

Sarovic Investments CC

Client Project Township Establishment on the Remaining Extent of Portion 79 of the Farm Blesboklaagte 296 JS & Portion 0 (Remaining Extent) of the Farm Leeuwpoort 283 JS, Mpumalanga

Draft Environmental Management Programme (EMPr)

EIA Ref No. 1/3/1/16/1N-175

October 2019





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Plot 24 Haakdoornboom AH Soutpan Road (M35) Pretoria North

Cell: 082 789 6525





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DEFINITIONS

Alternatives

In relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to the-

- a) property on which or location where the activity is proposed to be undertaken;
- b) type of activity to be undertaken;
- c) design or layout of the activity;
- d) technology to be used in the activity; or
- e) operational aspects of the activity;

and includes the option of not implementing the activity.

Application

An application for an Environmental Authorisation (EA).

Biodiversity Plan

A spatial plan that identifies one or more categories of biodiversity priority areas, using the principles and methods of systematic biodiversity planning.

Biodiversity Sector Plan

A map of Critical Biodiversity Areas and Ecological Support Areas accompanied by contextual information, land and resource-use guidelines and supporting GIS data. The map must be produced using the principles and methods of systematic biodiversity planning. A Biodiversity Sector Plan is the precursor to a Bioregional Plan.

Biodiversity target (threshold)

The minimum proportion of each ecosystem type that needs to be kept in a natural or near-natural state in the long term in order to maintain viable representative samples of all ecosystem types and the majority of species associated with those ecosystem types.

Buffer Area

Unless specifically defined, means an area extending 10 kilometres from the proclaimed boundary of a world heritage site or national park and 5 kilometres from the proclaimed boundary of a nature reserve, respectively, or that defined as such for a biosphere.

Conservation Area

Areas of land not formally protected by law, but informally protected by the current owners and users and managed at least partly for biodiversity conservation. Because there is no long-term security associated with conservation areas, they are not considered a guaranteed form of protection.

Critical Biodiversity Areas

Terrestrial and aquatic areas required to meet biodiversity targets for ecosystems, species or ecological processes, as identified in a systematic biodiversity plan.

Cumulative Impact

In relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities.



Development

The building, erection, construction or establishment of a facility, structure or infrastructure, including associated earthworks or borrow pits, that is necessary for the undertaking of a listed or specified activity, including any associated post development monitoring, but excludes any modification, alteration or expansion of such a facility, structure or infrastructure, including associated earthworks or borrow pits, and excluding the redevelopment of the same facility in the same location, with the same capacity and footprint.

Development footprint

Any evidence of physical alteration as a result of the undertaking of any activity.

EAP

An environmental assessment practitioner as defined in section 1 of NEMA.

Ecological corridors

Ecological corridors, also referred to as biodiversity corridors, can be landscape structures of various size, shape and habitat composition that maintain, establish or re-establish natural landscape connectivity. They can have a continuous or interrupted structure or a structure of stepping stones (Jongman *et. al.*, 2002).

Ecological Support Areas

Terrestrial and aquatic areas that are not essential for meeting biodiversity targets, but play an important role in supporting the ecological functioning of one or more Critical Biodiversity Areas, or in delivering ecosystem services.

EMPr

An environmental management programme contemplated in regulations 19 and 23 of the EIA Regulations, 2014.

Environment

The surroundings (biophysical, social and economic) within which humans exist and that are made up of:

- (i) the land, water and atmosphere of the earth;
- (ii) micro-organisms, plant and animal life;
- (iii) any part or combination of (i) and (ii) and the interrelationships among and between them; and
- (iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.

Environmental Impact Assessment

A systematic process of identifying, assessing and reporting environmental impacts associated with an activity and includes Basic Assessment and Scoping and Environmental Impact Reporting.

Environmental Impact Assessment Report

A report contemplated in regulation 23 of the EIA Regulations, 2014.

Independent

In relation to an EAP, a specialist or the person responsible for the preparation of an environmental audit report, means-

- a) that such EAP, specialist or person has no business, financial, personal or other interest in the activity or application in respect of which that EAP, specialist or person is appointed in terms of the EIA Regulations; or
- b) that there are no circumstances that may compromise the objectivity of that EAP, specialist or person in performing such work;

excluding -

(i) normal remuneration for a specialist permanently employed by the EAP; or



(ii) fair remuneration for work performed in connection with that activity, application or environmental audit.

Indigenous Vegetation

Vegetation consisting of indigenous plant species occurring naturally in an area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years.

Mitigation

To anticipate and prevent negative impacts and risks, then to minimise them, rehabilitate or repair impacts to the extent feasible.

Phased Activities

An activity that is developed in phases over time on the same or adjacent properties to create a single or linked entity.

Plan of Study for Environmental Impact Assessment

A study contemplated in regulation 22 of the EIA Regulations that forms part of a Scoping Report and sets out how an Environmental Impact Assessment will be conducted.

Present Ecological State (PES)

The PES of a river is expressed in terms of various components. That is, drivers (physico-chemical, geomorphology, hydrology) and biological responses (fish, riparian vegetation and aquatic invertebrates), as well as an integrated state, the EcoStatus.

Protected Area

An area of land or sea that is formally protected by law and managed mainly for biodiversity conservation. This is a narrower definition than the IUCN definition, which includes areas that are not legally protected and that would be defined in South Africa as Conservation Areas rather than Protected Areas.

Registered Interested and Affected Party

In relation to an application, means an Interested and Affected Party whose name is recorded in the register opened for that application in terms of regulation 42 of the EIA Regulations, 2014.

Scoping Report

A report contemplated in regulation 21 of the EIA Regulations, 2014.

S&EIR

The scoping and environmental impact reporting process contemplated in regulation 21 to regulation 24 of the EIA Regulations, 2014.

Significant Impact

An impact that may have a notable effect on one or more aspects of the environment or may result in non-compliance with accepted environmental quality standards, thresholds or targets and is determined through rating the positive and negative effects of an impact on the environment based on criteria such as duration, magnitude, intensity and probability of occurrence.

Specialist

A person that is generally recognised within the scientific community as having the capability of undertaking, in conformance with generally recognised scientific principles, specialist studies or preparing specialist reports, including due diligence studies and socio-economic studies.



Systematic Biodiversity Plan

A plan that identifies important areas for biodiversity conservation, taking into account biodiversity patterns (i.e. the principle of representation) and the ecological and evolutionary processes that sustain them (i.e. the principle of persistence). A systematic biodiversity plan must set quantitative targets/thresholds for aquatic and terrestrial biodiversity features in order to conserve a representative sample of biodiversity pattern and ecological processes.

Watercourse

- (a) a river or spring;
- (b) a natural channel in which water flows regularly or intermittently;
- (c) a wetland, pan, lake or dam into which, or from which, water flows; and

any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse as defined in the National Water Act, 1998 (Act No. 36 of 1998); and

a reference to a watercourse includes, where relevant, its bed and banks.

Wetland

Land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.

ABBREVIATIONS

BID	-	Background Information Document
CRR	-	Comments and Response Report
DWS	-	Department of Water and Sanitation
EA	-	Environmental Authorisation
EAP	-	Environmental Assessment Practitioner
EIA	-	Environmental Impact Assessment
EIR	-	Environmental Impact Report
EMF	-	Environmental Management Framework
EMPr	-	Environmental Management Programme
GN	-	Government Notice
I&AP	-	Interested and Affected Party
IWULA	-	Integrated Water Use Licence Application
NEMA	-	National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended
NEM:WA	-	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008), as amended
NHRA	-	National Heritage Resources Act, 1999 (Act No. 25 of 1999), as amended
MDARDLEA	-	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental
		Affairs, Mpumalanga
NWA	-	National Water Act, 1998 (Act No. 36 of 1998), as amended
R	-	Regulation
SAHRA	-	South African Heritage Resources Agency
S&EIR	-	Scoping and Environmental Impact Reporting



1. PROJECT TITLE

Township Establishment on the Remaining Extent of Portion 79 of the farm Blesboklaagte 296 JS and Portion 0 (remaining extent) of the farm Leeuwpoort 283 JS, Mpumalanga.

2. APPLICANT DETAILS

Applicant Name	Sarovic Investments CC
Contact Person	Reinet Sarovic
Postal Address	PO Box 3762, Witbank, 1035
Telephone Number	013 656 6789
Fax Number	013 656 5512
Email Address	wtbrentals@vodamail.co.za

3. ENVIRONMENTAL ASSESSMENT PRACTITIONER DETAILS

Environmental Assessment Practitioner Company	Labesh (Pty) Ltd
Contact Person	Lourens de Villiers
Postal Address	Postnet Box 469, Private Bag X504, Sinoville, 0129
Telephone Number	082 789 6525
Fax Number	086 552 6837
Email Address	admin@labesh.co.za
Qualifications	B.Sc Earth Science (North West University)
	Hons B.Sc Geography and Environmental Studies (North
	West University)
	M.Sc Water Resource Management (University of
	Pretoria)
Relevant experience	17 years' experience conducting Environmental Impact
	Assessment processes

The EAP's full Curriculum Vitae is attached under Appendix E.

4. LOCATION OF THE PROPOSED DEVELOPMENT AND ACTIVITIES

The property for the proposed development and its associated activities is as follows:

Property/Land Parcel	21 digit Surveyor General Code	Property size
Remaining Extent of Portion 79 of the farm	T0JS0000000029600079	47.1090ha
Blesboklaagte 296 JS		
Portion 0 (remaining extent) of the farm	T0JS0000000028300000	459.6984ha
Leeuwpoort 283 JS		

The project location is ±6.3km to the north-northwest of the eMalahleni CBD and directly east (Blesboklaagte) and north (Leeuwpoort) of Pine Ridge, in the Emalahleni Local Municipality, Nkangala District Municipality, Mpumalanga Province. Direct access to both project properties is from the Saaihoek Road (D1126). Further access from Verena Road and Pineridge Township will become available later in development.



The GPS coordinates for the project site are as follows: 25°48'27.22"S; 29°12'17.76"E

A locality map, provided on the next page, shows the location of the two project properties, at an appropriate scale.





Figure 1: Site locality map



The following photographs give an indication of the current status of the project property.





5. DESCRIPTION OF THE ASPECTS OF THE ACTIVITY THAT ARE COVERED BY THE EMPr AS IDENTIFIED BY THE PROJECT DESCRIPTION

5.1 Description of the activities to be undertaken

The project site is vacant at present and is used for cattle grazing. There are a number of cattle kraals onsite. A large quarry is also located on the northern portion of the site.

The proposed project will entail a mixed land use residential township development for the promotion of economic growth and the fulfilment of vacant residential erven needs on the following properties:

- Remaining Extent of Portion 79 of the farm Blesboklaagte 296, Registration Division J.S., Province of Mpumalanga; and
- Portion 0 (remaining extent) of the farm Leeuwpoort 283, Registration Division J.S., Province of Mpumalanga.

The two project properties are 506.8074ha in extent. The area of land that will be developed is therefore 506.8074ha.

The proposed development will be undertaken in two main phases:

Phase 1:

- A mixed density residential development is proposed on the Remaining Extent of Portion 79 of the farm Blesboklaagte 296 JS. The development will be called Pine Ridge Extension 1 4.
- The development will include the following land uses: Residential 1, Residential 3, Residential 4, Community Facility, Industrial 1, Business 3, Park, Commercial and Private Road.
- This development will be developed in four (4) sub-phases.
- This development will also include the provision of water-, storm water-, electricity-, sewerage- and road infrastructure.

Phase 2:

- A mixed density residential development is proposed on Portion 0 (remaining extent) of the farm Leeuwpoort 283 JS. The development will be called Pine Ridge Extension 5 25.
- The development will include the following land uses: Residential 1, Residential 2, Residential 3, Residential 4, Community Facility, Institutional, Business 2, Business 3, Industrial 1, Government, Park and Private Road.
- The proposed development will be developed in 21 sub-phases.
- This development will also include the provision of water-, storm water-, electricity-, sewerage- and road infrastructure.

The proposed development will consist of the following land uses and the allocation towards the different land uses is given in Table 1:

- Residential 1, 2, 3, and 4;
- Community Facility
- Institutional;
- Business 2 and 3;
- Industrial 1;
- Government;



- Park;
- Private park;
- Private road; and
- Commercial.

Table 1:	Land	use	differentiation	and	density	units	per	hectare	of	Pine	Ridge	Extension	1-4	of	the	proposed
developme	ent															

Proposed uses	Number of Erven	Size (ha)	Height	Coverage	FAR
Residential 1	779	23.37	2 storeys	50%	0.7
Residential 3	4	0.8224	3 storeys	30%	0.7
Residential 4	9	1.5426	5 storeys	40%	0.4
Community	7	0 273	3 storevs	50%	0.7
Facility	1	0.275	5 Storeys	5070	0.7
Industrial 1	12	2.0616	3 storeys	70%	0.7
Business 3	9	1.4652	2 storeys	40%	0.4
Park	5	2.0435	N/A	N/A	N/A
Commercial	3	0.4545	3 storeys	70%	0.7
Private road	4		2 storeys	N/A	N/A

Table 2: Land use differentiation and density units per hectare of Pine Ridge Extension 4-25 of the proposed development

Proposed uses	Number of Erven	Size (ha)	Height	Coverage	FAR
Residential 1	4161	185.7478	2 storeys	50%	0.7
Residential 2	2	0.7806	2 storeys	50%	0.7
Residential 3	5	1.3949	3 storeys	30%	0.4
Residential 4	30	7.5283	5 storeys	40%	1.5
Community	0	6 3 2 0 8	3 storous	50%	0.7
Facility	9	0.3290	5 Storeys	50 %	0.7
Institutional	12	15.1090	3 storeys	50%	0.7
Business 2	8	2.5642	3 storeys	50%	0.6
Business 3	7	3.1008	2 storeys	40%	0.4
Industrial 1	9	4.1997	3 storeys	70%	0.7
Government	2	2.1436	3 storeys	70%	0.6
Park	9	149.1692	N/A	N/A	N/A
Private park	1	3.8393	N/A	N/A	N/A
Private road		77.7912	2 storeys	N/A	N/A

The following specific land uses have been identified as part of the proposed development for Pine Ridge Extension 1-4:

- A combined business node and light industrial centre, along with some commercial stands, will be created. A buffer zone made up of high density erven that can accommodate social housing projects will be created between the business node and residential area to the north;
- Church and crèche stands have been included within the residential area; and
- Land has been earmarked for Community Facilities, for the use of clinics, sports and recreation grounds etc.

The following specific land uses have been identified as part of the proposed development for Pine Ridge Extension 5-25:



- A combined business node and industrial centre will allow ease of access due to the proximity of land uses to the district road. Directly adjacent to the business and industrial centre, on the western and southern side, will be a park as well as higher density residential erven. This will accommodate social housing projects and flats which will act as a buffer zone to the busy intersection and activities;
- Directly adjacent to the "Residential 4" erven, within the park boundary, is a grave site. This will be protected and left undisturbed;
- The "Industrial 1" erf situated on the eastern side of the district road (D1126) is proposed to accommodate a filling station servicing the newly proposed township as well as existing residential areas;
- Due to the need for formal sports and recreation facilities within the surrounding area, it is proposed to develop sport fields and related uses adjacent to the school. This will be open to the public, and will encourage the practicing and participation of sports within the community;
- All roads travelling past the school will be designated as higher order roads. This is to accommodate the increased traffic likely to be generated by the school, as well as to increase access from the surrounding areas;
- There is an expectation for a significant number of residents and customers, employees and workers to make use of
 public transport services such as Minibus-taxi's and Busses along the D1126 road and into the proposed
 development area (or site). As such, Minibus-taxi Lay-bys should be provided strategically within the development
 area along the main 'loop' road;
- On the western boundaries of the property, a river runs through the site with wetland areas along the edge of the river. A 50m buffer has been created in the design to ensure safety and keep possible floods from reaching erven; and
- Numerous properties have been identified and earmarked for the purpose of crèches and churches. These have been placed within the residential areas as they are seen as complimentary to the residential land uses as stated within the Breaking New Ground (BNG) Policy and further supported by the Spatial Development Framework (SDF) of Emalahleni, 2013/2014.

The following was identified within the Breaking New Ground Policy as having high importance in developing sustainable human settlements and has been taken into account for this proposed development:

- Citizens should live in safe and secure environments and have adequate access to economic opportunities, a mix of safe and secure housing and tenure types, reliable and affordable basic services, educational, entertainment and cultural activities, and health, welfare and police services;
- Ensure that low-income housing is provided in close proximity to areas of opportunity;
- Ensure the development of compact, mixed land use, diverse, life-enhancing environments;
- Ensure the development of more integrated, functional and environmentally sustainable human settlements, towns and cities; and
- Multi-purpose cluster concept should be applied to ensure the sustainable provision of primary municipal facilities, such as parks, playgrounds, sports fields, crèches, community halls, taxi ranks, satellite police stations, municipal clinics and informal trading facilities.

The business node has been proposed to be towards the centre, adjacent to the river running along the western boundary of the development. This will consist of business activities as well as governmental functions and services. Furthermore, the business node is proposed to have a post office, clinic, library, community centre, shops and retail activities and a parking garage/site for public parking.

The advantages of clustering these functional facilities are summarised in the Guidelines for Human Settlement and Design (Volume 1, Chapter 5.5, 5:2005):

• Convenience, as all services are located in one centre;



- Sharing of high-cost elements can reduce costs considerably;
- Exposure for public facilities and the encouragement of their use;
- The integration of different communities;
- A reduction in inequalities in the provision of facilities;
- Offsetting of transport costs;
- Cutting down on the amount of land required;
- The promotion of full use of buildings;
- Lower building costs and running costs;
- Reduced maintenance costs; and
- A large catchment area is less susceptible to localized demographic changes.

Land uses on site

The project site is vacant at present and is used for cattle grazing. There are a number of cattle kraals onsite. A large quarry is also located on the northern portion of the site. The proposed township is situated in an area that has been earmarked for residential expansion and is within the urban edge as approved by Emalahleni local Municipality.

Near and adjacent to the project property (Pine Ridge Extension 1-4) are the following land uses:

- North: Agricultural land belonging to the developer to be utilised for Township Establishment;
- East: Provincial District Road and Agricultural Land;
- South: Klarinet Extension 6; and
- West: Pine Ridge Township (Korsman & Associates, 2014a).

Near and adjacent to the project property (Pine Ridge Extension 5-25) are the following land uses:

- North: Agricultural Land;
- East: Provincial District Road & Agricultural Land;
- South: Proposed Pine Ridge Extension 1-4, Klarinet Extension 6, Pine Ridge Township; and
- West: Agricultural Land (Korsman & Associates, 2014b).

5.1.1 Roads and Storm Water

Access

Both Pine Ridge Extension 1-4 and Extension 5-25 of the proposed development will predominantly have direct access via the Saaihoek Road (or D1126). Alternative access will possibly be created from the Verena Road and Pine Ridge Township during later stages of the development (Phase 2). Refer to the Traffic Impact Assessment, attached under Appendix D, for more information.

Services like storm water, sewerage and water, as well as telecommunication and electricity will be accommodated in the road servitudes. These services will be accommodated according to the protocol set by Emalahleni Local Municipality in terms of positioning in the servitudes.

Surface Drainage

According to Korsman & Associates (2014a and 2014b) the road layout of the development lends itself to an adequate drainage system, as sufficient material slopes exist.

Storm water will be able to drain freely from the site via streets to curb inlets that will be provided on all internal roads and spaced according to topography and catchment size. The release of storm water from the township development to the nearby stream can be easily managed through minor outlet and energy dissipating structures located high within the



1:100 floodline area. There is possibly a need for rubbish retaining structures to be placed at the storm water outlet points.

Storm water lines are accommodated mostly in road reserves and these lines will be designed to also accommodate water runoff from higher lying adjacent townships. It is not foreseen that any problems will be encountered to accommodate the 1:2 (residential) and 1:5 year (business) return period storms on the roads and sub-surface conduits. Street levels will be designed in such a way that streets act as storm water collectors. Storm water inlets will be placed in such a way that access to the stands is not compromised. Erosion of roads is not of concern as all streets will be paved.

Storm Water Routing

The safe routing of storm water is vital within municipal areas, and as such it will receive special attention. Retention ponds may be a consideration at bulk stands, however, this is dependent on the density that will eventually be provided on these stands. This requirement shall thereof be in accordance with the bylaws of the Local Authority and shall be provided at the detail design phase. At this stage, no retention ponds are envisaged.

Existing excavated areas to the north and northwest of the site could be utilised as retention ponds, as it is thought that those areas would be uneconomical to rehabilitate in order for development of houses to take place. Furthermore, these areas should be considered for parks and recreation areas. These areas will be adequately drained and rehabilitated according to DMR Standards and the EMP (Korsman & Associates, 2014a and 2014b).

5.1.2 Water Services

Bulk Water Availability

According to Korsman & Associates (2014a and 2014b) the impact of this development on the existing bulk water infrastructure will be quantified once the Design Engineer has been appointed for the detail design phase of both bulk and network water services.

The scale of the proposed township development at its fullest extent will have a drastic impact on the provision and distribution of bulk water, affecting both the Water Treatment Works and the storage reservoirs in Witbank as well as the bulk water lines feeding from the Witbank reservoirs to the north-western suburbs. In particular, the later phases of development will impact bulk water services drastically. A secondary water reservoir, at the least, would be required in the new area.

It is estimated that the proposed development, and its associated land uses, will require the following demand of water:

Table 3: Required water capacity for development of Pine Ridge Extension 1-4

Technical Parameter	Estimated value
Estimated total daily demand	0.406 Mℓ/d
Estimated peak flow rate based on a peak factor of 8	40 ℓ/s
Peak flow rate – Fire flow	100 ℓ/s

Table 4: Required water capacity for development of Pine Ridge Extension 5-25

Technical Parameter	Estimated value
Estimated total daily demand	3.0 Mℓ/d
Estimated peak flow rate based on a peak factor of 8	180 ℓ/s

The main water supply internally will be designed in line with fire water requirements. Pipe sizes will likely vary from 110mm diameter to 315mm diameter. All pipes will need to be designed with later phases of development in mind.



Sufficient pressure is expected for the proposed development, as the site is located relatively low compared to low level reservoirs in the Witbank area. Secondary reservoirs are likely to be needed in the area with the development of the greater western area, together with the recently established Klarinet Extension 6. The need for elevated storage systems may arise. The upgrading of bulk lines to the development should be done in accordance with the Klarinet Integrated Housing Project. These designs will be done according to a master plan for the development of the greater Pine Ridge Area.

The water line from Pap & Vleis at the railway crossing feed from the Witbank reservoirs is expected to be upgraded to serve a portion of Phase 1C and Phase 2 of Pine Ridge extension 6. However, it is unlikely that this will be sufficient for the proposed development. It is also likely that the bulk lines to Pap & Vleis will be insufficient in the long term. Further upgrading by the Local Authority, through the bulk services contribution strategy, will have to be implemented.

The Local Authority will have to plan carefully in terms of the necessary upgrading work required for bulk water services.

Internal Water Layout

The layout of the proposed township development provides sufficient street reserves for an internal water network. The network will be designed and constructed according to municipal and national standards. All stands will be equipped with separate connections that will allow for internal fire systems as well. Fire water will also be accommodated according to national and municipal standards (Korsman & Associates, 2014a and 2014b).

5.1.3 Sewerage

Bulk Sewer Conveying Availability

Most of the development is situated topographically higher than the outfall sewer draining to the Pine Ridge Sewage Pump Station. This outfall sewer line is expected to be sufficient for most of Phase 1 Klarinet Integrated Housing Development. However, no further capacity is available on the pump line to Klipspruit for the proposed development. As such, the bulk line will have to be upgraded.

Further phases of the Klarinet Integrated Housing Development will require a new outfall sewer line which, from a topographical point of view, will also serve this proposed development.

An upgraded pump station at Pine Ridge proper outfall sewer to the Klipspruit works is inevitable. This should be done in accordance with the Klarinet Integrated Housing Development as well as the Bulk Services Contribution Policy (as provided by Emalahleni Local Municipality).

Internal sewer lines will likely vary from 160mm diameter to 250mm diameter. These will drain toward a bulk outfall sewer line to be implemented by Emalahleni Local Municipality within the next 3-6 years. Certain pipes will be sized with future development in mind (Korsman & Associates, 2014a and 2014b). It is proposed that sewage from the proposed development will be treated in the municipal sewage treatment works.

5.1.4 Electricity

The proposed development lies within the Emalahleni Local Municipality distribution area. Major electrical infrastructure that is currently visibly or identified on the proposed development site were Eskom High Voltage overhead lines as well as some minor MV overhead lines.

Bulk supply to the proposed development will be from the Klarinet 22/11kV substation with a current installed capacity of 10MVA [non-firm supply] transformer available.

The estimated demand of the proposed development is calculated as follows:



Table 5: Electricity Load Estimate for Pine Ridge Extension 1-4

Proposed use	Area	Units	Loading
Residential 1	25.4798 Ha	779	2700 kVA
Residential 3	0.8227 Ha		100 kVA
Residential 4	1.5420 Ha	571	1400 kVA
Community facility	1.2516 Ha		450 kVA
Industrial 1	1.5491 Ha		550 kVA
Business 3	1.4648 Ha		500 kVA
Park	2.0435 Ha		600 kVA
Private Road	12.9555 Ha		200 kVA
TOTAL	47.109 Ha		6 500 kVA

Table 6: Electricity Load Estimate for Pine Ridge Extension 5-25

Proposed use	Area	Units	Loading
Residential 1	185.7478 Ha	4161	14564 kVA
Residential 2	0.7806 Ha	20	60 kVA
Residential 3	1.3949 Ha	93	279 kVA
Residential 4	7.5283 Ha	2823	7058 kVA
Community facility	6.3298 Ha		2216 kVA
Institutional	15,109 Ha		5289 kVA
Business 2	2,5642 Ha		821 kVA
Business 3	3.1008 Ha		993 kVA
Industrial 1	4.1997 Ha		1344 kVA
Government	2,1436 Ha		686 kVA
Park	29.8338 Ha	9	450 kVA
Private Park	0.7679 Ha	1	5 kVA
Private Road	38.8956 Ha	486	25 kVA
TOTAL	459.6984 Ha		33 800 kVA

The ADMD (After Diversity Maximum Demand) allowed for Residential Units are as follows:

- Residential 1 units 3.5 kVA/unit
- Residential 2 units 3.0 kVA/unit
- Residential 3 units 3.0 kVA/unit
- Residential 4 units 2.5 kVA/unit

The proposed development is aimed at middle and lower income level groups. As such, the loading for Business is calculated at 80 VA/m², Government Facilities at 80 VA/m² and Industrial at 40 VA/m².

The bulk electricity requirement cannot currently be provided. However adequate power should be available with the new primary substation to be built by Eskom. As such, all application processes should be exercised in tandem with the Town Planning processes.

Should the township development be approved, a service report will be prepared in order to allow the finalisation of the services agreement. Electrical Contractors will then be appointed to supply and install the municipal and consumer's electrical networks. The Electrical Engineering Report is attached under Appendix D.



5.1.5 Traffic

WSP SA Civil and Structural Engineers (Pty) Ltd. was appointed to conduct the Traffic Impact Study. It is estimated that Pine Ridge Extension 1-4 will generate approximately 850 vph during weekday AM peak hour and 1 263 vph during weekday PM peak hour. Pine Ridge Extension 5-25 is estimated to produce a maximum of 2 122 vph during both weekday AM and PM peak hours.

The Saaihoek road (D1126) is expected to experience a significant impact due to the additional development traffic. As such, the upgrading at all four (4) key intersections from a capacity viewpoint will be required (according to the SIDRA analysis). Access onto D1126 will also require upgrading.

The proposed access into the township development is located approximately 750m to the north of the access to Pine Ridge Extension 1-4. This will require a short deceleration from the south on the D1126 as well as a short separate right-turn lane from the north. Access into the development is approximated 510m north of the Flamingo Street intersection. Road widening will be required on the Saaihoek Road (D1126).

A minimum of ten (10) Minibus-taxi Lay-by's are proposed on the main road within the proposed development. The exact positions of these should be decided by the Emalahleni Local Municipality in conjunction with the local Taxi Associations.

The proposed development is feasible in terms of traffic generation and impact, and so it is supported from a traffic engineering perspective. This is in light of the proposed Lay-by's and Site Access road with the relevant road widening of road D1126 being properly designed and constructed to appropriate design standards of the relevant Road Authority. The Traffic Impact Study is attached under Appendix D.

5.2 Listed Activities triggered by the proposed development

The following listed activities are triggered by the proposed development and therefore require Environmental Authorisation, in terms of the Environmental Impact Assessment Regulations of 4 December 2014:



Table 7: Listed activities triggered by the proposed development

Government Notice	Wording as per the Listing Notice	Description as per the project description relating to each listed activity
and Activity Number		
Government Notice	The development of facilities or infrastructure for the transmission and	The development of facilities or infrastructure for the transmission and
R983 (Listing Notice	distribution of electricity—	distribution of electricity, with a capacity of 275 kilovolts or more, may be
1), as amended by	(ii) inside urban areas or industrial complexes with a capacity of 275	required for the proposed development which lies within an urban area.
GN No. 327 of 7	kilovolts or more;	These facilities are likely to include sub-stations, switchgears, voltage
April 2017, Activity	excluding the development of bypass infrastructure for the transmission	cables, distribution kiosks and house connections.
No. 11	and distribution of electricity where such bypass infrastructure is —	
	(a) temporarily required to allow for maintenance of existing infrastructure;	
	(b) 2 Kilometres or shorter in length;	
	(c) within an existing transmission line servitude; and	
	development	
Government Notice	The development of facilities or infrastructure for the off-stream storage of	A new hulk water reservoir(s) may be required for the storage of water
R983 (Listing Notice	water, including dams and reservoirs, with a combined capacity of 50 000	for the proposed development. The reservoir(s) capacity may also
1), as amended by	cubic metres or more, unless such storage falls within the ambit of activity	exceed 50 000m ³ .
GN No. 327 of 7	16 in Listing Notice 2 of 2014.	
April 2017, Activity		
No. 13		
Government Notice	Residential, retail, recreational, tourism, commercial or institutional	Residential, retail, recreational, tourism, commercial, and institutional
R983 (Listing Notice	developments of 1 000 square metres or more, on land previously used for	erven will form part of the proposed development. On the northern
1), as amended by	mining or heavy industrial purposes; —	section of the site a large quarry was situated, where sand mining was
GN NO. 327 Of 7	excluding —	likely to have been carried out in the past. The total developmental
April 2017, Activity	(I) where such land has been remediated in terms of part 8 of the National	tootprint will be 5 068 $074m^2$ (or 506.807 na) in extent.
NU. 20	which case the National Environmental Management: Waste Act, 2008	
	annies or	
	(ii) where an environmental authorisation has been obtained for the	
	decommissioning of such a mine or industry in terms of this Notice or any	
	previous NEMA notice; or	
	(iii) where a closure certificate has been issued in terms of section 43 of the	



Government Notice	Wording as per the Listing Notice	Description as per the project description relating to each listed activity
and Activity Number		
	Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of	
	2002) for such land.	
Government Notice	Residential, mixed, retail, commercial, industrial or institutional	The proposed development is situated in an urban area and will
R983 (Listing Notice	developments where such land was used for agriculture, game farming,	comprise of residential, retail, recreational, tourism, commercial and
1), as amended by	equestrian purposes or afforestation on or after 01 April 1998 and where	Institutional land uses. The total development footprint will be
GN NO. 327 OF 7	such development:	5 U68 U74m ² (or 506.807ha). A large section of the northern and
No 28	(i) will occur inside an urban area, where the total land to be developed is	western corner of the site has been historically cultivated. The site was
110.20	excluding where such land has already been developed for residential	and is used for cattle grazing
	mixed, retail, commercial, industrial or institutional purposes.	
Government Notice	The expansion of facilities or infrastructure for the transmission and	Existing electricity facilities or infrastructure on the site may need to
R983 (Listing Notice	distribution of electricity where the expanded capacity will exceed 275	expand. This expansion will possibly exceed 275 kilovolts as the
1), as amended by	kilovolts and the development footprint will increase.	development footprint increases.
GN No. 327 of 7		
April 2017, Activity		
No. 47		
Government Notice	Phased activities for all activities—	The proposed development will take place in two main phases. These
1) as amonded by	(1) listed in this Notice, which commenced on or alter the elective date of this Notice, or similarly listed in any of the providus NEMA polices, which	two phases will contain sub-phases, with Phase 1 having four (4) sub-
GN No 327 of 7	commenced on or after the effective date of such previous NEMA Notices.	phases and t hase 2 having ten (10) sub-phases.
April 2017. Activity	excluding the following activities listed in this Notice-	
No. 67	17(i)(a-d);	
	17(ii)(a-d);	
	17(iii)(a-d);	
	17(iv)(a-d);	
	17(v)(a-d);	
	20;	
	21;	
	ZZ;	
	∠4(I),	



Government Notice	Wording as per the Listing Notice	Description as per the project description relating to each listed activity
and Activity Number		
	 29; 30; 31; 32; 34; 54(i)(a-d); 54(ii)(a-d); 54(iv)(a-d); 54(v)(a-d); 54(v)(a-d); 55; 61; 64; and 65; or (ii) listed as activities 5, 7, 8(ii), 11, 13, 16, 27(i) or 27(ii) in Listing Notice 2 of 2014 or similarly listed in any of the previous NEMA notices, which commenced on or after the effective date of such previous NEMA Notices; where any phase of the activity was below a threshold but where a combination of the phases, including expansions or extensions, will exceed a specified threshold. 	
Government Notice R984 (Listing Notice 2), as amended by GN No. 325 of 7 April 2017, Activity No. 6	The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent, 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;	 The proposed development will require a Water Use Licence application, in terms of the National Water Act, 1998, for one or more of the following proposed water use activities: Possibly Section 21(b) - the storage of clean water in a number of dams and reservoirs onsite; Section 21(c) - development/construction across watercourses and within 500m from the boundary of watercourses onsite; and Section 21(i) - development/construction across watercourses and within 500m from the boundary of watercourses onsite; and



Government Notice	Wording as per the Listing Notice	Description as per the project description relating to each listed activity
and Activity Number		
Government Notice R984 (Listing Notice 2), as amended by GN No. 325 of 7 April 2017, Activity No. 15	 (iii) the development of facilities or infrastructure for the treatment of effluent, polluted water, wastewater or sewage where such facilities have a daily throughput capacity of 2 000 cubic metres or less; or (iv) where the development is directly related to aquaculture facilities or infrastructure where the wastewater discharge capacity will not exceed 50 cubic metres per day. The clearance of an area of 20 hectares or more of indigenous vegetation, excluding 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. 	The proposed developmental extent is 406.9084ha. Indigenous vegetation will be cleared as part of this development.
Government Notice R985 (Listing Notice 3), as amended by GN No. 324 of 7 April 2017, Activity No. 12	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. f. In Mpumalanga: ii. Within critical biodiversity areas identified in bioregional plans.	The proposed developmental extent is 406.9084ha. Indigenous vegetation will be cleared as part of this development. Sections of the site lie within Critical Biodiversity Areas – Optimal.
Government Notice R985 (Listing Notice 3), as amended by GN No. 324 of 7 April 2017, Activity No. 26	Phased activities for all activities— i. listed in this Notice and as it applies to a specific geographical area, which commenced on or after the effective date of this Notice; or ii. similarly listed in any of the previous NEMA notices, and as it applies to a specific geographical area, which commenced on or after the effective date of such previous NEMA Notices— where any phase of the activity was below a threshold but where a combination of the phases, including expansions or extensions, will exceed a specified threshold; — excluding the following activities listed in this Notice— 7; 8; 11; 13; 20; 21; and 24.	The proposed development will take place in two main phases. These two phases will contain sub-phases, with Phase 1 having four (4) sub- phases and Phase 2 having ten (10) sub-phases.



5.3 Water Use Licence Activities

The following proposed water uses require Water Use Registration and/or Licence applications in terms of Chapter 4 of the National Water Act, 1998 (Act No. 36 of 1998):

- Possibly Section 21(b): Storage of water the storage of clean water in a number of dams and reservoirs onsite;
- Section 21(c): Impeding or diverting the flow of water in a watercourse development/construction across watercourses and within 500m from the boundary of watercourses onsite; and
- Section 21(i): Altering the bed, banks, course or characteristics of a watercourse development/construction across watercourses and within 500m from the boundary of watercourses onsite.

The required Water Use Registration and/or Licence application will be submitted to the Department of Water and Sanitation in due course.

5.4 Environmental sensitivity overlay map - Map at an appropriate scale that superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers.

Please refer to Figure 2, Figure 3 and Figure 4 below.





Figure 2: Vegetation sensitivity map





Figure 3: Heritage sensitivity map





Figure 4: Wetland sensitivity map



6. POLICY AND LEGISLATIVE CONTEXT OF THE APPLICATION

The following legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments are applicable to the proposed development and have or will be considered in this full Scoping and Environmental Impact Assessment process.

Legislation

- The Constitution of South Africa, 1996 (Act No. 108 of 1996), as amended
- The National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended
- The Environmental Impact Assessment Regulations of 4 December 2014, as amended on 7 April 2017
- The National Water Act, 1998 (Act No. 36 of 1998), as amended
- The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004), as amended
- The National Heritage Resources Act, 1999 (Act No. 25 of 1999), as amended
- The National Appeal Regulations Government Notice No. R.993 of 8 December 2014

Plans

• The Mpumalanga Biodiversity Conservation Plan

Guidelines

• Guideline on Need and Desirability in terms of the Environmental Impact Assessment (EIA) Regulations, 2010

Spatial tools

SANBI Biodiversity GIS Database

Municipal development planning frameworks

- Emalahleni Local Municipality Spatial Development Framework Final Report 2011
- Emalahleni Local Municipality Spatial Development Framework Final Report 2013/2014
- Emalahleni Local Municipality The Integrated Municipal Environmental
- Emalahleni Local Municipality Reviewed and Approved Integrated Development Plan 2013/2014



7. DESCRIPTION OF IMPACT MANAGEMENT OUTCOMES, MANAGEMENT STATEMENTS AND IMPACTS AND RISKS THAT NEED TO BE AVOIDED, MANAGED AND/OR MITIGATED

7.1 Impact Management Outcomes

Please refer to *Table 8* under Section 8 below.

7.2 Impact Management Statements

The applicant, Sarovic Investments CC, commits to implementing the mitigation actions contained in this Environmental Management Programme in order to ensure that the environmental impacts from the proposed development are minimised.

7.3 Impacts and risks that need to be avoided, managed and/or mitigated

The following impacts and risks have been identified for the preferred alternative and need to be avoided, managed and/or mitigated:

Planning and Design Phase

 Inadequate planning and design of the proposed project/development (the Township Development – Pine Ridge Extensions 1 - 25) that could result in environmental impacts that could have been avoided.

Pre-construction Phase

- Unsafe working conditions.
- Workers being unaware of the dangers of working at the construction site, resulting in a risk to their safety.

Wetlands

Construction and Operational Phases

- Changing the quantity and fluctuation properties of the watercourse by for example restricting water flow or increasing flood flows. The sources of this impacts include:
 - Compaction of soil;
 - Removal of vegetation;
 - Surface water redirection during construction activities;
 - Development within the wetland; and
 - Permanent changes to water flows during the operational phase are related to changes stormwater flows.
- Changing the amount of sediment entering water resource and associated change in turbidity (increasing or decreasing the amount). Possible sources of the impacts include:
 - Earthwork activities during construction;
 - Clearing of surface vegetation will expose the soils, which in rainy events would wash through the watercourse, causing sedimentation. In addition, indigenous vegetation communities are unlikely to colonise eroded soils successfully and seeds from proximate alien invasive trees can spread easily into these eroded soil;
 - Disturbance of soil surface;
 - Disturbance of slopes through the creation of roads and tracks adjacent to the watercourse; and
 - Erosion (e.g. gully formation, bank collapse).
- Introduction and spread of alien vegetation.
 - The moving of soil and vegetation resulting in opportunistic invasions after disturbance and the introduction of seed in building materials and on vehicles. Invasions of alien plants can impact on hydrology, by reducing the quantity of water entering a watercourse, and outcompete natural vegetation, decreasing the natural biodiversity.



Once in a system, alien invasive plants can spread through the catchment. If allowed to seed before control measures are implemented, alien plans can easily colonise and impact on downstream users.

- Loss and disturbance of watercourse habitat and fringe vegetation.
 - Direct development within watercourse areas, including crossings. Loss and disturbance of watercourse habitat
 and fringe vegetation due to direct development on the watercourse as well as changes in management, fire
 regime and habitat fragmentation.
- Changes in water quality due to pollution.
- Construction and operational activities may result in the discharge of solvents and other industrial chemicals, leakage of fuel/oil from vehicles and the disposal of sewage resulting in the loss of sensitive biota in the wetlands/rivers and a reduction in watercourse function as well as human and animal waste.

Post-construction and Rehabilitation Phase

None anticipated.

Cumulative

- Construction and operational activities may result in cumulative impact to the water courses within the local catchments and beyond. It is imperative that effective protective measures should be put into place and monitored. A rehabilitation plan should be put into action should any degradation be observed as a result from stormwater or sediment input. Increases in stormwater flows will definitely cause permanent degradation downstream unless mitigated at the design level.
- Changes in sediment entering and exiting the system: Cumulative impact is expected to be high. Should mitigation measure not be implemented sediment input may significantly alter the wetland and downstream watercourses. Reversing this process is unlikely and should be prevented in the first place.
- Alien vegetation: Regular monitoring should be implemented during construction, rehabilitation including for a period after rehabilitation is completed.
- Loss and disturbance of watercourse habitat and fringe vegetation: Cumulative impact is expected to be moderate. May result in a high degree of irreplaceable loss of resources.
- Changes in water quality due to pollution: Cumulative impact is expected to be moderate. Once in the system it may take many years for some toxins to be eradicated.

Aquatic

Construction Phase

- Increased surface water runoff due to hardened surfaces: During the upgrade of construction phase of the proposed housing development the use of heavy machinery, concrete foundations, compacted ground and impermeable surfaces will result in an increase in hardened surfaces. Hardened surfaces reduce infiltration rates and increase runoff volumes and velocities. The runoff from the construction activities is most likely to end up in one of the Blesbokspruit tributaries or directly into the Blesbokspruit itself. This can have impacts downstream where the increase in flow is concentrated; increase the risk of erosion and sedimentation; destroy riparian vegetation; and destabilise watercourses. A decrease in infiltration can also reduce natural recharge to the shallow and groundwater zones and subsequently may impact on the natural watercourses nearby.
- Increased erosion and sedimentation: Any bare soil resulting from the construction and associated vegetation clearing will be susceptible to erosion, especially during the rainy season. The increase in erosion and dust generation can result in increased sediment loads. Sedimentation will reduce the water quality, which can also affect aquatic life through the smothering of riverine habitat and fish gill clogging.



Construction and Operational Phases

• Sewage spill: Raw sewage will have a severe impact upon the water quality if it enters a river. The sewage contains elevated levels of nutrients (nitrates and phosphates), disease causing bacteria (in particular *E. coli*) and large volumes of waste matter. This will make the water undrinkable. The large amount of waste matter will increase the turbidity and provide a habitat for bacteria to breed and feed on the suspended material. Increases the turbidity of the water will block out sunlight which is necessary for all forms of life to exist in the water. It also blocks the gills of aquatic organisms, making it difficult to for them to breathe as well as hunt and catch food. The excess nutrients cause massive algal growth, which could result in eutrophication.

Post-construction and Rehabilitation Phase

None anticipated.

Cumulative None anticipated.

Surface and Groundwater

Construction and Operational Phases

- Pollution of surface and/or groundwater resources due to the potential release of pollutants, such as chemicals, especially during the construction phase.
- Pollution of surface and/or groundwater resources due to poor waste management.
- Pollution of surface and/or groundwater resources due to the incorrect management of chemical substances (fuels, oils etc.).

Operational Phase

- Pollution of surface and/or groundwater resources due to the potential release of wastewater (sewage) during the operational phase.
- Unsustainable utilisation of groundwater.

Post-construction and Rehabilitation Phase

None anticipated.

Cumulative

None anticipated.

Fauna

Construction and Operational Phases

- Loss of exotic species, declared weeds and invader plants: It is recommended that noxious alien trees, particularly blue-gums, are eradicated before construction is commenced. However, inevitably, new gardens will be established by planting exotics. This may ecologically not be puritan, but can be expected to favour an increase of garden birds.
- Loss of ecological sensitive and important vegetation units: When expressed as vertebrate habitat, the wetlands and water bodies are deemed as sensitive and their integrity should not be jeopardized during the construction or operational phases. It is recommended that cattle grazing be contained from the stage when the project is formalised.
- Loss of ecosystem function (e.g. reduction in water quality, soil pollution): Storm water run-off from the hard-cover areas of the development could amount to significant volumes inundating the wetlands, unless contained. Unmanaged water masses and quality can be expected to harm the wetlands and streambeds.



- Loss of faunal habitat: The likelihood that the proposed development will displace the biological components of the plains and slopes is high, but the ecological impact of this loss is spatially and ecologically deemed as small.
- Loss/displacement of threatened or protected fauna: Few, if any, of the Red Data species still persisting on the terrestrial and rupicolous habitats will survive. These will be displaced in the face of the planned development. Such a loss will be the ultimate stage of a spiral decline of species richness commenced decades ago.

Post-construction and Rehabilitation Phase

None anticipated.

Cumulative

None anticipated.

Flora

Construction Phase

- Destruction of natural rocky vegetation, in particular the rocky ridge, and deterioration of rocky grassland, due to:
 - Clearing of vegetation for construction of the township as well as infrastructure;
 - Access roads;
 - Illegal disposal and dumping of construction material such as cement or oil during construction; and
 - Edge effects from construction.
- Destruction of plant species that are 'Declining', 'Rare' or provincially protected: Construction activity on the rocky ridge, especially the area where these plants are concentrated.
- Destruction of moist grassland and deterioration of the vegetation associated with moist grasslands: Clearing of the vegetation and change to water runoff patterns and soil hydrology; and the Deterioration of vegetation in moist grasslands due to edge effects, sedimentation, compaction or increased pollutants.
- Possible increase in exotic and invasive vegetation: Alien vegetation spreading from existing infestation into disturbed soils as well as the moist grasslands.

Operational Phase

- Loss of the ecological function of the moist grasslands: Polluted water reaching the watercourses and moist grassland; and the lack of natural vegetation and the subsequent loss of the ecological function of the vegetation as catchment to the moist grassland and downstream watercourse.
- Deterioration of natural vegetation and eventual loss of rocky grassland: Edge effects from the development; and altered fire regime where natural fires are prevented.
- Possible increase in exotic and invasive vegetation: Alien vegetation spreading from existing infestation into disturbed soils as well as the wetland area; and Exotic plant species from gardens spreading to the rocky grasslands, moist grasslands and subsequently downstream.

Post-construction and Rehabilitation Phase

None anticipated.

Cumulative

• Soil erosion may alter water flow rates, resulting in a cumulative impact on plants within wetland areas as well as downstream from the site.



Heritage Resources

Construction and Operational Phases

• Disturbance or destruction of cultural and heritage resources.

Post-construction and Rehabilitation Phase

None anticipated.

Cumulative None anticipated.

Palaeontological resources

Construction Phase

- Construction and development activities resulting in a disturbance or destruction of palaeontological resources:
 - Earth moving equipment/machinery (front end loaders, excavators, graders, dozers); and
 - Sealing-in or destruction of fossils by development, vehicle traffic and human disturbance.

Operational Phase

None anticipated.

Post-construction and Rehabilitation Phase

None anticipated.

Cumulative None anticipated.

Air Quality and Noise

Construction Phase

- Generation of dust.
- Release of vehicle emissions from construction vehicles.
- Generation of nuisance and noise.

Operational Phase None anticipated.

Post-construction and Rehabilitation Phase None anticipated.

Cumulative None anticipated.

Land Capability and Land Use

Construction Phase

• Construction of residential units, shopping complexes, industrial complexes, stores, vehicle parking areas, roads etc.: The current arable, grazing or wilderness land capability will cease completely until the structures are removed.



The current land uses, such as grazing, will cease completely until the structures are removed (which is not foreseen).

- Possible contamination of soil by spillages of fuel or oil by mechanical equipment: The soil's physical and chemical properties will be adversely affected and will cause some reduction in land capability.
- Possible soil erosion at exposed building footprints due to higher runoff: Soil erosion will adversely affect land capability.

Operational Phase

• Use and maintenance of residential units, shopping complexes, industrial complexes, stores, vehicle parking areas, roads etc.: The pre-construction land capability at areas covered by concrete, tar or paving will remain ceased.

Post-construction and Rehabilitation Phase

None anticipated.

Cumulative

None anticipated.

Soil

Construction Phase

- The construction of structures that cover the soil surface by means of concrete, tar or paving:
- Compaction of the soil surface for building foundations, parking areas etc. will alter the soil's physical properties negatively; and
- Covering the soil surface with concrete, tar or paving will cause productive functioning of the soil to cease completely.
- Possible contamination of soil by spillages of fuel or oil by mechanical equipment with soil physical and chemical properties being adversely affected.
- Possible soil erosion at exposed building footprints due to higher runoff:
- Possible soil erosion at exposed construction sites where the current natural vegetation was removed.

Operational Phase

- Use and maintenance of residential units, shopping complexes, industrial complexes, stores, vehicle parking areas, roads etc.:
- All impacts on soils during the construction phase will remain during the operational phase. The productive functioning of soil at areas covered by concrete, tar or paving will remain ceased.

Post-construction and Rehabilitation Phase

• Soil erosion due to inefficient rehabilitation of construction areas.

Cumulative

None anticipated.

Socio-economic

Construction and Operational Phases

- Generation of a large number of job opportunities.
- Stimulation of the economy and housing sector.
- Potential increase in crime due to the influx of workers, especially during the construction phase.



Post-construction and Rehabilitation Phase None anticipated.

Cumulative

None anticipated.

Traffic

Construction and Operational Phases

• Increase in traffic volumes to the site.

Post-construction and Rehabilitation Phase

• Increase in traffic volumes to the site.

Cumulative

None anticipated.

DESCRIPTION OF PROPOSED IMPACT MANAGEMENT ACTIONS (ENVIRONMENTAL MANAGEMENT PROGRAMME ACTIONS) 8.1 Impact Management Outcome and Action Table

Please refer to Table 8 below.



Table 8: Environmental Management Programme - Impact Management Outcome and Action Table

Planning and Design Phase Planning and design of the proposed development that could development. To effectively plan and design the proposed the proposed development that could development in order to could have been avoided. To effectively plan and design of the proposed development in order to mimise operational impacts. • No activities should take place in the watercourse and associated buffer zones, unless authorised by a Water Use Registration/Licence, by way of adequate design of the proposed development. • Applicant • Registration/Licence, by way of adequate design of the construction phase. • Control of the site revealed zones with constraints regarding the expansive potential or heave and compressibility or collapse potential of the sole revealed zones with restricted excavation. A perched water table will require a proper drainage design to cope with the excess water. • Control of the sole revealed zones with constraints regarding the expansive potential or heave and compressibility or collapse potential of the sole available. • Wettands: • Design of sluctures should alightly reinforced strip footings with articulation joints at some internal and all external doors and openings with light reinforcement (brickforce) in masonny may be required. Site drainage and plumbing and service precautions must be used. • Design of sluctures should aim to have the least inpact on the habitat quality and hydrology of the watercourses and should include atternation structures to contribute to regional flood control and rehabilitation. • Design of sluctures should aim to have the least inpact on the habitat quality and hydrology of the watercourses and should include atternation accurate the contribute to regional flood control and rehabilitation.
Planning and design of the proposed development. Inadequate planning and design of the proposed development that could development in order to minimise To effectively plan and design the proposed development. • No activities should take place in the watercourse and associated buffer zones, unless authorised by a Water Use result in environmental impacts which could have been avoided. • Applicant • Applicant • Engineer • Prevent pedestrian and vehicular access into the watercourse and buffer areas, unless authorised by a Water Use impacts. • An ecologically sound, Storm Water Management Plan must be developed for the proposed development and implemented from the construction phase. • An ecologically sound, Storm Water Management Plan must be developed for the proposed development and implemented from the construction phase. • An ecologically sound, Storm Water Management Plan must be developed for the proposed development and implemented from the construction phase. • An ecologically sound, Storm Water Management Plan must be developed for the proposed development and implemented from the construction phase. • Applicant • Applicant • Confing of the site revealed zones with constraints regarding the expansive potential or heave and compressibility or collapse potential of the soil, as well as areas with restricted excavation. A perched water table will require a proper drainage design to cope with the excess water. • Foundations will require normal to modified normal foundation techniques and plumbing and service precautions must be used. • Wetlands: • Design of structures should alim to have the least impact on the habitat quality an hydrology of the watercourses and should i
Proper planning and design of the sewerage system should take place prior to construction to avoid sewage spillages. Flora:
In order to maintain catchment areas to the moist grassland, use permeable paving within the development. Pre-Construction Phase
Construction establishment. site Unsafe working conditions. To ensure construction site is operated in a safe and responsible manner for the duration of the construction phase. The construction site must be demarcated (fenced or delineated with danger tape). A site plan must be drawn up by the construction contractor and kept on file. The site plan must show proposed stockpile areas, waste storage areas and ablution facilities. Signage indicating that the site is a "Construction Site" and indicating the risks associated with the site must be displayed. Fire-fighting equipment must be placed at the construction site. Fire-fighting equipment must be placed at the construction site and must be easily accessible. The fire-fighting equipment must be maintained on a yearly basis. Welding, hot-work and flame-cutting may not be conducted close to fuel storage tanks. Where welding, hot-work and flame-cutting activities are undertaken, fire-fighting equipment must be at hand.
Appointment of Workers being unaware of the impact To adequately educate • Before any employees or contactors commence work at the proposed development, each individual must undergo an Induction • Applicant workers (employees and contractors) to that their activities may have on the environment. • Refore any employees or contactors commence work at the proposed development, each individual must undergo an Induction • Applicant commence construction activities onsite. environmental awareness. registers must be completed and kept on file. • Employees and contract workers must be issued with suitable Personal Protective Equipment (PPE), as applicable to each persons' job onsite. • Construction contractor Wetlands Wetlands • • • • • •
Construction and Operational Phases Compaction of soil; Changing the quantity and fluctuation To minimise and avoid Effective stormwater management should be a priority during both construction and operational phase. This should be monitored as Applicant



Aspect	Impact and	Impact Management	Impact Management Actions and Statements in order to avoid, modify, remedy, control or stop pollution or environmental	Responsible party/
	Nature	Outcomes	degradation	person(s)
 Removal of 	properties of the watercourse by, for	changes to the quantity and	part of the EMP.	 Construction
vegetation:	example, restricting water flow or	fluctuation properties of the	• An environmentally friendly stormwater design should be formulated based on empirical data showing how a neutral effect on the	contractor
 Surface water 	increasing flood flows.	watercourses onsite.	regional hydrograph will be achieved	Engineer
redirection during			 High energy stormwater input into the watercourses should be prevented at all cost. Changes to natural flow of water (surface water.) 	Eliginoon
construction			as well as water flowing within the soil profile) should be taken into account during the design phase and mitigated effectively	
construction			as well as water howing within the son prome) should be taken into account during the design phase and mitigated electively.	
			 Implement the principles set out in the South Amean Guidelines for Sustainable Drainage Systems (SubS) (Amilage et al., 2015). 	
Development			• Monitoring for local and downstream impacts during the construction as well as operational phases is imperative and should form	
within the wetland;			part of the EMP.	
and			• No development should occur within the delineated wetland and buffer zones, unless authorised by a Water Use	
Permanent			Registration/Licence.	
changes to water			 Implement effective rehabilitation to reverse construction related impacts. 	
flows during the				
operational phase				
are related to				
changes				
stormwater flows.				
• Earthwork activities	Changing the amount of sediment	To prevent changes to the	• Avoid construction related activities in the delineated wetlands and their buffer zones, unless authorised by a Water Use	Applicant
during	entering water resource and	amount of sediment entering	Registration/Licence.	Construction
construction;	associated change in turbidity	the water resources onsite.	 Consider the various methods and equipment available and select whichever method(s) will have the least impact on watercourses. 	contractor
Clearing of surface	(increasing or decreasing the		• Water may seep into trenching and earthworks. It is likely that water will be contaminated within these earthworks and should	
vegetation will	amount).		therefore be cleaned or dissinated into a structure that allows for additional sediment input and slows down the velocity of the	
expose the soils			water thereby reducing the risk of erosion. Effective sediment trans should be installed	
which in rainy			Construction in and around watercourses must be restricted to the driver winter months, where peopible	
events would wash			Construction in and around watercourses must be restricted to the dryer winter months, where possible.	
through the			• Retain vegetation and soil in position for as long as possible, removing it immediately anead of construction/earthworks in that area	
wataraoureo			(DWAF, 2005).	
watercourse,			Remove only the vegetation where essential for construction and do not allow any disturbance to the adjoining natural vegetation	
causing			cover.	
sedimentation. In			• Rehabilitation plans must be submitted and approved for rehabilitation of damage during construction and that plan must be	
			implemented immediately upon completion of construction.	
indigenous			• Cordon off areas that are under rehabilitation as no-go areas using danger tape and steel droppers. If necessary, these areas	
vegetation			should be fenced off to prevent vehicular, pedestrian and livestock access.	
communities are			• During the construction phase, measures must be put in place to control the flow of excess water so that it does not impact on the	
unlikely to colonise			surface vegetation.	
eroded soils			• Protect all areas susceptible to erosion and ensure that there is no undue soil erosion resultant from activities within and adjacent to	
successfully and			the construction camp and work areas.	
seeds from			 Runoff from the construction area must be managed to avoid erosion and pollution problems. 	
proximate alien			Maintain buffer zones to trap sediments	
invasive trees can			 Monitoring should be done to ensure that sediment pollution is timeously addressed 	
spread easily into			- monitoring onotice to onotice that obtainent politition to timeouoly dudressed.	
these eroded soil;				
• Disturbance of soil				
surface;				
Disturbance of				
slopes through the				
creation of roads				
and tracks adjacent				



Aspect	Impact and Nature	Impact Managemer Outcomes	Impact Management Actions and Statements in order to avoid, modify, remedy, control or stop pollution or environmental degradation	Responsible party/ person(s)
to the watercourse; and Erosion (e.g. gully formation, bank collapse)				
The moving of soil and vegetation resulting in opportunistic invasions after disturbance and the introduction of seed in building materials and on vehicles. Invasions of alien plants can impact on hydrology, by reducing the quantity of water entering a watercourse, and outcompeting natural vegetation, decreasing the natural biodiversity. Once in a system, alien invasive plants can spread through the catchment. If allowed to seed before control measures are implemented, alien plans can easily colonise and impact on downstream users.	Introduction and spread of alien vegetation.	To prevent the introductio and spread of alie vegetation.	 Implement an Alien Plant Control Plan. The control of alien invasive plants should also form part of the Maintenance Plan for the development. Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction/earthworks in that area and returning it where possible afterwards. Monitor the establishment of alien invasive species within the areas affected by the construction and maintenance and take immediate corrective action where invasive species are observed to establish. Rehabilitate or revegetate disturbed areas. 	 Applicant Construction contractor
Direct development within watercourse areas, including crossings.	Loss and disturbance of watercourse habitat and fringe vegetation due to direct development on the watercourse as well as changes in management, fire regime and habitat fragmentation.	To minimise the impact o wetland habitat and fring vegetation.	 No development should occur within the delineated wetland and buffer zones, unless authorised by a Water Use Registration/Licence. Demarcate the watercourse areas and buffer zones to limit disturbance; clearly mark these areas as no-go areas. Weed control should be implemented in buffer zones. Monitor rehabilitation and the occurrence of erosion twice during the rainy season for at least two years and take immediate corrective action where needed. Monitor the establishment of alien invasive species within the areas affected by the construction activities and take immediate corrective action where invasive species are observed to establish. Operational activities should not take place within watercourses or buffer zones, nor should edge effects impact on these areas, unless authorised by a Water Use Registration/Licence. Operational activities should not impact on rehabilitated or naturally vegetated areas. Ensure that overgrazing in the wetlands does not occur. 	 Applicant Construction contractor Applicant Applicant
may result in the	pollution.	chemicals, the leakage of	 Implementation of appropriate stormwater management around the excavations to prevent the ingress of run-off into the excavations and to prevent contaminated runoff into the watercourse. 	Construction contractor



Aspect	Impact and Nature	Impact Management	Impact Management Actions and Statements in order to avoid, modify, remedy, control or stop pollution or environmental degradation	Responsible party/
discharge of solvents and other industrial chemicals, leakage of fuel/oil from vehicles and the disposal of sewage resulting in the loss of sensitive biota in the wetlands/rivers and a reduction in watercourse function as well as human and animal waste.		fuel/oil from vehicles and the disposal of sewage into the environment.	 The development footprint must be fenced off from the watercourses and no related impacts may be allowed into the watercourse e.g. water runoff from cleaning of equipment, vehicle access etc. After construction, the land must be cleared of rubbish, surplus materials and equipment, and all parts of the land shall be left in a condition as close as possible to that prior to use. Maintenance of construction vehicles/equipment should not take place within the watercourse or watercourse buffers. Maintenance of buffer zones to trap sediments with associated toxins. Control of waste discharges and do not allow dirty water from operational activities to enter the watercourse. Ensure that no operational activities impact on the watercourse or buffer area, unless authorised by a Water Use Registration/Licence. This includes edge effects and failure of infrastructure, such as sewerage pipes. Implement litter traps at all watercourse crossings. Treatment of identified pollution should be prioritised accordingly. Maintain sewerage infrastructure to ensure that leaks are repaired and that leaking sewage does not enter the watercourse. 	
Post-construction and	Rehabilitation Phase			
Post-construction and rehabilitation activities.	None anticipated.	Not Applicable.		Not Applicable.
Cumulative Impacts				
Changes in the	Construction and operational activities	To prevent cumulative	Implement the mitigation measures as provided under the construction and operational phases.	Applicant
quantity and fluctuation properties of the watercourse.	water courses within the local catchments and beyond.	fluctuation properties of the watercourse.	 It is imperative that effective protective measures should be put into place and monitored. A rehabilitation plan should be put into action should any degradation be observed as a result from stormwater or sediment input. Increases in stormwater flows will definitely cause permanent degradation downstream unless mitigated at the design level. 	Construction contractor
Changes in sediment entering and exiting the system.	The cumulative impact is expected to be high. Should mitigation measures not be implemented, sediment input may significantly alter the wetland and downstream watercourses.	To prevent cumulative changes in sediment entering and exiting the system.	 Implement the mitigation measures as provided under the construction and operational phases. Reversing this process is unlikely and should be prevented in the first place. 	ApplicantConstruction contractor
Alien vegetation.	The moving of soil and vegetation resulting in opportunistic invasions after disturbance and the introduction of seed in building materials and on vehicles. Once in a system, alien invasive plants can spread through the catchment. If allowed to seed before control measures are implemented, alien plans can easily colonise and impact on downstream users.	To prevent the introduction and spread of alien vegetation.	 Implement the mitigation measures as provided under the construction and operational phases. Regular monitoring should be implemented during construction and rehabilitation, as well as for a period after rehabilitation is completed. 	 Applicant Construction contractor ECO/flora specialist
Loss and disturbance of watercourse habitat and fringe vegetation. Changes in water quality due to pollution.	The cumulative impact is expected to be moderate. May result in a high degree of irreplaceable loss of resources. The cumulative impact is expected to be moderate. Once in the system it may take many years for some toxins to be eradicated.	To prevent cumulative loss and disturbance of watercourse habitat and fringe vegetation. To prevent cumulative changes in water quality due to pollution.	 Implement the mitigation measures as provided under the construction and operational phases. Implement the mitigation measures as provided under the construction and operational phases. 	 Applicant Construction contractor Applicant Construction contractor
Aquatic Construction Phase				



Aspect	Impact and	Impact Management	Impact Management Actions and Statements in order to avoid, modify, remedy, control or stop pollution or environmental	Responsible party/
	Nature	Outcomes	degradation	person(s)
Increased surface water runoff due to hardened surfaces.	Nature During the construction phase of the proposed development the use of heavy machinery, concrete foundations, compacted ground and impermeable surfaces will result in an increase in hardened surfaces. Hardened surfaces reduce infiltration rates and increase runoff volumes and velocities. The runoff from the construction activities is most likely to end up in one of the Blesbokspruit tributaries or directly into the Blesbokspruit itself. This can have impacts downstream where the increase in flow is concentrated; increase the risk of erosion and sedimentation; destroy riparian vegetation; and destabilise watercourses. A decrease in infiltration can also reduce natural recharge to the shallow and groundwater zones and subsequently may impact on the patient.	Outcomes To minimise the increase in surface water runoff from hardened surfaces.	 All areas, not directly within the footprint of the development, where soil has been compacted, should be ripped to break up the compacted soil surface. This will aid infiltration and decrease runoff. Re-vegetation should take place immediately according to the re-vegetation plan. The species utilised for re-vegetation should be endemic to the area, as far as possible and practical, and not include any alien or invasive species. These areas should be monitored to ensure the successful re-establishment of vegetation and to ensure that no erosion gullies form. All water systems should be sited, designed and operated to restrict the possibility of damage to the riparian or in-stream habitat. Biomonitoring should be conducted at least once every four months (seasonally) during construction phase. Chemical analysis should occur on a weekly basis during construction phase and thereafter, if down-scaled, it should at least be monitored once a month. The current condition of the Blesbok Spruit is higher than the expected condition according to RIVCON, but is still in a poor condition. As conservation offset, it is recommended that the conditions of the Blesbok Spruit should be increased, i.e. reconstruction ponds. No further degradation of the Blesbok Spruit should be allowed. 	 person(s) Applicant Construction contractor
Increased erosion and sedimentation.	may impact on the natural watercourses nearby. Any bare soil resulting from the construction and associated vegetation clearing will be susceptible to erosion, especially during the rainy season. The increase in erosion and dust generation can result in increased sediment loads. Sedimentation will reduce the water quality, which can also affect aquatic life through the smothering of riverine habitat and fish gill clogging.	To minimise erosion and sedimentation.	 Initiate catchment management to control and reduce erosive runoff containing suspended sediment. Minimise the potential sources of sediment (small particles) from the outset. This means limiting the extent (area) and duration (time period) of land and vegetation disturbance to the minimum required and protecting surfaces once they are exposed. This minimises the potential for storm water disturbances and reduces the sediment loads to receiving streams. Where site disturbance is significant and unavoidable, undertake proper storm water management planning in accordance with the DWA's Best Practice Guideline documents. Retain sediments that are picked up on the project site through the use of sediment-capturing devices. On most sites successful erosion and sedimentation control requires a combination of structural (building required) and vegetative (planting required) practices. Immediate re-vegetation of all bare soil areas should be undertaken. The species utilised for re-vegetation should be endemic to the area, as far as possible and practical, and not include any alien or invasive species. These areas should be monitored to ensure the successful re-establishment of vegetation and to ensure that no erosion gullies form. The design of water management facilities should include suitable erosion protection measures to ensure that downstream erosion or sedimentation is minimised. Do not allow loose soil (removed soil) to wash away or blow away – keep the soil covered and place in a secure location. Access roads to the reed bed system, if any, should be regularly maintained and the roads should have an acceptable surface, be free from erosion damage and have effective drainage, preventing the impounding/ponding of water. Water quality should be monitored regularly according to the monitoring program and appropriate and timeous remedial interventions made in the case of non-compliance. 	 Applicant Construction contractor
Construction and Oper	ational Phases			
Sewage spillages.	Raw sewage will have a severe	To prevent sewage spillages.	Proper planning and design should take place prior to construction to avoid sewage spillages.	Applicant
	impact upon the water quality if it	•	• Development should always be constructed outside of the 1:100 year flood line of the Blesbokspruit or outside of the buffer created	Construction



Aspect	Impact and	Impact Management	Impact Management Actions and Statements in order to avoid, modify, remedy, control or stop pollution or environmental	Responsible party/
	Nature	Outcomes	degradation	person(s)
	enters a river. The sewage contains		for the wetland, whichever is larger, unless authorised by a Water Use Registration/Licence.	contractor
	elevated levels of nutrients (nitrates			Engineer
	and phosphates), disease causing			-
	bacteria (in particular E. coli) and			
	large volumes of waste matter. This			
	will make the water undrinkable. The			
	large amount of waste matter will			
	increase the turbidity and provide a			
	habitat for bacteria to breed and feed			
	on the suspended material. Increases			
	to the turbidity of the water will block			
	out sunlight which is necessary for all			
	forms of life to exist in the water. It			
	also blocks the gills of aquatic			
	organisms, making it difficult for them			
	to breathe as well as hunt and catch			
	food. The excess nutrients cause			
	massive algal growth, which could			
	result in eutrophication.			
Post-construction and	Rehabilitation Phase	Net Anglie ship		Net Anglia shia
None anticipated.	None anticipated.	Not Applicable.		Not Applicable.
Cumulative impacts	Nego opticingted	Net Applies ble		Net Applicable
None anticipated.	None anticipated.	Not Applicable.		Not Applicable.
Surface and Groundwa	rational Phases			
Construction and Open	Pollution of surface and/or	To provent the release of	A register must be compiled of all observed substances and depreserve reads used are its	Applicant
construction and	groundwater resources due to the	nollutanta into the	 A register must be complied of all chemical substances and dangerous goods used onsite. MCDC? (Metarial Cofety Data Chesta) must be maintained for all chemical substances and dangerous goods. The MCDC? must also 	Applicant
operational activities.	potential release of pollutants such	environment	 MSDS (Material Safety Data Sheets) must be maintained for all chemical substances and dangerous goods. The MSDS must also be displayed ensite. 	Construction
	as chemicals especially during the	environment.	be displayed offsite.	CONTRACTOR
	construction phase		I he chemical substances and dangerous goods must be stored safely and as per the requirements of the MSDS for each chemical substances and dangerous goods. Lacked storeds are preferable.	
			Substance and dangerous good. Locked storage areas are preferable.	
			• Drip trays must be readily available onsite and used for any repair work, maintenance work of refuelling undertaken onsite.	
			• Spill kits must be readily available onsite and personnel must be trained on the appropriate procedures to clean hydrocarbon	
			opiniayeo.	
			 No wastewater or wash water may be released into the environment from construction activities. Vehicles should regularly be inspected to appure that any fuel or cilles/co are repaired. 	
Construction	Dollution of ourface and/or	To oncure that waste	 Venicles should regularly be inspected to ensure that any rule of on reaks are repaired. 	Analianat
construction and	roundwater resources due to peer	(construction waste conoral	 Waste must be managed according to its nazard classification (i.e. general vs. nazardous waste). General and nazardous waste etreame should not be mixed. 	Applicant
operational activities.	waste management	(construction waste, general	streams should not be mixed.	Construction
	waste management.	is managed in an	 Waste stored onsite must be kept in appropriate containers with itds that can be closed. 	contractor
		environmentally responsible	 Waste must be taken to appropriately licensed facilities for reuse, recycling, recovery or disposal. Safe Disposal Certificates must be obtained and kept on record. 	
		manner.	 Any soil that has been contaminated by oil, diesel or petrol must be regarded as hazardous and disposed of at an appropriately licensed facility. Safe Disposal Certificates must be obtained and kept on record. 	
			 No waste may be stored on open soil or within wetlands and/or watercourses. 	
			Sufficient ablution facilities must be provided.	
			 Chemical toilets must be serviced regularly and must be provided with toilet paper at all times. 	
			Any spillages from the chemical toilets must immediately be cleaned and the contaminated soil disposed of as hazardous waste.	



Aspect	Impact and Nature	Impact Management Outcomes	Impact Management Actions and Statements in order to avoid, modify, remedy, control or stop pollution or environmental degradation	Responsible party/ person(s)
			 Construction waste must be stored in a designated area. Building rubble must be stored separately from domestic waste and may be stored on bare soil as it is inert in nature. It must, however, be ensured that other waste (general and/or hazardous waste) is not mixed together with the building rubble. Refuse bins must be provided for domestic waste. Large volumes of waste may not accumulate onsite. No waste may be burnt or buried onsite. Building rubble must be kept clean of plastic and brick ties. 	
Construction and operational activities.	Pollution of surface and/or groundwater resources due to the incorrect management of chemical substances (fuels, oils etc.).	To ensure the correct management of chemical substances (fuels, oils etc.) onsite.	 Drip trays must be readily available onsite and used for any repair work, maintenance work or refuelling undertaken onsite. Spill kits must be readily available onsite and personnel must be trained on the appropriate procedures to clean hydrocarbon spillages. 	ApplicantConstruction contractor
Runoff of contaminated stormwater.	Pollution of surface and/or groundwater resources.	To prevent the contamination of storm water.	 Storm water must be diverted around areas where there are pollution sources. Storm water drainage infrastructure must be regularly inspected for obstructions. No contaminated storm water may be released into the environment from the construction activities. Washing or cleaning of equipment and machinery must occur in a designated area and the contaminated wash water must be contained. Such an area could be a plastic drum, a leak-proof container or a plastic lined pit. 	 Applicant Construction contractor
Operational Phase		T		
Potential release of wastewater (sewage).	Pollution of surface and/or groundwater resources due to the potential release of wastewater (sewage) during the operational phase.	To prevent the release of wastewater (sewage) into the environment.	 All wastewater (sewage) must be collected in appropriate holding/conservancy tanks and may not come into contact with the environment prior to treatment thereof. The integrity of the sewerage conveyance system components, such as tanks and pumps, must be checked at a frequency as determined by the suppliers. Inspection and maintenance must also be conducted on sewerage pipelines. Any leaking pipelines must immediately be repaired. 	Applicant
Operational activities.	Unsustainable utilisation of water.	To ensure sustainable utilisation of water.	Regularly inspect reservoirs, water pipes, JoJo tanks and taps for leakages and repair immediately.	Applicant
Post-construction and	Rehabilitation Phase			
None anticipated.	None anticipated.	Not Applicable.		Not Applicable.
Cumulative Impacts				
None anticipated.	None anticipated.	Not Applicable.		Not Applicable.
Fauna Construction and Oper	rational Phases			
Construction and operational activities.	Loss of exotic species, declared weeds and invader plants.	To promote the eradication of exotic species, declared weeds and invader plants.	 It is recommended that noxious alien trees, particularly blue-gums, are eradicated before construction commences. However, inevitably, new gardens will be established by planting exotics. This may ecologically not be puritan, but can be expected to favour an increase of garden birds. 	 Applicant Construction contractor
Construction and operational activities.	Loss of ecologically sensitive and important vegetation units. When expressed as vertebrate habitat, the wetlands and water bodies are deemed as sensitive and their integrity should not be jeopardized during the construction or operational phases.	To minimise the loss of ecologically sensitive and important vegetation units.	 The area cleared for the proposed project must be kept to a minimum. Cattle grazing must be contained from the stage when the project is formalised. All areas designated as sensitive in a sensitivity mapping exercise should be incorporated into an open space system. The open space system should be managed in accordance with an Ecological Management Plan that complies with the Minimum Requirements for Ecological Management Plans and forms part of the EMP. The open space system should be fenced off/demarcated prior to construction commencing. 	 Applicant Construction contractor
Construction and operational activities.	Loss of ecosystem function (e.g. reduction in water quality, soil pollution): Storm water run-off from the hard-cover areas of the development could amount to	To minimise the loss of ecosystem function.	 Total sealing of paved areas such as parking lots, driveways, pavements and walkways should be avoided. Permeable material should rather be utilised for these purposes. The crossing of natural drainage systems should be minimised and only constructed at the shortest possible route, perpendicular to the natural drainage system. Where possible, bridge crossings should span the entire stretch of the buffer zone. 	 Applicant Construction contractor Engineer



Aspect	Impact and	Impact Managemer	Impact Management Actions and Statements in order to avoid, modify, remedy, control or stop pollution or environmental	Responsible party/
Construction and operational activities.	significant volumes inundating the wetlands, unless contained. Unmanaged water masses and the quality can be expected to harm the wetlands and streambeds. Loss of faunal habitat: The likelihood that the proposed development will displace the biological components of the plains and slopes is high, but the ecological impact of this loss is spatially and ecologically deemed as small.	To minimise the loss of faunal habitat.	 f • The area cleared for the proposed project must be kept to a minimum. Cattle grazing must be contained from the stage when the project is formalised. All areas designated as sensitive in a sensitivity mapping exercise should be incorporated into an open space system. The open space system should be managed in accordance with an Ecological Management Plan that complies with the Minimum Requirements for Ecological Management Plans and forms part of the EMP. The open space system should be fenced off/demarcated prior to construction commencing. The mitigation measures that GDARD (GDACE) (Directorate of Nature Conservation, GDACE, 2008 and 2009) developed for <i>developments, roads/pipelines/powerlines and power lines/telephone lines</i> are applicable to the proposed development and must 	 Applicant Construction contractor
Construction and operational activities.	Loss/displacement of threatened or protected fauna: Few, if any, of the Red Data species still persisting on the terrestrial and rupicolous habitats will survive. These will be displaced in the face of the planned development. Such a loss will be the ultimate stage of a spiral decline of species richness commenced decades ago.	To minimise the loss displacement of threatene or protected fauna.	 be adhered to, where relevant. Natural migration of fauna species should not be hampered and the protection of fauna species should be promoted. All outside lighting should be directed away from sensitive areas. Fluorescent and mercury vapour lighting should be avoided and sodium vapour (yellow) lights should be used wherever possible. All storm water structures should be designed so as to block amphibian and reptile access to the road surface. Should hedgehogs be encountered during the development, these should be relocated (by a suitably qualified specialist) to natural grassland areas in the vicinity of the site. The contractor must ensure that no fauna species are disturbed, trapped, harmed, hunted or killed during the construction phase. Conservation-orientated clauses should be included in contracts for construction personnel, complete with penalty clauses for non-compliance. 	ApplicantConstruction contractorEngineer
Post-construction and	Rehabilitation Phase			
None anticipated.	None anticipated.	Not Applicable.		Not Applicable.
Cumulative Impacts	None enticipated	Not Applicable		Not Applicable
None anticipated.	None anticipated.	Not Applicable.		Not Applicable.
Construction Phase				
 Clearing of vegetation for construction of the township as well as infrastructure; Access roads; Illegal disposal and dumping of construction material, such as cement or oil during construction; and Edge effects from construction. 	Destruction of natural rocky vegetation, in particular the rocky ridge, and deterioration of rocky grassland.	To prevent the destruction of natural rocky vegetation, if particular the rocky ridge and deterioration of rock grassland vegetation.	 An independent Ecological Control Officer (ECO) should be appointed to oversee construction activities. The construction footprint should incorporate as much rocky grassland as possible into open space planning, especially the area marked as high sensitivity, which contain the highest concentration of plants of conservation concern. A permanent fence or demarcation must be erected around the construction area to prevent access or edge effects to surrounding environs that will not be developed. Prohibit vehicular or pedestrian access into natural areas beyond the demarcated boundary of the construction area. Formalise access roads and make use of existing roads and tracks where feasible, rather than creating new routes through naturally vegetated areas that will not be developed. Where the localities of provincially protected and threatened plants cannot be avoided by construction, the plants must be removed, where possible and feasible, and either used during rehabilitation or be relocated to dedicated open space or conserved areas. These plants can only be removed and relocated with permission (a permit) from the Mpumalanga Tourism and Parks Agency (MTPA). Re-vegetate developed areas with indigenous plant species, as far as practical and as soon as possible. This will prevent erosion and invasion by alien invasive plant species. 	 Applicant Construction contractor
on the rocky ridge,	'Declining', 'Rare' or provincially	plant species that ar	this area. In addition, the Gauteng Ridge Policy (GDACEL, 2001) should be followed as best practise. This policy discourages	Applicant Construction



Aspect	Impact and	Impact M	anagement	Impact Management Actions and Statements in order to avoid, modify, remedy, control or stop pollution or environmental	Responsible party/
	Nature	Outcomes		degradation	person(s)
especially the area	protected.	'Declining', 'F	Rare' or	development on ridges or rocky outcrops. These areas are characterised by high spatial heterogeneity due to the range of differing	contractor
where these plants are		provincially protect	cted.	aspects (north, south, east, west and variations thereof), slopes and altitudes all resulting in differing soil (e.g. depth, moisture,	
concentrated.				temperature, drainage, nutrient content), light and hydrological conditions (GDACEL, 2001) and are usually characterised by high	
				biodiversity and therefore their protection contributes to the conservation of biodiversity. According to climate change modelling,	
				level topography will be particularly sensitive to future climate change and major extinction in these areas can be expected	
				(Rutherford et al., 2001). As such, in a landscape affected by climate change, chances for species survival will be higher on ridges (GDACEL, 2011).	
				• Implement a Plant Rescue Plan: Where the plants of conservation concern or provincially protected plants are deemed to be under	
				threat from the construction activity, the plants should be removed by a suitably qualified specialist and replanted into suitable open	
				spaces [this can also be undertaken in collaboration with Operation Wildflower, or the Custodians of Rare and Endangered	
				Wildflowers (CREW)]. These plants may only be removed with the permission of the provincial authority.	
				• The Crinum species observed was not in flower at the time of the field survey and the species should be confirmed during the	
				summer months. However, it is believed to be Crinum graminicola, which is provincially protected. These plants should be removed	
				prior to commencement of construction and where possible, be relocated to suitable habitat outside of the impacted area and monitored for survival.	
				• The provincially protected <i>Gladiolus</i> species and <i>Protea welwitschii</i> also occur within the development area. Although the <i>Gladiolus</i>	
				species can be transplanted elsewhere, it is unlikely that the <i>Protea</i> species will survive transplanting.	
				• Although the 'Endangered' Frithia humilis was not observed on the site, the possibility of it occurring cannot be ruled out. It is	
				advised that a site visit during its flowering time focus on scanning suitable habitat on the site (flowering period: January).	
				• In order to minimise the potential destruction of protected and threatened plants, it is advised that a summer assessment be	
				undertaken to the sensitive areas in order to identify any species flowering or those that might have been overlooked during the	
				April survey.	
				• Construction workers may not tamper or remove these plants and neither may anyone collect seed from the plants without	
				permission from the local authority.	
				• If the proposed open spaces cannot be adequate preserved, the plants of conservation concern should be removed (where survival	
				is possible) and relocated. This can only be done once a permit authorising the removal of the plants is granted by the	
				Mpumalanga Tourism and Parks Agency (MTPA). In addition, it is advised that a summer scan (during November) be undertaken	
				to limit the possibility that any plants of conservation concern that were not identified at the time of this report (April survey) are lost.	
Clearing of the	Destruction of moist grassland	To prevent the de	estruction of	• The minimum buffer zone, as recommended by the wetland specialist, around the moist grassland must be regarded as No-Go	Applicant
vegetation and change	and deterioration of the vegetation	moist grassla	and and	areas for the development. Instead, these areas should be incorporated into open space planning, unless authorised by a Water	Construction
to water runon patterns	associated with moist grasslands;	deterioration	or the	Use Registration/Licence.	contractor
and soil hydrology.	and Deterioration of wagetation in	vegetation assoc	cialed with	 In order to maintain catchment areas to the moist grassland, use permeable paving within the development. 	
	Detenoration of vegetation in maint grasslands due to edge	moist grassianus.		 Make use of existing roads and tracks, where feasible, rather than creating new routes through moist grassiand areas. 	
	effects sedimentation			 Runon from roads must be managed to avoid erosion and pollution problems. Demove only the versitation where eccential for construction and do not allow any disturbance to the adjoining potymel versitation. 	
	compaction or increased			• Remove only the vegetation where essential for construction and do not allow any disturbance to the adjoining natural vegetation cover.	
	pollutants.			• Protect all areas susceptible to erosion and ensure that there is no undue soil erosion resultant from activities within and adjacent	
				to the construction camp and work areas.	
				 Prevent polluted water from reaching the watercourse and surrounding moist grasslands. 	
				 An ecologically sound, storm water management plan must be implemented during construction. Ensure that the storm water management of the completed development is adequate to prevent deterioration of the moist grasslands and the Blesbokspruit. 	
				• The construction storm water plan could include berms or swales to allow infiltration of rainwater into the soil on the site, thereby	
				retaining the function of the study site as a catchment area for the moist grassland. Blesbokspruit and its tributary.	
				 Do not allow storm water to be canalised. 	
				Prevent contamination of rainwater on the site.	
				• Place and maintain erosion control barriers as appropriate to prevent sedimentation into the watercourse and moist grasslands.	



Aspect	Impact and Nature	Impact Management Outcomes	Impact Management Actions and Statements in order to avoid, modify, remedy, control or stop pollution or environmental degradation	Responsible party/ person(s)
			• Trucks and equipment should only be washed in dedicated areas and the dirty water is not allowed to discharge into the watercourse or surrounding natural vegetation.	
Alien vegetation spreading from existing infestation into disturbed soils as well as the moist grasslands.	Possible increase in exotic and invasive vegetation.	To prevent an increase and spread of exotic and invasive vegetation.	 Alien invasive species, especially category 1b invaders that were identified within the study area, should be removed. By removing these species, the spread of seeds will be prevented into disturbed soils. This could have a positive impact on the surrounding natural vegetation. All alien seedlings and saplings must be removed as they become evident for the duration of construction. Manual/mechanical removal is preferred to chemical control. All construction and operation vehicles and equipment, as well as construction material, should be free of plant material. Therefore, all equipment and vehicles should be thoroughly cleaned prior to access on to the construction areas. This should be verified by the ECO. 	ApplicantConstruction contractorECO
Operational Phase		T		
Polluted water reaching the watercourses and moist grassland; and the lack of natural vegetation.	Loss of the ecological function of the moist grassland vegetation as catchment to the moist grassland and downstream watercourse.	lo prevent the loss of ecological function of the moist grasslands.	 Implement an ecologically sound storm water management plan that will allow rainwater within the development to penetrate the soil e.g. via berms or swales as well as permeable paving. Ensure that the stormwater management system prevents contamination of stormwater and that no polluted water reaches the moist grasslands, Blesbokspruit and the tributary. Cordon off the main developed area from the surrounding natural vegetation and moist grasslands to prevent any disturbances into the surrounding areas. Place and maintain erosion control barriers, as appropriate, to prevent sedimentation into the watercourse and moist grasslands. Incorporate the moist grasslands into open space planning and maintenance. 	ApplicantEngineer
Edge effects from the development; and altered fire regime where natural fires are prevented.	Deterioration of natural vegetation and eventual loss of rocky grassland.	To prevent the deterioration of natural vegetation and loss of rocky grassland.	 Incorporate the rocky grassland into open space planning e.g. an eco-park with formal pathways for pedestrians and cyclist. Ensure that a home owners association takes responsibility for maintaining the natural grasslands and to ensure that no dumping or vehicular access impact on the rocky ridge area occurs. Regular surveys to ensure the survival of plants of conservation concern within the rocky grassland. In consultation with a specialist, consider a burning programme to maintain the rocky grassland. 	 Applicant HOA Flora specialist
Alien vegetation spreading from existing infestation into disturbed soils as well as the wetland area; and exotic plant species from gardens spreading to the rocky grasslands, moist grasslands and subsequently downstream.	Possible increase in exotic and invasive vegetation.	To prevent an increase of exotic and invasive vegetation.	 Alien invasive species that were identified within the study area should be removed prior to construction-related soil disturbances. By removing these species, the spread of seeds will be prevented into disturbed soils which could thus have a positive impact on the surrounding natural vegetation. Landscaping in the development must make use of indigenous vegetation and no alien invasive plant species should be allowed within home gardens. 	ApplicantHOA
Post-construction and	Rehabilitation Phase			
None anticipated.	None anticipated.	Not Applicable.		Not Applicable.
Construction and operational activities, and resultant soil erosion.	Soil erosion may alter water flow rates, resulting in a cumulative impact on plants within wetland areas as well as downstream from the site.	To minimise erosion.	 Implement the mitigation measures as provided under the construction and operational phases for the limiting of erosion. Reversing this process is unlikely and should be prevented in the first place. 	ApplicantConstruction contractor
Heritage Resources	notional Dhase			
Construction and Oper	ational Phase	To provent the disturbence or		Applicant
Construction and		o prevent the disturbance or	• If the graves (Site 1) are to be impacted, mitigation measures will have to be implemented to protect the graves and negate any	Applicant



Aspect	Impact and Nature	Impact Management Outcomes	Impact Management Actions and Statements in order to avoid, modify, remedy, control or stop pollution or environmental degradation	Responsible party/ person(s)
operational activities.	and heritage resources.	destruction of cultural and heritage resources.	 begindation possible impacts by the proposed development. This will entail either the formal protection (fencing and management of the site) or exhumation and relocation of the graves to another area. SAHRA has recommended that a fence with a gate is erected around the graves. Before fencing may occur, permission from the family members must be sort. This must be done by undertaking a social consultation process to identify the family members of the site. This must be done in terms of Chapter IX of the NHRA Regulations and section 36(3) of the NHRA. No mitigation is required for Sites 2-4, according to the heritage specialist. SAHRA has required that comment in terms of section 34 of the NHRA, for sites 2-4, are sought from the Mpumalanga Heritage Resources Authority (MPHRA). Should any other unknown objects, sites or features of archaeological nature be uncovered during any development activities, the work in that area shall be halted immediately for inspection and recommendations regarding the way forward. This will include any possible and previously unknown, low stone packed or unmarked graves in the area. SAHRA requirements: If any new heritages resources are discovered during construction and operation phases of the proposed development, then a professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the findings at the expense of the developer. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required at the expense of the NHRA (Act 25 of 1999). The SAHRA APM Unit may be contacted for further details: Nokukhanya Khumalo/Phillip Hine: 021 202 8654. If any unmarked human burials are uncovered and the archaeologist called in to inspect the finds and/or the police find them to be heritage graves, then mitigation may be necessary and the SAHRA Burial Grounds and Graves (B	 Construction contractor ECO Heritage specialist
Post-construction and	Rehabilitation Phase	Net Anglinghia		Net Anglie skie
None anticipated.	None anticipated.	Not Applicable.		Not Applicable.
None anticipated.	None anticipated.	Not Applicable.		Not Applicable.
Palaeontological Reso	urces			
Construction Phase				
Construction and development activities.	 Disturbance or destruction of palaeontological resources from: Earth moving equipment/machinery (front end loaders, excavators, graders, dozers); and Sealing-in or destruction of fossils by development, vehicle traffic and human disturbance. 	To prevent the unregulated/ uncontrolled destruction of fossil assemblages.	 Care must be taken during the digging of foundations and removing topsoil, subsoil and overburden. If any paleontological material is exposed during digging, excavating, drilling or blasting, SAHRA must be notified. All construction activities must be stopped and a palaeontologist should be called in to determine proper mitigation measures. Condition in which development may proceed: It is further suggested that a Section 37(2) agreement of the Occupational, Health and Safety Act (Act No. 85 of 1993) is signed with the relevant contractors to protect the environment and adjacent areas as well as for safety and security reasons. SAHRA requirements: In the event that fossils are uncovered during construction, then construction must cease within the immediate vicinity, a buffer of 30m must be established and a palaeontologist called in to inspect the finds. The palaeontologist must obtain a section 35(4) permit in terms of NHRA and Chapter IV NHRA Regulations, before any fossils are collected. 	ApplicantConstruction contractorECO
Operational Phase				
None anticipated.	None anticipated.	Not Applicable.		Not Applicable.
None anticipated	None anticipated	Not Applicable		Not Applicable
Cumulative Impacts				
None anticipated.	None anticipated.	Not Applicable.		Not Applicable.
Air Quality and Noise				

Aspect	Impact and	Impact Management	Impact Management Actions and Statements in order to avoid, modify, remedy, control or stop pollution or environmental degradation	Responsible party/
operational activities.	and heritage resources.	destruction of cultural and heritage resources.	 by possible impacts by the proposed development. This will entail either the formal protection (fencing and management of the site) or exhumation and relocation of the graves to another area. SAHRA has recommended that a fence with a gate is erected around the graves. Before fencing may occur, permission from the family members must be sort. This must be done by undertaking a social consultation process to identify the family members of the site. This must be done in terms of Chapter IX of the NHRA Regulations and section 36(3) of the NHRA. No mitigation is required for Sites 2-4, according to the heritage specialist. SAHRA has required that comment in terms of section 34 of the NHRA, for sites 2-4, are sought from the Mpumalanga Heritage Resources Authority (MPHRA). Should any other unknown objects, sites or features of archaeological nature be uncovered during any development activities, the work in that area shall be halted immediately for inspection and recommendations regarding the way forward. This will include any possible and previously unknown, low stone packed or unmarked graves in the area. SAHRA requirements: If any new heritages resources are discovered during construction and operation phases of the proposed development, then a professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the findings at the expense of the developer. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required at the expense of the developer. Mitigation will only be carried out after the archaeologist or palaeontologist obtains a permit in terms of section 35 of the NHRA (Act 25 of 1999). The SAHRA APM Unit may be contacted for further details: Nokukhanya Khumalo/Phillip Hine: 021 202 8654. If any unmarked human burials are uncovered and the archaeologist called in to inspect the finds and/or	 Construction contractor ECO Heritage specialist
None anticipated.	None anticipated.	Not Applicable.		Not Applicable.
Cumulative Impacts		i i i i i i i i i i i i i i i i i i i		
None anticipated.	None anticipated.	Not Applicable.		Not Applicable.
Palaeontological Reso	urces			
Construction and development activities.	 Disturbance or destruction of palaeontological resources from: Earth moving equipment/machinery (front end loaders, excavators, graders, dozers); and Sealing-in or destruction of fossils by development, vehicle traffic and human disturbance. 	To prevent the unregulated/ uncontrolled destruction of fossil assemblages.	 Care must be taken during the digging of foundations and removing topsoil, subsoil and overburden. If any paleontological material is exposed during digging, excavating, drilling or blasting, SAHRA must be notified. All construction activities must be stopped and a palaeontologist should be called in to determine proper mitigation measures. Condition in which development may proceed: It is further suggested that a Section 37(2) agreement of the Occupational, Health and Safety Act (Act No. 85 of 1993) is signed with the relevant contractors to protect the environment and adjacent areas as well as for safety and security reasons. SAHRA requirements: In the event that fossils are uncovered during construction, then construction must cease within the immediate vicinity, a buffer of 30m must be established and a palaeontologist called in to inspect the finds. The palaeontologist must obtain a section 35(4) permit in terms of NHRA and Chapter IV NHRA Regulations, before any fossils are collected. 	 Applicant Construction contractor ECO
Operational Phase				
None anticipated.	None anticipated.	Not Applicable.		Not Applicable.
Post-construction and	Renabilitation Phase	Not Applicable		Not Applicable
Cumulative Impacts				
None anticipated.	None anticipated.	Not Applicable.		Not Applicable.
Air Quality and Noise	T			



Aspect	Impact and Nature	Impact Management Outcomes	Impact Management Actions and Statements in order to avoid, modify, remedy, control or stop pollution or environmental degradation	Responsible party/ person(s)			
Construction Phase	Construction Phase						
Construction activities.	Generation of dust.	To prevent the generation of dust.	 Implement dust suppression techniques. Limit vegetation clearance until it is necessary for soil stripping. A complaints register must be kept onsite and be easily accessible to any party who wishes to lodge a complaint. The complaints register must include the following fields: The date of the complaint; The name and surname of the person lodging the complaint; Details of the complaint; and How and when the complaint was addressed. 	 Applicant Construction contractor 			
Construction activities.	Release of emissions from construction vehicles.	To minimise emissions from construction vehicles.	Regular maintenance of vehicles to minimise the release of emissions.	 Applicant Construction contractor			
Construction activities.	Generation of nuisance and noise from construction vehicles and equipment/machinery.	To prevent the generation of excessive noise and nuisance.	 Activities that generate the most noise must be scheduled during times of the day that result in the least disturbance to adjacent receptors. Noisy work must be avoided on weekends and public holidays. No amplified music is allowed onsite. Sirens and/or hooters may only be used during emergencies and drills. Vehicles must not be left idling unnecessarily. All vehicles must be regularly maintained. A complaints register must be kept onsite and be easily accessible to any party who wishes to lodge a complaint. The complaints register must include the following fields: The date of the complaint; The name and surname of the person lodging the complaint; Details of the complaint; and How and when the complaint was addressed. 	 Applicant Construction contractor 			
Operational Phase							
None anticipated.	None anticipated.	Not Applicable.		Not Applicable.			
Post-construction and	Rehabilitation Phase						
None anticipated.	None anticipated.	Not Applicable.		Not Applicable.			
Cumulative Impacts							
None anticipated.	None anticipated.	Not Applicable.		Not Applicable.			
Land Capability and La Construction Phase	nd Use						
Construction of residential units, shopping complexes, industrial complexes, stores, vehicle parking areas, roads etc.	The current arable, grazing or wilderness land capability will cease completely until the structures are removed. The current land uses, such as grazing, will cease completely until the structures are removed (this is not foreseen).	To minimise the impact of a cessation of arable, grazing or wilderness land capability.	All mitigation measures applied on soils will mitigate land capability, as far as possible.	 Applicant Construction contractor 			
Spillages of fuel or oil by mechanical equipment.	Possible contamination of soil by spillages of fuel or oil by mechanical equipment: The soil's physical and chemical properties will be adversely affected and will cause some reduction in land capability.	To prevent fuel and oil spillages.	All mitigation measures applied on soils will mitigate land capability, as far as possible.	ApplicantConstruction contractor			



Aspect	Impact and Nature	Impact Management Outcomes	Impact Management Actions and Statements in order to avoid, modify, remedy, control or stop pollution or environmental degradation	Responsible party/ person(s)
Construction activities.	Possible soil erosion at exposed building footprints due to higher runoff: Soil erosion will adversely affect land capability.	To minimise soil erosion.	All mitigation measures applied on soils will mitigate land capability, as far as possible.	 Applicant Construction contractor
Operational Phase				
Use and maintenance of residential units, shopping complexes, industrial complexes, stores, vehicle parking areas, roads etc.	The pre-construction land capability at areas covered by concrete, tar or paving will remain ceased.	To minimise the impact of a cessation of land capability in areas covered by concrete, tar or paving.	 All mitigation measures applied on soils will mitigate land capability, as far as possible. 	 Applicant
Post-construction and	Rehabilitation Phase			
None anticipated.	None anticipated.	Not Applicable.		Not Applicable.
Cumulative Impacts				
None anticipated.	None anticipated.	Not Applicable.		Not Applicable.
Joil Construction Phase				
The construction of	Compaction of the soil surface for	To minimise the impact from	Contain the construction footnrint as far as possible	Applicant
structures that cover the soil surface by means of concrete, tar or paving.	 building foundations, parking areas etc. will alter the soil's physical properties negatively; and Covering the soil surface with concrete, tar or paving will cause productive functioning of the soil to cease completely. 	soil compaction and covering.	 Prevent removal of the natural vegetation cover where possible. The development footprint must be optimised to minimise the area that will be compacted during the construction activities. Soil should be moved when dry, as far as possible. Excessively heavy vehicles should not be used for earthmoving activities. This will minimise compaction of the soil. 	Construction contractor
Spillages of fuel or oil by mechanical equipment.	Possible contamination of soil by spillages of fuel or oil by mechanical equipment, with soil physical and chemical properties being adversely affected.	To prevent fuel and oil spillages.	 All mechanical equipment must be serviced at an approved facility and at the required service intervals. All accidental fuel and oil spillages must be cleaned up immediately. Contaminated soil must be disposed at a suitable disposal facility. 	 Applicant Construction contractor
Construction activities.	 Possible soil erosion at exposed building footprints due to higher runoff: Possible soil erosion at exposed construction sites where the current natural vegetation was removed. 	To minimise soil erosion.	 Implement runoff control measures and structures during the first stages of construction, as far as possible. Contain the construction footprint as far as possible. Prevent removal of the natural vegetation cover, where possible. 	 Applicant Construction contractor
The mixing of concrete.	Soil pollution.	To prevent the contamination of soil during to concrete mixing.	 Concrete should ideally be mixed on an impermeable surface such as a concrete slab. Cement bags (new and used) must be stored under roof or in closed containers where they will not be exposed to rain. Dry concrete must be removed and disposed of together with other building rubble. Ready-mix concrete trucks may clean chutes into foundations, but not elsewhere onsite. 	ApplicantConstruction contractor
Operational Phase		T		
of residential units, shopping complexes,	All impacts on soils during the construction phase will remain during the operational phase. The productive	i o minimise the adverse impacts on the soil.	 Evaluation of the runoff control system and structures. Rectification where structures are inadequate. Frequent maintenance where necessary and prompt reparation after damages caused by any nature. 	ApplicantEngineer



Aspect	Impact and Nature	Impact Management Outcomes	Impact Management Actions and Statements in order to avoid, modify, remedy, control or stop pollution or environmental degradation	Responsible party/ person(s)
industrial complexes, stores, vehicle parking areas, roads etc.	functioning of soil at areas covered by concrete, tar or paving will remain ceased.			
Post-construction and	Rehabilitation Phase			
Rehabilitation activities.	Soil erosion due to inefficient rehabilitation of construction areas.	To prevent soil erosion.	 Rehabilitation must already be initiated during the construction phase, where possible. Areas for rehabilitation must be cleared of any building rubble and/or debris before rehabilitation is commenced with. Soil should be moved when dry, as far as possible. Weeds must be removed prior to soil replacement. Areas under rehabilitation must be cordoned off to prevent pedestrian and vehicular access. Re-vegetation must be undertaken using indigenous species, as far as possible. Areas under rehabilitation must be monitored to ensure successful vegetation establishment. Organic fertilizers and topsoil should be added to areas where vegetation establishment is not effective. 	 Applicant Construction contractor
Cumulative Impacts				
None anticipated.	None anticipated.	Not Applicable.		Not Applicable.
Socio-economic				
Construction and Oper	ational Phases			
Construction and	Generation of a large number of job	This is a positive impact and	no mitigation measures are therefore required.	Not applicable.
Construction and operational activities.	Stimulation of the local economy and housing sector.	This is a positive impact and	no mitigation measures are therefore required.	Not applicable.
Construction and operational activities.	Potential increase in crime due to the influx of workers, especially during the construction phase.	To prevent an increase in incidents of crime in the area.	 Reference checks should be conducted on all workers before they are appointed. Workers should not be allowed to leave the construction site during the day and should be transported to and from the site on a daily basis. 	 Applicant Construction contractor
Post-construction and	Rehabilitation Phase			
None anticipated.	None anticipated.	Not Applicable.		Not Applicable.
Cumulative Impacts				
None anticipated.	None anticipated.	Not Applicable.		Not Applicable.
Construction and Oper	ational Phases			
Construction and	Increase in traffic volumes to the site	To minimise the effect of an	Drivers must adhere to all speed restrictions and road rules	Applicant
operational activities.		increase in traffic volumes.	 Routing of vehicles must take other road users into account. Load restrictions must be adhered to. Avoid using access roads during peak times, as far as possible. Loads must be securely fastened. 	Construction contractorHOA
Post-construction and	Rehabilitation Phase			
Rehabilitation activities.	Increase in traffic volumes to the site.	To minimise the effect of an increase in traffic volumes.	 Drivers must adhere to all speed restrictions and road rules. Routing of vehicles must take other road users into account. Load restrictions must be adhered to. Avoid using access roads during peak times, as far as possible. Loads must be securely fastened. 	ApplicantConstruction contractor
Cumulative Impacts		· · · · · · · · · · · · · · · · · · ·		· · · · · · · · · · · · · · · · · · ·
None anticipated.	None anticipated.	Not Applicable.		Not Applicable.



8.2 Applicable Environmental Management Standards and Practices

Biomonitoring should be conducted at least once every four months (seasonally) during construction phase. Chemical analysis should occur on a weekly basis during construction phase and thereafter, if down-scaled, it should at least be monitored once a month.

8.3 Applicable provisions of the NEMA, 1998, as amended, regarding closure

The provisions of NEMA, 1998, pertaining to closure are not applicable to this proposed development as the development does <u>not</u> include the prospecting, exploration or extraction of a mineral or petroleum resource.

8.4 Applicable provisions of the NEMA, 1998, as amended, regarding financial provision for rehabilitation

The provisions of NEMA, 1998, pertaining to financial provision for rehabilitation are not applicable to this proposed development as the development does <u>not</u> include the prospecting, exploration or extraction of a mineral or petroleum resource.

8.5 Method of monitoring the implementation of the impact management actions

Construction Phase

An independent Environmental Control Officer (ECO) must be appointed to conduct monthly compliance audits during the construction phase of the proposed development. The audits must verify compliance with the Environmental Authorisation and this Environmental Management Programme and a formal report must be compiled after each audit. The reports must be submitted to the Competent Authority. Once the construction phase has been completed, a post-construction audit must be conducted by the independent ECO and the report also submitted to the Competent Authority.

Operational Phase

An internal ECO must be appointed to conduct monthly compliance audits during the operational phase of the proposed development and to ensure that corrective actions are implemented where required. Reports resulting from these audits do not need to be submitted to the Competent Authority.

An independent ECO must be appointed to conduct annual compliance audits during the operational phase of the proposed development. The audits must verify compliance with the Environmental Authorisation and this Environmental Management Programme and must comply with the requirements of Appendix 7 of the Environmental Impact Assessment Regulations of 2014, as amended. A formal report must be compiled after each audit and the reports must be submitted to the Competent Authority.

8.6 The frequency of monitoring the implementation of the impact management actions

Construction Phase

Monthly independent ECO compliance audits.

Operational Phase

Monthly internal ECO compliance audits and annual external ECO compliance audits.



8.7 Persons who will be responsible for the implementation of the impact management actions

The applicant is ultimately responsible for the implementation of the impact management actions, during all phases of the development, even where the implementation of the actions may be contracted out to a third party. During the construction phase, sub-contractors will for the most part be carrying out the required impact management actions and these actions should therefore be adequately communicated to the contractors. It is recommended that this document forms part of the tender documentation and contract documentation for all contractors. During the operational phase, the applicant will mostly be responsible for carrying out the required impact management actions.

The applicant must appoint a designated person for the function of internal/in-house ECO and an external, suitably qualified Environmental Assessment Practitioner for the function of external, independent ECO.

8.8 Time periods within which the impact management actions must be implemented Planning and Design Phase

The management actions for the Planning and Design Phase must be completed before the Pre-construction Phase is commenced with.

Pre-construction Phase

The management actions for the Pre-construction Phase must be completed before the Construction Phase is commenced with.

Construction Phase

The management actions for the Construction Phase must be completed prior to the completion of the Construction Phase (i.e. before the Operational Phase is commenced with).

Operational Phase

The management actions for the Operational Phase must be implemented during the Operational Phase, on a continual basis.

Post-construction and Rehabilitation Phase

The management actions for the Post-construction and Rehabilitation Phase must be completed within one year from the completion of the Construction Phase.

8.9 Mechanism for monitoring compliance with the impact management actions

Please refer to Sections 8.5 and 8.6 of this EMPr.



8.10 Program for reporting on compliance, taking into account the requirements as prescribed by the EIA Regulations, 2014, as amended

Toblo	0.	Poparting program	n
Iane	σ.	neporting program	1

Type of reporting	Reporting Frequency	Authority to report to
Construction Phase		
Monthly independent ECO compliance	Monthly, for the duration of the	Competent Authority (MDARDLEA)
audits	construction phase	
Post-construction phase independent	Once-off, upon completion of the	Competent Authority (MDARDLEA)
ECO compliance audit	construction phase	
Operational Phase		
Monthly independent ECO compliance	N/A – Internal reporting	N/A – Internal reporting
audits		
Annual external ECO compliance audits	Yearly	Competent Authority (MDARDLEA)

9. ENVIRONMENTAL AWARENESS PLAN

The applicant will ensure that its employees are adequately informed of the environmental risks that may result from work that they conduct onsite and how these risks must be dealt with in order to avoid pollution or the degradation of the environment, through the implementation of this Environmental Awareness Plan.

The Environmental Awareness Plan for the proposed project consists of two parts, namely, initial Induction Training and ongoing job-specific, Toolbox-talk Training. The same training material will be utilised during both the Induction Training and Toolbox-talk Training.

Induction Training

Before any employees or contactors commence work at the proposed development, each individual must undergo an Induction Training session. This is required during the following phases of the proposed project:

- Pre-Construction phase;
- Construction phase;
- Post-construction and rehabilitation phase; and
- Operational phase.

An attendance register must be kept by Sarovic Investments CC and each individual who has completed the Induction Training must complete the attendance register. This will also function as an acknowledgement that each individual has understood the training received.

Toolbox-talk Training

Toolbox-talk Training must be conducted biannually during the operational phase of the proposed development and all operational employees must attend these sessions. An attendance register must be kept by Sarovic Investments CC and each individual who has completed the Toolbox-talk Training must complete the attendance register. This will also function as an acknowledgement that each individual has understood the training received.

Training Material

The same material will be used for both the Induction Training and Toolbox-talk Training sessions and will cover the following topics:



- What is meant by the term "environment";
- Why the environment requires protection;
- The environmental risks that may result from work that is performed at the proposed project/development (the Township Development Pine Ridge Extensions 1-25), during the above mentioned phases of the project;
- How the identified risks may impact upon the environment;
- How the identified risks can be mitigated;
- The protection of workers who refuse to do environmentally hazardous work, as provided for in the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended;
- Environmental Management Programme conditions that are specifically applicable to employee's work onsite;
- Fire-fighting procedures; and
- Hydrocarbon spill response procedure, including spill kit usage training.

The training can be presented in a verbal format if required.

10. SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

No specific information has been required by the Competent Authority at this stage of the application process.