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ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

Proposed Housing Development on Portion 237 of the Farm Harteespoort 328 in Koedoespoort, Gauteng Province

GDARD Reference No.: 002/18-19/E0008

Report No : 18026-46-Rep-002-Harteespoort EMPr-Rev0

Submitted to :

Gauteng Department of Agriculture and Rural Development
P.O. Box 8769
Johannesburg
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09 November 2018 18026

DOCUMENT CONTROL SHEET

Project Title: **EMPr for the proposed Housing Development on Portion 237 of the Farm Harteespoort 328 in Koedoespoort, Gauteng Province**

Project No: **18026**

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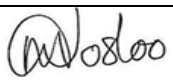
DOCUMENT APPROVAL

ACTION	DESIGNATION	NAME	DATE	SIGNATURE
Prepared	Project Manager	Tebogo Mapinga	09 November 2018	
Reviewed/Approved	Project Associate	Mathys Vosloo	9 November 2018	

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LIST OF ACROYNYMS

Acronym	Description
BA	Basic Assessment
BAR	Basic Assessment Report
CA	Competent Authority
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
EO	Environmental Officer
GDARD	Gauteng Department of Agriculture and Rural Development
HDA	Housing Development Agency
MS	Method Statement
NEMA	National Environmental Management Act 107 of 1998 (as amended)
NEMWA	National Environmental Management Waste Management Act 59 of 2008
NWA	National Water Act 36 of 1998
OHS	Occupational Health and Safety Act 85 of 1993
PAIA	Promotion of Access to Information Act 2 of 2000
PM	Project Manager
PPE	Personal Protection Equipment
PPP	Public Participation Process

GLOSSARY OF TERMS

Term	Description
Environment	Environment means the surroundings 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 well-being.
Environmental Aspect	Element of an organization's activities or products or services that can interact with the environment.
Environmental Assessment Practitioner	Individual responsible for the planning, management, coordination or review of Environmental Impact Assessments, Strategic Environmental Assessments, Environmental Management Programmes or any other appropriate environmental instruments introduced through regulations.
Environmental Impact	Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects.
Interested and Affected Party	Interested and Affected Party for the purposes of Chapter 5 of the NEMA and in relation to the assessment of the environmental impact of a listed activity or related activity, means an interested and affected party contemplated in Section 24(4)(a)(v) of the NEMA and which includes - a) Any person, group of persons or organisation interested in or affected by such operation or activity; and b) Any organ of stale that may have jurisdiction over any aspect of the operation or activity.
Pollution	Pollution means any change in the environment caused by - (i) substances; (ii) radioactive or other waves; or (iii) noise, odours, dust or heat, emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future.

1 INTRODUCTION AND BACKGROUND

The Housing Development Agency (HDA) is proposing to establish a housing development on Portion 237 of the Farm Hartebeestpoort 328 JR in Koedoespoort which falls within the jurisdiction of The City of Tshwane Metropolitan Municipality, Gauteng Province. The proposed housing development is proposed on a property that is 18,7480 hectares in extent. It entails construction of the following infrastructure and facilities:

- High density residential units including
  - Fully subsidized units
  - Social housing
  - Bonded housing
  - Social and recreational facilities
- Commercial facilities including
  - Retail
  - Restaurants and coffee shops
  - Urban manufacturing
  - Offices
- Infrastructure support services such as:
  - Roads & Stormwater
  - Water & Sanitation

The site under consideration is identified as an inner-city project that is earmarked for the development of an integrated human settlement.

2 GENERAL OBJECTIVES AND PURPOSE OF EMPr

Mr Antonio Cremona (applicant) together with the contractors appointed to undertake the development activities will be required to:

- Manage and operate their activities with due care and diligence;
- Avoid and/or limit any adverse impacts they may have on the environment by the proper design and construction of the proposed development;
- Control predicted impacts that may occur so as to meet acceptable standards, both as a legal and a moral responsibility to the environment within which they operate; and
- Ensure transparency in their operation and environmental management of the site.

This Environmental Management Programme (EMPr) serves as a stand-alone document to be issued to and used by Antonio Cremona (applicant), the contractor/s, sub-consultants and project managers (PMs) /supervisors during the construction and operational phases of the project. By its very nature, the EMPr is a dynamic document and updating may be required over the life of the development.

3 DOCUMENT ROADMAP

The EMPr document has been structured and collated to conform to Section 19(4) read with Appendix 4 of the National Environmental Management Act 107 of 1998 (NEMA) (as amended) Environmental Impact Assessment (EIA) Regulation 2014. The relevant document parts which addresses each of the aspects provided in Appendix 4 of the NEMA EIA Regulation 2014 is provided in **Table 3-1**. This has been done to ensure that the Competent Authority (CA) (i.e. GDARD) is provided with a comprehensive document that can be translated into a working / dynamic document during the Construction and Operational Phases of the proposed project.

Table 3-1: Document Roadmap

Relevant regulation, stipulation or condition			Relevant Document Part
Appendix 4			
1. An EMPr must comply with section 24N of the Act and include-			
(a)	details of -		
	(i)	the EAP who prepared the EMPr; and	Section 5
	(ii)	the expertise of that EAP to prepare an EMPr, including curriculum vitae;	Section 5
(b)	a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;		Section 4
(c)	prepared map at an appropriate scale which superimpose 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;		Section 4
(d)	assessment description of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including-		
	(i)	Planning and design;	Section 10
	(ii)	Pre-construction activities;	Section 10
	(iii)	Construction activities	Section 10
	(iv)	Rehabilitation of the environment after construction and where applicable post closure; and	Section 17
	(v)	Where relevant, operational activities	Section 10
(e)	a description and identification of impact management outcomes required for the aspects contemplated in paragraph (d);		Section 10
(f)	a description of the proposed impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (d) and (e) will be achieved, and must, where applicable, include actions to-		
	(i)	Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;	Section 10 & 15
	(ii)	Comply with any prescribed environmental management standards or practices;	Section 7
	(iii)	Comply with any applicable provisions of the Act regarding closure, where applicable; and	Not applicable
	(iv)	Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;	Not applicable
(g)	the method of monitoring the implantation of the impact management actions contemplated in paragraph (f);		Section 10, 14, 15 & 16

Relevant regulation, stipulation or condition			Relevant Document Part
(h)	the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);		Section 15
(i)	an indication of the persons who will be responsible for the implementation of the impact management actions;		Section 9 & 15
(j)	the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;		Section 15
(k)	the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);		Section 11 & 15 & 16
(l)	a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;		Section 16
(m)	an environmental awareness plan prescribing the manner in which-		
	(i)	The applicant intends to inform his or her employees of any environmental risk which may result from their work; and	Section 13
	(ii)	Risks must be dealt with in order to avoid pollution or the degradation of the environment; and	Section 15
(n)	any specific information that may be required by the competent authority		Not Applicable

4 PROJECT DESCRIPTION

4.1 Study Area

Description of the Study Area

The study area is located on Portion 237 of the Farm Hartebeestpoort 328 JR in Koedoespoort which falls within the jurisdiction of The City of Tshwane Metropolitan Municipality (refer to **Error! Reference source not found.**). Majority of the proposed site is vacant however, there are several businesses operating on and around the site, most of which are related to scrap yards and selling and repairing of motor vehicles, as well as residential use of the site. The southern side of the site is surrounded by the suburbs of Kilner Park and Silvertondale and is bordered by railway tracks emanating from the Koedoespoort Train Station. The site is also located 500m from the Lindopark Primary School. The surrounding suburbs of Rastlynne and Eastlynne and Eersterust can be found to the north and the north-east of the site respectively (refer to **Error! Reference source not found.**).

Table 2: Description of the proposed site

	Description
Farm Name	Hartebeestpoort 328 JR
Farm Portion	Portion 237
SD Code	T0JR00000000032800078

Development Footprint	~ 18.75ha
Central Co-ordinates	25° 42'56.25" S 28° 17'20.11"E
Land Zoning	Urban Development Zone
Nearest Suburbs	Southern side of the site -Kilner Park and Silvertondale North- northeast of the Rastlynne and Eastlynne and Eersterust

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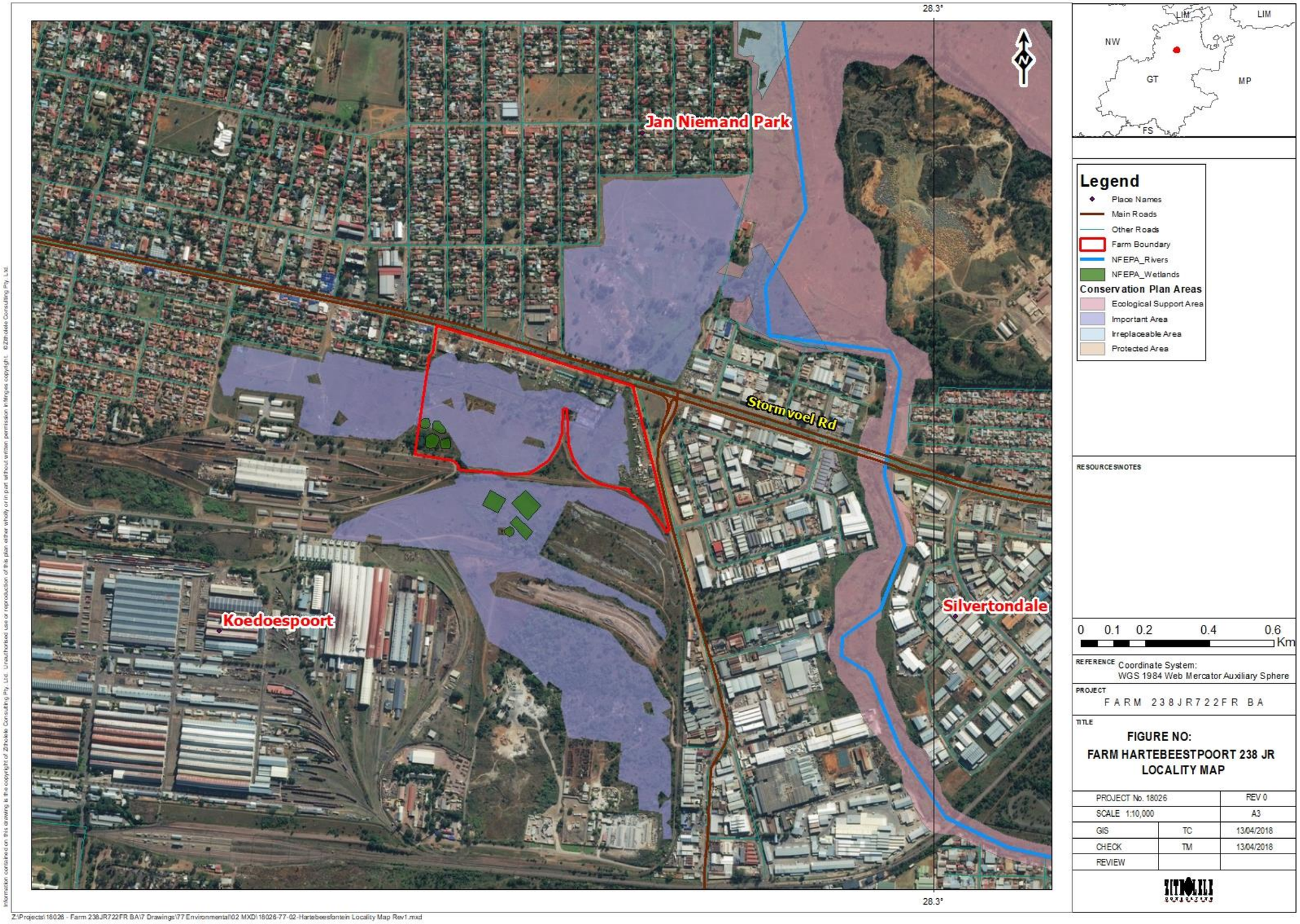

Figure 4-1: Locality Map

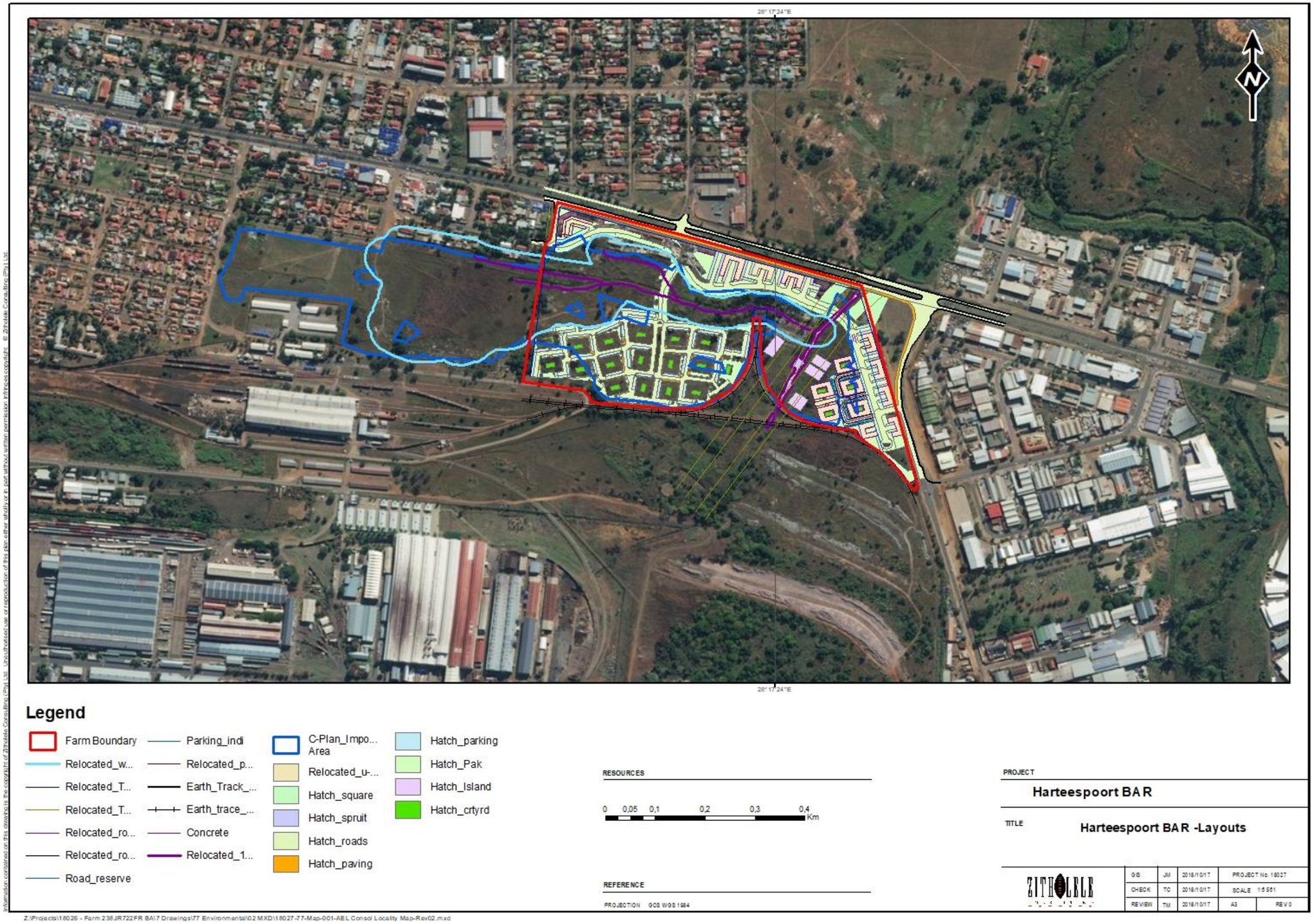

Figure 4-2: Layout Map

4.2 Project Activities

The Housing Development Agency (HDA) is proposing to establish a housing development on Portion 237 of the Farm Hartebeestpoort 328 JR in Koedoespoort which falls within the jurisdiction of The City of Tshwane Metropolitan Municipality, Gauteng Province. The proposed housing development is proposed on a property that is 18,7480 hectares in extent. It entails construction of the following infrastructure and facilities:

- High density residential units including
  - Fully subsidized units
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  - Bonded housing
  - Social and recreational facilities
- Commercial facilities including
  - Retail
  - Restaurants and coffee shops
  - Urban manufacturing
  - Offices
- Infrastructure support services such as:
  - Roads & Stormwater
  - Water & Sanitation

The site under consideration is identified as an inner-city project that is earmarked for the development of an integrated human settlement.

Need and desirability

The special vision of the City is to lead integrated planning, maximizing on special efficiencies for optimal service delivery in order to achieve sustainability, competitiveness and resilience. In order to comply with the Gauteng Spatial Development Framework, the city need to insure continued urban growth, resource based economic development, the re-direction of urban growth- limit growth in non-viable areas, protection of rural areas and enhancement of tourism, and increase access to and mobility. To achieve some of the above mentioned requirements, the HDA is proposing the development of a liveable and sustainable human settlement for an affordable market on the proposed site. The site falls within the Municipality's current master plan as part of future development for Koedoespoort Station. The region is popular in terms of high category retail and office function and there is an important industrial region in close proximity to the site, which will allow easy access to transportation, retail facilities and industrial area. The site is therefore strategically located and well positioned for the development of a sustainable human settlement.

4.3 Description of Project Component

4.3.1 Pre-Construction and Construction process for the proposed development

The construction of the proposed development will be undertaken in the following steps:

- Undertaking and completion of proposed development concept;
- Undertaking Environmental Authorisation application and environmental impact assessment process;
- Pre-Construction site work, such as geotechnical investigations;
- Undertaking of and compliance with pre-construction activities and conditions in terms of the Environmental Authorisation;
- Site preparation (Vegetation clearance);
- Demolishing of the existing building;
- Civil work and civil construction: Casting of new foundations and plinths for the proposed development;
- Construction of the residential and business units and associated infrastructures (roads, open spaces area);
- Construction and/or installation of water supply, sewer reticulation and storm water management infrastructure; and
- Testing and commissioning.

The construction phase for the proposed project will take approximately 5 years.

4.3.2 Operational activities

During the operational and maintenance phase of the project, the applicant will ensure that operation and maintenance activities are carried out by suitable qualified individual as the activities are specialized. For the activities to be carried out during operational phase refer to project activities discussed above.

4.3.3 Decommissioning activities

Decommissioning of the proposed activities is neither envisioned nor feasible as this would result in loss of housing (shelter) and social impacts through fragmentation of communities.

5 DETAILS AND EXPERTISE OF ENVIRONMENTAL ASSESSMENT PRACTITIONER

In terms of the National Environmental Management Act, (Act 107 of 1998) as amended (NEMA) and EIA Regulations (2014), the proponent/developer must appoint an

Environmental Assessment Practitioner (EAP) to undertake a BA and/or Public Participation Process (PPP) for listed activities regulated in terms of the aforementioned act. In this regard, Antonio Cremona has appointed Zitholele Consulting (Pty) Ltd as the EAP on this project to undertake the BA process for the proposed project, in accordance with the aforementioned regulations.

Zitholele is an empowerment company formed to provide specialist consulting services primarily to the public sector in the fields of Water Engineering, Integrated Water Resource Management, Environmental and Waste Services, Communication (public participation and awareness creation) and Livelihoods and Economic Development.

Zitholele Consulting has no vested interest in the proposed project and hereby declares its independence as required by the EIA Regulations (2014, as amended).

This EMPr report has been compiled by the following persons who have the relevant expertise and experience in environmental management (see attached CV in **Appendix A**):

Table 5-1: Details of EAP on this project

Name and Surname	Tebogo Mapinga
Highest Qualification	Bsc (Zoology & Physiology)
Professional Registration	Pr.Sci.Nat. (115518)
Company Represented	Zitholele Consulting (Pty) Ltd.
Physical Address	Building 1, Maxwell Office Park, Magwa Crescent West, Waterfall City, Midrand
Postal Address	P O Box 6002, Halfway House, 1685
Contact Number	011 207 2060
Facsimile	086 674 6121
E-mail	tebogom@zitholele.co.za

Specialist Teams

Specialists were appointed to undertake the relevant assessments to identify assess impacts and propose appropriate mitigation and management measures for the identified impacts. The specialist assessments, that were commissioned include:

- Geotechnical Assessment – V3 Consulting Engineers
- Water Resource Assessment – The Biodiversity Company
- Traffic Impact Assessment – Merchelle's Collective
- Terrestrial Ecological (Fauna and Flora) – Nemai Consulting
- Social Impact Assessment – NGT ESHS Solutions
- Heritage Impact Assessment – JLB Consulting
- Paleontological Impact Assessment - Banzai Environmental (Pty) Ltd

6 DETAILS OF PROJECT PROPONENT

The details of the project proponent/Developer are provided in **Table 6-1** below.

Table 6-1: Proponent's details

Applicant name:	Housing Development Agency
Company Registration number:	N/A
Contact person:	Lucien Rakgoale
Responsible position:	Head of Land Assembly
Physical address:	Block A, Riviera Office Park, 6-10 Riviera Road, Killarny, Johannesburg 2193
Telephone:	011 544 1000
Cell:	079 494 9829
Fax:	011 544 1007
E-mail:	Reception.headoffice@thehda.co.za

7 LEGISLATIVE FRAMEWORK

7.1 Legislative Requirements for the EMPr

In terms of Section 19(4) read with Appendix 4 of the Environmental Impact Assessment Regulations, 2014 as amended (EIA Regulations); the EMPr must comply with Section 24N of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) as amended and include.

The implementation of the EMPr for the proposed activity is a requirement by the NEMA EIA Regulations (2014) and is likely to similarly be a condition in the Environmental Authorisation (assuming such), issued by the GDARD. As such, failure to comply with this EMPr will constitute an offence and the client and their Contractor may be liable to penalties and/or legal action. Therefore, it is important for all the responsible parties to understand their duties and undertake them with duty and care.

7.2 Other Applicable Legislation

The client is responsible for compliance with the provisions for duty of care and remediation of damage in accordance with Section 28 of NEMA and its obligations regarding the control of emergency incidents in terms of Section 30 of NEMA. Accordingly, the GDARD must immediately be notified of an incident as defined in subsection 30(1) (a) of NEMA.

Various environmental legislation and policies relate to the proposed activities, including the following listed in **Table 7-1**.

Table 7-1: List of Applicable Legislation

Title of legislation, policy or guideline:	Administering authority:	Promulgation Date:
National Environmental Management Act, 1998 (Act No. 107 of 1998 as amended).	National & Provincial	27 November 1998
The Constitution of the Republic of South	The Judiciary	18 December 1996

Africa (Act 106 of 1998)		
Social Housing Act of No 16 of 2008	Department of Human Settlements (DHS)	5 November 2008
NEMA Environmental Impact Assessment (EIA) Regulations 2014, as amended in April 2017 (published in Government Notice No. R.326)	Gauteng Department of Agriculture and Rural Development (GDARD)	4 December 2014, amended on the 07 April 2018
National Water Act 36 of 1998 (NWA)	Department of Water and Sanitation (DWS)	20 August 1998
Water Service Act 108 of 1997	DWS	19 December 1997
National Environmental Management Waste Act 59 of 2008 (as amended) (NEMWA), National Norms and standards for the Storage of Waste (GNR.926 of 29 November 2013)	GDARD	10 March 2009 29 November 2013
National Environmental Management: Biodiversity Act 10 of 2004	GDARD	07 June 2004
National Heritage Resources Act 25 of 1999	The South African Heritage Resources Agency (SAHRA)	28 April 1999
National Housing Code, 2009	Department of Human Settlements (DHS)	2009
Applicable by-laws of the City of Tshwane Metropolitan Municipality.	City of Tshwane Metropolitan Municipality	-
National Housing Code, 2009	Department of Human Settlements (DHS)	2009

7.3 List of activities associated with the project

The activities that are associated with the proposed project trigger activities listed in Government Notice No. R.983 (2014). As set out in Regulations 19 of the National Environmental Management Act (NEMA) Environmental Impact Assessment Regulations, 2014, the proposed project is subjected to a BA Process (Government Notice No. R.982). Mr. Cremona has therefore appointed Zitholele Consulting (Pty) Ltd as the independent EAP to undertake the BA Process for the proposed project.

The BAR will be submitted to the GDARD for licensing of the listed activity triggered as indicated in **Table 7-2** below:

Table 7-2: Detailed description of the listed activity associated with the project

Indicate the number of the relevant	Activity No (s) (relevant notice): e.g.	Describe each listed activity as per the wording in the listing notices:

Government Notice:	Listing notices 1, 2 or 3	
GN R327 08 Dec 2014	19 (i) (c) (Listing Notice 1)	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse.
GN 327, 08 Dec 2014	Activity 27 (Listing Notice 1)	The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for-. Exclusions not applicable.
GN 324, 08 Dec 2014	Activity 12 (c)(ii) (Listing Notice 3)	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. (c) Gauteng (ii) Wthin Critical Biodiversity Ares or Ecological Support Areas identified in the Gauteng Conservation Plan or bioregional plans.

8 ORGANISATION STRUCTURE

The organisational structure identifies and defines the responsibilities and authority of the various role-players (individuals and organisations) involved in the project. All instructions and official communications regarding environmental matters shall follow the organisational structure shown in **Figure 8-1** below.

The organisational structure reflected in **Figure 8-1** has been developed to ensure that:

- There are clear channels of communication;
- There is an explicit organisational hierarchy for the integration project; and
- Potential conflicting or contradictory instructions are avoided.

In terms of the defined organisational structure reflected in **Figure 8-1** below, all instructions that relate to environmental matters will be communicated to the Contractor via the Environmental Officer (EO). The only exception to this rule would be in an emergency situation. An emergency is defined as a situation requiring immediate action and where failure to intervene timeously would, in the reasonable opinion of the Environmental Control Officer (ECO), result in unacceptable environmental degradation. In emergency situations

instructions may be given directly to the Contractor. The detailed roles and responsibilities of the various role-players identified in the organisational structure are outlined in **Section 9**.

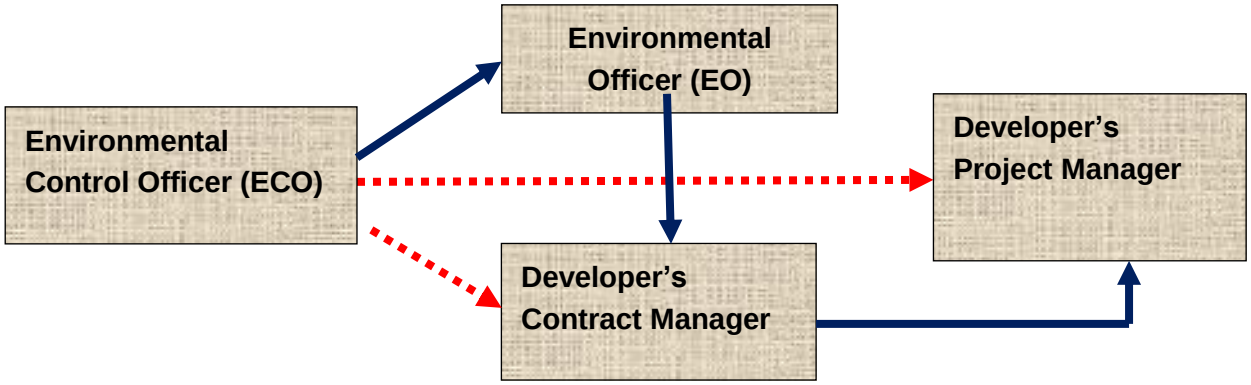


Figure 8-1: Organisation Structure for Environmental Reporting

9 ENVIRONMENTAL ROLES AND RESPONSIBILITIES

The key-role-players for the integration project are the GDARD, the Developer (The HAD), the ECO and the Contractor. The detailed roles and responsibilities of each of these organisations are outlined below.

9.1 Gauteng Department of Agriculture and Rural Development

As the CA, the GDARD has the responsibility to ensure that the developer complies with the conditions of the EA for this proposed project (once received) as well as the requirements of the broader environmental legislation, specifically the NEMA. Compliance would be confirmed via the following mechanisms:

- Receipt and review of the environmental reporting required in terms of the EA; and
- *Ad hoc* and planned site inspection by the GDARD Compliance and Enforcement.

The successful implementation of this EMPr requires cooperation between the developer, the appointed project management consultant, the appointed contractors and the appointed ECO.

9.2 General roles and responsibilities

General roles and responsibilities have been outlined below (**Table 9-1**) and the project team are required to comply with the conditions defined herein.

Table 9-1: Roles and Responsibilities

Responsible Agent	Role/Responsibility
Developer	The Developer has overall responsibility for ensuring that its

Responsible Agent	Role/Responsibility
	operations are undertaken in an environmentally sound and responsible manner, and in particular, reflects the requirements and specifications of the EMPr and recommendations from the relevant authorities. The responsibilities of the Project Developer will be to: • appoint or designate a suitably qualified PM to manage the implementation of the proposed development; • Establish and maintain regular and proactive communications with the designated/ appointed PM, Contractor(s) and ECO; and • Ensure that the EMPr is reviewed and updated as necessary. <u>Reporting Structure:</u> The Developer will liaise with and/or take instruction from the following: • Authorities; • ECO; and • General Public.
ECO	ECO should be a suitably qualified person and should: • Ensure that contractors receive copies of the EMPr, Environmental Authorisation and all agreed Method Statements; • Provide on-site guidance, surveillance and reporting commensurate with the project phase/progress; • Undertake frequent site visits and record key findings. This includes photographic monitoring of the construction site and an evaluation of the implementation, effectiveness and level of compliance of on-site construction activities with the EMPr and associated plans and procedures; • Attend monthly project meetings; • Instruct EO or Contract Manager or Antonio Cremona's appointed PM on actions or issues impacting on the environment and provide appropriate site instructions to address and rectify these matters; • Record and provide written documentation of non-conformances with the EMPr and require Antonio Cremona to undertake mitigation measures to avoid or minimise any adverse impacts on the environment or report required changes to the EMPr; • Review corrective and preventative actions to ensure implementation of recommendations made from audits and site inspections; • Order the Contractor to suspend part or all of the works if the Contractor and/or any sub-contractors, suppliers, etc. fail to comply with any aspect of either the EMPr or EA; • Identify possible areas of improvement; • Ongoing assessment of the suitability or effectiveness of the EMPr and make concomitant recommendations;

Responsible Agent	Role/Responsibility
	• Submit monthly environmental audit reports to GDARD (or as per conditions of EA) during the construction phase; • Monitor and record the processing of public complaints and their resolution relating to the construction activities; and • Ensure that updates to the EMPr (as necessary) are implemented.
Construction Contractor (CC) / Appointed EO	The Construction Contractor must: • Appoint a EO to interpret the EA and EMPr on behalf of the Construction Contractor *inter alia* to ensure appropriate environmental awareness and training to achieve conditions of the EA and EMPr; • Ensure that all construction staff, sub-contractors, suppliers, etc. are familiar with, understand and adhere to the EMPr, EA and all agreed Method Statements (Environmental Awareness Plan) per their job function; • Ensure that all facets of the work undertaken are properly and competently directed, guided and executed during construction according to the EMPr; • Ensure construction of the facility to contractual environmental specifications; and • Adherence to laws and standards relevant to the construction of the facility.
PM	The primary role of the PM will to ensure that the Contractor and Developer comply with the environmental specifications in the EMPr. The PM shall further: • Oversee the general compliance of the Contractor with the EMPr and other pertinent site specifications; and • Liaise between and with the Contractor (including EO) and ECO on environmental matters, as well as any pertinent engineering matters where these may have environmental consequences. In addition, the PM shall: • Designate or appoint a suitably qualified Environmental Manager (EM) that will manage all environmental aspects on behalf of the PM and the Developer; • Assume overall responsibility for the effective implementation and administration of the EMPr; • Be familiar with the contents of the EMPr, and his role and responsibilities as defined herein; • Ensure that the EMPr is included in the Contractor's contract; • Communicate to the Contractor, verbally and in writing, the advice of the ECO and the contents of the ECO reports; • In conjunction with the EO; undertake regular inspections of the Contractor's site as well as the installation works in order to check for compliance with the EMPr in terms of the specifications outlined therein. Inspections shall take place at least once a week during construction and copies of the

Responsible Agent	Role/Responsibility
	weekly monitoring checklist will be contained in the file; • Issue site instructions giving effect to the ECO requirements where necessary; • Keep a register of all complaints and incidents (spills, injuries, complaints, legal transgressions, etc.) and other documentation related to the EMPr; • Report to the ECO any problems (or complaints) which cannot first be resolved in co-operation with the Contractor(s); • Implement recommendations of possible audits; • Implement Temporary Work Stoppages as advised by the ECO, where serious environmental infringements and non-compliances have occurred; • Facilitate proactive communication between all role-players in the interests of effective environmental management; and • Ensure that construction staff is trained in accordance with requirements of the EMPr. <u>Reporting Structure:</u> The PM will report to the Developer, as and when required.

10 ENVIRONMENTAL ISSUES IDENTIFIED

Specialist assessments were conducted for the proposed Project and a summary of the findings have been included below:

Heritage Assessment:

Based on observations made during the site inspection, it can be concluded that no significant heritage resources were found on the site. The water canal that runs through the project area is not considered to be of heritage significance. Therefore the impact will be of a LOW SIGNIFICANCE.

Palaeontology Assessment:

The proposed footprint is completely underlain by the Silverton Formation (Pretoria Group, Transvaal Supergroup). This formation is known to contain stromatolites and probably also microfossils. According to the SAHRIS PalaeoMap this formation has a moderate palaeontological sensitivity. The scarcities of fossil heritage at the proposed Hartebeestpoort development indicate that the impact of the housing in palaeontological terms. Thus, the construction and operation of the facility may be authorised as the whole extent of the development footprint is not considered sensitive in terms of palaeontological resources. Therefore the impact will be of a LOW SIGNIFICANCE.

Terrestrial Ecology Assessment

During the field survey, no threatened plant species were observed on site, however only one species of conservation concern was noted, namely Hypoxis hemerocallidea, and this species has a conservation status of Declining. No fauna of conservation concern were recorded on site. The human presence and associated disturbances taking place usually have a detrimental impact on fauna species (especially mammals and snakes) in the area. The proposed development will cause disruption during the construction phase, but as long as mitigation measures are implemented, these disruptions should have minimal lasting effects on the ecosystems of the proposed development. From an ecological perspective, it was concluded that the proposed development be considered favourable provided that the sensitivity map be considered during the planning and construction phases of the proposed development activities in order to aid in the conservation of ecology within the study area. Therefore the impact will be of a MODERATE SIGNIFICANCE before mitigation and LOW SIGNIFICANCE after mitigation.

Water Resource Assessment

According to the desktop information available, the aquatic systems are highly modified largely due to the significant water and habitat quality modification in the catchment. Two HGM types (natural depression and a channelled valley-bottom wetland) were identified within the 500m project assessment boundary. The wetland was determined to be in a largely modified (Class D) state. The HGM type had an overall intermediate level of services, with various services providing moderately high and high ecological services. The ecological importance and sensitivity as well as the hydrological/functional importance for both HGM units has been scored moderate whereas the direct human benefits has been scored low. Therefore the impact will be of a MODERATE SIGNIFICANCE before mitigation and a LOW SIGNIFICANCE after mitigation.

Social Assessment

From a Social perspective, It is concluded that the significance of positive social benefits exceeds the significance of negative social impacts. The project will bring about new housing infrastructure in a region that is in need of housing. The construction of the proposed integrated housing development will also contribute to eradication of past political landscape spatial divides in human settlement patterns. It will also result to job opportunities and potential business opportunities for local contractors and suppliers should the 30% project value allocation to regional or local business be complied with in line with government local procurement objectives. The only negative community impacts that will result from the project include noise pollution and traffic congestion during the construction phase of the project; however, these impacts are short lived with minimum residual impacts on traffic due to increase in number of people in the area during the operation phase of the project. Therefore the impact will be of a LOW SIGNIFICANCE.

Overall, the impact of the proposed activity is expected to be LOW as the study site is already heavily impacted by the surrounding activities and land use. The activities will further be mitigated to acceptable levels. A summary of the anticipated environmental impacts associated with each of the project lifecycle phases of the proposed project that were identified during the BA Process is presented in **Table 10-1** and **Table 10-2**.

Table 10-1: Summary of Pre-Construction, Construction and Operation Phase Impacts

Proposal

Potential impacts:	**Significance rating of impacts (positive or negative):**	**Proposed mitigation:**	**Significance rating of impacts after mitigation:**	**Risk of the impact** and **mitigation not being implemented**
PRE-CONSTRUCTION				
Appointment of construction contractor	**4 – Moderate Positive**	Ensure that unskilled labour required for the construction and installation of equipment are predominately South Africans from the surrounding communities.	**4 – Moderate Positive**	• No improvement on the unemployment conditions in the area and livelihood of the surrounding communities.
Poor communication about the project creates high expectations about the potential of job opportunities.	**3 – Low (-)**	Caution with communication so as not to create the expectation of massive job creation	**2- Low (-)**	• Poor communication could lead to disappointment amongst community members, Labour and social unrest. While the project will create employment opportunities – the scale of the project means that not everyone will get employed
Poor communication about eligibility for subsidized and social housing creates high expectations.	**3 – Low (-)**	Clear communication about the eligibility criteria for social and subsidised housing. Clear communication on how allocations will be made.	**2 – Low (-)**	• This could lead to a flood of ineligible applications, disputes and disappointments during housing allocation
CONSTRUCTION PHASE				
➢ **ECOLOGY**				
Loss of plant species of conservation concern	**4- Moderate**	• It is recommended that prior to construction, the *Hypoxis hemerocallidea* plant species recorded must be searched and rescued and then following construction activities, they can be re-established at the site. • Given that the species of conservation importance were observed, it is important that a walk-down survey be conducted for plant species of conservation importance and threatened species which may occur on the project area and are addressed through a search and rescue plan.	**3- Low**	• Loss of species of conservation concern occurring in the area.

Destruction of indigenous flora	**4- Moderate**	• Indigenous plants naturally growing on the development site, but that would be otherwise destroyed during clearing for development purposes should be incorporated into landscaped areas. • Vegetation clearing should be kept to a minimum, and this should only occur where it is absolutely necessary and the use of a brush-cutter is highly preferable to the use of earth-moving equipment. • Rehabilitate all disturbed areas as soon as the construction is completed within the proposed development area. • Ensure that all personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and on-going minimisation of environmental harm and this can be achieved through provision of appropriate awareness to all personnel.	**3- Low**	• Loss of natural habitats for the biodiversity occurring in the area.
Loss of animals on site	**4 - Moderate**	• Training of construction workers to recognise threatened animal species will reduce the probability of fauna being harmed unnecessarily. • During site preparation special care must be taken during the clearing of the works area in order to minimise damage or disturbance of roosting and nesting sites. • The contractor must ensure that no faunal species are disturbed, trapped, hunted or killed during the construction phase. • Vehicles must adhere to a speed limit, 30-40 km/h is recommended for light vehicles and a lower speed for heavy vehicles. • All construction and maintenance vehicles must stick to properly demarcated and prepared roads. Off-road driving should be strictly prohibited. • No fires should be allowed at the site. • No dogs or other pets should be allowed at the site.	**3 - Low**	• Loss of animals with in the proposed area.
Loss of habitat and habitat fragmentation	**4 - Moderate**	• The most significant way to mitigate the loss of habitat is to limit the footprint within the natural habitat areas remaining.	**3 - Low**	• Loss of natural habitats for the biodiversity occurring in the area.

		• No structures should be built outside the area demarcated for the development. • Although it is unavoidable that the proposed development will need to traverse areas of potential sensitivity, the housing development should be constructed in such cases so as to avoid further impact to these areas.		
Soil contamination, vegetation loss and vegetation disturbance due to fuel and chemicals	**4 - Moderate**	• Appropriate measures should be implemented in order to prevent potential soil pollution through fuel and oil leaks and spills and then compliance monitored by an appropriate person. • Make sure construction vehicles are maintained and serviced to prevent oil and fuel leaks. • Emergency on-site maintenance should be done over appropriate drip trays and all oil or fuel must be disposed of according to waste regulations. Drip-trays must be placed under vehicles and equipment when not in use. • Implement suitable erosion control measures.	**3 - Low**	• Pollution of water resources and land. • Loss of natural habitats for the biodiversity occurring in the area.
Potential Impact Vegetation and habitat disturbance due to the accidental introduction of alien species	**4 - Moderate**	• The Contractor implements suitable methods during the construction phase to limit the introduction and spread of alien invasive plant species. • Promote awareness of all personnel. • The establishment of pioneer species should be considered with the natural cycle of rehabilitation of disturbed areas, which assists with erosion control, dust and establishment of more permanent species. This can be controlled during construction phase and thereafter more stringent measures should be implemented during the rehabilitation and post rehabilitation. • Larger exotic species that are not included in the Category 1b list of invasive species could also be allowed to remain for aesthetic purposes.	**3 - Low**	• Loss of natural habitats for the biodiversity occurring in the area.
Vegetation and habitat disturbance due to pollution and littering during construction phase	**4 - Moderate**	• The Contractor should employ personnel on site responsible for preventing and controlling of litter. • Promote good housekeeping with daily clean-ups on site.	**3 - Low**	• Loss of natural habitats for the biodiversity occurring in the area.

		• During construction, refresher training can be conducted to construction workers with regards to littering, ad hoc veld fires, and dumping. • No fires are allowed on site.		
Loss of habitat of the Marikana thornveld and CBA region	**4 - Moderate**	• Vehicles and construction workers should under no circumstances be allowed outside the site boundaries to prevent impact on the surrounding vegetation. • Where possible, natural vegetation must not be cleared and encouraged to grow. • All stockpiles, construction vehicles, equipment and machinery should be situated away from the natural vegetation. • Disturbance of vegetation must be limited only to areas of construction. • Prevent contamination of natural grasslands by any pollution. • Areas cleared of vegetation must be re-vegetated prior to contractor leaving the site	**3 - Low**	• Loss of natural habitats for the biodiversity occurring in the area.
Damage to plant life outside of the proposed development site	**4 - Moderate**	• Construction activities should be restricted to the development footprint area and then the compliance in terms of footprint can be monitored by Environmental Control Officer (ECO). • Areas which could be deemed as no go should be clearly marked.	**3 - Low**	• Loss of natural habitats for the biodiversity occurring in the area.
Disturbance to animals	**4 - Moderate**	• Animals residing within the designated area shall not be unnecessarily disturbed. • During construction, refresher training can be conducted to construction workers with regards to littering and poaching. • The Contractor and his/her employees shall not bring any domestic animals onto site. • Toolbox talks should be provided to contractors regarding disturbance to animals. Particular emphasis should be placed on talks regarding snakes.	**3 - Low**	• Displacement of animals.
Animal passage out of construction site	**4 - Moderate**	• Allow for safe animal passage through and specifically out of the construction site.	**3 - Low**	• Loss of animals with in the proposed area.

The proposed construction activities may affect biodiversity through the encroachment of exotic vegetation following soil disturbance, in addition the maintenance of the area would disturb naturalised species within the area	**4 - Moderate**	• Newly cleared soils will have to be re-vegetated and stabilised as soon as construction has been completed and there should be an on-going monitoring program to control and/or eradicate newly emerging invasives.	**3 - Low**	• The encroachment of exotic vegetation following soil disturbance.
➢ **WATER RESOURCES**				
Impeding the flow of water and altering the surface flow dynamics.	**4 - Moderate**	• A minimum buffer zone of 30 m is recommended for the SDP. • The SDP must avoid all wetland areas and the prescribed 30 m buffer zone. • The status and functioning of the recommended buffer area can be improved through a dedicated vegetation strategy and a landscape management plan, which should include soft engineering approaches. • An integrated alien plant control program (as per the AIS Regulations) should be developed for the buffer and other open spaces within the property, including delineated water resources. • Make use of preventative construction techniques (source controls), such as to limit the amount of impervious material near watercourses as far as possible, and to demarcate setbacks from the watercourse in the form of a buffer zone with a natural vegetation cover. • Consider green engineering measures such as water polishing or naturally vegetated attenuation ponds to improve water quality. Other structural control measures include grass swales, infiltration trenches and basins, wet ponds, and constructed	**3- Low**	• Altering the surface flow dynamics.
Erosion of watercourse	**4 - Moderate**		**3- Low**	• Erosion of the watercourse
Sedimentation of the water resources	**3 - Low**		**2- Low**	• Increase in the sedimentation of the water course
Water quality impairment	**4 - Moderate**		**3- Low**	• Decrease the quality of water

		wetlands. • Discharged storm water must be released in a controlled manner with a diffuse flow pattern and be accompanied by energy dissipating interventions to prevent erosion.		
➢ **SOCIAL**				
Increased employment opportunities and economic growth	**11- High (+)**	• Leverage this through procurement policies that favour local suppliers and businesses.	**11- High (+)**	• Infrastructure development drives economic growth and has a huge multiplier effect. Infrastructure development not only generates employment directly through construction and operations but also creates an industrial base around the development for goods and services to supply the construction workers and activities. These industries would get more entrepreneurs and employ more labour. These workers would purchase more goods from the markets, creating a virtuous cycle.
Creation of temporary skilled and unskilled job opportunities directly on the project	**11- High (+)**	• Leverage this through recruitment policies that favour local labour	**11- High (+)**	• Creating temporary skilled and unskilled job opportunities.
Termination of temporary employment	**11 High (-)**	• N/A	**11 High (-)**	• Loss of temporary employment.
Increase in the quality of social, subsidised and bonded housing for the region.	**14- High (+)**	• N/A	**14- High (+)**	• This will reduce the number of informal settlements, reduce population density in neighbouring suburbs and increase the standard of living for the communities.
➢ **HERITAGE**				
Destruction of Heritage Resources	**3 - Low**	• For any chance finds of heritage resources, all work must cease in the area affected and the Contractor must immediately inform the Project Manager. A registered heritage specialist / palaeontologist must be called to site for inspection. The PHRA-G must be informed	**2 - Low**	• Loss of heritage resources

		about any finds. • Permits must be obtained from the PHRA-G if heritage resources are to be removed, destroyed or altered. • Any mitigation measures recommended by the desktop palaeontological assessment must be adhered to. • Any heritage resources found close to the construction site must be protected by a 7m buffer in which no construction can take place. The buffer material (danger tape, fencing, etc.) must be highly visible to construction crews. • Under no circumstances may any heritage material be destroyed or removed from site unless under direction of a heritage specialist. • Should any remains be found on site that is potentially human remains, the South African Police Service (SAPS) should also be contacted. Members of the SAPS may not remove remains until the necessary permits have been obtained.		
➢ **PALAEONTOLOGY**				
Destruction the palaeontological resources	**1 - Low**	• In the event that fossil remains are uncovered during any phase of construction, either on the surface or unearthed by new excavations and vegetation clearance, the ECO in charge of these developments ought to be alerted immediately. These discoveries ought to be protected (if possible in situ) and the ECO must report to SAHRA so that appropriate mitigation (e.g. recording, collection) can be carry out by a professional palaeontologist. • Preceding any collection of fossil material, the specialist would need to apply for a collection permit from SAHRA. Fossil material must be curated in an accredited collection (museum or university collection), while all fieldwork and reports should meet the minimum standards for	**1 - Low**	• Loss of palaeontological resources.

		palaeontological impact studies proposed by SAHRA.		
OPERATION PHASE				
➢ **ECOLOGY**				
Disturbance of faunal species	**4 - Moderate**	• The disturbance of fauna should be minimized. • Animals residing within the designated area shall not be unnecessarily disturbed.	**3 - Low**	Displacement of animals.
➢ **WATER RESOURCES**				
Altering the surface flow dynamics.	**4 - Moderate**	• Make use of preventative construction techniques (source controls), such as to limit the amount of impervious material near watercourses as far as possible, and to demarcate setbacks from the watercourse in the form of a buffer zone with a natural vegetation cover. • Consider green engineering measures such as water polishing or naturally vegetated attenuation ponds to improve water quality. Other structural control measures include grass swales, infiltration trenches and basins, wet ponds, and constructed wetlands. • Discharged storm water must be released in a controlled manner with a diffuse flow pattern and be accompanied by energy dissipating interventions to prevent erosion.	**3 - Low**	Decrease in the quality of water and alteration of the drainage pattern.
➢ **SOCIAL**				
Reduction in the negative impacts of urban Sprawl such as Traffic fatalities, traffic jams and air pollution as communities are afforded access to housing close to a manufacturing and industrial hub which has plenty of job opportunities	**14 – High (+)**	• N/A	**14 – High (+)**	This will result in a safe environment which will provide affordable homes which are close to a manufacturing and industrial hub which has plenty of job opportunities
Disputes over housing allocation for subsidised and social housing.	**4 - Moderate (-)**	• Clear and transparent communication about the allocation of housing	**3- Low (-)**	Issues may arise over housing allocation.

Table 10-2: Summary of Decommissioning Phase Impacts

NB: The impacts below have been determined for the decommissioning of the proposed construction site. All activities relating to the future decommissioning of the proposed development and the associated infrastructure does not form part of this application and as such would be subject to a separate Environmental Authorisation Process.

Id.	Impact	Description	Nature of Impact (Negative / Positive)	Management Objective / Principle	Level of Mitigation
Decommissioning Phase					
The development is permanent and will not be decommissioned. Only the construction site at the end of the construction period will need decommissioning and rehabilitation.					

11 APPROACH TO CORRECTIVE ACTION

11.1 Implementation of Corrective Action

Checking and corrective action forms part of the environmental management function and is aimed at ensuring that the necessary environmental management activities are being implemented and that the desired outcomes are achieved. When non-conformities do occur that have a negative impact on the environment, these should be rectified by the implementation of corrective actions issued by the ECO and PM within a reasonable or agreed period of time. All corrective actions need to be documented and the outcome photographed and included in the next report. Broadly, the mechanisms for addressing non-compliance that are provided for in the environmental specifications and associated contract documentation can be divided into the following categories:

- Controlling performance via the certification of payments;
- Requiring the Contractor to “make good”, at their own cost, any unjustifiable environmental degradation;
- Implementing a system of penalties to dissuade environmentally risky behaviours;
- Removing environmentally non-compliant staff/ plant from site, or suspending part or all of the activities on site;
- To confirm, upon receipt of the Tender, that the Contractor has made sufficient allowance in his Tender Price for meeting the various environmental requirements; and
- During the tender adjudication process for each Contract, each Contractor should be scored in terms of the aforementioned considerations and allocated an environmental competency score. This score should form a key consideration in the final decision-making regarding the award of the various contracts.

12 METHOD STATEMENTS

A Method Statement (MS) must be compiled for every activity undertaken by the Contractor which poses a risk to the environment (natural, biophysical and social), and includes the following:

- The MS should be submitted at least 7 working days prior to the commencement of work to the ECO;
- A MS describes the scope of the intended work in a step by step description to ensure that the ECO / EO understand the Contractors intentions. This will enable them to assist in devising any mitigation measures which would minimise environmental impact during these tasks;
- The ECO may require changes to a MS if it does not comply with the specification or if, in the reasonable opinion of the ECO, the proposal may result in, or carries a greater than reasonable risk of damage to the environment in excess of that permitted by the EMPr or any legislation;
- The Contractor shall carry out the activities in accordance with the approved MS;

- Approved MS shall be readily available on the site and shall be communicated to all relevant personnel;
- Approval of the MS shall not absolve the Contractor from any of his obligations or responsibilities in terms of the contract;
- No claim for delay or additional cost incurred by the Contractor shall be entertained due to inadequacy of a MS;
- For each instance where it is requested that the Contractor submit a MS to the satisfaction of the ECO, the format should clearly indicate as a minimum the following:
    - Responsible person (Name and Identity Number) and an alternative (Name and Identity Number);
    - The applicable requirements provided in all legislation and policies which have a bearing on the proposed activities (refer to **Table 7-1**);
    - Training Requirements;
    - Timing of activities as per the Project / Construction Schedule;
    - Materials, plant and equipment to be used;
    - Proposed construction procedure, including the order in which the activities making up the procedure will be carried out, designed to implement the relevant environmental specifications;
    - The system to be implemented to ensure compliance with the above;
    - Person Protection Equipment (PPE) required;
    - A detailed description of the process of work, methods and materials;
    - Emergency Procedures;
    - Response in the case of a non-compliance; and
    - Other information deemed necessary by the ECO.
- All MS must be signed by the Engineer; and
- Work may not commence until the MS has been approved by the ECO. All MS will form part of the EMPr documentation and are subject to all terms and conditions contained within the EMPr main document.

The following MS shall be prepared by the Contractor for approval:

- **Site Layout**: The graphical representation with detailed notes of the location, layout and method of establishment of the construction camp must be provided and must include the following:
    - All Contractor's buildings, and/or offices;
    - Lay down areas;
    - Vehicle and plant storage areas, including wash areas;
    - Workshops, if required and approved by ECO;
    - Fuel storage and dispensing areas, if required and approved by ECO;
    - Cement/concrete batching areas, if required and approved by ECO (including the methods employed for the mixing of concrete and particularly the containment of runoff water from such areas and the method of transportation of concrete);
    - Other infrastructure required for the running of the project.
- **Access Routes**: Details, including a drawing, showing where and how the access points and routes will be located and managed must be provided in a MS. Details of fences and gates affected or used during the construction activities, including a drawing showing the location of fences and access gates must be provided.
- **Pollution control**: Expected solid waste types, quantities, methods and frequency of collection and disposal as well as location of disposal sites must be identified and

stated in a MS. The MS shall further include methods of minimising, controlling, collecting and disposing of contaminated water, and details of any hazardous substances/materials to be used, together with the transport, storage, handling and disposal procedures for the substances.

- **Safety considerations**: The Contractor shall provide details identifying what safety precautions will be implemented to ensure the safety of all staff, and the general public at large, on site during the life of the project. This will include protective clothing requirements for all types of construction activities on site, including protection against dust, noise, falling objects, and work associated with electricity and working at heights.
- **Emergency procedures**: The Contractor shall provide details regarding all relevant emergency procedures that will be implemented for fire control and accidental leaks and spillages of hazardous substances (including fuel and oil). The Contractor shall further include details of risk reduction measures to be implemented including firefighting equipment, fire prevention procedures and spill kits.
- **Waste management control**: The Contractor shall provide details regarding how solid and liquid waste generated on the construction site and site camp will be collected, stored, transported and disposed of. Details of any service provider(s) appointed to manage this task must also be provided.
- **Storm water and erosion control**: The Contractor shall provide details of how storm water emanating within or adjacent to the construction site may impact on construction activities. Details on how the Contractor will deal with storm water runoff and potential erosion within the construction footprint and servitude must be provided. Details of any service provider(s) appointed to manage this task must also be provided.

13 ENVRIONMENTAL AWARENESS PLAN

Environmental awareness training is required for all personnel involved in the proposed project. This includes all employees working on the site including temporary labourers, contractors and subcontractors. The Environmental Awareness Plan is intended to describe the method that will be adopted by the proponent to inform any person acting on their behalf, including an agent, sub-contractor, employee or any person rendering a service, of any environmental risk which may result from the implementation of the project activities and the manner in which risks must be managed in order to avoid adverse environmental consequences.

Environmental awareness training should cover:

- The importance of the EMPr;
- Specific details of the EMPr;
- Employees role in compliance with the EMPr;
- Environmental effects associated with the activities;
- Training targeted at specific personnel, e.g. example operators of heavy machinery;
- The environmental impacts, actual or potential, of their work activities;
- The environmental benefits of improved personal performance;

- Their roles and responsibilities in achieving conformance with the environmental policy and procedures;
- Emergency preparedness and response requirements;
- The potential consequences of departure from specified operating procedures;
- The mitigation measures required to be implemented when carrying out their work activities;
- Environmental legal requirements and obligations;
- The importance of not littering;
- The importance of using supplied toilet facilities;
- The need to use water and electricity sparingly; and
- Details of and encouragement to minimise the production of waste and re-use, recover and recycle waste where possible.

Training should be conducted by a suitably qualified person and if necessary in more than one language to ensure it is understood by all workers. Copies of the environmental training must be available on site in languages appropriate to the work force. Records of the training sessions including attendance registers, nature of training and date of training should be kept to ensure all parties have received the necessary training and for auditing purposes.

In addition to training, general environmental awareness must be fostered among the project's workforce to encourage the implementation of environmentally sound practices throughout its duration. Environmental awareness and training is an important aspect of the implementation of the EMPr. Once the awareness plan and training material are available, the entire workforce and project management team should undergo an environmental awareness training course. Environmental awareness training is critical for the workforce to understand how they can play a role in achieving the objectives specified in the EMPr. All visitors to the site (including project team members which are not based onsite), must undergo Environmental Induction before being permitted to the construction and associated area. The Environmental Induction should be structured so as to provide a condensed version of the comprehensive Environmental Awareness Training that will be provided to the workforce / onsite staff.

Environmental awareness could be fostered in the following manner:

- Induction for all workers on site, before commencing work;
- Refresher courses as and when required;
- Daily toolbox talks at the start of each day with all workers coming on site, where workers might be alerted to particular environmental concerns associated with their tasks for that day or the area/habitat in which they are working; and
- Courses must be given by suitably qualified personnel and in a language and medium understood by workers/employees.

The Environmental Awareness Plan should be drawn up by the PM, in consultation with the ECO and EO and should be kept for implementation and audit purposes. The

Environmental Awareness Plan should be a dynamic document (or set of documents) which should be updated as changes to the project, environment, staff and *etc.* occur.

14 TRAINING

The applicable training will be as follows:

- The EO shall be appropriately trained in environmental management and shall possess the skills necessary to impart environmental management skills to all personnel involved in the construction of the proposed mixed business and residential development;
- The PM and EO shall ensure, on behalf of the Developer, that the employees (including construction workers, engineers, and long-term employees) are adequately trained and understand the management measures provided in the EMPr; and
- All employees shall have an induction presentation on environmental awareness. The cost, venue and logistics shall be for Antonio Cremona's account.

Where possible, training must be conducted in the predominant mother language spoken by the employees. The induction and training shall, as a minimum, include the following:

- The importance of conformance with all the specifications of the EMPr and other environmental policies and procedures;
- The significant environmental impacts, actual or potential, of their work activities;
- The environmental benefits of improved personal performance;
- Their roles and responsibilities in achieving conformance with the EMPr and other environmental policies and procedures;
- The potential consequences of departure from specified operating procedures; and
- The mitigation measures required to be implemented when carrying out their work activities.

14.1 Environmental Authorisation

The ECO shall convey the contents of this EMPr and the conditions of the EA and discuss the contents in detail with the Developer's PM and Contractors. This formal induction training shall be done with all main and sub-contractors. Record of the training dates, people who attended and discussion points shall be kept by the ECO.

15 ENVIRONMENTAL MANAGEMENT MEASURES

The management measures documented in each of the sub-sections below have been compiled using the following information:

- Impact Assessment and mitigation measures documented in the BAR for the proposed establishment of a mixed business and residential development and its operations; and
- Mitigation and management recommendations provided by the specialist studies and EAP.

The mitigation and management measures relating to each anticipated impact are described in **Table 15-1** and **Table 15-2**.

In addition to the above-mentioned information sources, the EMPr should be updated to include the conditions documented in the EA to be received upon approval of the BAR. The Developer should appoint an EAP to amend the EMPr should amendments be required by GDARD.

15.1.1 Planning Phase

To mitigate the negative environmental impacts, a number of measures will have to be addressed in the design of the project's layout during the planning phase. An inspection must be carried out on the design layout before commencement of the proposed mixed use development in order to ensure that the mitigation measures have been incorporated in the design.

15.1.2 Construction Phase

Table 15-1: Impacts, Management/ Mitigation Measures during Pre-Construction and Construction Phase

Id.	Impact	Mitigation / Management Measures	Responsible Person	Frequency and/or Time Period	Method of Monitoring
Pre-Construction and Construction Phase					
1.	Economic benefit to local economy	Ensure that unskilled labour required for the construction and installation of equipment are predominately South Africans from the surrounding communities.	Developer / Contractor	Not Applicable	Not Applicable.
2.	Dust nuisance	Water sprays, especially on dry and windy days, on haul roads and where vegetation is being / has been cleared. Dust nuisance Complaints should be recorded in the complaints register at the construction site.	Contractor / EO / Developer / ECO	Duration of Construction Phase.	Complaints register must be kept at the construction site. No. of dust complaints received will be used to measure the effectiveness of the dust impact mitigation.
3.	Possible sedimentation from uncovered areas	Vegetation clearance should be undertaken in phases, i.e. limited to working unit at a time.	Contractor / EO / ECO	Monthly monitoring within the duration of Construction Phase.	Monthly ECO Audits.
4.	Loss of ecological integrity and natural habitats	No mitigation measures proposed. However, the proposed development site has largely degraded over the years.	Not Applicable.	Not Applicable.	Not Applicable.
5.	Vehicle traffic congestion	Ensure that proper road signage is used. Limit access to the construction site to construction vehicles only.	Contractor / Developer	Monthly monitoring within the duration of Construction Phase.	Monthly ECO Audits.

Id.	Impact	Mitigation / Management Measures	Responsible Person	Frequency and/or Time Period	Method of Monitoring
Pre-Construction and Construction Phase					
6.	Land/soil pollution from chemical / hydrocarbon spills, litter and waste metals.	Establish a chemical storage area that is suitably designed to contain all spills. Ensure that hydrocarbons are stored in a bunded area with a capacity of 110% of storage volume. Ensure that the bunded area is suitably designed to allow for cleaning and prevent spillage to the environment. Ensure that all vehicles, storage, and usage areas have suitable spill kits. Develop a chemical and hydrocarbon spill procedure. Ensure that chemical and hydrocarbon usage is controlled. No servicing of vehicles onsite. Regular inspection and servicing of vehicles. Develop a spill management procedure for vehicles that may leak accidently. Develop a waste management plan. Ensure that concrete spills are cleaned up. Ensure litter is cleared regularly to designated waste areas.	Contractor / EO / ECO	Monthly monitoring within the duration of Construction Phase.	Monthly ECO Audits.
7.	Pollution may enter ground / surface water	Establish a chemical storage area that is suitably designed to contain all spills. Ensure that hydrocarbons are stored in a bunded area with a capacity of 110% of storage volume. Ensure that the bunded area is suitably designed to allow for cleaning and prevent spillage to the environment. Ensure that all vehicles, storage, and usage areas have suitable spill	Contractor / EO / ECO	Monthly monitoring within the duration of Construction Phase.	Monthly ECO Audits.

Id.	Impact	Mitigation / Management Measures	Responsible Person	Frequency and/or Time Period	Method of Monitoring
Pre-Construction and Construction Phase					
		kits. Develop a chemical and hydrocarbon spill procedure. Ensure that chemical and hydrocarbon usage is controlled.			
8.	Fugitive dust emissions (Health impact)	Dust suppression mitigation is recommended.	Contractor / EO / ECO	Duration of Construction Phase.	Complaints register must be kept at the construction site. No. of dust complaints received will be used to measure the effectiveness of the dust impact mitigation.
9.	Erosion and loss of soil resources	Develop a storm water management plan prior to commencement with construction. Use silt traps where necessary. Use bumps, humps, and cut off drains to control water velocity of exposed soils. Stockpile soils from footings in demarcated areas. Use soil material from footings in rehabilitation of impacted areas wherever possible. Develop a spill management procedure for vehicles that may leak accidently. Develop a waste management plan.	Contractor / EO / ECO	Monthly monitoring within the duration of Construction Phase.	Monthly ECO Audits.
10.	Increased noise	Limit construction activities to daylight working hours.	Contractor / EO / Developer	Duration of Construction Phase.	Complaints register must be kept at the construction site. No. of noise complaints received will be used to measure the effectiveness of the noise impact mitigation.
11.	Sedimentation,	Soil stock piling to be done at the	Contractor / EO / ECO	Monthly monitoring within the duration of Construction	Monthly ECO Audits.

Id.	Impact	Mitigation / Management Measures	Responsible Person	Frequency and/or Time Period	Method of Monitoring
Pre-Construction and Construction Phase					
	siltation, and increased turbidity in surface water	designated area.		Phase.	
12.	Impact on heritage resources	In the unlikely event of any unmarked human burials, burial pits, potsherds or stone tools being uncovered during earthworks for the proposed development, these must be reported immediately to the South African Heritage Resources Agency (Mr Andrew Salomon (021 362 2535)	Contractor / EO / ECO	Duration of Construction Phase.	Monthly ECO Audits.
13.	Uncontrolled activities may lead to fires	Undertake monitoring to determine if fires have any impact on the surrounding environment, suitable rehabilitation is to be undertaken where necessary. A fire management plan to be established prior to construction commencing. Vegetation is to be cut back in areas where welding is undertaken to prevent fires from occurring. Fire breaks along the servitude are to be established. Suitable fire fighting equipment and training is to be provided.	Contractor / EO / Developer / ECO	Monthly monitoring within the duration of Construction Phase.	Monthly ECO Audits.

15.1.3 Operational Phase

Table 15-2: Impacts, Management/ Mitigation Measures during Operational Phase

Id.	Impact	Mitigation / Management Measures	Responsible Person	Frequency and/or Time Period	Method of Monitoring
Operational Phase					
1.	Pollution from	Ensure that a site clean-up is undertaken at the end of every	Developer / Contractor	Duration of Operational Phase.	Compliance inspection by the

Id.	Impact	Mitigation / Management Measures	Responsible Person	Frequency and/or Time Period	Method of Monitoring
Operational Phase					
	litter, waste metals, vehicle spills / hydrocarbon spills during maintenance activities	maintenance cycle to ensure that no pollution has occurred. Where this has happened appropriate remedial action is to be taken.			authority.
2.	Pollution may enter ground / surface water	Ensure that all vehicles, storage, and usage areas have suitable spill kits. Develop a chemical and hydrocarbon spill procedure. Ensure that chemical and hydrocarbon usage is controlled.	Contractor / Developer	Duration of Operational Phase.	Compliance inspection by the authority.
3.	Energy consumption	Energy-saving awareness activities / notices to be practiced within the development site (both business and residential) areas.	Developer	Duration of Operational Phase.	Not applicable.
4.	Increased Noise	Noise from the proposed residential occupants should be regulated through the building manager and rules of the residential area.	Developer.	Duration of Operational Phase.	Complaints register must be kept at the construction site. No. of noise complaints received will be used to measure the effectiveness of the noise impact mitigation.
5.	Improvement on livelihood of the local communities (positive)	No Mitigation proposed	Developer	Duration of Operational Phase.	Not Applicable.
6.	Influx of people into the area	Employment opportunities must be allocated to residents in the local	Developer	Duration of Operational Phase.	Not Applicable

Id.	Impact	Mitigation / Management Measures	Responsible Person	Frequency and/or Time Period	Method of Monitoring
Operational Phase					
	looking for job opportunities (Social Impact)	communities surrounding the development first.			
7.	Increased traffic congestion	Establishment of the proposed public road or street is a mitigation measure to cater for more expected vehicle in the area. Proper road signs to be placed along the proposed streets.	Developer	Duration of Operational Phase.	Not Applicable
8.	Contribution to the Local Economic Development and Infrastructural Development (Positive)	None required	Developer	Duration of Operational Phase.	
9.	Improved water management and/or conservation (Positive)	Development designs to incorporate the erosion controls and storm water management infrastructures.	Developer	Duration of Operational Phase.	Compliance inspection by the authority.

15.1.4 Decommissioning Phase

Table 15-3: Impacts, Management/ Mitigation Measures during Decommissioning Phase

Id.	Impact	Mitigation / Management Measures	Responsible Person	Frequency and/or Time Period	Method of Monitoring
Decommissioning Phase					
The development is permanent and will not be decommissioned. Only the construction site at the end of the construction period will need decommissioning and rehabilitation.					

16 MONITORING

This chapter deals with Compliance Monitoring as well as specific monitoring requirements, as per the Specialist Studies, during construction and operational phases. The key to a successful EMPr is appropriate monitoring and review to ensure effective functioning of the EMPr and to identify and implement corrective measures in a timely manner. An audit of the environmental monitoring and management actions undertaken is essential to ensure that it is effective in operation, is meeting specified goals, and performs in accordance with relevant regulations and standards.

Regular monitoring of all the environmental management measures and components shall be carried out by the Developer's PM and independent ECO to ensure that the provisions of this plan are adhered to. Ongoing and regular reporting of the progress of implementation of this Programme should be done. Various points of compliance will be identified with regard to the various impacts that the construction will have on the environment.

Prior to the start of construction activities, an audit schedule should be drawn up, on basis of the environmental authorisation requirements and with input from ECO. The audit schedule should include target dates for implementation of recommendations and timeframes for submission to the Developer's EM, Developer's appointed PM and GDARD. The audits should be timed to coincide with scheduled project meetings, where possible.

16.1 Auditing

The key to a successful EMPr is appropriate monitoring and review to ensure effective functioning of the EMPr and to identify and implement corrective measures in a timely manner. An audit of the environmental monitoring and management actions undertaken is essential to ensure that it is effective in operation, is meeting specified goals, and performs in accordance with relevant regulations and standards.

Regular monitoring of all the environmental management measures and components shall be carried out by the Developer (Antonio Cremona) and the ECO to ensure that the provisions of this plan are adhered to. Ongoing and regular reporting of the progress of implementation of this Programme should be done. Various points of compliance will be identified with regard to the various impacts that the construction will have on the environment.

Inspections and monitoring shall be carried out to assess the implementation of the EMPr. Visual inspections on all environmental aspects shall be carried out on a regular basis.

Prior to the start of construction activities, an audit schedule should be drawn up, on the basis of the EA requirements and with input from ECO. The audit schedule should include target dates for implementation of recommendations and timeframes for submission to the Developer's appointed PM and the GDARD. The audits should be timed to coincide with scheduled project meetings, where possible.

16.2 Site Documentation or Reporting

Site documentation standard shall be used to keep records on site. In addition, all non-compliances to the EA will be reported to the assigned PM within 24 hours. All documents as listed below shall be kept on site and be available for monitoring and auditing purposes. Site inspections by an Environmental Audit team may require access to this documentation for auditing purposes. The documentation shall be signed by all parties to ensure that such documents are legitimate. Regular monitoring of all site works by the ECO is imperative to ensure that all problems encountered are solved punctually and amicably. When the ECO is not available, the PM shall keep abreast of all works to ensure no problems arise.

The following documents must be kept on site:

- Access negotiations and physical access plans;
- Site instructions;
- Pre-construction audit report undertaken by ECO;
- Complaints register;
- Records of all remediation / rehabilitation activities;
- Copy of this EMPr;
- Copy of the Environmental Authorisation;
- Environmental Awareness Plan;
- Monthly compliance report;
- Environmental training records; and
- Emergency response procedures.

The monthly compliance report should include:

- Complaints received from I&APs and details of the actions taken;
- Environmental incidents, spills of hazardous substances, *etc.*
- Environmental damage which requires rehabilitation; and
- Damages of private property such as buildings or crops.

16.3 Monitoring

16.3.1 Undertaking audits

The Developer or PM shall appoint a qualified and experienced ECO to ensure implementation of and adherence to the EMPr.

The ECO shall conduct audits to ensure that the system for implementation of the EMPr is operating effectively. The audit shall check that a procedure is in place to ensure that:

- The EMPr and the Method Statements being used are the up to date versions;
- Variations to the EMPr, Method Statements and non-compliances and corrective actions are documented; and
- Emergency procedures are in place and effectively communicated to personnel.

The audit programme shall consist of the following at a minimum:

- First audit no later than 1 month after EA is obtained; and
- Thereafter audits at monthly intervals, at a minimum or as per EA requirement.

16.3.2 Compliance with the EMPr

The Developer and/or its agents are deemed not to have complied with the EMPr and remedial action if:

- There is evidence of contravention of the EMPr clauses within the boundaries of the site or extensions;
- Environmental damage ensues due to negligence; and
- The Developer fails to comply with corrective or other instructions issued by the PM, within a time period specified by the PM.

16.4 Environmental Contact Person

To be confirmed prior commencement of the proposed development should GDARD grant an EA to proceed with the project.

16.5 Emergency Numbers

- Police: 10111
- Ambulance 10177
- Netcare 911 082 911

17 SITE REHABILITATION

17.1 Removal of structures and infrastructure

During and following the completion of the construction activities, the area must be rehabilitated by appropriate landscaping, levelling, topsoil dressing, land preparation, alien plant eradication

and vegetation establishment. All construction plant, equipment, storage containers and temporary fencing must be removed from site.

17.2 Waste and pollution control

- Waste minimisation, the re-use, recycling and recovery of waste must be promoted;
- Rubble, including surplus rock, foundations and batching plant aggregates will be removed from the construction site and firstly recycled and re-used, where possible, before disposed of at a registered landfill site;
- All waste storage containers will be removed from site on a regular basis;
- All portable sanitation facilities will be removed by a certified contractor. It must be ensured that no leaks or spillage from sanitation facilities occurs during the removal thereof; and
- All hazardous waste which is temporary stored on site, including the storage containers must be removed from site and disposed of at a registered hazardous landfill site.

17.3 Grassing

- Grassing must be undertaken by a suitably qualified Contractor;
- Grass areas using the method specified on the plant plans;
- Only indigenous seeds (seed mixes) common to the area must be used in rehabilitation and re-seeding of the disturbed areas;
- Sodding may be done at any time of the year, but seeding must be done during the summer when the germination rate is higher; and
- Hydro-seeding with a winter mix will only be specified where re-grassing is urgent, and cannot be postponed until summer.

17.4 Ripping and Scarifying

- Rip and / or scarify all areas following the application of topsoil to facilitate re-growth of vegetation where required. The ECO will specify whether ripping and / or scarifying is necessary, based on the site conditions immediately before these works begin;
- Rip and / or scarify all disturbed (and other specified) areas of the construction site, including temporary access routes and roads, compacted during the execution of the works; and
- Areas may not be ripped / scarified under wet conditions, as the soil will not break up.

17.5 Topsoil replacement and soil amelioration

- The principle of Progressive Reinstatement must be followed wherever possible. This includes the reinstatement of disturbed areas on an ongoing basis, immediately after the specified construction activities for that area are concluded;
- Execute top soiling activity prior to the rainy season or any expected wet weather conditions;
- Execute topsoil placement concurrently with construction where possible, or as soon as construction in an area has ceased;

- Replace and redistribute stockpiled topsoil together with herbaceous vegetation, overlying grass and other fine organic matter in all disturbed areas of the construction site, including temporary access routes and roads. Replace topsoil to the original depth. These areas will be quantified by the ECO;
- Place topsoil in the same area from where it was stripped. If there is insufficient topsoil available from a particular soil zone to produce the minimum specified depth, topsoil of similar quality may be brought from other areas of similar quality;
- The suitability of substitute material will be determined by means of a soil analysis addressing soil fraction, fertility, pH and drainage, and approved by the ECO; and
- Do not use topsoil suspected to be contaminated with the seed of alien vegetation.

17.6 Maintenance of rehabilitated areas

- Allow for a maintenance period of one year following practical completion;
- Landscape maintenance must be undertaken by a suitably qualified professional or landscape architect;
- Cordon off areas that are under rehabilitation as no-go areas using danger tape and steel droppers. If necessary, these areas should be fenced off to prevent vehicular, pedestrian and livestock access.
- Re-vegetation must match the vegetation type which previously existed, unless otherwise indicated in the Contract or specified by the ECO.
- Water all transplanted, planted and grassed areas;
- For planted areas that have failed to establish, replace plants with the same species as originally specified. The same species as originally specified must be used unless otherwise specified by the ECO; and
- A minimum grass cover of 80% is required, and individual plants must be strong and healthy growers at the end of the Maintenance Period.

18 FINANCIAL PROVISIONING

Section 30 of Chapter five of NEMA proposes penalties for non-compliance with the provisions of Chapter five. Any person who contravenes the regulations set out here or commits an offence as described in this section is liable for a fine or jail term. The responsible person, who is undertaking an activity, that contravenes these regulations, will be liable for these penalties. Fines and penalties shall be managed in accordance with the Public Management Finance Act.

A penalties and fines system shall be developed for this project and shall take the following in consideration:

- Penalties will be issued for the transgressions and non-compliances where the Contractor inflicts non-repairable damage upon the environment or fails to comply with any of the environmental specifications. The Contractor shall be liable to pay a penalty over and above any other contractual consequence.
- Penalties may be issued per incident at the discretion of the PM and ECO. The exact value of the penalty imposed shall be at the discretion of the PM and ECO. The Contractor will also be responsible for remediation costs.

- Such fines will be issued in addition to any remedial costs incurred as a result of non-compliance with the EMPr. The PM will inform the Contractor of the contravention and the amount of the penalty, and will deduct the amount from monies due under the Contract.
- The PM and ECO shall be the judge as to what constitutes a transgression in terms of this clause subject to the provisions of the General Conditions of Contract.
- For each subsequent similar offence, the penalty may, at the discretion of the PM and ECO be doubled in value to a maximum value to be determined.
- Payment of any penalty in terms of the contract shall not absolve the offender from being liable from prosecution in terms of any law.

A guideline of minimum fine values is provided for minor, moderate and serious offences in **Table 18-1** below.

Table 18-1: Guideline to fines for minor, moderate and serious offences

Offences		Fine
Minor offences	• Littering • Possession of intoxication substances on site. • Failure to use ablutions. • Moving on areas recently landscaped. • Disturbing grassed areas. • Not parking in demarcated areas. • Not using safety equipment • Wasting of water and electricity. • Not removing domestic waste off site. • Not stockpiling topsoil adequately.	R 1500 - 00
Moderate offences	• Oil spills • Persistent oil leeks on vehicles. • Generation of excessive dust and noise. • Transgression of the speed limit. • Illegal fires. • Burying of waste. • Use of intoxicate substances on site. • Lack of erosion control. • Entering non-demarcated areas. • Hunting and snaring. • Damaging of pre- identified trees.	R 5000-00
Serious offences	• Large oil/ hazardous waste spill. • Removal of pre-identified trees. • Damage of pre- identified heritage sites or objects. • Continually exceed noise limits. • Transgression of legal requirements. • Sanitation facilities not adequate. • Pollution of groundwater. • Removal of any protected plant or other species. • Damage or pollution of wetlands.	R15 000.00

19 CONCLUSION

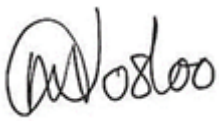
It is the opinion of the EAP that the implementation of the management and mitigation measures provided in the EMPr is sufficient to manage the environmental impacts associated with the proposed project. This EMPr will furthermore contribute to realising the following over-arching objectives set out to be reached by the use of the document as an environmental management tool:

- Ensure that sufficient monetary provision, aligned with the significance of the environmental impact and scale of the project, is made to remediate and rehabilitate the environment impacted on by the construction activities;
- Verify environmental performance through information on impacts as they occur;
- Respond to unforeseen events and environmental incidents; and
- Provide feedback to drive continual improvement in environmental performance.

The effectiveness of this EMPr will to a large degree rest on adherence to and fulfilling the roles and responsibilities of each role player and stakeholder. The roles and responsibilities for management actions contained in the EMPr (refer to Section 9 of this document) and arrangements for coordination among the role players are clearly defined in this document.

ZITHOLELE CONSULTING (PTY) LTD

Tebogo Mapinga
Project Manager



Mathys Vosloo
Project Associate

Z:\Projects\18026 - Farm 238JR722FR BA\4 Reports\46 Environmental\002 EMPR

APPENDIX A: EAP's CV

ZITHOLELE CONSULTING

Professional Registrations:

- SACNASP (115518)

Occupation:

- Snr. Environmental Scientist

Specialisation:

- Project Management
- Environmental Authorisations
- Environmental Management
- The review of BARs, EIARs, and EMPr's

Education:

- BSc (Zoology and Physiology), 2007
  University of Limpopo
  Turfloop Campus

Tebogo Mapinga

KEY EXPERIENCE

Tebogo is is a professional evironmental scientist with 11years' experience in the environmental management field in both public and private sectors. Her competencies lie in management and co-ordination of environmental projects, environmental impact assessments, compliance monitoring ensuring compliance to legislation and guidelines and public participation for small and large scale projects.

PROJECT EXPERIENCE

2017 **Thabamesti Coal Fired Power Station**
Permitting

2017 **Richards Bay CCPP Power Project**
Environmental Screening and Environmental Impact Assessment – EIA

2017 **Roggeveld Wind Farm**
Environmental Management Programme (EMPr) Amendment and all work required to reach financial close- permitting (Building Energy and G7)

2017 **Klawer Wind Farm**
EMPr Amendment and all work required to reach financial close- permitting (Building Energy and G7)

2017 **Roggeveld Wind Farm**
Environmental Management Programme (EMPr) Amendment and all work required to reach financial close- permitting (Building Energy and G7)

2017 **Adams PV Facility Upgrading of Charles Street**
All work required to reach financial close- permitting (Aurora Power Solutions (Pty)

2016 **Bellatrix PV Facility**
All work required to reach financial close- permitting (Aurora Power Solutions (Pty) Ltd**)**

2016 **Great Karoo EA amendment**
2015 **Karusa Wind Farm Jhb**
Part 2 EA Amendments (Enel Green Power)

PROJECT EXPERIENCE (continued)

2015 Soetwater Wind Farm
Part 2 EA Amendments (Enel Green Power)

2015-17 Gunstfontein Wind Energy Facility
EIA (ACED)

Basic Assessment Report (ACED)

2015 Acwa Power SolarReserve Redstone Solar Thermal Power Plant
EMPr amendment

2015 Sirius Phase One Solar PV Facility
All work required to reach financial close- permitting) (Aurora Power Solutions (Pty) Ltd)

2015 Nxuba Wind Farm
All work required to reach financial close- permitting (ACED and Enel Green Power)

2015 Upington Two CSP Facility
EIA (Abengoa Solar South Africa (Pty) Ltd

2015 Pofadder 3
4 EIA Processes (Mainstream Renewable Power South Africa)

4 separate Basic Assessment Reports (Mainstream Renewable Power South Africa)

2009 Castle Wind Energy Facility
EIA (juwi Renewable Energies)

2009 Spitskop Wind Energy Facility
Renewable Energy Systems Southern Africa (Pty) Ltd – EIA (RES SA);

2009 Bobididi Solar Facility
Environmental Screening- Root 60FOUR Energy (Pty) Ltd

2009 Great Fish River Watercourse Crossing BAR
African Clean Energy Developers (Pty) Ltd (ACED)

2009 Bedford Watercourse Crossing BAR-
African Clean Energy Developers (Pty) Ltd (ACED)

2008 EIA at Phaki Phakanani Environmental Consultants

- Construction of Khetho Bridge, Greater Giyani Local Municipality
- Demolition and Relocation of Malamulele High School
- Construction of Malamulele Shopping Complex
- The Subdivision of land in Ellisrus
- Construction of the Senwabarwane Filling Station
- Residential Development in Tlapeng Village
- Township Development in Maphosa Village

- Establishment of a Piggery in Mogalakwena Local Municipality
- Establishment of two Piggeries in Elias Motsoaledi Local Municipality
- Establishment of a Piggery in Modimolle Local Municipality
- Township Development in Rietfontein
- Public Participation and Section 24G Application for the National Taxi Scrapping Project

2008 EIA at Strategioc Environmental Focus

- Establishment of a Guest House (ECA application
- Establishment of a Waste Management Depot in Rustenburg
- Establishment of a Waste Management Depot in Tzaneen and Nkowa-Nkowa
- Langkuil Industrial Development, (Environmental Manager and Project Manager);
- Township Development in Reitfontein
- Upgrading of the BP Golf Course
- Construction of the BP Soshanguve VV Filling Station
- Construction of the BP Soshanguve ZZ Filling Station
- Shell Filling Stations(Project Manager and Client Liaison
- Eskom- Komati Water Augmentation
- Rainbow Junction Residential Development
- Township Development in Delmore Park Extension 7
- West Rand District Municipality- Bulk Water Supply
- West Rand District Municipality Air Quality Assessment
- Lonmin K4 Shaft Mine Upgrading
- Westlake Residential Development
- Montana Spruit Upgrading

EMPLOYMENT RECORD

Present	Zitholele Consulting	Senior Environmental Scientist
2010	Savannah Environmental	Principal Env. Manager
2013	DEA	Env. Officer Specialised duction
2010	Strategic Environmental Focus	Env. Project Manager
2008	Phaki Phakanani Environmental Consultants	Environmental Consultant

ZITHOLELE CONSULTING

Professional Registrations:

- (SACNASP) South African Council for Natural Scientific Professions
- (IAIAsa) International Association for Impact Assessment – South Africa

Occupation:

- Senior Environmental Scientist

Specialisation:

- Environmental and Social Impact Assessments
- Strategic Environmental Assessments
- Estuarine Ecological Assessments
- Project Management and GIS

Education:

- Ph.D., Zoology, 2012 Nelson Mandela Metropolitan University
- M.Sc., Zoology, 2003 University of Port Elizabeth
- B.Sc. Hons, Zoology, 2001 University of Port Elizabeth
- B.Sc., Zoology and Botany, 2000 University of PE

Dr. Mathys Vosloo

KEY EXPERIENCE

Dr. Mathys Vosloo is a well-qualified and technically proficient environmental and natural scientist with more than 12 years environmental management experience. His experience include Environmental Impact Assessments (EIAs) and the development of Environmental Management Programmes during environmental assessments of construction projects, environmental compliance monitoring and reporting, and Environmental Control Officer (ECO) services for construction projects. Recent experience includes project management and execution of large waste related projects, such as the application for development of Ash Disposal Facilities, and large linear projects such as the management EIA process for the implementation of extensive power lines for renewable projects. Mathys also has substantial experience in Geographical Information Systems (GIS), creating and analysing digital terrain models, runoff and stream flow analysis, stormwater design and map-making for projects in Africa. Further experience include the development and completion of State Of the Environment Reporting (SOER), Strategic Environmental Assessments (SEA) and feasibility studies. Mathys' experience in natural science include aquatic ecological assessments, project management and sample collection in several west, south and east coast estuaries, including ecosystem analysis of estuaries in the Eastern Cape and former Transkei area.

PROJECT EXPERIENCE

2017 PPP and WOP for Kusile PS 60year ADF R 2.8m
Public participation process for Wetland Offset Strategy and implementation of Wetland Offset Plan for the Kusile Power Station 60year Ash Disposal Facility.

2017 BA for KEMJV slimes pipeline R 230 000
Basic Assessment for construction of slimes pipeline for Kimberley Ekapa Mine Joint Venture, Northern Cape.

2016 - 2017 Asbestos Mine Rehabilitation Programme R 1.3 million
Undertaking environmental site investigations and project scoping for the rehabilitation of 10 derelict and abandoned asbestos mines in Limpopo and Mpumalanga Provinces.

PROJECT EXPERIENCE (continued)

2016 Walkdown & WULA for Kuruman Powerline upgrade R 355 000
Specialist walkdown of approved 132 kV powerline servitude between Kuruman and Kathu, Northern Cape.

2016 - 2017 EA Amendment for Kuruman Powerline Upgrade R 60 000
EA Amendment application i.t.o. EIA 2014 regulations for amendment to the approved 132 kV powerline corridor between Hotazel, Kuruman and Kathu, Northern Cape.

2016 Breede-Gourits CMS: Estuarine component R 81 000
Estuary Situation Assessment to inform the Breede-Gourits Catchment Management Strategy for Breede-Gourits Water Management Area.

2016 - 2017 BA for Tshepisong Extension 4 development R 198 000
Basic Assessment for Mixed Business and Residential Development within Portion 64 of Farm Vlakfontein 238 IQ, Tshepisong Extension 4, Johannesburg West, Gauteng Province.

2016 - 2017 BA for Patensie Housing Development R 283 000
Basic Assessment for the Patensie Housing Development, Eastern Cape.

2016 Specialist Walkdown for Kuruman Powerline upgrade R 355 000
Specialist walkdown of approved 132 kV powerline servitude between Hotazel and Kuruman, Northern Cape.

2016 Solar Park EA Amendment R 248 000
Environmental Authorisation (EA) Amendment application i.t.o. EIA 2014 regulations for amendments to the Solar Park to Nieuwehoop 400 kV power line corridor near Upington, Northern Cape.

2015 - 2016 Solar Park WULA R 547 000
WULA for Solar Park to Nieuwehoop 400 kV powerline development near Upington, Northern Cape.

2015 - 2016 BA Clanwilliam Weirs R 409 000
Proposed Re-alignment of the Bulshoek Dam and Doring River Weirs near Clanwilliam, Western Cape.

2015 - 2016 BA Klipspruit Valley R 244 000
BA and WULA for the Klipspruit Valley Road Upgrade.

2014 - 2016 EIA Koffiefontein Slimes Dam R1 million
EIA for the new Koffiefontein Slimes Dam Development, Kimberley.

2014 - 2015 BA and WULA Kuruman Upgrade R1.3 million
BA and WULA for 132kV power line upgrade from Hotazel to Kuruman and Kathu, Northern Cape.

2013 - 2016 EIA Kendal 30 year Ash Disposal Facility R6 million
EIA, WMLA and WULA for a new Ash Disposal Facility for Kendal Power Station near Ogies in Mpumalanga.

2013 - 2014 Design of 3 canals R 700 000
3 x BAs for the proposed prevention of water ingress into previously mined out areas in the Witwatersrand Mining Basin (canalisation of 3 streams), Gauteng.

2013 - 2014 BA for Vaalbank Switching Station R 380 000
Basic Assessment for Vaalbank Switching Station and 2 x 88 kV Powerlines, Free State.

PROJECT EXPERIENCE (continued)

2012 - 2015 EIA Solar Park **R5 million**
EIA, EMP &WULA for the Solar Park 132/400 kV Sub Station and Associated lines, Northern Cape.

2012 - 2015 Kusile 60 year Ash Disposal Facility **R11 million**
EIA, WML and WULA for the 60 year Ash Disposal Project near Balmoral in Mpumalanga.

2012 - 2015 WULA Wilge Pipeline **R 900 000**
WULA for the sewage and water pipeline from Wilge Township to Phola, Mpumalanga.

2012 BA Kouga Dam Wall **R 250 000**
The rehabilitation of the Kouga Dam wall and associated mining activities.

2012 EMP City of Cape Town Stormwater **R1.5 million**
Maintenance and management interventions undertaken by the City of Cape Town in its surface stormwater systems.

2012 BA Melkhout Powerlines **R 100 000**
The installation of 132kV transmission lines from Melkhout to Dieprivier, including the construction of a new substation at Dieprivier, Cacadu District.

2012 BA Diepriver Powerlines **R 100 000**
The installation of 132kV transmission lines from Dieprivier to Kareedouw, including the extension of the existing substation at Kareedouw, Cacadu District.

2012 BA Patensie Powerlines **R 100 000**
The installation of 132kV transmission lines from Melkhout to Patensie, including the construction of a new substation at Patensie, Cacadu District.

2012 Mmnthatha River System
Catchment delineation and stream calculation for the Mnthatha River System, GIBB Durban.

2011 - 2012 PRASA Passenger rail and shunting yard proposed sites
Environmental Screening for the PRASA passenger rail and shunting yard proposed sites in Cape Town, Gauteng and Durban.

2010 - 2012 ATTP Flow Limiters installation
NMBM Assistance to the poor (ATTP) and schools leakages repairs and flow limiters installation.

2010 - 2012 ATTP Database ManagementFlow Limiters installation **R4 million**
NMBM Assistance to the poor (ATTP) and schools leakages repairs and flow limiters installation database management.

2010 - 2011 Nelson Mandela Bay Provincial Department of Housing
Nelson Mandela Bay and Cradock low cost housing rectification audits. Management of incoming and outgoing GIS data and GIS mapping, Provincial Department of Housing.

2010 - 2011 ECO Bulk Stormwater Infrastructure Motherwell
Installation of bulk storm water infrastructure in Motherwell NU29 and 30 and Implementation of an artificial wetland at the Motherwell stormwater canal outlet structure.

PROJECT EXPERIENCE (continued)

2010 BA McAdam Street Upgrade **R 60 000**
The extension of McAdam Street from Worraker to Mangold Street, NMBM.

2009 - 2011 EIA Motherwell Housing Development **R 270 000**
Motherwell NU 31 housing development, NMBM.

2009 - 2011 Coega Integrated Stormwater Management Plan
Coega IDZ Eastern Sector Integrated Stormwater Management Plan, Coega Development Corporation.

2009 - 2011 EIA KougaWind Farm **R 350 000**
Kouga 300 MW wind farm, Kouga Local Municipality.

2009 - 2010 ECO Swartkops River Artificial Wetland
Swartkops River, NMBM.

2009 - 2010 ECO Humewood Road Upgrade
Realignment of the S-bend section of Humewood Road in Humewood.

2009 - 2010 ECO Paapenkuils Sewer Augmentation
Paapenkuils Main Sewer Augmentation in Port Elizabeth NMBM.

2009 - 2010 SOER State of the Environment Report **R 350 000**
NMBM State of the Environment Report.

2009 - 2010 ISWMP Coega IDZ **R 350 000**
Coega IDZ Eastern Sector Integrated Stormwater Management Plan, CDC.

2009 - 2010 SOER Flood Plain and Spatial Analysis
Nelson Mandela Metropolitan Municipality SOER flood plain and spatial analysis, NMBM.

2009 - 2010 EIA – Red Cap Developments
Kouga Local Municipality wind farm development EIA, RedCap Developments.

2008 - 2009 Port Harcourt City Open Space System Plan
Port Harcourt City Open Space System Plan, Government of Nigeria.

2008 - 2009 ECO Kwazakhele stormwater infrastructure
Construction of stormwater detention ponds and upgrading of stormwater infrastructure in Kwazakhele, Phase 3.

2008 ECO Sherwood Road Upgrade
Upgrading of Devon and Fairley Roads in Port Elizabeth, NMBM.

2008 OR Tambo District Municipality water conservation and demand management
OR Tambo District Municipality water conservation and demand management.

2008 SOER Eden District Municipality
Eden District Municipality SOER, Eden District Municipality.

2008 Kouga Local Municipality catchment and flood attenuation analysis
Jeffreys Bay Marina Martinique catchment and flood attenuation analysis, Kouga Local Municipality.

2008 EIA Bethelsdorp Housing Development **R 230 000**
Bethelsdorp Phase 3 social housing development, NMBM.

PROJECT EXPERIENCE (continued)

2008 **BA Beacon Maritime Navigational Structure Upgrade** **R 60 000**
Beacon maritime navigational structure upgrading, NMBM.

2008 **BA Moffet Dam Rehabilitation** **R 60 000**
Moffet Dam breach remedial works, Kouga Local Municipality.

2008 **BA Pollok Beach light mast installation** **R 50 000**
Pollok Beach light mast installation, NMBM.

2008 **BA Humewood Road Re-alignment** **R 60 000**
Humewood Road re-alignment along the S-bend section, NMBM.

2008 **SOER Hessequa Local Municipality** **R 200 000**
Hessequa Local Municipality State of the Environment Summary Report.

2008 **SEA Coastline redevelopment** **R 250 000**
North End Coastline redevelopment SEA, NMBM.

2008 **Mzimkhulu River catchment and flood attenuation analysis**
Mzimkhulu River catchment and flood attenuation analysis, Umzimkhulu Municipality.

2008 **PE Paapenkuils River catchment and flood attenuation analysis**
Port Elizabeth Paapenkuils River catchment and flood attenuation analysis, NMBM.

2007 - 2008 **ECO Mavuso Road Upgrade**
Construction of Mavuso Road in Kwazakhele, NMBM.

2007 **BA Jagersfontein Chicken Farm** **R 40 000**
Jagersfontein farm 432 commercial production of chicken and operation of an abattoir, Kouga Local Municipality.

2007 **BA Zwide Roads Upgrade** **R 55 000**
Tarring of roads in Zwide, NMBM.

2007 **BA McAdam Street Construction** **R 40 000**
Construction and extension of McAdam Street, NMBM.

2007 **BA Tygerbay Reconstructiontion** **R 60 000**
Repair and reconstruction of water retaining structures at Tyger Bay EIA NMBM.

2007 **BA Lorraine Infill development** **R 40 000**
Erf 306 Lorraine Infill development, NMBM.

2007 **BA Sherwood Roads Upgrade** **R 40 000**
Tarring of roads in Sherwood, NMBM.

2007 **BA Zwide Roads Upgrade** **R 40 000**
Tarring of Ntsele, Mkutuka, Nanto and Vabaza Streets in Zwide, NMBM.

2007 **BA Pollok Beach Parking Lot** **R 50 000**
Pollok Beach, Summerstrand, parking lot relocation, NMBM.

2007 **BA Uitenhage Roads Upgrade** **R 40 000**
Tarring of Dube, Grootboom and Luzipho Streets in Uitenhage, NMBM.

PROJECT EXPERIENCE (continued)

2007 BA PE ICC Site Assessment **R 150 000**
Port Elizabeth International Convention Centre Rapid site assessment, NMBM.

2007 EIA Exemptions Applications Motherwell
Motherwell/Coega outfall canal upgrade.

2007 EIA Exemptions Applications Lorraine Infill Development
Erf 17, Lorraine, infill development.

2007 EIA Exemptions Applications Korsten Upgrade
Korsten Modal Interchange Upgrade.

2007 GIS SANRAL outdoor advertising opportunities
SANRAL outdoor advertising opportunities in the Eastern Cape, SANRAL.

2007 Coega Integrated Stormwater Plan
Coega Integrated Stormwater Plan, Coega Development Corporation.

2007 Uitenhage Stormwater Master Plan
Uitenhage Stormwater Master Plan, NMBM.

2006 Nelson Mandela Metropolitan University exchange programme
Analyses and identification of nematode collected samples from the Mngazi Estuary in the Eastern Cape (former Transkei), South Africa, University of Ghent, Belgium – Nelson Mandela Metropolitan University exchange programme.

2005 - 2006 Berg River Reserve Determination Study **R 150 000**
Hyperbenthos and zooplankton field assessment in Berg River estuary.

2005 Olifants River Reserve Determination Study, Western Cape **R 300 000**
Specialised field ecologist - Field assessment: subtidal macrozoobenthos, hyperbenthos and zooplankton in Olifants River estuary for the Olifants River Reserve Determination study, Western Cape., Contracted sampling for CSIR Stellenbosch (Environmentek).

2004- 2005 DWAF - Kromme and Seekoei Estuary Reserve Determination Study **R 200 000**
Specialised field ecologist - Kromme and Seekoei Estuary Catchment Reserve Study. Contracted sampling for Department of Water Affairs and Forestry (DWAF).

2003 - 2004 Berg River Baseline Monitoring Program (UCT) **R 350 000**
Berg River Baseline Monitoring Program (UCT). Collecting subtidal macrozoobenthos.

2002 - 2006 University of Port Elizabeth Ecological analysis **R4 million**
Specialised field ecologist - Field assessment: subtidal macrozoobenthic and hyperbenthic invertebrates, zooplankton, microzooplankton, meiofauna at Mngazi and Mngazana River estuaries.

2002 - 2003 University of Port Elizabeth Ecological analysis
Ecological analysis of the functioning Sundays, Swartkops, Kromme, and Gamtoos estuaries using Ecopath with Ecosim, and assessment of the impact of recreational fishing on these ecosystems. MSc dissertation, University of Port Elizabeth.

PROJECT EXPERIENCE (continued)

2002 Sylt Ecosystem, Germany R 250 000
Assistant ecosystem modeller - Assisting in preparation and balancing of ecosystem carbon flow models of the Sylt Ecosystem, Germany.

2002 Field assessment: subtidal macrozoobenthos, hyperbenthos and zooplankton in Rooiels R 400 000
Specialised field ecologist - Field assessment: subtidal macrozoobenthos, hyperbenthos and zooplankton in Rooiels, Palmiet, Heuningnes, Breede, Klein Brak and Kaaimans River estuaries, Western Cape.

2002 Field Assessment - intertidal invertebrates Eastern Cape R 150 000
Specialised field ecologist - Field assessment: intertidal invertebrates in Kabeljous, Gamtoos, Swartkops, Sundays and Kariga River estuaries, Eastern Cape.

PAPERS, PUBLICATIONS, PRESENTATIONS AND PROFESSIONAL SOCIETIES

PAPERS, PUBLICATIONS

1. Vosloo, M C and Hendricks, M G J. 2017. Marine and estuarine nematodes in South Africa, Book Chapter. In *Nematology in South Africa: A view from the 21st Century*. Fourie, Spaull, Jones, Daneel, De Waele (Eds).
2. Vosloo, M.C. 2012. Network analysis of trophic linkages in two sub-tropical estuaries along the south-east coast of South Africa. PhD thesis, Nelson Mandela Metropolitan University.
3. Vosloo, M.C. 2009. Marine and estuarine meiofauna: Contribution to the National Marine Ecosystem Diagnostic Analysis. Agulhas and Somali Current Large Marine Ecosystems.
4. Vosloo, M.C. 2004. A comparative assessment of the impact of recreational and subsistence fishing on selected Eastern Cape estuarine ecosystems using the Ecopath modelling approach. MSc Dissertation, University of Port Elizabeth, Port Elizabeth.

PROFESSIONAL SOCIETIES

1. Member of International Association for Impact Assessment – South Africa (IAIAsa)
2. Registered member of South African Council for Natural Scientific Professions, (SACNASP)

EMPLOYMENT RECORD

2013 - Present	Zitholele Consulting	Manager: Licencing and Permitting, Senior Environmental Consultant
2012	GIBB Engineering and Science	Senior Environmental Scientist
2007 – 2011	GIBB Engineering and Science	Environmental Scientist

2008 – 2011	Nelson Mandela Metropolitan University	Postgraduate (part-time) Student
2005 – 2007	Nelson Mandela Metropolitan University	Full time Postgraduate (PhD) Student
2001 - 2003	University of Port Elizabeth	Full time postgraduate (MSc) Student
2006	University of Ghent, Belgium	Exchange Ecologist

APPENDIX B: MAPS

28.3°

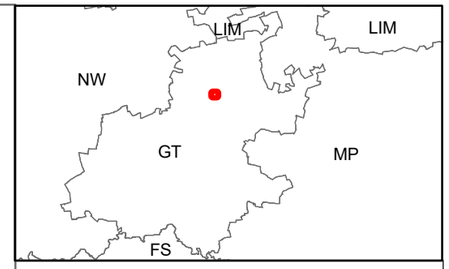
Jan Niemand Park

Stormvoel Rd

Koedoespoort

Silvertondale

28.3°



Legend

- Place Names
- Main Roads
- Other Roads
- Farm Boundary
- NFEPA_Rivers
- NFEPA_Wetlands

Conservation Plan Areas

- Ecological Support Area
- Important Area
- Irreplaceable Area
- Protected Area

RESOURCES\NOTES

0 0.1 0.2 0.4 0.6 Km

REFERENCE Coordinate System:
WGS 1984 Web Mercator Auxiliary Sphere

PROJECT
FARM 238JR722FR BA

TITLE

FIGURE NO:
FARM HARTEBEESTPOORT 238 JR
LOCALITY MAP

PROJECT No. 18026		REV 0
SCALE 1:10,000		A3
GIS	TC	13/04/2018
CHECK	TM	13/04/2018
REVIEW		

ZITHOLELE CONSULTING

Z:\Projects\18026 - Farm 238JR722FR BA\7 Drawings\77 Environmental\02 MXD\18026-77-02-Hartebeesfontein Locality Map Rev1.mxd

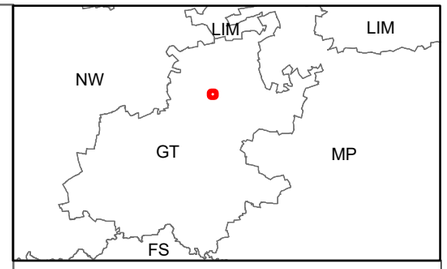
28,3°

Jan Niemand Park

Stormvoel Rd

Koedoespoort

28,3°



Legend

- Farm Boundary
- wetland
- Cadastral_boundary
- Cadastral_servitude
- roads_dash
- roads
- Road_reserve
- Parking_indi
- parking
- Tar_Road
- Railway
- Concrete
- floodline
- u-shape
- square
- spruit
- roads
- paving
- parking
- Pak
- Island
- crtyrd
- NFEPA_Wetlands

CPlanV33_1110_ge
Conservation Plan Areas

- Ecological Support Area
- Important Area
- Irreplaceable Area
- Protected Area

RESOURCES\NOTES

0 0,075 0,15 0,3 0,45 Km

REFERENCE Coordinate System:
WGS 1984 Web Mercator Auxiliary Sphere

PROJECT
FARM 238JR722FR BA

TITLE

FIGURE NO:
FARM HARTEBEESTPOORT 238 JR LAYOUT MAP

PROJECT No. 18026		REV 0
SCALE 1:8 260		A3
GIS	TC	2018/10/16
CHECK	TM	2018/10/16
REVIEW		

ZITHOLELE CONSULTING

Z:\Projects\18026 - Farm 238JR722FR BA\7 Drawings\77 Environmental\02 MXD\18026-77-02-Hartebeesfontein Locality Map Rev1.mxd

Development Layout Map