APPENDIX J
EMPr

ENVIRONMENTAL MANAGEMENT PROGRAMME

FOR

PROPOSED RESIDENTIAL DEVELOPMENT WITH OFFICES ON PORTIONS 72 AND 162 OF THE FARM WATERKLOOF 305 JQ, RUSTENBURG, NORTH WEST PROVINCE, SOUTH AFRICA

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Prepared by:

Address: P.O. Box 1322, Ruimsig, 1732
Tel: 082 667 5056
Fax: 086 692 8820
info@hydroscience.co.za

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Definitions, Abbreviations and Acronyms

BA	Basic Assessment
BAR	Basic Assessment Report
CARA	Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983)
CBA	Critical Biodiversity Area
CBD	Central Business District
CFC	Chloro-Fluoro Carbons
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMP	Environmental Management Programme
EO	Environmental Officer
GPS	Global Positioning System
MPE	Magaliesberg Protected Environment
NEMA	National Environmental Management Act, 1998 (Act 107 of 1998), as Amended
NEMBA	National Environmental Management Biodiversity Act, 2004 (Act 10 of 2004)
OHSA	Occupational Health and Safety Act, 1993 (Act 85 of 1993)
SANS	South African National Standards
VOC	Volatile Organic Compounds

1 INTRODUCTION

HydroScience cc, an independent Environmental Assessment Practitioner (EAP), has been appointed by Magic Plant Hire (Pty) Ltd, to undertake a Basic Assessment (BA) process and submit a Basic Assessment Report (BAR) to apply for environmental authorisation for the proposed residential development with offices on Portions 72 and 162 of the farm Waterkloof 305 JQ, Rustenburg, North West Province, South Africa.

The BA process for this project has been designed to comply with the requirements of the Environmental Impact Assessment (EIA) Regulations of 7 April 2017 in terms of Section 24 of the National Environmental Management Act (NEMA), 1998 (Act 107 of 1998), as Amended, which is South Africa's national framework environmental legislation. Key principles embodied in the NEMA include:

- Sustainability – development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs;
- Mitigation hierarchy – avoidance of environmental impact, or where this is not possible, minimising the impact and remediating the impact; and
- The duty of care towards the environment.

The assessment of impacts has been conducted in accordance with these principles.

Based on the findings of the BA process, an Environmental Management Programme (EMP) has been developed that will be implemented to control and minimise possible adverse impacts during all phases of the proposed project. The EMP will therefore:

- Define the various measures to be taken into account during the life of the project in order to enhance positive and minimise/reduce adverse environmental impacts and meet the performance specifications of low to negligible impact;
- Define the actions required to implement these measures;
- Describe how this will be achieved; and
- Allocate responsibilities for implementation.

EMPs are important tools for ensuring that the management actions/measures arising from the EIA process are clearly defined and implemented through all phases of the project.

The purpose of the EMP (this document) is to ensure the following:

- That unnecessary or reasonably avoidable adverse impacts of the project are prevented;
- That impacts which cannot be prevented are managed to reduce their significance; and
- That the positive benefits of the project are enhanced where possible.

2 SITE CONTEXT

The proposed residential development with offices will be established on Portions 72 and 162 of the farm Waterkloof 305 JQ, Rustenburg, North West Province (Figure 1). The proposed portion of land is located approximately 1 km south from the Waterfall Mall in Rustenburg. This farm portion can be accessed via the R24 on the eastern boundary of the site. The Global Positioning System (GPS) coordinates are 25° 42' 42.7" South; 27° 15' 15.5" East.

The project includes the following (refer to Figure 2, layout plan):

- Residential
  - Residential 1 across 5.58ha (29.9% of area) for 48 stands
  - Residential 2 across 6.61ha (35.5% of area) for three (3) stands
- Special for offices etc. across 3.27ha (17.5% of area)

- Roads across 2ha (10.7% of area)
- Private open space across 1.09ha (5.9% of area)
- Special for access control – 0.057 ha
- Memorial sites (2) will be moved to graves' location.
- Graves, together with memorial sites, will then be kept undisturbed in their existing position.

3 SPECIALIST STUDIES

The following specialist studies were conducted and their findings have been incorporated into the EMP:

- A Cultural and Heritage Impact Assessment by Archaetnos Culture and Cultural Resource Consultants (Prof. A.C. van Vollenhoven), which found two (2) memorial sites and two (2) graves on the property.
- An Ecological (fauna and flora) Impact Assessment by African Litany (Ms Melissa Moffett), which found that the third of the property closest to the R24 (east) has a vegetation unit with a conservation status of Vulnerable and was noted to be partially transformed, whereas the two thirds section of the property towards Waterberg road (west) has a vegetation conservation status of Least Disturbed and was noted to be largely undisturbed and natural.
- A geotechnical investigation by Rocksoil Consult (Mr D.H. Wessels), whose findings indicated that there were no geotechnical features on the site that would affect the housing development if mitigation measures are implemented..

The BA, that includes the specialist studies (field work and report writing) and the public participation process, were conducted as part of the **planning phase of the project**.

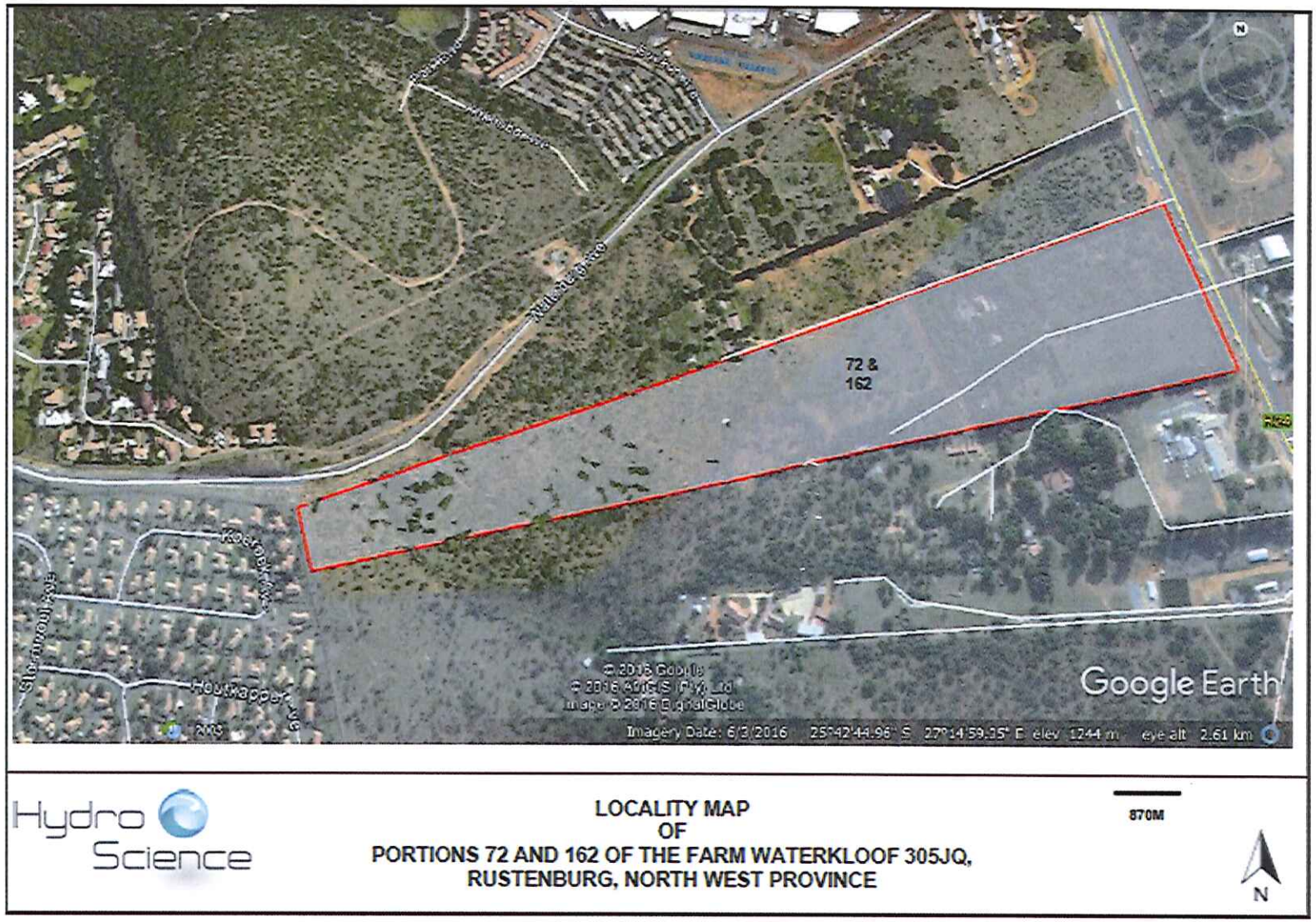

Figure 1: Regional locality map

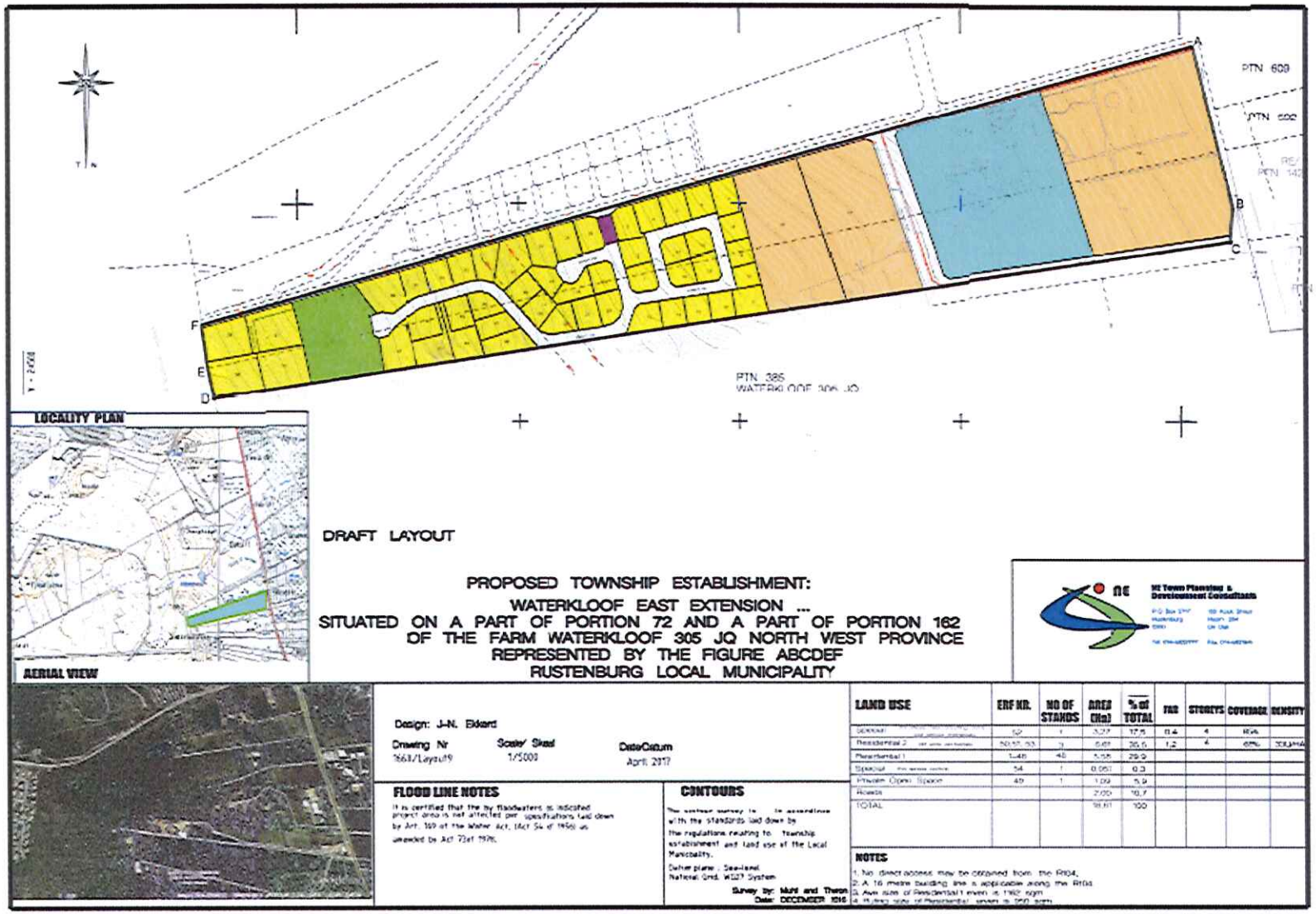

Figure 2: Site Layout Plan

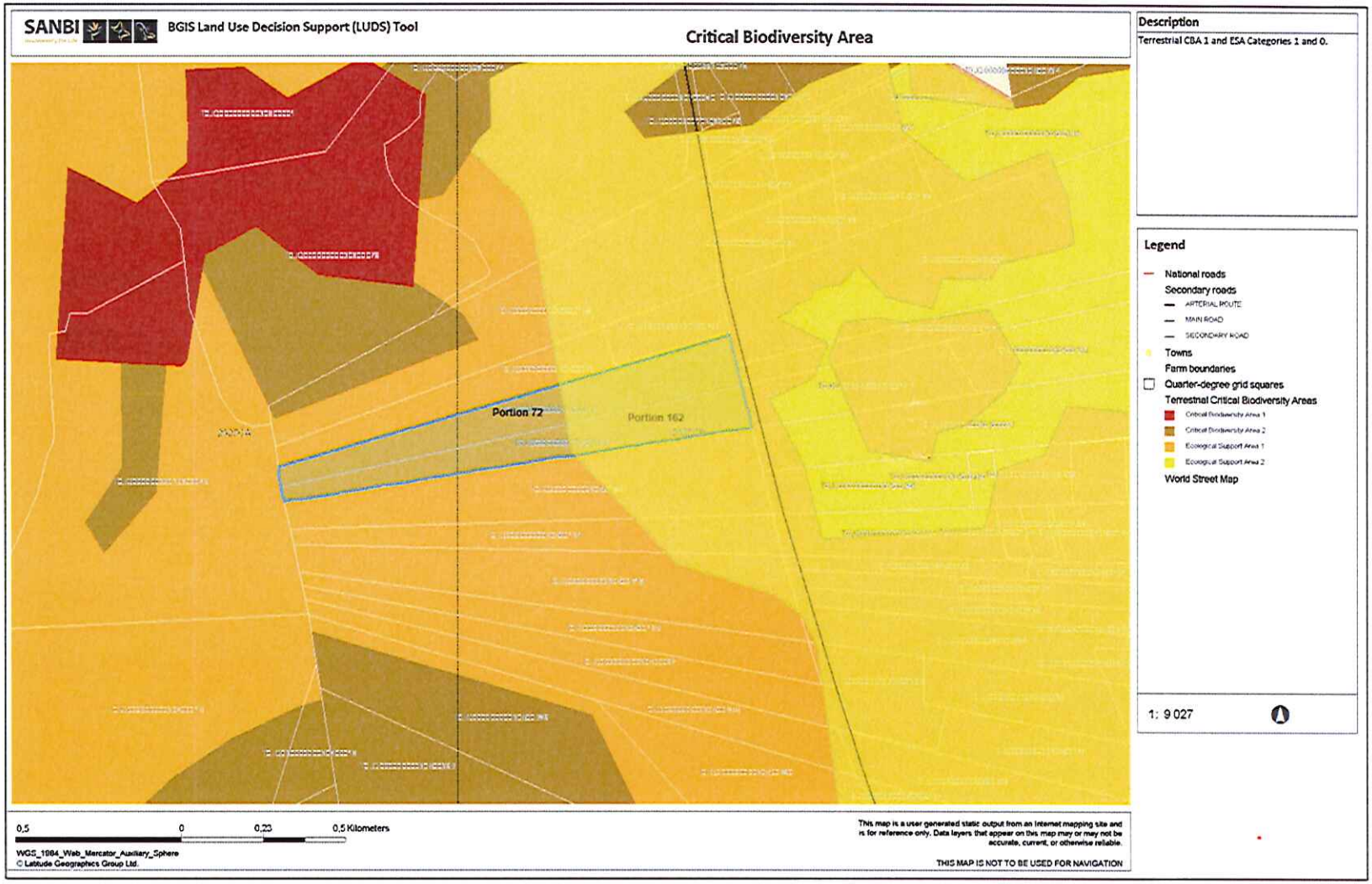

Figure 3: Critical Biodiversity Map of the Proposed Project Area

4 ENVIRONMENTAL IMPACT ASSESSMENT

4.1 Methodology

The significance of the environmental impacts identified was assessed in terms of their:

- Duration;
- Extent;
- Probability; and
- Severity.

The above were used to determine the significance of an impact without any mitigation, as well as with mitigation.

Nature of an impact: An impact's nature can be positive (+) or negative (-).

Consequence: Considers duration, extent and severity

Consequence = duration + extent + severity

Table 1: Environmental risk and impact assessment criteria.

DURATION (D)		
Immediate	Less than 1 month	1
Short-term	6 months	2
Construction	36 months	3
Life of project	Operational phase	4
Post-closure	Time of rehabilitation and for re-establishment of natural systems	5
Residual	A permanent impact (100 years or more)	6
EXTENT (E)		
Site specific	Site of the proposed development (Portions 62 and 172)	1
Local	Farm/site and surrounding farms/site (Farm Waterkloof 305 JQ)	2
Regional	Rustenburg Local Municipality	3
Provincial	North West Province	4
National	Republic of South Africa	5
PROBABILITY (P)		
Rare	<5% probability of occurrence – may occur in exceptional circumstances	1
Unlikely	15% - 6% probability of occurrence – could occur at some time	2
Possible	45% - 16% chance of occurrence – might occur at some time	3
Likely	65% - 46% probability of occurrence – will probably occur in most circumstances	4
Almost Certain	90% - 66% probability of occurrence – is expected to occur	5
Definite	100%- will occur	6
SEVERITY (S)		
Catastrophic (critical)	Total change in area of direct impact, relocation not an option, death, toxic release off-site with detrimental effects, irreversible loss, huge financial loss	6
Significant (High)	> 70% change in area of direct impact due to loss of significant aspect, extensive injuries, long term loss in capabilities, off-site	5

	release to high extent, major financial implications	
Serious	50 – 70% long-term loss, extensive rehabilitation / restoration / treatment required, high financial impact, still restricted in extent	4
Moderate (medium)	20 – 49% change, medium term loss in capabilities, rehabilitation / restoration / treatment required, on-site release with outside assistance, medium financial impact	3
Minor	10 – 19% change, short term impact that can be absorbed, on-site release, immediate containment, low financial implications	2
Insignificant (low)	< 10 % change in the area of impact, no financial implications, localised impact, a small percentage of population	1

[Duration (D) + Extent (E) + Severity (S)] x Probability (P) = Impact Significance (IS)

IMPACT SIGNIFICANCE (IS)		
Impact Significance	**IS score range**	**Description**
Low (L)	<15	The impact is minor or insubstantial; it is of little importance to any stakeholder and can easily be rectified.
Moderate Low (ML)	16 - 45	The impact is limited in extent, even if the intensity is major; the probability will only be likely, the impact will not have a significant impact considered in relation to the bigger picture; no major material effect on decisions and will require only small scale management intervention bearing moderate costs.
Moderate high (MH)	46 - 70	The impact is significant to one or more stakeholders, and its intensity will be medium or high; therefore, the impact may materially affect the decision, and management intervention will be required.
High (H)	71 <	The impact could render development options controversial or the entire project unacceptable if it cannot be reduced to acceptable levels; and/or the cost of management intervention will be a significant factor in project decision-making.

4.2 Impact Assessment Ratings

The impacts and associated significance ratings for each phase of the project were assessed (Tables 2, 3 and 4). The no-go option would not meet the market demand for housing and offices.

Table 2: Impact significance for the construction phase

Aspect and description		Impact rating (before mitigation)							Impact Rating (after mitigation)						
Aspect	Description	Nature of Impact (positive / Negative)	Spatial Scale/ Extent (6)	Duration (6)	Severity (6)	Consequence	Probability (6)	Significance (108)	Nature of Impact (positive / Negative)	Spatial Scale/ Extent (6)	Duration (6)	Severity (6)	Consequence	Probability (6)	Significance (108)
Fauna & Flora	Loss of biodiversity	N	1	6	3	10	6	60	N	1	6	3	10	6	60
Land Use	Residential and offices from agricultural	N	1	6	3	10	6	60	N	1	6	2	9	6	36
Soils	Soil erosion due to aspect & collapsible nature of soils	N	1	4	3	8	6	48	N	1	4	3	8	3	24
Waste Management	Disposal of Construction Waste / Material	N	3	2	3	8	6	48	N	2	3	2	7	2	14
Air Quality	Dust	N	2	3	3	8	6	48	N	1	3	1	5	2	10
	Emissions from vehicles & equipment	N	2	3	1	6	5	30	N	2	3	1	6	1	6
Water	Pollution of Surface Water Runoff	N	2	3	3	8	3	24	N	2	3	2	7	2	14
	Contamination of Groundwater	N	3	3	3	9	3	27	N	3	3	2	8	2	16
Storm Water Management	Improper Storm Water Management	N	2	3	3	8	4	32	N	1	3	2	6	2	12
Safety Requirements	Safety measures	N	2	3	3	8	5	40	N	2	3	2	7	2	14
Cultural & heritage	Graves and memorials	N	1	6	3	10	6	60	N	1	6	2	9	6	54

Table 3: Impact significance for the operational phase.

Aspect and description		Impact rating (before mitigation)							Impact Rating (after mitigation)						
Aspect	Description	Nature of Impact (positive / Negative	Spatial Scale/ Extent (6)	Duration (6)	Severity (6)	Consequence	Probability (6)	Significance (108)	Nature of Impact (positive / Negative	Spatial Scale/ Extent (6)	Duration (6)	Severity (6)	Consequence	Probability (6)	Significance (108)
Socio-economic	Health and Safety	N	2	4	3	9	3	27	N	2	4	2	8	2	16
	Sustainability	N	1	4	3	8	3	24	N	1	4	2	7	2	14
Air Quality and Noise	Increase in noise levels due to the presence of people. Air quality will be impacted by braais and vehicle exhaust systems.	N	1	6	2	9	3	27	N	1	6	2	9	2	18
Waste Management	Waste generated	N	3	4	2	9	3	27	N	2	4	2	8	2	16
Fauna & Flora	Alien infestation due to disturbance	N	1	4	2	7	2	14	N	1	4	1	6	1	6
Storm Water Management	Improper Storm Water Management	N	1	4	2	7	2	14	N	1	4	1	6	1	6

Job creation can be seen as a positive impact of the operational phase.

Decommissioning is not applicable to a residential and office type development.

Table 4: Impact and associated significance for the No-go Option

Aspect and description		Impact rating (before mitigation)						
Aspect	Description	Nature of Impact (positive / Negative	Spatial Scale/ Extent (6)	Duration (6)	Severity (6)	Consequence	Probability (6)	Significance (108)
Health and Safety	Air Quality	N	3	4	2	9	3	27
	Waste	N	3	4	2	9	4	36

5 POTENTIAL IMPACTS

Based on the identified impacts and associated significance ratings provided above, the following potential (negative and positive) impacts have been identified as being key to the two (2) phases (construction and operation) of the preferred option for the proposed project:

5.1 Negative Impacts

Construction phase (Short term)

- Construction methodology due to collapsible soil.
- Waste management – The sorting of waste types and appropriate disposal is necessary.
- Vegetation clearance, earthworks and compaction of soil by heavy vehicles used during construction could lead to increased surface runoff flow velocity and erosion.
- Loss of indigenous vegetation due to vegetation clearing will lead to loss of faunal habitat and a decrease in biodiversity associated with the project area.
- Cultural heritage aspects including graves and two (2) memorial sites will be affected in the short-term.

Operational phase (indefinitely)

- Waste management – General waste will be produced by the residents and workers on the site that will need to be disposed accordingly or it can result in pollution and health risks.

5.2 Positive impacts

Positive impacts will occur as part of the construction and operational phase and include the following environmental and socio-economic benefits:

- Job creation
- Provision of housing

5.3 No-go Option impacts

The aspects below are impacted upon if the no–go option is selected. Mitigation for these impacts includes the continuation of the proposed project.

- No job creation since the land is not currently used for agricultural purposes. Only security guards are currently employed.
- Safety and security since the land is currently vacant and needs to be protected by security guards to prevent criminal activities.
- Loss of land with development potential since the site is currently vacant and not used for its zoned purpose, i.e. agriculture.

6 MANAGEMENT MEASURES

Dedicated management measures have been identified to manage the above identified impacts (Table 6). The purpose of the EMPr is to ensure that undue or reasonably avoidable adverse impacts of the project are prevented; that impacts which cannot be prevented are managed to reduce their significance; and that the positive benefits of the project are enhanced.

Table 5: Identified potential impacts and proposed management measures

Construction phase including Installation (36 months)	
Fauna & Flora	
Potential impact:	**Loss of biodiversity** • The site is located within the buffer zone of the Magalies Protected Environment (MPE), an area legislated as a protected area. • Degradation of the area through a loss of plant cover. This may have an impact on threatened and conservation-worthy plant species. • Removal of soil cover may lead to erosion and to an increase in the rate of stormwater flow (due to relatively steep slopes of project area). • Vegetation removal will cause fauna to move away and reduce extent of faunal habitat; • Establishment and spread of declared weeds and alien invader plants; and • Alien vegetation species are more prominent near disturbances relative to less disturbed areas.
Impact Significance: (prior to mitigation)	**Moderate high**
Management measures:	Recommendations that form part of the mitigation of potential ecological impacts include: • To remain within demarcated areas during construction to limit disturbances to surrounding areas; • To remove all exotic/invasive species as Conservation of Agricultural Resources Act (CARA), 1983 (Act 43 of 1983) and National Environmental Management Biodiversity Act (NEMBA), 2004 (Act 10 of 2004) requires; • To limit construction activities to the day time and working hours for the purpose of not disturbing activities and ecological processes of nocturnal birds, small mammal etc.; • No material (animals, plant, trees for firewood, rocks) may be removed from the nearby MPE area and no fauna species encountered may be harmed, trapped or captured, *i.e.* poaching is forbidden; • Signage indicating conduct on property, such as no littering, no removal of trees or animals, no pets, no harm to trees and animals etc; • The Contractor to retain as many of the indigenous trees and bushes as possible and practical. This could be through the incorporation of natural bushveld trees as part of the landscape features of the residential development. The Contractor's work force would need to be sensitised to this requirement. It would also require detailed planning and consideration by the Developer; • The Developer to designate a portion of the project site as 'no-go' area and retain this area as a biodiversity

	corridor (private open space). Such a 'no-go' area should link with the adjacent MPE and assume the role of biodiversity corridor. This 'no-go' area must be demarcated prior to construction activities commencing to guide the Contractor and his staff; • In the event that any rare / endangered / protected species are found in the project site footprint, such species should be relocated to a similar location/habitat not more than 300 metres from its original location, before site clearing and planting activities occur; and • Avoid the removal of the protected species *Sclerocarya birrea* (Marula) if it is identified during the construction phase.
Impact significance (post mitigation)	Moderate High
Land Use	
Potential impact:	**Change of land use** The property is zoned agricultural but not used for commercial agricultural activities. Agricultural land will be lost. There remains of a small mango tree plantation is located on the property.
Impact Significance: (prior to mitigation)	Moderate High
Management Measures:	Rezone the property from agricultural use to residential and business use based on the following facts: • The property is surrounded by existing, approved or planned residential, commercial and business developments. • The property is located within the urban edge. • The site is in close proximity to the Rustenburg CBD.
Impact Significance: (post mitigation)	Moderate Low

Soil and geotechnical (Extracted from geotechnical investigation (Rocksoil Consult, 2017)	
Potential impact:	• Eastern half has a fair slope and is covered with relatively thick collapsible soil. • Centre to western areas have intermediate to localised areas of steep slopes and ridges with rock outcrop and shallow rock in areas. • Upper soils are deemed collapsible. • Localised fill area and drainage features require engineering. • Scattered outbuildings, structures and cement reservoir with expected French drains / sub-surface soak-away systems. • On-site soil suitable for o mattress construction with low bearing structures; o bedding and backfill material as per DWA specifications; and o sub-grade material in road construction; selective material suitable for selective layers construction.
Impact Significance: (prior to mitigation)	**Moderate high**
Management Measures:	• No soluble dolomitic/limestone formations. • No identified mineral deposits and undermining. • Foundation precautionary measures to limit/prevent unwanted damage to proposed/planned structures due to expected collapse/consolidation settlement associated with soils. o Foundation types/options recommended for Zone 1 (C2/2ABDE (3L)): soil raft, compaction of in-situ soil below individual footings and floors/slabs, stiffened strip footings, stiffened strip footings, stiffened or cellular raft. o Foundation types/options recommended for Zone 2 (P (Burrowed and uncontrolled fill) C2 / 2ABDE (3L)): removal of fill and instatement/rehabilitation by means of backfill and compaction of inert material; suitable foundation option dependent on rehabilitation approach. o Foundation types/options recommended for Zone 3 (C2-R/2ABDEFI (2-3FIL)): soil raft, compaction of in-situ soil below individual footings and floors/slabs, stiffened strip footings, deep strip foundations (feasibility will be area specific), stiffened strip footings, stiffened or cellular raft. • Normal construction to modified normal construction for structures on competent weathered quartzite (localised area in Zone 3) • Open foundation trenches to be inspected and certified by competent person if deep strip foundations, normal construction or modified normal construction are considered. • Evaluate slope stability of any significant cut and/or excavations. • Proper drainage and damp proofing to prevent moisture damage to foundations/floors and masonry.

	• Safety precautionary measures for manned excavations or trenches, Sign off by competent person required as per regulations. • Phase 2 investigation as per SANS 634:2012
Impact Significance: (post mitigation)	Moderate Low
Waste Management	
Potential impact:	**Improper Handling and Disposal of Waste** General waste will accumulate during the construction phase due to vegetation clearance, demolition of structures and construction workers. Waste generated on site must be sorted into different waste streams. Poor solid waste management practises can lead to contamination and unsightly areas, as well as pests/vermin and odours with associated health issues. Waste streams include: • Vegetation due to removal of vegetation. • Solid construction waste generated through construction activities (building rubble). • Hazardous waste in the event of a hydrocarbon spillage/leak (construction equipment or vehicles). • General waste produced by builders (biodegradable and non-biodegradable).
Impact Significance: (Prior to mitigation)	Moderate High
Management Measures:	• Collect general waste in suitable containers (drums/skips/bins on site) and remove from site for disposal to the Rustenburg Local Municipal landfill facility by the construction contractor on a regular basis (at least weekly or when skip is full). • Ensure sufficient containers are available for storage of waste prior to removal off site to prevent overflow and littering on the site and surroundings. • Waste containers must have covers to prevent rainwater infiltration. • Reduce waste quantities and disposal costs through a reduction in the materials ordered. "Take-back" schemes – setting up schemes with suppliers to take back surplus materials. • Separation of materials into different waste streams for collection and recycling. Make arrangement with recycling contractors to provide clearly marked bins for material separation. Make sure that sub-contractors are aware of the placement of the bins and their responsibility to separate materials. • Material storage – material storage areas should be safe, secure and weatherproof to prevent damage to material (resulting in waste generation) and theft. • Reduce and reuse – engage with the supply chain to supply products and materials that use minimal

	packaging, and segregate packaging for reuse. • Contractors to report on the quantities of different waste streams they manage (landfill, reuse, recycling, energy recovery); • Ensure no litter, refuse, waste and rubble generated on the premises will be placed, dumped or deposited on this site, adjacent or surrounding properties or road verges during the construction and clean-up phase. • Ensure copies of all waste manifests (safe disposal certificates) are kept, showing responsible handling, transport and disposal by a reputable waste handler. • Include measure in contract that will ensure sub-contractors are required to clean their work area after construction.
Impact Significance : (Post mitigation)	Moderate Low
Air quality	
Potential impact:	**Dust and Emissions** Emissions may be released into the atmosphere resulting from vehicles and machinery (carbon monoxide emissions, smoke), solvents, and malodours as a result of waste not being removed from the construction site; and Dust may result from earthworks.
Impact Significance: (Prior to mitigation)	Moderate High
Management Measures:	• All vehicles and machinery/equipment used on, or entering the site, must be maintained and serviced regularly to ensure that they do not emit smoke or fumes. The contractor's representative must ensure that all on-site vehicles comply with the old SABS 0181 standards (now SANS 10181:2003 in conjunction with SANS 10282:2003) • Limiting idling time of vehicles / equipment. • Avoiding overloading of construction vehicles. • Any solvent based finishes such as paints, varnishes, sealants, and polishes will contain minimal levels of Volatile Organic Compounds (VOC) and no Chloro-Fluoro Carbons (CFC), which may harm the atmosphere. Water-based paints are to be used where possible and plant based stains and sealants must be considered as these are more environmentally friendly. • Waste must be disposed, as soon as possible to a municipal transfer station, skip or on a licensed landfill site. Waste must not be allowed to stand on site to decay, resulting in malodours and attracting vermin. Waste may

	not be burnt on site. • Hazardous waste must be separately stored from general waste on an impermeable surface and disposed of at a hazardous waste landfill site. • Water sprays and dust suppression surfactants, must be used to limit dust generated if required. • A complaints register must be kept throughout the construction and operational phase.
Impact Significance : (Post mitigation)	Moderately Low
Surface runoff	
Potential impact:	**Incorrect handling and spillage of building materials and hydrocarbons** Spillages can cause soil, runoff and groundwater contamination.
Impact Significance: (Prior to mitigation)	Moderately Low
Management Measures:	• If feasible, construction should preferably occur in the dry season, when surface water runoff is minimal. • No uncontrolled discharge from the site should be permitted. • Construction vehicles must be limited to one path to reduce compaction of soil, which increases surface runoff. • Designing the site with a smaller area of impervious surfaces. • Surface run-off from construction sites should be discharged into storm water drains via adequately designed sand/silt removal facilities such as sand traps, silt traps and sediment basins to reduce siltation in storm water drains. Channels or earth bunds or sand bag barriers should be provided on site to properly direct storm water to such silt removal facilities. • Silt removal facilities should be maintained and the deposited silt and grit should be removed regularly, to ensure that these facilities are functioning properly at all times. • Wastewater generated from the washing down of mixer trucks and drum mixers and similar equipment should wherever practicable be recycled. • Contractor must ensure that all building materials / chemicals are effectively stored (sealed containers) and managed (mixing etc.) to prevent contamination. In the unlikely event of a spillage, sufficient clean-up procedures must be carried out immediately. • All reagents, reagents storage tanks and mixing units must be supplied with a bunded area built to contain

	110% of the capacity of the facility, to contain any spilled material and return back into the system if possible. The system must be maintained in a state of good repair and standby pumps must be provided.
Impact Significance : (Post mitigation)	Low
Storm Water Management	
Potential impact:	**Improper storm water management** Impermeable surfaces minimises the surface area available for water infiltration and prevents the effective infiltration of precipitation into the soils and therefore leads to an increase in surface water flow volumes to be managed as well as the velocity at which it flows. This may also lead to erosion.
Impact Significance: (Prior to mitigation)	Moderately Low
Management Measures:	• Alteration of existing drainage patterns must be avoided. • The use of low impact development techniques are preferred to intercept and infiltrate runoff from developed areas distributed throughout the site. • The cost of storm water implementation, management and maintenance, as well as flood risk, can be greatly reduced by identifying, retaining and enhancing the natural areas along which runoff flows.
Impact Significance : (Post mitigation)	Low
Safety requirements during construction	
Potential impact:	**Failure to comply** Failure to comply with the safety requirements can result in health impacts (injury) and environmental damage.
Impact Significance: (Prior to mitigation)	Moderately Low
Management Measures:	Compliance with OHSA.
Impact Significance : (Post mitigation)	Low

Cultural and heritage (extracted from cultural and heritage impact assessment (Archaetnos, 2017)	
Potential impact:	Two (2) graves and two (2) memorials were found on the property.   
Impact Significance: (Prior to mitigation)	**Moderate High**

Management Measures:	• Two (2) memorials to be relocated to be moved to where the graves are situated.
	• Add a small plaque with contextual information on the Wissekerke family.
	• Graves must be preserved in situ and the memorials be placed at this location.
	  o A buffer zone of at least 20 m should be allowed.
	  o Cultural heritage management plan should be drafted for the preservation of the site.
	• If the graves (younger than 60 years) need to be exhumed and relocated, an undertaker needs to be involved and it should be done in accordance with the legislation indicated in the specialist report.
	• Development may continue only after the mitigation measures indicated above had been implemented and approved by SAHRA. The documentation was submitted to SAHRA via the SAHRIS website on 19 April 2017.

	• It should be noted that the subterranean presence of archaeological and/or historical sites, features or artifacts is always a distinct possibility. Due to the density of vegetation, it also is possible that some sites may only become known later on. Operating controls and monitoring should therefore be aimed at the possible unearthing of such features. Care should therefore be taken when development commences that if any of these are discovered, a qualified archaeologist be called in to investigate the occurrence.
Impact Significance: (Post mitigation)	**Moderate High**

Operational phase (indefinite)	
Waste Generation	
Potential impact:	**Waste generated during the operational phase** General waste will be produced by residents, visitors and workers. Waste removal services are required.
Impact Significance: (Prior to mitigation)	Moderately Low
Management Measures:	• Drums and skip / bins must be kept onsite for waste collection. • General waste must be handled as per the construction phase. • Though no special disposal methods are required (non-hazardous waste), store non-biodegradable refuse such as glass bottles, plastic bags, etc. in suitable containers to allow for recycling and empty on an as-required basis. • Ensure no litter, refuse and waste generated on the premises will be placed, dumped or deposited on this site, adjacent or surrounding properties during the operational phase. • Proof must be provided by the waste contractor that the general waste is disposed of at a registered appropriate landfill site (safe disposal certificate). • Waste manifest / safe disposal certificate must be kept on site.
Impact Significance : (Post mitigation)	Moderately Low
Air Quality & Noise	
Potential impact:	Noise levels will increase due to the presence of people (people talking, children playing, dogs barking, music playing, cars driving etc.) Air quality will be impacted by braais and vehicle exhaust systems.
Impact Significance: (Prior to mitigation)	Moderately Low
Management Measures:	Noise levels will be typical to that of residential areas and is not seen as a concern since the nature of the area is changing.
Impact Significance : (Post mitigation)	Moderate Low

Fauna & Flora	
Potential impact:	<u>Loss of biodiversity</u> • Increase in the spread of alien and invasive plants on site due to disturbance of vegetation cover during the construction phase. • The alien and invasive vegetation may spread to the proposed 'no-go area' corridor.
Impact Significance: (Prior to mitigation)	Low
Management Measures:	• The disturbance associated with the construction phase of the project will render the disturbed areas vulnerable to alien plant invasion. • To remove all exotic/invasive species as Conservation of Agricultural Resources Act (CARA), 1983 (Act 43 of 1983) and National Environmental Management Biodiversity Act (NEMBA), 2004 (Act 10 of 2004) requires.
Impact Significance : (Post mitigation)	Low
Storm Water Management	
Potential impact:	<u>Increased and polluted storm water runoff</u> Impermeable surfaces minimises the surface area available for water infiltration and prevents the effective infiltration of precipitation into the soils and therefore leads to an increase in surface water flow volumes to be managed as well as the velocity at which it flows.
Impact Significance: (Prior to mitigation)	Low
Management Measures:	• Storm water runoff must be controlled and kept to low velocity flows. • Passing water from gutters onto grassed surfaces, rather than directly into areas prone to erosion (bare surfaces). • A storm water management plan is required.
Impact Significance : (Post mitigation)	Low

7 MONITORING PROGRAMME

During the construction phase, monitoring and auditing of compliance with this EMP, the environmental authorisation conditions and with the OHSA Regulations are to be conducted. An Audit Protocol for the construction phase has to be drawn up by a suitably qualified person to include but not be limited to aspects listed below.

7.1 Construction Phase

The following aspects need to be audited:

a) EMP and environmental authorisation compliance
- Appoint an Environmental Control Officer (ECO)

b) Noise Monitoring
- A record of complaints must be kept on the premises, as well as the measures taken to address these complaints.

8 RESPONSIBILITY

The applicant, Magic Plant Hire (Pty) Ltd, will be responsible for the implementation of all management measures, as well as for compliance with this EMP and any additional conditions imposed by the environmental authorisation. Each Contractor or employee involved in the project will comply with the EMP and environmental authorisation conditions and Contractors will therefore appoint a Contractor's Representative (such as an environmental officer (EO) but the title may vary), who is responsible for the on-site implementation of the EMP (or relevant sections of the EMP).

The representative will be suitably qualified to perform the necessary tasks and will be appointed at a level such that he/she can interact effectively with other site contractors, labourers, the ECO, and the public. The representative must ensure that all sub-contractors abide by the requirements of the EMP and environmental authorisation conditions.

The representative for Magic Plant Hirea is Mr Danie Erasmus (014 592 6431).

The construction contractor and ECO still have to be appointed.

The conditions of the EMP and environmental authorisation must be brought to the attention of all persons (employees, workers, consultants, contractors etc.) associated with the undertaking of these activities. Magic Plant Hire (Pty) Ltd must take such measures that are necessary to bind such persons to the conditions thereof (contracts with penalties for non-compliances).

Magic Plant Hire (Pty) Ltd can further enforce this by running workshops or seminars with all employees/contractors in order to raise environmental awareness (refer to environmental awareness plan). These workshops should cover aspects such as the handling of used hydrocarbons (grease & oil), pollution prevention, safe operating of mechanical equipment, water conservation, waste management and general duty of care.

9 RECORD KEEPING AND REPORTING

Accurate and up-to-date records will be kept by the EO or other appointed representative of all system malfunctions resulting in non-compliance with the EMP or environmental authorisations. Magic Plant Hire (Pty) Ltd will also, within 24 hours, ensure that the relevant

authorities are notified of the occurrence or detection of any incident which has the potential to cause, or has caused pollution of the environment, health risks or which is a contravention of any EMP or environmental authorisation condition. Magic Plant Hire (Pty) Ltd is then to submit an action plan indicating measures which will be taken to:

- Correct the impacts resulting from the incident;
- Prevent the incident from causing any further impact; and
- Prevent a recurrence of a similar incident.

A complaints register will be kept on site and all complaints from the public will be noted therein as well as measures taken to rectify the situation as described above.

10 ALTERATIONS TO THE EMP

As EMPs should remain dynamic and flexible, certain conditions may require the EMP to be revised. These conditions may include the following:

- Changes in legislation;
- Published/gazetted norms and standards;
- Occurrence of unanticipated impacts or impacts of greater significance, intensity and extent than anticipated;
- Conditions in environmental authorisation which do not form part of the EMP;
- Inadequate mitigation measures, i.e. where the level of an environmental parameter is not conforming to the required level despite the implementation of the mitigation measure; and
- Secondary impacts which occur as a result of the mitigation measures.

11 ENVIRONMENTAL AWARENESS PLAN

11.1 Objectives

The objectives of an environmental awareness plan are to:

- Inform employees and contractors of any environmental risk which may result from their work, and
- Inform employees and contractors of the manner in which the identified possible risks must be dealt with in order to avoid pollution or degradation of the environment.

In general, the purpose of implementing an environmental awareness plan is to optimise the awareness of those partaking in the activities (mostly construction activities), which have the potential to impact negatively on the environment, and in doing so, promote the goal of sustainable development.

11.2 Communication

Both objectives of the environmental awareness plan indicate that employees and contractors must be informed of environmental matters. Information sharing is only possible through effective communication channels.

The goal for proficient communication is to provide structures for effective communication, participation and consultation that relate to the occupational health and safety hazards, environmental hazards and the Safety, Health, Environment and Quality (SHEQ) management system, especially during construction.

The objective of the communication procedure is to ensure effective communication flow, involvement of all levels of employees in the communication chain and to comply with the requirements in terms of ISO 9001:2008 clause 5.5.3 and ISO 14001:2004 clause 4.4.3.

11.3 Communication responsibility

Communication on site will be uncomplicated due to the nature of the development (residential and offices). During the construction phase, the main construction contractor will be responsible for communication with sub-contractors and workers.

The **management representative** for Magic Plant Hire (Pty) Ltd (Mr Danie Erasmus) has the responsibility, designated authority and accountability to ensure:

- Communication channels/processes are established, implemented and maintained.
- External communication: Communication with the media (press releases), other governmental departments (Department of Health, Department of Labour etc.), provincial (NW READ) and local authorities (Rustenburg Local Municipality), as well as Interested and Affected Parties (I&APs) on environmental issues.
- Internal communication:
  - Informing employees as to who is their representative and designated management appointee.
  - Obtaining information relating to responses required and/or requested by external parties from on-site representatives.
- Amendments to or new legislation, amendments to or new company policies, amendments to or new procedures and protocols.
- Development and review of environmental policies and management of hazards/risks/impacts.

Employees (on-site representatives) have the responsibility to conduct themselves in a circumspect manner ensuring the environment is not negatively impacted by their activities and their actions do not negatively impact the company image.

11.4 Environmental risk

Employees will be informed of any environmental risk, which may result from their work through the communication channels established and described above. Employees will be informed of environmental risks through communication from management and documentation provided. Environmental principles will be communicated effectively to newly appointed employees, current employees, employees returning from leave as well as contractors and visitors upon entering the area.

Work procedures and protocols, which include potential risks, will be compiled for all tasks to be undertaken. Within each work procedure, an environmental risk section will be included. The environmental risk section will indicate whether the risk is to air, groundwater, surface water, soil, fauna or flora. The work procedure will then also include actions to be taken by the employee to prevent or minimise the risk.

11.5 General considerations

It is important to consider the level of education and literacy of the receiving audience and all information communicated should therefore be kept simple and be easy to understand, making use of pictures as much as is practically possible to also overcome possible language barriers in English documentation.

Personnel, staff, workers and contractors on the project need to be equipped with the knowledge, skills and training to enable them to manage their task competently and safely without significant impact on their surrounding environment. Magic Plant Hire (Pty) Ltd will ensure that they appoint people qualified for the task which is expected of them and/or provide in-house training to acceptable skill levels.

While management will ultimately be responsible and accountable, personnel will also be given responsibility and accountability to follow procedures and report to management on certain aspects.

Basic environmental knowledge, training and awareness will be included in inductions.

11.6 Aspects covered

The first objective of the environmental awareness plan is to inform employees and contractors of any environmental risk which may result from their work. The following aspects will be addressed during environmental awareness training for employees, personnel, staff, workers, contractors and visitors. The objective is to raise environmental awareness and educate people on environmentally responsible conduct.

The items have been structured to enable even uneducated visitors to comprehend it. Pictures will be added to convey the message to illiterate people. Pamphlets will be distributed and notices will be placed around the site to continually remind workers to be environmentally responsible and cautious when entering premises.

11.6.1 General

Importance of the environment and why we need to protect it.

- Non-living elements: air, water, soil.
- Living elements: plants, animals, humans.
- Living elements depend on non-living elements for survival.
- Relationship between living and non-living elements.
- The life cycle to keep everything in balance.
- People are reliant on the natural life cycle for their existence.

Terminology

- Any change to the environment due to human activities is called an impact. Impacts can be positive or negative. A positive impact is job creation. A negative impact is pollution such as littering and improper waste handling.
- Contamination or pollution is when a natural element such as air or water is impacted negatively due to human activities. Spillages of oil/diesel (hydrocarbons) from construction equipment can pollute storm water runoff and soil.
- Environmental management is the control of human activities to minimise the impact on the natural environment as much as possible. It ensures that pollution is minimised and that people living in the environment are healthy (physically and mentally). The use of driptrays during emergency maintenance to catch hydrocarbon (diesel/oil) spillages is an environmental mamnagement measure.

The role of the employee.

- What can you and I do to protect the environment? Discuss environmentally acceptable behaviour such as closing of taps, correct use of ablution facilities etc.

- What can you and I do to ensure that this project does not cause unnecessary damage to the environment? Report and clean spillages, stay within demarcated areas etc.
- There is always a reason for an environmental impact or accident and generally people are the reason.
- Always work carefully so that you don't damage the environment and protect your own safety and health.
- Obey the rules.
- Report any impacts/incidents or accidents to your supervisor/manager.
- Your role is important, be environmentally responsible and always aware of the environment.
- Negative environmental impacts can cause death, injury, pain, suffering, diseases, damage to property and equipment, legal liability, cost, loss of productivity.
- We must look after our environment for the sake of our children and their children.

South African laws protecting the environment:

- Constitution of the Republic of South Africa, 1996 (Act 108 of 1996)
- National Water Act, 1998 (Act 36 of 1998)
- National Environmental Management Act, 1998 (Act 107 of 1998)
- National Environmental Management Waste Act, 2008 (Act 59 of 2008)
- National Environmental Management Air Quality Act, 2004 (Act 39 of 2004)
- Hazardous Substances Act, 1973 (Act 85 of 1973)
- National Forests Act, 1998 (Act 84 of 1998) – protecting Marula trees on site
- National Heritage Resources Act, 1999 (Act 25 of 1999) – protecting graves on site
- National Environmental Management: Biodiversity Act (NEMBA), 2004 (Act 10 of 2004)

11.6.2 Animals

- No hunting, poaching, snaring or killing of any animals will be allowed.
- Report animals seen within the area to your supervisor to have them safely removed as this poses a danger to them.

11.6.3 Plants

- Vegetation will only be removed within the demarcated footprint for the building of houses and other structures, except for weeds and exotic vegetation, which should be cleared and controlled.

11.6.4 Sewage and ablution

- No ablution or washing outside designated areas.

11.6.5 Waste management

- No littering is allowed on the property or neighbouring properties. A litter patrol will be conducted once a week to remove litter from the environment and properly dispose of this.
- No waste is to be buried on this site or neighbouring properties.
- No burning of waste.
- Use skips/bins for general waste storage until it is collected for disposal.
- Oils / greases / diesel (hydrocarbon) contaminated waste is considered hazardous and should be collected separately for recycling.

- Waste manifests or safe disposal certificates need to be obtained for all waste streams leaving the site to ensure proper recycling or safe disposal.
- Clean up any spillages and dispose appropriately of the waste which was generated as a result.

11.6.6 Water

- Use water sparingly. No wastage of water will be allowed. Close taps after use.
- Repair leaking pipes.
- Ensure all valves or taps on water lines are closed if not in use.
- Maintain infrastructure (pipes) that convey water to prevent blockages and/or spillages.

11.6.7 Sensitive environments

- Streams, rivers, wetlands and dams or any area associated with naturally occurring water is considered environmentally sensitive features and should be avoided.
- Remain within demarcated areas.

11.6.8 Safety

- Keep on designated pathways.
- Report fires, incidents, accidents, injuries etc.

11.6.9 Reporting & Recording

- All complaints by members of the public should be registered and captured in a complaints register;
- All incidents should be recorded in an incident log sheet to allow investigation and remedial action;
- Report impacts/incident/accidents immediately to a supervisor/manager;
- Investigate any impact/incident/accident to find out why it happened, what can be done to fix it and what should be done to prevent it from happening again; and
- Report any damage to infrastructure to supervisor/manager.

11.6.10 Recording and Reporting of Incidents / Accidents / Impacts

The second objective of the environmental awareness plan is to inform employees and contractors of the manner in which the identified possible risks must be dealt with in order to prevent degradation of the environment. Dealing with identified possible risks will include recording and reporting of incidents / accidents / impacts.

Investigation Reports

All incidents / accidents / impacts (injuries, spillages etc.) will be recorded as per defined SHEQ standards. A standard format (investigation report) will be completed for each incident / accident / impact to allow further investigations into the matter.

The investigation report will contain the following information:
- Particulars and description of incident / accident / impact;
- The investigation panel;
- Root cause;
- Corrective and preventative measures to prevent recurrence;
- Witness and Insured's statements;

- Photos and Work Instructions; and
- Risk assessments carried out for the tasks performed.

Emergency and Contingency Measures

Emergency and contingency plans will be put in place in conjunction with the necessary equipment and personnel on stand-by to manage such situations as and when necessary. Codes of Practice, operating procedures and planned maintenance systems will be established for inspection, maintenance, and to ensure effective and continuous operation and early detection of any malfunction or emergency incident.

Table 5: Example of Emergency Contact Details

NETCARE	082 911
POLICE	10111
POLICE STATION (Rustenburg)	014 590 4115
FIRE/AMBULANCE	10177
FIRE STATION (Rustenburg)	014 590 3444
HOSPITAL (Rustenburg Provincial Hospital in Rustenburg CBD)	014 590 5400

Table 6: Example of Incident and Environmental Reporting Sheet

INCIDENT AND ENVIRONMENTAL LOG SHEET																				
Date:	2	0			/	m	m	/	d	d	**Time:**			:			**Location:**			
Nature of incident or risk type:			Procedure/ Process					Environmental				Safety		Health			Equipment/ Machinery		Other	
Description / nature			**Quantity of Spill/ Release:**											**Pollutant/ Substance:**						
Clean up or containment method:														**Product Used:**						
Hours lost:								**Cost:**						**Root Cause:**						
Corrective actions taken:																				
Incident reported by:													**Signature:**							
Capacity of person above:													**Repeat Incident**				YES		NO	
Further investigation required:			YES					NO					**Person handling further investigation:**							