) red data list;
  - The South African Red Data lists for mammals, birds, butterflies;
  - The National Forests Act (Act No. 84 of 1998) Protected Trees;
  - The Limpopo Environmental Management Act (No. 7 of 2003) Schedule 2: Specially protected wild animals, Schedule 3: Protected wild animals, Schedule 11: Specially protected plants and Schedule 12: protected plants;
  - The National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) (NEM:BA); and
  - The Convention on International Trade In Endangered Species of Flora and Fauna (CITES) list.

- Determine if any of the recorded species are alien invasive species or problem species in terms of NEM:BA and the Conservation of Agricultural Resources Act (CARA);
- Using data gathered from the field, determine the vegetation communities occurring within the study area and map these;
- Map important habitats for fauna within the study area;
- Determine the Biodiversity Value of the study area using information gathered on both flora and fauna and map this; and
- Assess the identified impact of the proposed project and recommend mitigation measures.

10.2.7 Hydrology

10.2.7.1 Methodology and Scope of Work

10.2.7.1.1 Catchment Assessment

The catchment assessment will be done to further describe the hydrology of the area by assessing the river flow characteristics, floodline boundaries and water quality.

10.2.7.1.2 Storm Water Management Plan

A Storm Water Management Plan (SWMP) will be compiled based on the Best Practice Guideline G1: Stormwater Management Plan (Department of Water and Sanitation, August 2006).

The objective of the SWMP is to ensure the separation of clean and dirty water. Clean water is runoff emanating from upstream or outside of the Project site, whilst dirty water is runoff emanating from within the power plant infrastructure layout.

The SWMP will include the conceptual sizing of the storm water conveyance infrastructures (channels, berms, etc.), together with dirty water containment facilities such as pollution control dams (PCDs).

The SWMP and conceptual design will include the following:

- Delineation of clean and dirty water catchments.
- Calculation of peak flows for clean and dirty water catchments.
- Calculate anticipated runoff volumes for the dirty water areas so as to provide a conceptual size for the dirty water containment facilities (PCDs).
- Use the calculated peak flows to provide conceptual designs for the clean and dirty water conveyance infrastructures.
- Provide a schematic showing placement of all clean and dirty water infrastructures.

- Provide the necessary conclusions and recommendations based on the findings obtained from the conceptual SWMP.

10.2.7.1.3 *Surface Water Impact Assessment*

Identification of impacts on the surface water resources from the proposed activities includes recommended mitigation measure to prevent and/or minimise the potential impacts, together with an effective monitoring plan. Once impacts have been identified, a numerical environmental significance rating process that utilises the probability of an event occurring, and the severity of the impact as factors to determine the significance of a particular environmental risk, will be undertaken.

10.2.7.1.4 *Reporting*

A detailed surface water specialist report, including the necessary conclusions and recommendations will be produced.

10.2.8 Geohydrology Study

Activities at the proposed IPP Project are likely to release contaminants and have inherent risks to the groundwater environment. The distinct activities that could result in the deterioration of the groundwater quality in typical power plants include: ash disposal, coal stockpiling, dirty water dams, domestic and other solid waste, sewage and surface run-off from the power plant area. Inorganic contaminants can potentially seep from the ash dump, coal stockyard disposal facility and return water dams while organic contaminants can originate from spillage during transportation and/or leakage from storage tanks.

10.2.8.1 Aims and Objectives

The objectives of the hydrogeological study include:

- To assess the baseline groundwater depth, quality and flow directions;
- To identify the receptors in the proposed project site. These include: the aquifers, private boreholes, groundwater users, surface water streams and surrounding ecosystem;
- To estimate the potential impact on the receptors due to activities at the proposed power plant;
- To develop a groundwater numerical model which will be used as a predictive tool for the site groundwater management plan;
- To manage and mitigate any groundwater pollution by characterising the sources of contamination, flow pathways and groundwater receptors;
- To ensure compliance with national legislations and standard requirements that are relevant to the groundwater environment;

- To comment on the design of waste storage facilities and product effluent streams so as to prevent and abate groundwater contamination; and
- To refine the groundwater monitoring plan based on site hydrogeology and proposed activities.

10.2.8.2 Methodology and Scope of Work

A number of hydrogeological activities have been conducted at the project site. These include:

- A site visit to the project area have been conducted to verify surface geology, topography and any surface water bodies in relation to the proposed power plant and local hydrogeology; and
- Following the site visit, a desktop review of existing data and reports will be carried out.

A hydrocensus was conducted in 2011 and groundwater monitoring in 2015 (on-going) at Temo Coal and the proposed power plant premises. This included:

- A complete inventory of groundwater users;
- Springs (if any);
- Available groundwater monitoring points;
- Water levels will be measured from available boreholes and flow direction will be estimated; and
- Water samples from 6 representative boreholes were collected to evaluate the baseline water quality.

Based on the interpretation of available airborne geophysical data and understanding of the geology, percussion boreholes have been drilled. The drilling programme was aimed in refining the hydrogeological understanding of the site. A qualified hydrogeologist from Digby Wells supervised the installation of the percussion boreholes and record all hydrogeological information.

A geochemical analysis of the ash material will be conducted to assess the mineralogical composition, acid mine drainage potential and trace metal concentration of the ash leachate under natural environmental conditions. It is assumed that the ash disposal as well as coal stockyard will be of homogenous composition and therefore a provision is made for only one sample from each. The required sample size is of at least 2kg each and has to be supplied by the client (Currently a sampling campaign of the coal to be used for the IPP is underway with the following analysis to be done:

- Synthetic Precipitation Leachate Procedure (SPLP), Acid Base Accounting (ABA) and X-Ray Diffraction (XRD) on the coal that will from part of the stock piles; and

- SPLP, ABA and XRD on the Ash produced after burning the coal in a mixture with limestone.

A numerical model will be developed to evaluate the potential impact of the proposed power plant on the groundwater environment. Transient state flow and transport model simulations will be conducted to estimate the groundwater flow direction and contamination plumes at various stages of the life of the power plant. Impacts on private boreholes and farms over time (construction, operational, decommissioning and post-closure phases) will be addressed. Scenario modelling (lined versus unlined ash disposal site) will be conducted to provide groundwater management options and mitigation measures with higher confidence level.

A final hydrogeological report will be complied and submitted (including all relevant hydrogeological data).

10.2.9 Aquatic

Potential impacts, identified during the scoping phase to date, include degradation of water quality, loss of water quantity to the downstream environment. The construction activities may result in contaminants entering into the system as a result of leakages, spills, incorrect capture and removal of contaminants, as well as discharging into the system. The potential risk will increase as the number and variety of activities on site increases. Additionally the clearing of the area to accommodate development and the stockpiling of material may increase the surface run-off and associated erosion risk, resulting in sedimentation of the system.

The following impacts are anticipated:

- Discharge of contaminated water into the Limpopo River; and
- Sedimentation of the system as a result of run-off.

The operational activities may require water, which if water cannot be provided by boreholes or another means may require the abstraction of water from the Limpopo River, increasing the stress on the system. The Limpopo River catchment may be supported by a number of underground aquifers and the potential dewatering of these aquifers may decrease the availability of water for the system. It is anticipated that dewatering of underground aquifers may occur which potentially supports the system.

10.2.10 Wetland

10.2.10.1 Aims and Objectives

The aim of the wetland assessment is to determine the wetland boundaries and the exact size (hectares) for the proposed site and to assess the ecological relevance of the identified wetland areas. In order to achieve this aim the following objectives were considered:

- The identification and the delineation of all wetland areas within the area under consideration;
- A description and characterisation of the identified wetland areas;
- Determination of the wetland ecological integrity (WET-Health) (PES) of the units;
- The description of ecological services (WET-EcoServices) provided by the wetlands;
- The description of the Ecological Importance and Sensitivity (EIS) of the wetlands;
- An impact assessment of the identified wetland system;
- Provide an integrated wetland assessment report; and
- Provide a management and a monitoring programme for the identified wetland areas within the project area.

10.2.10.2 Methodology and Scope of Work

10.2.10.2.1 Wetland Delineation

The soils within the Project area are very well drained and consist of very high sand content; therefore these soils lack the evidence of hydric indicators. According to DWAF guidelines for wetland delineations (2005), these areas should be treated as special cases where the wetland delineation methodology is conducted using the following indicators:

- Terrain Unit Indicator – helps to identify those parts of the landscape where wetlands are more likely to occur;
- Soil Form Indicator – identifies the soil forms, which are associated with prolonged and frequent saturation;
- Soil Wetness Indicator – identifies the morphological “signatures” developed in the soil profile as a result of prolonged and frequent saturation; and,
- Vegetation Indicator – identifies hydrophilic vegetation associated with frequently saturated soils.

Due to the lack of hydric indicators in the soils located within the project area and surroundings, wetland delineations and assessments will be conducted in-conjunction with the floral assessments. Specific typical wetland vegetation will be used to identify and delineate wetland areas

10.2.10.2.2 Determination of wetland ecological integrity

A Present Ecological Status (PES) analysis was conducted in order to establish baseline integrity (health) for the associated wetlands. In order to determine the integrity (health) of the characterised HGM units for the project area, the WET-Health tool will be applied. According to Macfarlane *et al*. (2007) the health of a wetland can be defined as a measure of the deviation of wetland structure and function from the wetland's natural reference condition. The health assessment attempts to evaluate the hydrological, geomorphological and vegetation health in three separate modules in order to attempt to estimate similarity to or deviation from natural conditions. The tool is structured such that a low score (close to 0) provides an indication of good health, while a high score (close to 10) provides an indication of poor health.

10.2.10.2.3 Ecological classification and description

Ecological classification refers to the determination and categorisation of the integrity of the various selected biophysical attributes of ecosystems compared to the natural or close to natural reference conditions (Kleynhans and Louw, 2007). The ecological evaluation in terms of expected reference conditions, followed by integration of these components and assessed in terms of biological responses, represents the Ecological Status or EcoStatus of a system (Kleynhans and Louw, 2007). According to Iversen *et al*. (2000) EcoStatus may be defined as the totality of the features and characteristics of the system that bear upon its ability to support an appropriate natural flora and fauna.

According to Kleynhans and Louw (2007) the A to F scale represents a continuum and that the boundaries between categories are notional, artificially-defined points along the continuum. As a result of this there may be uncertainty regarding which category a particular entity belongs to. This situation falls within the concept of a fuzzy boundary, where a particular entity may potentially have membership of both classes (Robertson *et al*., 2004). For practical purposes these situations are referred to as boundary categories and are denoted as B/C, C/D, and so on. An illustration of the distribution of the ecological categories on a continuum (Kleynhans and Louw, 2007) is presented in Figure 10-3.

Figure 10-3: An illustration of the distribution of the ecological categories on a continuum

The ecological state category as well as the rating and description per category are presented in Figure 10-4 below.

Figure 10-4: The ecological state categories, rating and category descriptions

Category	Rating	Category description
A	Very good	*Unmodified state* – Un-impacted state, conditions natural.
B	Good	*Largely natural* – Small change in community characteristics, most aspects natural.
C	Moderate	*Moderately modified* – Clear community modifications, some impairment of health evident.
D	Poor	*Largely modified* – Impairment of health clearly evident. Unacceptably impacted state.
E	Very poor	*Seriously modified* – Most community characteristics seriously modified. Unacceptable state.
F	Critical	*Critically modified* – Extremely low species diversity. Unacceptable state.

10.2.10.2.4 Wetland functionality assessment

In accordance with the method described by Kotze et al. (2007) a Level II ecological functional assessment of the wetland areas will be undertaken. This methodology provides for a scoring system to establish the services of the wetland ecosystem. The onsite wetlands will be grouped according to homogeneity and assessed utilizing the functional assessment technique, WET-EcoServices, developed by Kotze et al, (2007) to provide an indication of the benefits and services.

10.2.10.2.5 Wetland Ecological Importance and Sensitivity

To assess the importance of wetlands identified on site from an ecological perspective, taking into account aspects related solely to the maintenance of ecological diversity and functionality, the EIS tool will be used. For this methodology, a series of determinants are assessed according to a ranking scale of 0-4 (Table 10-5), from which the median of each determinant is used to allocate an ecological management class.

Table 10-5: Criteria used for determining the EIS of wetlands

Primary determinants
1. Rare & Endangered Species
2. Populations of Unique Species
3. Species/taxon Richness
4. Diversity of Habitat Types or Features
5 Migration route/breeding and feeding site for wetland species
6. Sensitivity to Changes in the Natural Hydrological Regime
7. Sensitivity to Water Quality Changes
8. Flood Storage, Energy Dissipation & Particulate/Element Removal
Modifying determinants
9. Protected Status
10. Ecological Integrity

10.2.11 Cultural and Heritage Assessment

10.2.11.1 Aims and Objectives

The aim of this scoping report was to identify the potential for certain heritage resources within the proposed Project area. This report also aimed to protect, preserve and develop resources within relative legislative frameworks. In essence, this Scoping Report's objectives are to:

- Identify the potential for cultural and historic sites, including graves and cemeteries within the proposed Project area;
- Evaluate whether proposed Project activities will have any potential impacts on these heritage resources during construction, operation and decommissioning phases;
- Recommend further studies to be completed such as an HIA where Project-related mitigation and management measures will be provided to avoid or amend any negative impacts on objects or sites of cultural significance. Where Project-related mitigation measures cannot remove negative impacts, appropriate heritage-related mitigation of heritage resources are recommended; and
- Promote overall conservation and protection of natural and cultural resources in the proposed Project area and its surroundings.

10.2.11.2 Methodology and Scope of Work

Unlike the EIA process, primary triggers for a HIA are not based on particular activities, nor is significance determined by the severity of impact. HIAs are required in terms of legislated requirements in terms of the environmental and heritage legal framework, mainly:

- NHRA; and
- NEMA.

The relevant heritage resources authority (HRA) has been notified of the proposed Project. The Notice of Intent to Develop (NID) is considered as the first phase of the HIA process. The NID has been completed and included the following:

- Project background;
- Details of properties on which the proposed project will take place, including regional and site maps, footprints of proposed infrastructure;
- Landowner details and permission;
- Details of known and/or potential heritage resources located in the vicinity of the proposed project area;
- List potential or envisaged impacts on heritage resources;
- Statement of Significance of heritage resources; and
- Specialist motivation whether or not a HIA is required.

10.2.12 Public Consultation and Stakeholder Engagement Process

10.2.12.1 Aims and Objectives

Public consultation in environmental authorisation processes is not only a statutory requirement, but a process that should lead to a joint effort by I&APs.

The public consultation process designed for the proposed environmental authorisation processes is designed to serve the following objectives:

- To provide sufficient and accessible information to I&APs in an objective manner; and
- To assist them to raise issues of concern and suggestions for enhanced benefit, and verify that their issues have been captured during the EIA for the proposed project.

10.2.12.2 Methodology and Scope of Work

The environmental authorisation process consists of:

- A technical process to analyse the relevant project details, identify and evaluate alternatives and assess the impacts of the preferred alternative(s); and

- A public consultation process to supply adequate information to I&APs, gather their issues and concerns, have these responded to by the technical team and communicate the findings of the impact assessment process to them.

10.2.13 Social Impact Assessment

Should the scoping phase of the project be successful, the SIA will proceed to the impact assessment phase. The SIA will quantify the social impacts by means of a recognised rating scale, and will formulate realistic mitigation measures to avoid or ameliorate negative socio-economic impacts and enhance positive ones. The following Plan of Study is recommended:

10.2.13.1 Definition of the Study Areas

Three study areas were delineated for the SIA. The study area for an impact assessment is generally defined as the area that is likely to experience the impacts arising from or to exert an influence on, the project or activity being assessed. In the case of socio-economic impact assessment, this task is complicated by the fact that different types of socio-economic impacts make themselves felt over different geographical areas. One of the first tasks during the impact assessment phase will, therefore, be to finalise the social impact study areas which will form the basis for the final identification and assessment of social impacts.

10.2.13.2 Site Visits

Site visits will be undertaken to consult both directly and indirectly affected stakeholders, including land owners, farm workers, municipality representatives, government departments, non-governmental organisations and organised community groups. Consultations will take the form of one-on-one meetings and semi-structured focus group interviews. Consultations will be used to assess stakeholder perceptions, verify baseline information collected during the literature review, and assess the potential social impacts of the Project on people's lives and livelihoods.

10.2.13.3 Legislative Framework and Applicable Standards

The SIA will include a description of relevant national and provincial laws and/or regulations, municipal policies and plans, as well as the administrative framework applicable to project implementation. The SIA report will also describe the applicable international standards such as the Equator Principles and the IFC performance standards.

10.2.13.4 Baseline Description

The social baseline description in this scoping report will be augmented and updated based on information collected during the site visits. The baseline component will describe the pre-project socio-economic environment and this information will be used to further identify and then assess social impacts. This baseline information could also serve as a benchmark to monitor changes in the socio-economic environment over time. This will assist the Project in tracking its impact on its surroundings and in addressing concerns when issues arise.

Topics considered as part of the baseline profile include (but are not limited to) the following:

- Demographics, including population size and growth, and population distribution in terms of age, gender, race and education;
- Economic conditions and development;
- Levels of employment and employment sectors;
- Spatial development and land use;
- Infrastructure and services (e.g. housing, energy, water, sanitation and health); and
- Community needs and development.

10.2.13.5 Impact assessment

The objectives of the impact assessment phase will be as follows:

- Update the socio-economic baseline profile developed during the scoping phase;
- Identify, rank and assess the anticipated positive and negative social impacts of the Project;
- Formulate mitigation measures and management actions to avoid and/or mitigate the anticipated negative social impact and enhance positive impacts;
- Develop a management and monitoring framework for implementing social mitigation measures; and
- Provide specialist input into the overall project EIA.

The results of the scoping study and the socio-economic baseline description will be used to further identify potential direct and indirect positive and negative socio-economic economic impacts associated with the construction, operational and closure phases of the proposed project. Cumulative impacts will also be addressed given the widespread coal and power plant development in the broader project area.

An impact assessment methodology that was developed by Digby Wells will be used for assessing the range of socio-economic impacts according to severity, spatial scale, duration and probability. The impact rating process was designed to provide a numerical rating of the various environmental and socio-economic impacts identified for various project activities.

The impact assessment will also aim to determine the ability of affected parties to adapt to changes associated with the Project. Key to this determination will be their ability to maintain their livelihoods, relationships and institutional structures upon which they depend for daily functioning. Interrelationships between social and biophysical aspects of the environment will be considered in the impact assessment. Of particular importance will be the findings of the water, air, transportation, visual and aesthetic and noise studies.

10.2.13.6 Impact Management

Feasible mitigation measures will be developed to mitigate (and where possible avoid) the negative social impacts, and optimise the positive social impacts. A social management and monitoring framework will be developed to define objectives and actions for mitigation and enhancement measures and guide implementation of the mitigation measures.

Key social risks will also be identified to determine if these risks constitute constraints that must be considered in project design, and/or require appropriate management and mitigation before the project implementation.

10.2.14 Health Impact Assessment

This study will evaluate the different types of evidence from the various specialist studies, as well as other readily available information, in order to assess the health impacts associated with the IPP project on the population of concern. In so doing, the project aimed to adhere to the relevant provisions contained in the Equator Principles (IFC, 2006). These provisions are derived from the principles themselves and the International Finance Corporation (IFC)'s Performance Standards and Environmental Health and Safety (EHS) Guidelines.

10.2.14.1 Methodology

The baseline assessment will involve a desktop review of relevant documentation, including:

- Publicly-available data on health-related statistics (including prevalence of disease, access to and utilisation of health services, etc.), with particular emphasis on local and provincial-level statistics;
- Maps, socio-economic statistics and other available information pertaining to the proximity, distribution, density and vulnerability of surrounding communities – i.e. the communities who are most likely to experience health-related impacts as a result of the proposed Project;
- The outcomes of the scoping-phase stakeholder engagement process for the EIA, with particular emphasis on health-related issues or concerns raised by community members or other stakeholders; and
- Scoping-level findings of other specialist studies being undertaken as part of the overall EIA. In this regard, specific attention will be paid to information on relevant baseline conditions (e.g. current ambient air quality, groundwater and surface water and social impacts) that may have indirect implications for the health of surrounding communities.

The outcomes of the aforementioned activities will be documented in a cHIA baseline report. This report will contain:

- A baseline community health profile focusing on neighbouring communities and the local municipal area as a whole, set against the backdrop of the district municipality and the province; and
- A preliminary discussion on likely community health impacts of the proposed Project.

The identified potential community health impacts will then categorised in terms of twelve Environmental Health Areas (EHAs) – a set of health-related factors and considerations defined by IFC methodology. These are summarised in Table 10-6. The set of EHAs provides a linkage between Project-related activities and potential positive or negative community-level impacts, and incorporates a variety of biomedical and key social determinants of health. In this integrated analysis, cross-cutting environmental and social conditions that contain significant health components are identified instead of a cHIA focusing primarily on disease-specific considerations – as is frequently done in many biomedical analyses of potential Project-related public health impacts. The EHA framework is based on an analysis performed and published by the World Bank (IFC, 2009).

Table 10-6: Environmental Health Areas

Environmental Health Areas (EHAs)	
1.	**Vector-related diseases** – Mosquito, fly, tick and lice-related diseases (e.g. malaria, dengue, yellow fever, lymphatic filariasis, rift valley fever, human African trypanosomiasis, onchocerciasis, etc.)
2.	**Acute respiratory infections and respiratory effects from housing** – Transmission of communicable diseases (e.g. acute respiratory infections, pneumonia, tuberculosis, meningitis, plague, leprosy, etc.) and respiratory infections that can be linked to overcrowding and housing inflation. It also considers indoor air pollution related to use of biomass fuels.
3.	**Veterinary medicine and zoonotic issues** – Diseases affecting animals (e.g. bovine tuberculosis, swinepox, avian influenza) or that can be transmitted from animal to human (e.g. rabies, brucellosis, Rift Valley fever, Lassa fever, leptospirosis, etc.)
4.	**Sexually-transmitted infections, including Human Immunodeficiency Virus/ Acquired Immune Deficiency Syndrome (HIV/AIDS) –** Sexually-transmitted infections such as syphilis, gonorrhoea, chlamydia, hepatitis B and, most importantly, HIV/AIDS. Linkages of TB will be discussed where relevant under HIV, but often linked to EHA1.
5.	**Soil-, water- and waste-related diseases** – Diseases that are transmitted directly or indirectly through contaminated water, soil or non-hazardous waste (e.g. diarrheal diseases, schistosomiasis, hepatitis A and E, poliomyelitis, soil-transmitted helminthiases, etc.)

Environmental Health Areas (EHAs)	
6.	**Food- and nutrition-related issues** – Adverse health effects such as malnutrition, anaemia or micronutrient deficiencies due to e.g. changes in agricultural and subsistence practices, or food inflation; gastroenteritis, food-borne trematodiases, etc. This will also consider feeding behaviours and practices. Access to land plays a major role in developing subsistence farming contexts.
7.	**Accidents/injuries** – Road traffic or work-related accidents and injuries (home and Project related); drowning
8.	**Exposure to potentially hazardous materials, noise and malodours** – This considers the environmental health determinants linked to the Project and related activities. Noise, water and air pollution (indoor and outdoor) as well as visual impacts will be considered in this biophysical category. It can also include exposure to heavy metals and hazardous chemical substances and other compounds, solvents or spills and releases from road traffic and exposure to mal-odours. There is a significant overlap in the environmental impact assessment in this section. Ionizing radiation also falls into this category.
9.	**Social determinants of health** – Including psychosocial stress (due to e.g. resettlement, overcrowding, political or economic crisis), mental health, depression, gender issues, domestic violence, suicide, ethnic conflicts, security concerns, substance misuse (drug, alcohol, smoking), family planning, health seeking behaviours, etc. There is a significant overlap in the SIA in this section.
10.	**Cultural health practices** – Role of traditional medical providers, indigenous medicines, and unique cultural health practices
11.	**Health systems issues** – Physical health infrastructure (e.g. capacity, equipment, staffing levels and competencies, future development plans); program management delivery systems (e.g., malaria-, TB-, HIV/AIDS-initiatives, maternal and child health, etc.)
12.	**Non-communicable diseases** – Cardiovascular diseases, cancer, diabetes, obesity, etc.

The outcome of the baseline assessment will determine whether an impact assessment will be required. Should an impact assessment be required, a separate proposal will be provided for undertaking such an assessment.

Activities that will be undertaken during impact assessment (should the outcomes of the baseline study indicate that one is required) would include:

- Collection of primary health-related data through consultation with local health staff and community members; and
- Identification of potential health impacts and associated mitigation and management measures for ameliorating negative community health impacts and enhancing positive ones.

10.2.15 Rehabilitation

10.2.15.1 Aims and Objectives

Rehabilitation measures are taken when all efforts are done to avoid and minimize the proposed impacts as per the Mitigation Hierarchy (see Figure 5-2). The aim in developing a Rehabilitation Plan for the proposed IPP is to set rehabilitation objectives as early as possible so to ensure the optimal management of rehabilitation issues that may arise and to restore land back to a satisfactory standard. The rehabilitation plan aims to ensure activities associated with the proposed IPP Project for the closure, operation and construction phases will be designed to prevent or minimise adverse long-term environmental impacts and promote a self-sustaining ecosystem. The Rehabilitation Plan also aims to comply with relevant local and national regulatory requirements. This Plan will be a guideline for on-going surface rehabilitation during operations but will not include a comprehensive closure plan.

10.2.15.2 Methodology and Scope of Work

All information applicable to the site will be reviewed. This will include national and regional available information as well as the specialist studies that will be conducted for this particular project. The baseline ecological assessments will be key in the compilation of the rehabilitation plan. The rehabilitation objectives that are set will need to consider the life of operation, which is likely to remain in situ for in excess of 30 years.

During the construction phase it is particularly important that the extent of planned disturbed areas is minimised. After construction activities cease, areas that are not going to be utilised during the operational phase and have been impacted upon during the construction phase should be rehabilitated. The plan will provide recommendations regarding what plant species can be used for rehabilitation purposes during the construction phase and upon closure. The following sections will be described as part of the rehabilitation plan:

- Soil stripping and stockpiling guidelines
  - Topsoil and subsoil will need to be stripped and stored separately and according to similar soil types;
  - Location of stockpiles will be identified;
  - Correct vegetation species composition for the re-vegetation of the soil stockpiles to conserve soil quality and prevent erosion;
  - Inspection of soil stockpiles to check degradation and/or pollution;
  - Fertility analysis and amelioration procedures; and
  - Evaluating and readjusting the rehabilitation plan.
- Re-vegetation plan:
  - Correct vegetation species composition;

- Appropriate use of vegetation for rehabilitation during concurrent rehabilitation (if possible); and
- schedule listing the maintenance and management required to ensure sustainable growth.

- Profile and Water Management Plan
  - This will include the SWMP and any further rehabilitation related activities.
- Alien invasive control plan
- Rehabilitation Mapping
  - Plans will display areas where certain rehabilitation activities will take place. These detailed plans will allow for the formulation of a strategic plan for rehabilitation and will be utilised to guide the process of physical rehabilitation on site
- Monitoring of rehabilitation after closure.

10.2.16 Closure cost

Regulation 23(4) of the NEMA, as amended, states that *"An EMPr must contain all information set out in Appendix 4 to these Regulations and, where the application is for an environmental authorisation for prospecting, exploration, extraction and primary processing of a mineral or petroleum resource or activities directly related thereto, the EMPr must address the requirements as determined in the regulations, pertaining to the* ***financial provision*** *for the rehabilitation, closure and post closure of prospecting, mining or production operations, made in terms of the Act".*

The South African Government has drafted regulations for the determination of financial provision for rehabilitation and closure. As these regulations have not yet been promulgated, this proposal does not address any of the requirements of these proposed regulations.

10.2.16.1.1 Measurements

Digby Wells will utilise layout plans to measure all items of infrastructure or associated structures of the proposed project. These measurements will be standardised to ensure that the costs calculated are easily updatable and that they are consistent.

10.2.16.1.2 Cost Calculation

A closure cost model will be compiled using Microsoft Excel. The matrix model will consist of an input sheet, containing measurements of the existing infrastructure, a standard rate sheet and a summary sheet, which summarises the costs for closure.

- The matrix model calculates the cost of demolishing, removing and rehabilitating each component of the Project's infrastructure which may include (but is not limited to):

- Demolition of all surface infrastructure including steel, wood, brick and concrete structures;
- Rehabilitation of yards and roads;
- Reclamation of mineralised waste deposits (e.g. tailings and waste rock);
- Removal and rehabilitation of process solution facilities (e.g. heap leach pads, evaporation ponds);
- Generalised rehabilitation and vegetation management strategies; and
- Long term maintenance and monitoring costs.

A sheet collating the calculations in to the format prescribed by the Department of Mineral Resources (DMR) will also be included into the matrix model for easy comparison.

10.2.16.1.3 Closure Cost Report

The Closure Cost Report (CCR) will include the following elements which will be supported by verification documentation where possible:

- Infrastructure mapping plans;
- Record of rates used in the closure cost estimate model;
- A closure cost estimate summary table;
- Written records of consultation with Project personnel and/or experts consulted in determining potential latent and residual risk and appropriate mitigations; and
- A summary of assumptions made during development of the closure cost estimate

11 Conclusion

This Scoping Report has been compiled to give an introduction to the proposed Namane IPP Project and associated activities. This report forms part of the legal requirements of the NEMA as it provides a baseline overview of the receiving environment and possible impacts on the physical, biological, social and health environment that may result from the proposed Project.

Namane has identified an opportunity to utilise Temo Coal Mine's low grade coal to generate electricity. The proposed Project is intended to supply power into the Coal Base Load IPP programme or alternately to other consumers, and so contributing to the energy security of South Africa, whist taking all possible sustainable precautions to limit the impact on the environment.

The proposed operation has been evaluated and the potential impacts during construction, operation and decommissioning for each of the environmental aspects identified.

The objective of the scoping report is to provide authorities and I&APs with an overview of the proposed activities, and the potential identified environmental impacts.

12 Undertaking Regarding Correctness of Information

I, **Barbara Wessels**, herewith undertake that the information provided in the foregoing Report is correct and that the comments and inputs from stakeholders and I&APs has been correctly recorded in the Report.

	13/11/2015
Signature of EAP	Date

13 Undertaking Regarding Level of Agreement

I, **Barbara Wessels**, herewith undertake that the information provided in the foregoing Report is correct and that the level of agreement with I&APs and stakeholders has been correctly recorded and reported herein.

_____ **13/11/2015**

Signature of EAP Date

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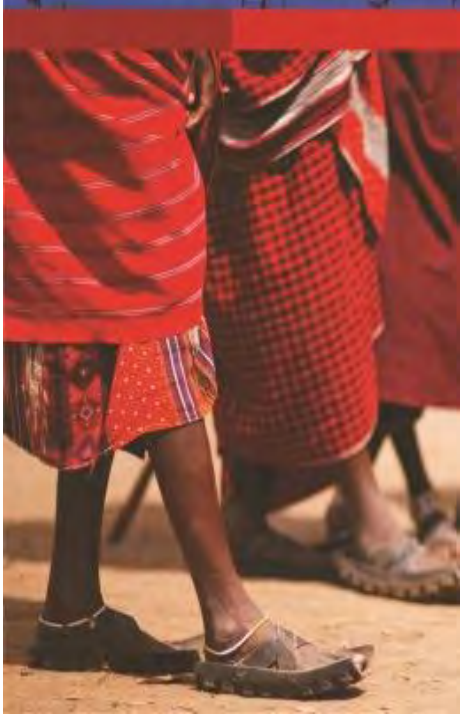
Appendix A: Plans

LIST OF PLANS

Appendix B: Stakeholder Engagement



DIGBY WELLS
ENVIRONMENTAL

Namane Independent Power Producer (IPP) Project

Public Participation Report

Project Number:

NAM3428

Prepared for:

Namane Resources (Pty) Ltd

November 2015

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This document has been prepared by Digby Wells Environmental.

Report Type:	**Public Participation Report**
Project Name:	**Namane Independent Power Producer (IPP) Project**
Project Code:	**NAM3428**

Name	Responsibility	Signature	Date
Vanessa	Report Writer		2 November 2015
Nestus Bredenhann	Reviewer		3 November 2015

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1 Introduction

Namane Generation (Pty) Ltd (Namane) is proposing the development of an Independent Power Producer (IPP) power plant. The proposed IPP project site falls within the Waterberg District Municipality, Limpopo Province. The power plant and associated infrastructure will be located on the Remaining Extent of the farm Duikerpan 249 LQ and it is proposed to dispose of the fly ash within the mined out pits of Temo coal on the farm Verloren Valey 246 IQ and is approximately 60 km west of Lephalale in the Limpopo Province.

An Integrated Environmental Authorisation Application will be submitted to the Department of Environmental Affairs (DEA) for listed activities associated with a power plant in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and the Environmental Impact Assessment (EIA) Regulations, 2014; and waste management activities in accordance with the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008). Furthermore, the following applications will be submitted:

- Air Emissions Licence application in accordance with the National Environmental Management Air Quality Act, 2004 (Act No. 39 of 2004) (NEM:AQA) for activities associated with the power plant to the Limpopo Department of Economic Development Environment and Tourism (LEDET);
- Water Use Licence Application (WULA) in accordance with the National Water Act, 1998 (Act No. 36 of 1998) (NWA) for activities associated with the power plant to the Department of Water and Sanitation (DWS); and
- Approval from the South African Heritage Resources Agency (SAHRA) in accordance with the National Heritage Resources Act, 1999 (Act 25 of 1999) (NHRA) for all the activities.

The process is designed to provide Interested and Affected Parties (I&APs) with the opportunity to evaluate the proposed project, to provide the needed inputs and to receive feedback from the project team and/or proponent. I&APs represent relevant sectors of society and various relevant organs of state. This Public Participation (PP) report provides an overview of the Public Participation Process (PPP) and describes what PP activities have been undertaken to date and includes the next steps as part of the environmental regulatory process.

1.1 Public Participation Process Objectives

The PPP objectives for the environmental regulatory process have been set out below:

- To ensure that I&APs are informed about the proposed project;
- To provide I&APs opportunity to engage and provide comment on the proposed project;
- To draw on local knowledge by identifying environmental and social concerns associated with the proposed project;
- To involve I&APs with identifying methods in which concerns can be addressed;
- To verify that stakeholder comments have been accurately recorded; and
- To comply with the legal requirements.

As part of the PPP three (3) main phases, during which I&APs are engaged as part of the environmental regulatory process, are detailed below:

1.1.1 Scoping Phase

During the Scoping Phase, the following core PP activities are undertaken:

- Stakeholders were identified, and the database continually updated;
- Background Information Document (BID) and letter was distributed together with the placement of adverts and site notices;
- The environmental Scoping Report and associated documentation is available for public comment;
- Consultation with I&APs will be undertaken; and
- Suggestions and concerns will be obtained from I&APs.

1.1.2 Impact Assessment Phase

For the Impact Assessment Phase the following main PP activities will be undertaken:

- Feedback about the specialist studies conducted and mitigation measures proposed during I&AP consultation will be provided;
- Opportunity will be provided to I&APs to comment on specialist findings, impacts assessments and recommendations;
- Environmental reports will be made available for public comment; and
- I&AP will verify the accurate capturing of comments raised and responses provided.

1.1.3 Decision-Making Phase

With completion of the Impact Assessment Phase registered IAPs will be notified of the decision made by the relevant competent authorities about the proposed project.

2 Methodology

The proposed methodology being implemented for the PPP is in line with the prescribed environmental regulatory requirements as described in the Introduction.

2.1 Scoping Phase

2.1.1 Identification of Stakeholders

To ensure a proper representation of stakeholders interested in or affected by the proposed project, the following identification methods are used to develop a stakeholder database:

- Windeed and desktop searches were conducted in and around the project area to verify landownership and obtain contact details;
- Responses from the newspaper advertisement and site notices;
- Responses from the Background Information Document (BID) and notification letter made available to stakeholders; and
- Networking with stakeholders in order to identify additional stakeholders interested in or affected by the proposed project.

Stakeholders for the proposed project are grouped into the following categories:

- **Government:** National, Provincial, District and Local authorities;
- **Landowners:** Directly affected and surrounding landowners;
- **Land occupiers:** Directly affected and surrounding land occupiers;
- **Communities:** Surrounding communities;
- **Non-Governmental Organisations (NGOs):** Environmental and social organisations;
- **Agriculture:** associations or organisations focussed on agricultural activities;
- **Parastatals:** semi-government institutions; and
- **Business:** small and medium enterprises and formal organisations.

A stakeholder database has been compiled which will be updated throughout the environmental regulatory process **(refer to *Appendix A*)**. Directly affected and adjacent farms for the proposed IPP project are included in **Table 1 below.**

Table 1: Directly Affected and Adjacent Farms

Farm	Portion	Owner
Directly Affected		
Duikerpan 249	RE	Steenkamp Daniel Hermanus
Adjacent		
Matopi 705	RE	Sasol Mafutha Mining (Pty) Ltd
Matopi 705	RE	Wandering Star Trading 20 (Pty) Ltd
Verloren Valey 246	RE	Mr Louw and Mrs Elizabeth Swanepoel
Twistpan 265	RE	Steenkamp Gerhardus Albertus
Gruisfontein 230	RE	Prostart Traders 136 (Pty) Ltd
Groenfontein 250	2	Sasol Mafutha Mining (Pty) Ltd
Groenfontein 250	2	Wandering Star Trading 20 (Pty) Ltd
Vlakfontein 264	RE	Sasol Mafutha Mining (Pty) Ltd
Vlakfontein 264	RE	Wandering Star Trading 20 (Pty) Ltd
Tambootievley 261	RE	Wandering Start Trading 20 (Pty) Ltd
Nieuw Holland 247	RE	Steenkamp Gerhardus Albertus

2.1.2 Land Claimants

A formal enquiry, which contains all the directly affected and adjacent farms for the project, was submitted via letter to Ms Gladys Mogale of the Limpopo Department of Rural Development and Land Reform, Land Claims Commission, on Tuesday, 3 November 2015. Awaiting feedback from Land Claims Commissioner.

2.1.3 Public Participation Media

Considering legislative requirements and good practice the following media have been implemented to make information about the proposed project available to stakeholders (see Table 2 for further details).

- **Background Information Document (BID):** includes the location and a description of the proposed project, the legislative processes and requirements that will be followed, the specialist studies to be conducted, the competent authorities and the consultation and registration process including contact details of the responsible person representing the independent Environmental Assessment Practitioner (EAP).
- **Newspaper Advertisements:** an English newspaper advert was placed in one regional newspaper. The advertisement included a brief project description, information about the required legislation, the competent authorities, details of the

appointed EAP, information about availability of the Scoping Report for public comment and details about the Public Meeting to be held.

- **Site Notices:** English site notices were put up at various places as indicated in Table 2**.** The site notices contained a brief project description, information about the required legislation, the competent authorities, details of the appointed EAP and information about availability of the Scoping report for public comment and details about the Public Meeting.
- **Letter with Comment and Registration Form:** a letter was sent in English which contained information about the proposed project, applicable legislation and competent authorities, information on availability of the Scoping Report for public comment and details of the Public Meeting. A Registration and Comment Form was also provided for stakeholders to use for formal registration as I&APs or to submit comments.
- **Maps:** various maps will be on display throughout the proceedings of stakeholder meetings undertaken. These included, but not limited to, regional locality of the project, project footprint and proposed infrastructure.

2.1.4 Consultation with Stakeholders

Stakeholders, and predominantly affected landowners and authorities, will be consulted during November/December 2015 on a one-on-one basis telephonically in order to provide further information about the proposed project and to identify or verify landowner information.

A formalised stakeholder meeting has been scheduled during the 30-day public comment period in the form of a Public Meeting and stakeholders on the database have been informed and invited. Comments raised by stakeholders will be captured in a Comment and Response Report (CRR). Stakeholder comments will be closely considered and addressed by the project team, where applicable, to inform the scope for specialist studies to be undertaken during the Impact Assessment Phase. Responses will be provided to the comments raised by stakeholders and included in the CRR throughout the PPP.

The updated Scoping Report will be made available to stakeholders on the Digby Wells website (www.digbywells.com) for a 21 day comment period and notification will be distributed to inform stakeholders.

2.1.4.1 Public Meeting

A Public Meeting has been arranged for stakeholders who are affected by or interested in the project. The intention of the meeting is to share project details, address comments already received and to obtain further comments.

2.1.5 Public Participation Scoping Phase Activities

In Table 2 more detail is provided about the PP activities undertaken thus far, together with referencing materials included as Appendices.

Table 2: Public Participation Scoping Phase Activities

Activity	Details	Reference in Report
Identification of stakeholders	A stakeholder database was developed which includes I&APs from various sectors of society, including directly affected and adjacent landowners, in and around the proposed project area.	**Appendix A** Stakeholder database
Distribution of announcement letter and Background Information Document (BID)	A BID, announcement letter with Registration and Comment Form was emailed and posted to stakeholders on **Tuesday, 3 November 2015**.	**Appendix B** Announcement Documents
Placing of newspaper advertisement	An English advert was placed in the Mogol Post on **Friday, 6 November 2015.**	**Appendix C** Advertisement
Putting up of site notices	English site notices were put up at the proposed project site, local libraries and municipal offices on **Wednesday, 4 November 2015** at: ▪ Lesedi Village, Steenbokpan; and ▪ Lephalale Local Municipality Public Library. A site notice placement map and report were also developed to indicate geographically the various site notice locations.	**Appendix D** Site Notice Placement map Site Notice Report
Announcement of Scoping Report	Announcement of availability of the Scoping Report was emailed and posted to stakeholders together with the formal project announcement on **Tuesday, 3 November 2015**. Copies of the Scoping Report are available at: ▪ Lesedi Village, Steenbokpan; and ▪ Lephalale Local Municipality Public Library. The Scoping Report is also available on www.digbywells.com and will be made available the Public Meeting. ***(30-day comment period for the Scoping Report: Friday, 13 November to Monday, 14 December 2015)***	**Appendix B** Announcement Documents
Stakeholder Meeting	A Public Meeting will be undertaken as follows: Mogol Club (Cnr George Wells and Nelson Mandela Drive, Onverwacht) on **Friday, 27 November 2015** from **10:00 – 12:00**.	

Activity	Details	Reference in Report
Announcement of updated Scoping Report	Announcement of availability of the updated Scoping Report will be emailed and posted to stakeholders together with a Comment Form and will be available on www.digbywells.com (Public Documents).	
Obtained comments from stakeholders	Comments, issues of concern and suggestions received from stakeholders will be captured in the CRR.	

3 Public Participation during Impact Assessment Phase

It is anticipated that the PP process to be implemented for the Impact Assessment phase will be similar to the process commenced for the Scoping phase. The premise of activities is to adhere to various legislative requirements for PP and that a single, integrated process is followed. This will limit stakeholder fatigue and ensure that stakeholders are presented with a single view of the full project and EIA information. It is envisaged that the process will commence in January / February 2016 during which another Public Meeting will be held.

Stakeholder comments gathered during the Scoping phase and outcomes from the meetings will be closely considered for further PP activities and inclusion for specialist studies (where applicable). The main emphasis of stakeholder meetings as part of this phase will be so share results of the specialist impact studies completed and the associated suggested mitigation measures and recommendations.

4 Decision-Making Phase

The DEA and LEDET, as competent authorities, will issue a decision about the Environmental Authorisation (EA) for the proposed project. These decisions will need to be communicated to stakeholders as prescribed under the NEMA legislation. As such, notification to stakeholders will be done by means of a letter via email and post, and placement of an advertisement in the relevant newspaper(s).

Appendix A: Stakeholder Database

Category	Company	Mr/Ms	First Name	Last Name	Position
Agricultural Union	Agri SA - Lephalale	Mr	Francois	Van der Berg	
Agricultural Union	Agri South Africa	Mr	Gert	Smith	Chairperson
Agricultural Union	Northern Traansvaal Agricultural Union (NTLU)	Mr	Wilma	Prinsloo	Secretary
Agricultural Union	Northern Transvaal Agricultural Union (NTLU)	Mrs	J	Swanevelder	
Agricultural Union	Transvaal Agricultural Union S.A (TLUSA)	Mr	Gert	Snyman	
Agricultural Union, Landowner	Steenbopan Bboere Unie	Mr	Thinus	Steenekamp	
Authorities	Limpopo Heritage Resources Authority (LIHRA)	Mr	Donald	Lithole	Manager
Authorities, Provincial Government	Limpopo Department of Mineral Resources (DMR)	Mr	Aaron	Kharivhe	Regional Manager
Authorities, Provincial Government	Limpopo Department of Water and Sanitation (DWS)	Mr	Love	Hlekane	Engineering Technician
Business and commerce	Eskom	Ms	Rosetta	Rammutla	Environmental Manager
Business and commerce	Eskom Distribution Division | Limpopo Operating Unit	Mr	Xander	Neethling	Land Development & Environmental Management
Business and commerce	Imbi Safari (Pty) Ltd	Mr	Bill	Hardin	

Business and commerce	Lategan Viljoen Pretorius Attoneys	Mr	Kobus	De Villiers	Attorney
Business and commerce	Lategan Viljoen Pretorius Attoneys	Mr	S D J	De Villiers	
Business and commerce	Lategan Viljoen Pretorius Attoneys	Ms	Retha	Maritz	Personal Assistant
Business and commerce	Limpopo Development Agency	Mr	Freddy	Chaba	National Government/Conflict Management
Business and commerce	Sunfox 7 CC	Mr	Ellert Michael	Werner	
Business and commerce	Taaiboschpan Landgoed CC.	Mr	Oberholzer	Judex	
Business and commerce	Taaiboschpan Landgoed CC.	Mr	Jan	Talma	
Business and commerce	Transnet Freight Rail	Mr	Francis	Rahlapane	Risk Manager
Business and commerce	Warburton Gunn Attorneys	Mr	Gunn	Adam	
Business and commerce	Zeekoeivley Hunting Safaris CC	Mr	Andre	Uys	
Business and commerce	Zinyathi Lodge cc	Mr	Le Grange	Hannes	
Business and commerce	Zitshunele Trading & Contracting	Mr	Jantjies	Iki	
Business and commerce, Indirectly Affected Landowners	Eskom Transmission Land and Rights	Mr	Tobile	Bokwe	Chief Environmental Advisor

Business and commerce, Indirectly Affected Landowners	Transnet	Mr	Phillip	De Klerk	Project Manager
Chamber of Commerce	Chamber of Mines	Ms	Stephina	Mudau	Environmental Manager
Community Based Organisations	Community Policing Forum (CPF)	Mr	Petrus	Megwai	Chairperson
Community Based Organisations	Lephalale Development Forum	Mr	Jacques	Snyman	
Community Based Organisations	South African National Civic Organisation (SANCO) - Limpopo	Mr	MJ	Maphoso	Provincial Secretary
Community Based Organisations	South African National Civic Organisation (SANCO) - Waterberg	Mr	MK	Dabana	
Community Based Organisations	Steenbokpan Development Consortium (SDC)	Mr	Chris J	Maritz	
Community Based Organisations	Steenbokpan Development Consortium (SDC)	Mr	Khun (Snr)	Callie Frederik	
Community Based Organisations	T Motsatsi & Assosciates	Ms	Motsatsi	Tshegofatso	
Community Based Organisations	The Ground Hornbill Research & Conservation Project	Ms	Ann	Turner	
Consultant	Digby Wells Environmental	Ms	Barbara	Wessels	Project Manager
Consultant	Digby Wells Environmental	Mr	Nestus	Bredenhann	Departmental Manager
Consultant	Digby Wells Environmental	Ms	Vanessa	Viljoen	Public Participation Practioner

Consultant	Digby Wells Environmental	Ms	Qondile	Monareng	Public Participation Practioner
Directly Affected Landowner, Indirectly Affected Landowners		Mr	Hermanus	Steenkamp	Landowner
Directly Affected Landowner, Indirectly Affected Landowners		Mr & Mrs	Louw & Elizabeth	Swanepoel	Landowner
Directly Affected Landowner, Industry and mining	Anglo Operations (Pty) Ltd	Mr	Dawid	van der Walt	
Directly Affected Landowner, Indirectly Affected Landowners	Ekosto 1058 (Pty) Ltd	Mr & Mrs	Ivan & Jana	Visnakova	Landowner
Directly Affected Landowner, Indirectly Affected Landowners	Prostart Traders 136 (Pty) Ltd	Mr	Hein	Schönfeldt	
Directly Affected Landowner, Indirectly Affected Landowners, Transport Sector (SANRAL)	SA National Road Agency (SANRAL)	Ms	Victoria	Bota	Environmentalist
District Municipality	Waterberg District Municipality	Mr	Vincent	Langa	
District Municipality	Waterberg District Municipality	Mr	Mpheta	Mabotja	Municipal Manager
District Municipality	Waterberg District Municipality	Mr	K S	Lamola	Infrastructure Development
District Municipality	Waterberg District Municipality	Mr	Leonard	Sole	LED Officer
District Municipality	Waterberg District Municipality	Mr	Reuben	Mashego	Environmental Manager

District Municipality	Waterberg District Municipality	Ms	Betty	Molekwa	LED Manager
District Municipality	Waterberg District Municipality	Ms	Lindiwe	Kgomo	IDP Manager
Environmental NGO's	Birdlife South Africa	Ms	Pamela	Barrett	CEO PA & Secretary
Environmental NGO's	Centre for Environmental Rights NPC	Mr	Nicole	Loser	
Environmental NGO's	Centre for Environmental Rights NPC	Mr	Teboho	Sebogodi	Candidate Attorney
Environmental NGO's	Centre for Environmental Rights NPC	Mr	Robyn	Hugo	
Environmental NGO's	Centre for Environmental Rights NPC	Ms	Slyvia	Kamanja	
Environmental NGO's	Earthlife Africa	Ms	Makoma	Lekalaka	Senior Programmes Officer
Environmental NGO's	Endangered wildlife Trust (EWT)	Mr	Adam	Pires	Programme Manager
Environmental NGO's	Endangered Wildlife Trust (EWT)	Mr	Bradley	Gibbons	Field Officer
Environmental NGO's	Endangered Wildlife Trust (EWT)	Ms	Ashleigh	Dore	Training Coordinator
Environmental NGO's	Endangered Wildlife Trust (EWT)	Ms	Wendy	Collinson	Field Officer
Environmental NGO's	Groundwork	Mr	Bobby	Peek	Climate & Environmental Justice

Environmental NGO's	Lawyers for Human Rights	Ms	Kayan	Leung	Candidate attorney
Environmental NGO's	Lowveld Bird Club	Ms	Karen	Bullen	Lowveld Chairperson
Environmental NGO's	Rock Art Research Institute	Mr	David	Pearce	Director
Environmental NGO's	Wildlife and Environment Society of South Africa (WESSA)	Mr	Lemson	Betha	Project Manager
Environmental NGO's, Water Bodies - Institution	Water Research Commission	Mr	Adriaan	Taljaard	Marketing and Communications Manager
Farmers Association	Mogol Farmers Association	Mr	Theuns	Pretorius	
Indirectly Affected Landowners		Mr	Gerhardus	Steenkamp	Landowner
Indirectly Affected Landowners, Industry and mining	Resgen South Africa (Pty) Ltd	Mrs	Louise	Van den Berg-Nicolai	
Indirectly Affected Landowners, Industry and mining	Sasol Mafutha Mining (Pty) Ltd	Mr	Piet-Nel	de Vos	
Industry and Commerce	Eskom Park (Eskom Holdings)	Mr	Xander	Neethling	Supervisor
Industry and Commerce	Target Cranes	Mr	Gert	Basson	
Industry and Commerce	Telkom SA Ltd	Mr	P.J	Barkhuizen	
Industry and mining	Exxaro Resources	Ms	Filomaine	Swanepoel	Environmental Manager

Industry and mining	Temo Coal Mining	Mr	John	Schoeman	
Landowner		Mr	Heinrich Wedon	Schonfeldt	
Landowner	Limpopo Game Farm	Mr	D H	Steenkamp	Landowner
Landowner	Relative to Tjaard Sauer	Mr	Sauer Johannes	Jacobus	
Landowner	Steenbokpan Handedlaars		A	Swart	
Landowner	Streekbestuurder TLUSA Noord	Ms	Marie	Helm	
Landowner	Theunispan 293 LQ	Mr	Harmse	Gerhardus Marthinus	
Library	Lephalale Local Municipality	Ms	Paulina	Mampa	Assistant Librarian
Library	Marapong Public Library	Mr	Sophonia	Petja	Librarian
Local Municipality	Lephalale Local Municipality	Cllr		Thulare	
Local Municipality	Lephalale Local Municipality	Cllr	Ramokane	Moatshe	Ward Councillor
Local Municipality	Lephalale Local Municipality	Cllr	Moloko	Maeko	Mayor
Local Municipality	Lephalale Local Municipality	Dr	Ditlhokua	Matsoma	EMC

Local Municipality	Lephalale Local Municipality	Mr	MF	Mabotja	IDP Manager
Local Municipality	Lephalale Local Municipality	Mr	Eben	Badernhost	Environmental Officer
Local Municipality	Lephalale Local Municipality	Mr	Joshua	Hlapa	Waste & Environmental Manager
Local Municipality	Lephalale Local Municipality	Mr	Kgabo	Tlhako	Manager Infrastructural Services
Local Municipality	Lephalale Local Municipality	Mr	Madumetja	Kgafela	Councillor Coordinator
Local Municipality	Lephalale Local Municipality	Mr	Malose	Marakalala	Councillor
Local Municipality	Lephalale Local Municipality	Mr	William	Motlokwa	Councillor
Local Municipality	Lephalale Local Municipality	Mr	Charles	Lekaka	
Local Municipality	Lephalale Local Municipality	Mr	Victor	Monyepao	Public Participation Manager
Local Municipality	Lephalale Local Municipality	Mrs	A E	Maartens	Acting EMS
Local Municipality	Lephalale Local Municipality	Ms	Charity	Radipabe	LED Manager
Local Municipality	Lephalale Local Municipality	Ms	E M	Tukakgomo	Municipal Manager
Local Municipality	Lephalale Local Municipality	Ms	Oteng	Radipabe	Town Planner

Local Municipality, Resident	Lephalale Local Municipality	Mr	Frans	Magwai	Ward Councillor
National Government	Department of Agriculture, Forestry and Fisheries (DAFF)	Ms	Portia	Khumalo	ROC - Environmental
National Government	Department of Environmental Affairs (DEA)	Mr	Lucas	Mahlangu	Control Environmental Officer
National Government	Department of Environmental Affairs (DEA)	Mr	Obed	Baloyi	Environmental Impact Evaluation
National Government	Department of Environmental Affairs (DEA)	Mr	Mark	Gordon	Deputy Director General
National Government	Department of Environmental Affairs (DEA)	Ms	Pumeza	Skepe	Deputy Director
National Government	Department of Environmental Affairs (DEA)	Ms	Nyiko	Nkosi	Principal Environmental Officer: Environmental Impact Assessement
National Government	Department of Environmental Affairs (DEA)	Ms	Millicent	Solomons	Director
National Government	Department of Rural Development and Land Reform (DRDLR)	Mr	Cindy	Benyane	Chief Director
National Government	National Department of Water and Sanitation	Mr	Solly	Mabuda	Chief Director: Integrated Water Resource Planning
National Government	National Nuclear Regulator (NNR)	Mr	Patle	Mohajane	Manager
National Government	National Nuclear Regulator (NNR)	Mr	Mwinsa	Mpundu	Principal Specialist
National Government	National Nuclear Regulator (NNR)	Mr	Andre	Botha	Resource

National Government	National Nuclear Regulator (NNR)	Mr	Wilcot	Speelman	
National Government	National Nuclear Regulator (NNR)	Mr	Elmond	Lekota	Specialist: Environmental Radiation Protection
National Government	National Nuclear Regulator (NNR)	Mrs	Solofelang	Masike - Ibiyemi	Senior Specialist
National Government	South African Heritage Resources Agency (SAHRA)	Mr	Phillip	Hine	Archaeologist
National Government	South African Heritage Resources Agency (SAHRA)	Mr	Godfrey	Tshivhalavhala	Heritage Officer
Provincial Government	Department of Labour	Mr	Albert	Tshidavhu	Chief Director Provincial Operations
Provincial Government	Department of Public Works	Mr	N	Moloto	Manager
Provincial Government	Department of Social Development	Ms	Daisy	Mafubelu	Information officer
Provincial Government	Department of Water and Sanitation (DWS)	Ms	Felicia	Nemathaga	Control Environmental Officer
Provincial Government	Department of Water and Sanitation (DWS)	Ms	Kama	Meso	
Provincial Government	Limpopo Department of Water and Sanitation (DWS)	Mr	Ben	Sengani	Assistant Director
Provincial Government	Limpopo Department of Water and Sanitation (DWS)	Mr	Donald	Mabanda	
Provincial Government	Limpopo Department of Economic Development, Environment and Tourism	Mr	Solly	Kgopong	Head of Department

Provincial Government	Limpopo Department of Mineral Resources (DMR)	Mr	TC	Kolani	Case Officer
Provincial Government	Limpopo Department of Mineral Resources (DMR)	Ms	Lerato	Maibelo	Ministers Executive Assistant
Provincial Government	Limpopo Department of Rural Development and Land Reform	Ms	Gladys	Mogale	
Provincial Government	Limpopo Department of Health	Ms	Aldina	Ntsewa	District Executive Manager
Provincial Government	Limpopo Department of Agriculture and Rural Development	Ms	Maphuti	Ramalla	Deputy Direcctor
Provincial Government	Limpopo Department of Economic Development, Environment and Tourism	Ms	Seema	Harmse	Senior Manager
Provincial Government	Limpopo Department of Mineral Resources (DMR)	Ms	Mapula	Sathekge	Environmental Manager
Provincial Government	Limpopo Department of Rural Development and Land Reform	Ms	Lorraine	Mosebedi	Manager: information Management Unit
Provincial Government	Limpopo Department of Mineral Resources (DMR)	Ms	Tebogo	Mangaba	Secretary
Provincial Government	Limpopo Department of Roads & Transport	Mr	Jonathan	Gafane	Senior Manager
Resident		Cllr	Sophia	Matlou	
Tribal Authorities		Mr	Solomon	Mogotsi	Induna
Water Bodies -Institution	Trans Caledon Tunnel Authority (TCTA)	Mr	Nelwamondo	Azwianewi	

Appendix B: Announcement Documents

DIGBY WELLS
ENVIRONMENTAL

Project Reference: NAM3428 3 November 2015

ENVIRONMENTAL AUTHORISATION FOR THE PROPOSED NAMANE INDEPENDENT POWER PRODUCER (IPP) PROJECT, LEPHALALE, LIMPOPO PROVINCE

Dear Stakeholder,

Namane Generation (Pty) Ltd (Namane) is proposing the development of an Independent Power Producer (IPP) power plant. The proposed IPP project site falls within the Waterberg District Municipality, Limpopo Province. The power plant and associated infrastructure will be located on the Remaining Extent of the farm Duikerpan 249LQ and it is proposed to dispose of the fly ash within the mined out pits of Temo coal on the farm Verloren Valey 246LQ and is approximately 60 km west of Lephalale in the Limpopo Province.

An integrated Environmental Authorisation Application will be submitted to the Department of Environmental Affairs (DEA) for listed activities associated with a power plant in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and the Environmental Impact Assessment (EIA) Regulations, 2014; and waste management activities in accordance with the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM:WA). Furthermore, the following applications will be submitted:

- Atmospheric Emissions Licence application in accordance with the National Environmental Management Air Quality Act, 2004 (Act No. 39 of 2004) (NEM:AQA) for activities associated with the power plant to the Limpopo Department of Economic Development Environment and Tourism (LEDET);
- Water Use Licence Application (WULA) in accordance with the National Water Act, 1998 (Act No. 36 of 1998) (NWA) for activities associated with the power plant to the Department of Water and Sanitation (DWS); and
- Approval from the South African Heritage Resources Agency (SAHRA) in accordance with the National Heritage Resources Act, 1999 (Act 25 of 1999) (NHRA) for all the activities.

Digby Wells Environmental (Digby Wells) has been appointed by Namane to undertake the EIA process and associated studies.

Scoping Report Availability

Submission of the application to the DEA will initiate the formal 300 day EIA process. The Scoping Report will be made available to stakeholders for a 30 day comment period before the Final Scoping Report is submitted to the DEA.

The Scoping Report will be available for public comment from **Friday, 13 November to Monday, 14 December 2015** at the following places:

Person	Location	Contact
Printed Copies		
Councillor Frans Magwai (Ward 3)	Lesedi Village, Steenbokpan	(079) 977-8547
Paulina Mampa	Lephalale Local Municipality Public Library (Cnr Joe Slovo Street & Douwater Avenue, Lephalale)	(014) 763-4402

Person	Location	Contact
Rebecca Mafura	Digby Wells Lephalale Office No 2, Booysen street	(014) 763 4167
Electronic Copies		
Vanessa Viljoen	(www.digbywells.com) under Public Documents), or phone and request CD copy	(011) 789 9495

How to Comment on the Scoping Report

Comments on the Scoping Report can be submitted through any of the following means:

- Completing a Registration and Comment Form that can be obtained from the Stakeholder Engagement Office and from public places listed above;
- Writing a letter;
- Sending an email, fax or post using the details below;
- Providing comments at the Public Meetings; or
- Phoning the Stakeholder Engagement Office.

Invitation to Public Meeting

A Public Meeting will be held to discuss the Scoping Report content and obtain stakeholder comments, as indicated below.

Date	Time	Venue
Friday, 27 November 2015	10:00 – 12:00	Mogol Club (Cnr George Wells and Nelson Mandela Drive, Onverwacht)

An advertisement of the above mentioned public meeting will appear in the Mogol Post and site notices will also be placed within the project area.

Stakeholders affected by, or who are interested, in the proposed project, are invited to register as an Interested and Affected Party (I&AP). Please complete and return the attached Registration and Comment Form to Digby Wells to register as an I&AP, to indicate your interest in receiving further information regarding the EIA process or to submit comments.

You are welcome to contact the Stakeholder Engagement Office on Tel: 011 789 9495, Fax: 086 583 5715, Postal: Private Bag X10046, Randburg, 2125, Email: vanessa.viljoen@digbywells.com. Your input and feedback are highly valued.

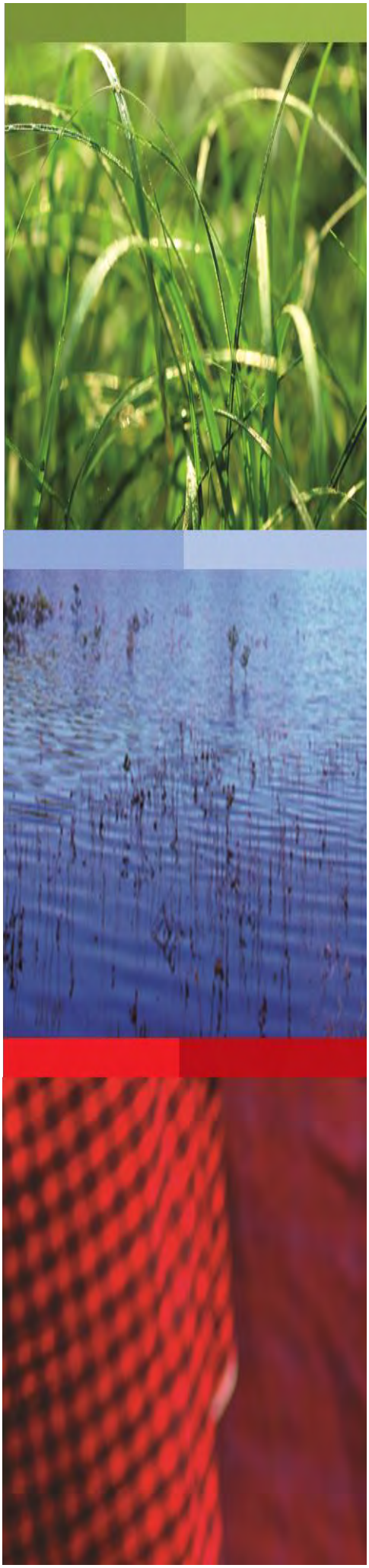
Yours sincerely

Vanessa Viljoen

Stakeholder Engagement Office

Enclosed:

- *Background Information Document (BID)*
- *Registration and Comment Form*



DIGBY WELLS
ENVIRONMENTAL

BACKGROUND INFORMATION DOCUMENT

Environmental Authorisation for the Proposed Namane Independent Power Producer (IPP) Project, Lephalale, Limpopo Province

November 2015

Project Number:

NAM3428

Prepared for:

Namane Generation (Pty) Ltd.

For any project related information, please contact:

Digby Wells Environmental – Stakeholder Engagement Office

Vanessa Viljoen or Nestus Bredenhann
Tel: (011) 789 9495 or Fax: 086 583 5715
Email: vanessa.viljoen@digbywells.com or nestus.bredenhann@digbywells.com

Website: www.digbywells.com (Public Documents)

Digby Wells and Associates (South Africa) (Pty) Ltd (Subsidiary of Digby Wells & Associates (Pty) Ltd). Co. Reg. No. 2010/008577/07. Turnberry Office Park, 48 Grosvenor Road, Bryanston, 2191. Private Bag X10046, Randburg, 2125, South Africa
Tel: +27 11 789 9495, Fax: +27 11 789 9498, info@digbywells.com, www.digbywells.com

Directors: DJ Otto, GB Beringer, LF Koeslag, AJ Reynolds (Chairman) (British)*, J Leaver*, GE Trusler (C.E.O)
*Non-Executive

1 INTRODUCTION

Namane Generation (Pty) Limited (Namane) is proposing the development of an Independent Power Producer (IPP) power plant near Lephalale in the Limpopo Province on the Farm Duikerpan 249LQ.

This Background Information Document (BID) has been developed to:

- Provide a description of the proposed project;
- Provide an overview of the environmental regulatory processes which will be undertaken in accordance with South African legislation; and
- Provide details of the Public Participation Process (PPP) and how stakeholders can become involved.

Digby Wells Environmental (Digby Wells) has been appointed by Namane and will be responsible for undertaking the Environmental Impact Assessment (EIA) process and associated studies for the proposed IPP development.

Please note: In association with the proposed IPP development, Temo Coal Mining (Pty) Limited (Temo) is also proposing the construction of a rail loop on the farm Duikerpan 249LQ and the diversion of road D175 along the boundary of the farm Verloren Valey 246LQ. A separate EIA process will be undertaken for the aforementioned Temo developments.

2 PROJECT DESCRIPTION

2.1 Project Location

The proposed IPP project site falls within the Lephalale Local Municipality, which is located in Waterberg District Municipality, Limpopo Province. The power plant and associated infrastructure will be located on the Remaining Extent of the farm Duikerpan 249LQ and it is proposed to dispose of the fly ash within the mined out pits of Temo coal on the farm Verloren Valey 246LQ and is approximately 60 km west of Lephalale in the Limpopo Province (see Plan 1).

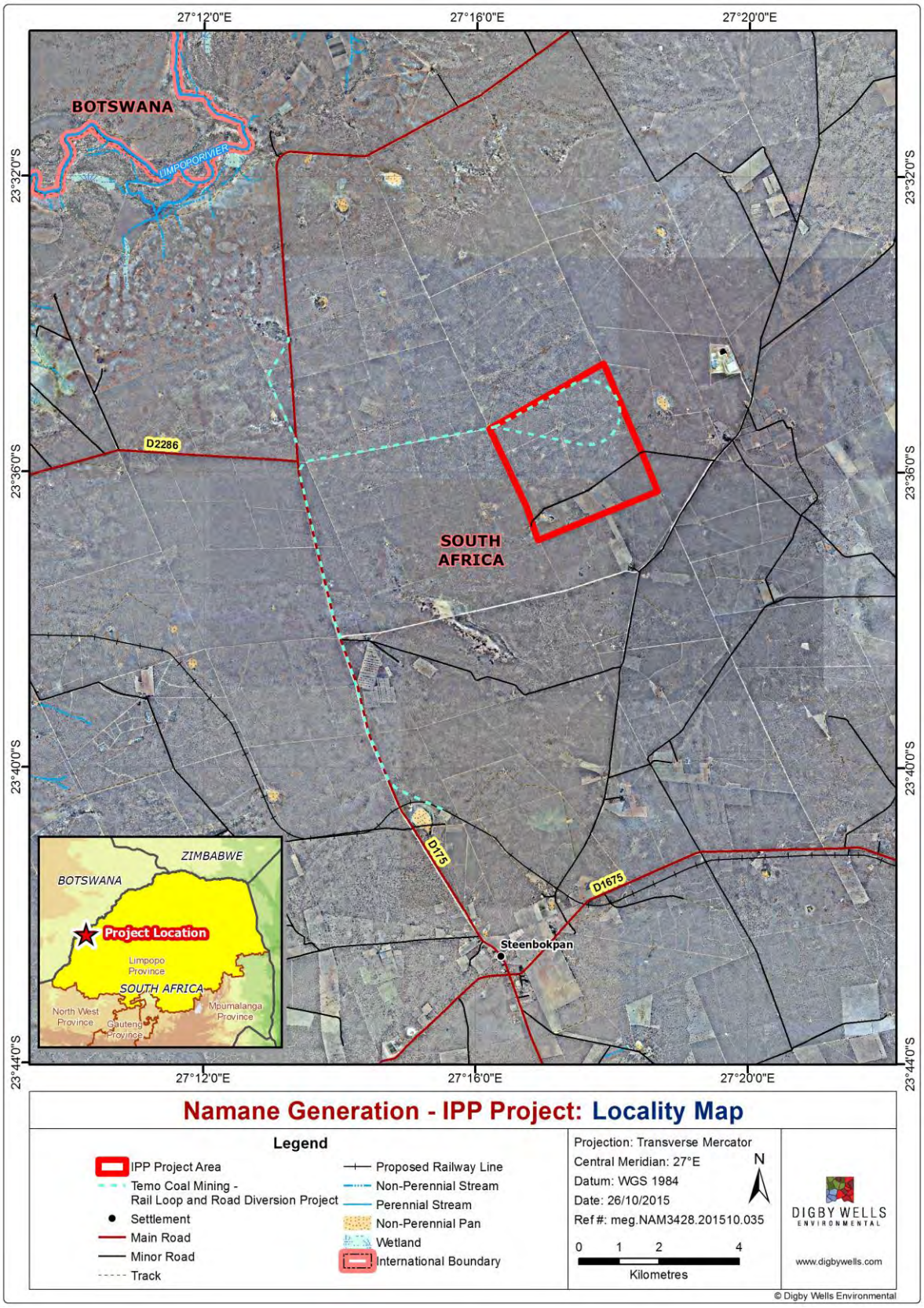
2.2 Independent Power Producer

Namane plans to construct a power plant on the farm Duikerpan 249LQ. The exact location of the Power Plant within the borders of farm Duikerpan 249LQ has not been confirmed but the environmental sensitivity analysis needs to inform the final decision. The size of the power plant will be 600 MW and Circulating Fluidised Bed (CFB) technology will be used. The boiler sizes will either be four 150 MW or two 300 MW. Dry cooling will be used and typically the water consumption of a CFB plant is 0.3 litres/KWhr translating to an annual water requirement of approximately 1 340 300 m3/annum. The generated power will be distributed via transmission lines to Eskom's Medupi power station. The transmission line route still needs to be determined in conjunction with Eskom. Fly ash from the power plant will be backfilled into the open pit on the Temo coal mine to be located on the farm Verloren Valey 246LQ.

3 ENVIRONMENTAL AUTHORISATIONS

The following application will be made to the Department of Environmental Affairs (DEA) as competent authority for the proposed project:

- An integrated Environmental Authorisation Application to the Department of Environmental Affairs (DEA) for listed activities associated with a power plant in accordance with the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and the Environmental Impact Assessment Regulations, 2014 (the EIA Regulations, 2014); and waste management activities in accordance with the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM:WA).



Plan 1: Local Setting

In addition to the above, the following applications will be submitted:

- Air Emissions Licence application in accordance with the National Environmental Management Air Quality Act, 2004 (Act No. 39 of 2004) (NEM:AQA) for activities associated with the power plant to the Limpopo Department of Economic Development Environment and Tourism (LEDET);
- Water Use Licence Application (WULA) in accordance with the National Water Act, 1998 (Act No. 36 of 1998) (NWA) for activities associated with the power plant to the Department of Water and Sanitation (DWS); and
- Approval from the South African Heritage Resources Agency (SAHRA) in accordance with the National Heritage Resources Act, 1999 (Act 25 of 1999) (NHRA) for all the activities.

3.1 Specialist Studies

To support the EIA process, various specialist studies will be undertaken to determine potential impacts the project might have, including:

- Wetlands
- Aquatics
- Hydrology
- Hydrogeology
- Air Quality and Noise
- Heritage
- Fauna and Flora
- Health
- Social Economic
- Visual and Topography
- Closure and Rehabilitation
- Soils and Rehabilitation

3.2 Public Participation Process

Stakeholders affected by or who are interested in the proposed project are invited to register as an Interested and Affected Party (I&AP) to become involved in the PPP. Notification will be done by means of letters, newpaper advertisements, site notices and telephonic communication.

With submission of the application (see Section 3) to the DEA, the formal 300 day EIA process will be initiated. The Scoping Reports will be made available to stakeholders for a 30 day comment period following the submission of the application. After approximately two months the Impact Assessment phase will commence with availability of the EIA Reports for another 30 day comment period. After submission of the finalised EIA Reports, a decision about the IPP will be received from the DEA and I&APs will be informed thereof accordingly. The various upcoming PPP activities are envisaged to take place as indicated below:

- Availability of Scoping Reports for a 30 day public comment period (November 2015);
- Stakeholder meetings to be held during the Scoping commenting phase (November 2015);
- Availability of updated reports for public comment (January 2016); and
- Anticipated commencement of the Impact Assessment phase with stakeholder meetings (January/February 2016).

Further information regarding the project can be found on the Digby Wells website

(www.digbywells.com) under Public Documents.

Registered I&APs will be informed about availability of reports and scheduled stakeholder meetings via their preferred means of communication (SMS, email, post or fax). Comments raised by stakeholders will assist in informed decision-making for authorities and provides information to be considered by the project team and specialists conducting studies.

DIGBY WELLS
ENVIRONMENTAL

ENVIRONMENTAL AUTHORISATION FOR THE PROPOSED NAMANE INDEPENDENT POWER PRODUCER (IPP) PROJECT, LEPHALALE, LIMPOPO PROVINCE

REGISTRATION AND COMMENT FORM

November 2015

*Registered Inrested and Affected Parties (I&APs) will be informed of ongoing developments via their preferred means of communication (SMS, email, post or fax). The Scoping Report will be made available for comment between **Friday, 13 November to Monday, 14 December 2015** on www.digbywells.com (under Public Documents) and various public places, as per the announcement letter. Comments raised by I&APs will assist in informed decision-making for authorities and provides information to be considered by the project team and specialists conducting the Environmental Impact Assessment process. Please register as an I&AP and provide comments by sending this form, or other written correspondence, to the contact details provided below:*

Vanessa Viljoen of Digby Wells Environmental Stakeholder Engagement Office:
Fax: 0865835715, **Telephone:** (011) 789 9495, **Postal Address:** Private Bag X10046, Randburg, 2125
Email: vanessa.viljoen@digbywells.com

Please formally register me as an Interested and Affected Party (I&AP)	Yes		No	
I would like to receive my notifications by	Email	SMS	Post	Fax

Please indicate which sector you represent and also provide a name

Government Department	
Municipality	
Community	
Non-Government Organisation	
Business	

If you are a *landowner* or *land occupier*, please indicate which farm(s) and portion(s) you reside on

Landowner	
Land occupier	

Please fill in your contact details below for the project database

Title, Full Name					
Designation					
Cellphone		Fax		Tel	
Email					
Postal Address					

Environmental Impact Assessment Regulations of 2014, promulgated in terms of the National Environmental Management Act, as amended, Section 44 (1) requires that we *gather comments* from I&APs. Please complete the questions below. Should you require assistance in completing these questions please contact the Stakeholder Engagement Office contact information provided above.

How do you think the project might impact (affect) you?
How do you think the project might impact (affect) your socio-economic conditions? (e.g. livelihoods, farm, business, household)
How can these impacts be managed, avoided and / or fixed?

What is the land being used for?

Where are these land uses taking place?

Are there any environmental features which we need to be aware of? (e.g. water, heritage sites, rare plants or animals)

Where are these found?

Do you think the project could impact (affect) infrastructure you might have? (e.g. houses, buildings, roads)

If so how can these impacts (affects) be managed, avoided or fixed?

General Comments

If there are any other stakeholders we should include onto the stakeholder database for the proposed project, please provide their contact details.

Title, Full Name		Title, Full Name	
Organisation		Organisation	
Cellphone		Cellphone	
Email		Email	

Signature ***Date***

Appendix C: Advertisement

(Cont. from page 21)

Mogolklub skietsubseksie maak geskiedenis

Ria Wells

LEPHALALE - Mogolklub gaan op Saterdag 7 November geskiedenis maak wanneer die skietsubseksie 'n opwindende "gong"-skietkompetisie te Appelvlakteskietbaan gaan aanbied.

Dit sal die eerste amptelike skietdag van Mogolklub se skietsubseksie op dié skietbaan wees. Gong-skiet behels dat daar na staalplaatteikens van 200 mm in deursnee wat aan rame hang op afstande van 150 - 350 meter geskiet word. Enige senterslagkalibervuurwapen kan gebruik word waar met vyf skote op vyf teikens in 'n maksimum van vier minute geskiet – en ráákgeskiet word!

Skuts moet hul eie vuurwapen en ammunisie vir die dag byderhand hê en die wenners sal bepaal word deur skuts wat daarin slaag om al vyf teikens in die kortste tyd raak te skiet. Let gerus daarop dat skuts meer as een keer kan deelneem om sy/haar tyd en hoeveelheid teikens raakgeskiet te probeer verbeter. Die koste is R50 per skietbeurt vir vyf skote. Skiet dus tot jou beursie leeg is!

Daar is ook 'n juniorskietbaan vir skuts wat op 7 November (die dag van die kompetisie) onder 12 jaar oud is. Daar word met .22-gewere in oopvisier of met teleskoop op die juniorskietbaan geskiet. Juniorskuts kan op beide bane deelneem en wel onder ouertoesig. Hulle betaal R20 vir vyf skote oor afstande van 25 – 90 meter.

Die verrigtinge begin reeds om 7:00 wanneer die reëls onder andere uiteengesit gaan word en inskrywings begin, sorg dus dat jy betyds daar is. Die amptelike kompetisie skop om 8:00 af.

Skuts wat op dié dag by die Mogolskietklub aansluit staan 'n kans om 'n spesiale prys ter waarde van R1 000 te wen. Aansluitingsvorms sal beskikbaar wees.

Groot nuus is dat daar 'n totale prysgeld van R35 000 op die spel is wat toegeken gaan word vanaf die 1ste - tot die 17de plek! Daar gaan ook groot trekpryse wees. Daar word van die wenners verwag om tydens die prysuitdelingsfunksie teenwoordig te wees, anders sal die prys verbeur word.

Inskrywings om deel te neem kan deurlopend plaasvind tot en met 15:00 en die kompetisie sluit amptelik om 16:00. Die prysuitdeling vind plaas sodra die punteverwerking afgehandel is.

Almal wat by die skietdag teenwoordig gaan wees (skuts sowel as toeskouers) word verplig om, voordat die skietbaan betree word, die skietbaanregister te voltooi om sodoende toegang tot die skietbaan te verkry. Opgeleide baanoffisiere sal deurgaans diens doen.

Worsbroodjies, water en koeldrank sal te koop aangebied word. Mogolklub bedank byvoorbaat al die borge wat donasies gemaak het om dié dag moontlik te maak en nooi almal hartlik uit na die eerste Ope Gong-skietdag te Appelvlakte.

Kontak Hendrik van Zyl by 083 562 8329 of Francois Badenhorst by 082 927 3269 vir verdere navrae.

Vyf van hierdie teikens in die "gong"-rame moet in maksimum vier minute raakgeskiet word

(Foto verskaf)

SUDOKU

Oplossing

9	6	8	5	4	3	1	2	7
7	2	4	1	9	8	5	6	3
5	3	1	7	6	2	9	4	8
8	4	2	9	3	5	6	7	1
1	5	6	4	8	7	3	9	2
3	7	9	6	2	1	8	5	4
4	9	7	8	1	6	2	3	5
2	8	5	3	7	9	4	1	6
6	1	3	2	5	4	7	8	9

"Poetry ignites light in me"

Tebogo Tlhako

LEPHALALE — "Poetry is a form of expression and an immortal voice of the soul, an expression of the human spirit".

This is how Lephalale's very own poet extraordinaire Kesentseng Madibana described what poetry means to her in an interview with Mogol Post, to hear about her experience in the arts field. Lephalale residents first heard of her when she recited a powerful poem describing the first radio station in Lephalale - Lephalale FM - titled "Who would have thought".

Since then she had opportunities to perform on bigger platforms.

"I first had the opportunity to showcase my talent locally when I was given a poetry slot on one of the shows on Lephalale FM. The response from the community was overwhelming which has pushed me to work even harder and let my creativity flow" said the 30 year old poet. She was born and bred in Sifihlogo village and now resides in Marapong.

Kesentseng said that she went to Mmabana Arts and Culture, Sports foundation in Mahikeng in the North West Province. Here she discovered her love for poetry through her exposure to other poets and different types of artists. Her performances at the Market Theatre and working with directors like Selaelo Maredi and writers like Mpumelelo Grootboom has helped her to develop and horn her skills.

"In June/July I was also part of a team that performed two productions at the National Arts festival in Grahamstown" she added.

In the past three months Kesentseng has managed to write 32 poems of which she has performed 11.

This past weekend Kesentseng had the opportunity to open for one of the local poets who was launching a CD. "Lebo Mashile is my favourite poet in the country. Her contemporary style is similar to mine.

To those out there who want to get into poetry – my advice is to be passionate, follow your heart, have self-sacrifices and never let anyone limit your dreams" Kesentseng said.

The poet...

(Photo supplied)

Mike is magic on the air

LEPHALALE — On Wednesday 28 October, Mike Molekoa, maths and science educator of Hoërskool Ellisras, addressed gr. 12 learners on Lephalale FM on various topics concerning maths and science.

Paper one was about equations and inequalities, exponents and surds, sequences and series, probability, functions and graphs and also financial mathematics.

Paper two focussed on analytical geometry, trigonometry, euclidean, geometry, data handling (statistics) and measurement.

Mr. Sir Mike (as his learners address him) also motivated learners and encouraged them to study mathematics after grade 12. "Maths is like swimming, you don't get medals for watching the coach, you have to get wet!" he says.

Finally he wished every learner the best of luck in their exams, maths and science in particular.

Appendix D: Site Notice Placement Map and Site Notice Report

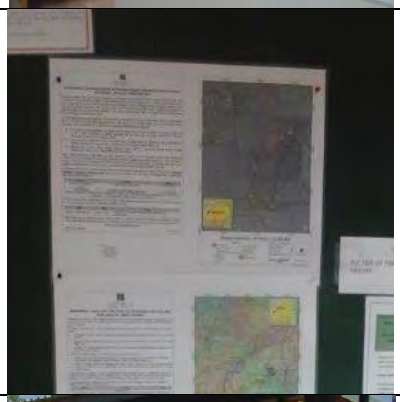
DIGBY WELLS
ENVIRONMENTAL

Namane Resources (Pty) Limited

ENVIRONMENTAL AUTHORISATION FOR THE PROPOSED NAMANE INDEPENDENT POWER PRODUCER (IPP) PROJECT, LEPHALALE, LIMPOPO PROVINCE

SITE NOTICES

SITE NOTICES PLACED AT PUBLIC PLACES ON WEDNESDAY, 4 NOVEMBER 2015

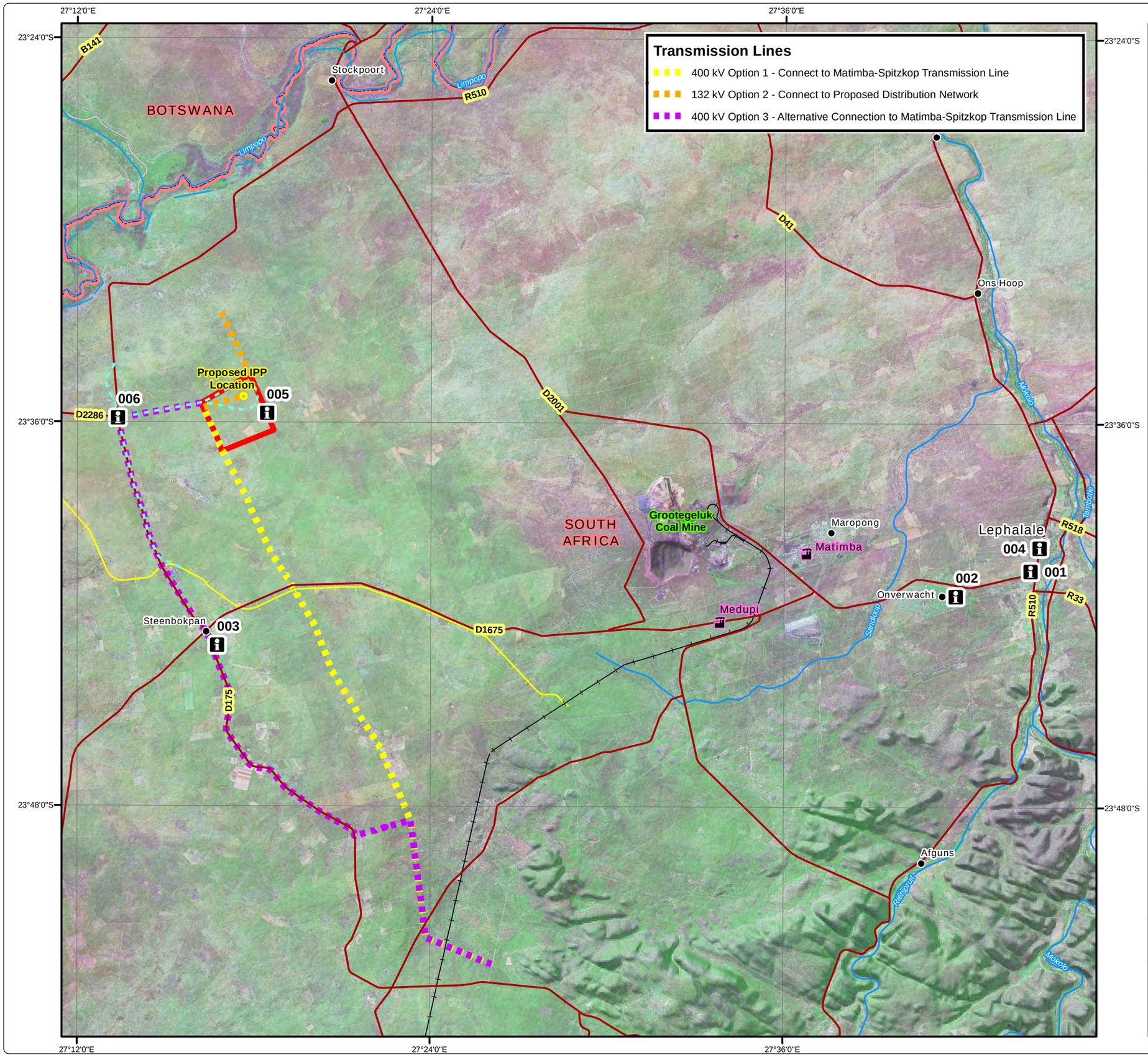
Public Place	Coordinates / Location	Photo
(001)- Digby Wells Lephalale Office Next to entrance	No 2, Booysen street 23°40'36.85"S 27°44'21.05"E	
(002)- Lephalale Local Municipality Public Library	Cnr Joe Slovo Street & Douwater Avenue, Lephalale 23°41'24.64"S 27°41'48.95"E	
(003)- Lesedi Tshukudu Thusong Centre in Steenbokpan On gate at outside	23° 42' 58.814" S 27° 16' 45.362" E	

(004)- Steenbokpan Clinic On fence next to pedestrian gate entrance.	23°39'53.62"S 27°44'39.38"E		
(005)- On fence on road leading to side	23°35'43.46"S 27°18'25.75"E		
(006)- in fence going to site.	23°35'52.29"S 27°13'22.51"E		

Plan 1

Namane Generation IPP Project

Site Notices



Legend

- Site Notices
- IPP Project Area
- Proposed IPP Location
- Temo Coal Mining - Rail Loop and Road Diversion Project
- Major Town
- Settlement
- Power Station
- Main Road
- Railway Line
- Proposed Railway Line
- Perennial Stream
- International Boundary

DIGBY WELLS ENVIRONMENTAL

• Sustainability • Service • Positive Change • Professionalism • Future Focused • Integrity

Projection: Transverse Mercator	Ref #: scm.NAM3428.201511.092
Datum: WGS 1984	Revision Number: 1
Central Meridian: 27°E	Date: 11/11/2015

N

0 2.5 5 10

Kilometres

1:220 000

www.digbywells.com