



# ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)

FOR THE PROPOSED DEVELOPMENT OF PORTION 260 (A  
PORTION OF PORTION 114) OF THE FARM RIETFONTEIN 189 IQ AS  
WELL NECESSARY SERVICES ON SURROUNDING PROPERTIES

## Final

**Proponent:**

Hocom Properties (Pty) Ltd.

**Project Reference:**

21949-Ptn 260 Rietfontein 189

**Report Date:**

November 2020




**Report Reference:**

21949-EMPR-2

## DOCUMENT CONTROL

<b>Project Name</b>	Portion 260 (a Portion Of Portion 114) Of The Farm Rietfontein 189 IQ as well Necessary Services on Surrounding Properties
<b>Report Title</b>	Environmental Management Programme (EMPr)
<b>Authority Reference Number</b>	GAUT 002/19-20/E2532
<b>Report Status</b>	Final Submission

<b>Applicant Name</b>	Hocom Properties (Pty) Ltd
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	Name	Signature	Date
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## DOCUMENT PROGRESS

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26/11/2020	21949-EMPR-02	Internal	Internal Review
30/11/2020	21949-EMPR-2	GDARD	Online and hard copy
30/11/2020	21949-EMPR-2	I&APS	PDF

### Amendments on Document

Date	Report Reference Number		Description of Amendment
17/09/2020	21949-EMPR-0	21949-EMPR-1	Minor amendments; Finalise report
26/11/2020	21949-EMPR-1	21949-EMPR-02	Amended to take into account I&AP comments
30/11/2020	21949-EMPR-02	21949-EMPR-2	Minor amendments; Finalise report

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# 1 INTRODUCTION

## 1.1 Overview

The proposed development of Portion 260 of the Farm Rietfontein 189 IQ involves a mix use development which includes a broad range of uses including Business 1 and Commercial Uses. This aims to serve growing residential areas around the area. The following primary rights are being applied for:

- Erf 1 – 4 | Business 1 (As per Scheme: Shops, Office use, Dwelling Units, Residential Use, Hotel and Restaurant)
- Erf 5 | Commercial (As per Scheme: - Warehousing and Distribution)
- Erf 6-7 | Business 1 As per Scheme: Shops, Office use, Dwelling Units, Residential Use, Hotel and Restaurant)

Necessary roads and services required for the development will also be put in place.

## 1.2 Project Location

The proposed development occurs on Portion 260 of the Farm Rietfontein 189 IQ. In addition, a number of services are required and will traverse nearby properties. **Table 1-1** provides an overview of the affected properties together the Surveyor General 21-digit diagram number and associated project components.

**Table 1-1: Affected Properties and associated project components**

21-digit code	Property Description	Services
T0IQ0000000018900255	Portion 255 of the Farm Rietfontein 189	Sewer (Proposal)
T0IQ0000000018900254	Portion 254 of the Farm Rietfontein 189	
T0IQ0000000018900253	Portion 253 of the Farm Rietfontein 189	
T0IQ0000000018900252	Portion 252 of the Farm Rietfontein 189	
T0IQ0000000018900251	Portion 251 of the Farm Rietfontein 189	
T0IQ0000000018900007	Portion 7 of the Farm Rietfontein 189	
T0IQ0000000018900260	Portion 260 of the Farm Rietfontein 189	Internal Stormwater and bioretention pond
		Internal sewer
		Internal water
T0IQ0000000018900189	Portion 189 of the Farm Rietfontein 189	Road A and section of Road B ( <u>proposed layout</u> ), water pipeline
T0IQ0000000018900188	Portion 188 of the Farm Rietfontein 189	Road A, Water Pipeline
T0IQ0000000018900222	Portion 222 of the Farm Rietfontein 189	Water pipeline

The coordinates for the project are provided in **Table 1-2**.

**Table 1-2.: Project Components**

	Coordinates	
Centre Point of Mixed Use Development on Portion 260	26° 2'53.37"S	27°53'18.09"E
Start, Middle and End Point Coordinates of Stormwater pipeline and bioretention pond	26° 2'55.99"S	27°53'18.61"E
	26° 2'49.72"S	27°53'13.96"E
	26° 2'58.36"S	27°53'12.69"E
Start, Middle and End Point Coordinates of Sewer Line (Proposal)	26° 2'55.46"S	27°53'18.33"E
	26° 2'48.23"S	27°53'4.57"E
	26° 3'2.37"S	27°52'35.97"E
Start, Middle and End Point Coordinates of Sewer Line (Alternative)	26° 2'55.76"S	27°53'18.71"E
	26° 2'57.93"S	27°53'3.01"E
	26° 3'3.58"S	27°52'36.11"E
Start, Middle and End Point Coordinates of Road A (and water line)	26° 3'5.81"S	27°53'24.82"E
	26° 3'1.93"S	27°53'22.45"E
	26° 2'57.71"S	27°53'19.66"E
Start, Middle and End Point Coordinates of Road B (Proposed Layout)	<u>26° 2'55.75"S</u>	<u>27°53'25.65"E</u>
	<u>26° 2'57.43"S</u>	<u>27°52'57.38"E</u>
	<u>26° 2'59.41"S</u>	<u>27°53'12.58"E</u>
Start, Middle and End Point Coordinates of Road B (As part of Alternative Layout)	26° 2'55.87"S	27°53'26.16"E
	26° 2'48.16"S	27°52'53.99"E
	26° 2'40.34"S	27°53'14.43"E

An overview of the location of the development is provided in **Figure 1-1** and **Figure 1-2**.

### 1.3 Alternatives

As required by the Environmental Impact Assessment (EIA) Regulations, 2014 (as amended), alternatives have been as been assessed as part of the Basic Assessment (BA) process. These alternatives relate to the sewer line. **Figure 1-3** and **Figure 1-4** provide an overview of the Proposal and alternative.

In addition, due to comments received from I&APs and the Department, additional layouts were also assessed as alternatives and are also discussed below.

### 1.3.1 Sewer Line Alternatives

#### 1.3.1.1 Proposed Sewer Line

The proposal involves the development of approximately 1.3km 160mm and 200mm diameter pipelines which travels to the north of the wetland and crosses the wetland buffer in two locations before entering the wetland area to connect to the existing line.

#### 1.3.1.2 Alternative Sewer Line

In contrast, with Alternative 1, the 160mm line is shorter (only 1.1km) but almost completely traverses the wetland and thus has a much larger and direct impact due to modified flow and loss of wetland vegetation. It also enters the C-plan Ecological Support Area (ESA) and Zone 3 of the Gauteng Provincial Environmental Management Framework (GPEMF). It is therefore not preferred.

### 1.3.2 Alternative Layouts

#### 1.3.2.1 Proposed Layout (FAR -0.4)

With the Proposal, the FAR of the proposed development is reduced to 0.4 and therefore results in an area of 25 134.4 m<sup>2</sup>. Figure 1-5 provides the proposed layout.

The biggest implication of the reduced FAR is that of traffic and access. The Traffic Impact Assessment was updated to take into account the new proposed layout and found that with the amended FAR of 0.4 (Proposed Layout), the Morning (AM) Peak Hour was expected to be 519 (313 in / 206 out) and Afternoon (PM) Peak Hour 1,352 (664 in / 687 out), Access to the site would therefore be as follows:

- **Road A** The construction of a new Class 5a (commercial local) road – 7.4m wide in a 20m road reserve (note: this is already approved).
- **Road B** The construction of a new Class 4a (commercial collector) road – 7.4m wide in a 25m road reserve (along the southern boundary of the application site, terminating at the western corner).

Figure 1-6 shows the proposed access arrangements (from Road B/Beyers Naude and Road A (which later connects to Beyers Naude).

#### 1.3.2.2 Alternative Layout (FAR – 0.8)

In contrast, the Alternative Layout has a FAR of 0.8 which results in an area 50 265.80 m<sup>2</sup>. Refer to Figure 1-7.

The impact of this FAR was initially assessed as part of the original Traffic Impact Assessment which found that the expected trip generation of the application was ±965 vehicle trips during the weekday morning (AM) peak hour and ±2,293 vehicle trips during the weekday afternoon (PM) peak hour (based on COTO TMH 17, the South African Trip Data Manual).

In order to cater for this, construction of the following roads would be required:

- Road A The construction of a new Class 5a (commercial local) road – 7.4m wide in a 20m road reserve.
- Road B The construction of a new Class 4a (commercial collector) road – 7.4m wide in a 25m road reserve (***this would extend from Beyers Naude along the southern boundary of the site and then link to the section of the K56 which is being constructed as part of the Beyers Naude Road Upgrade***).

Figure 1-8 provides an overview of the roads and access required.

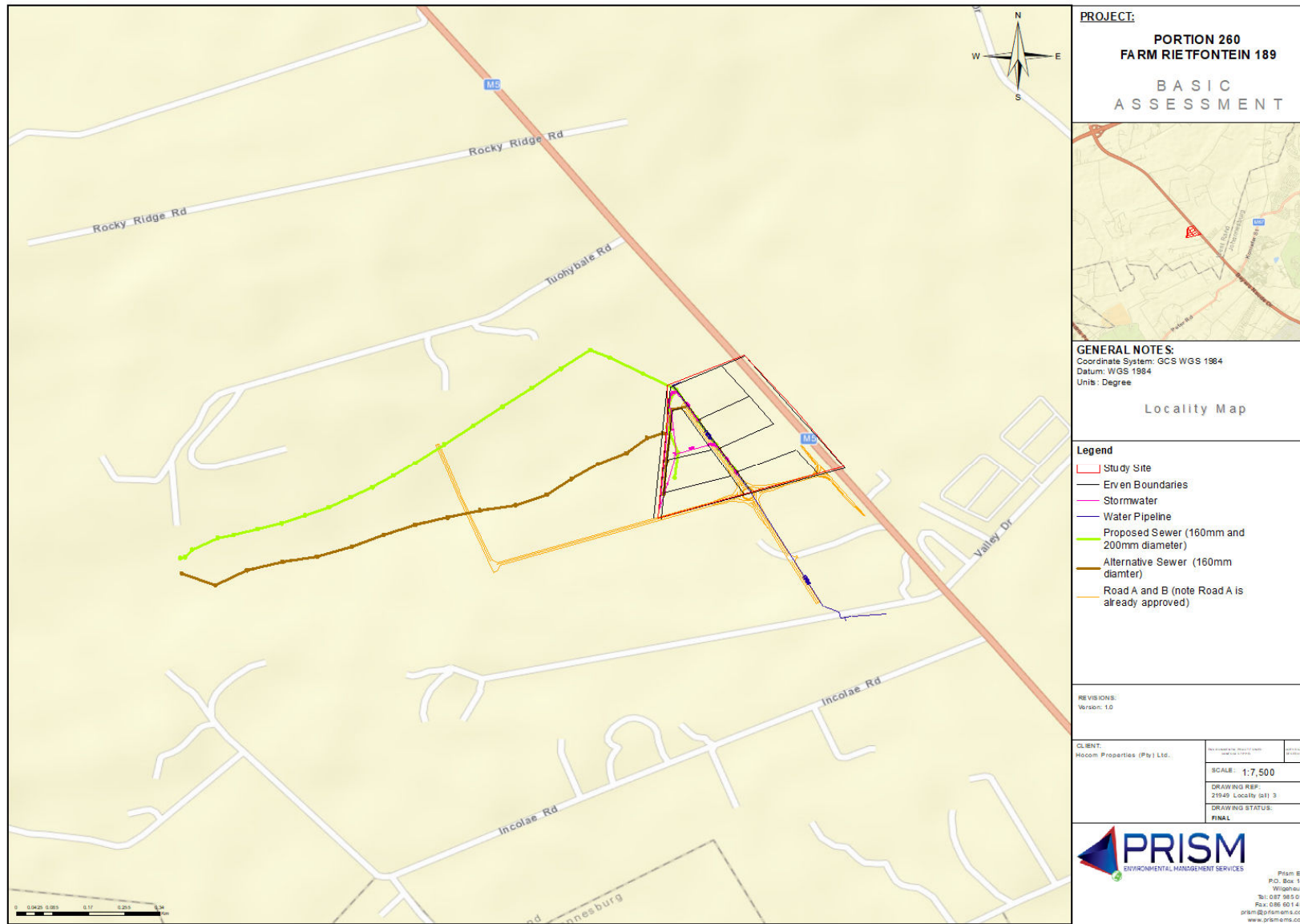


Figure 1-1: Locality Map showing main project components (with both the proposals and alternatives shown)

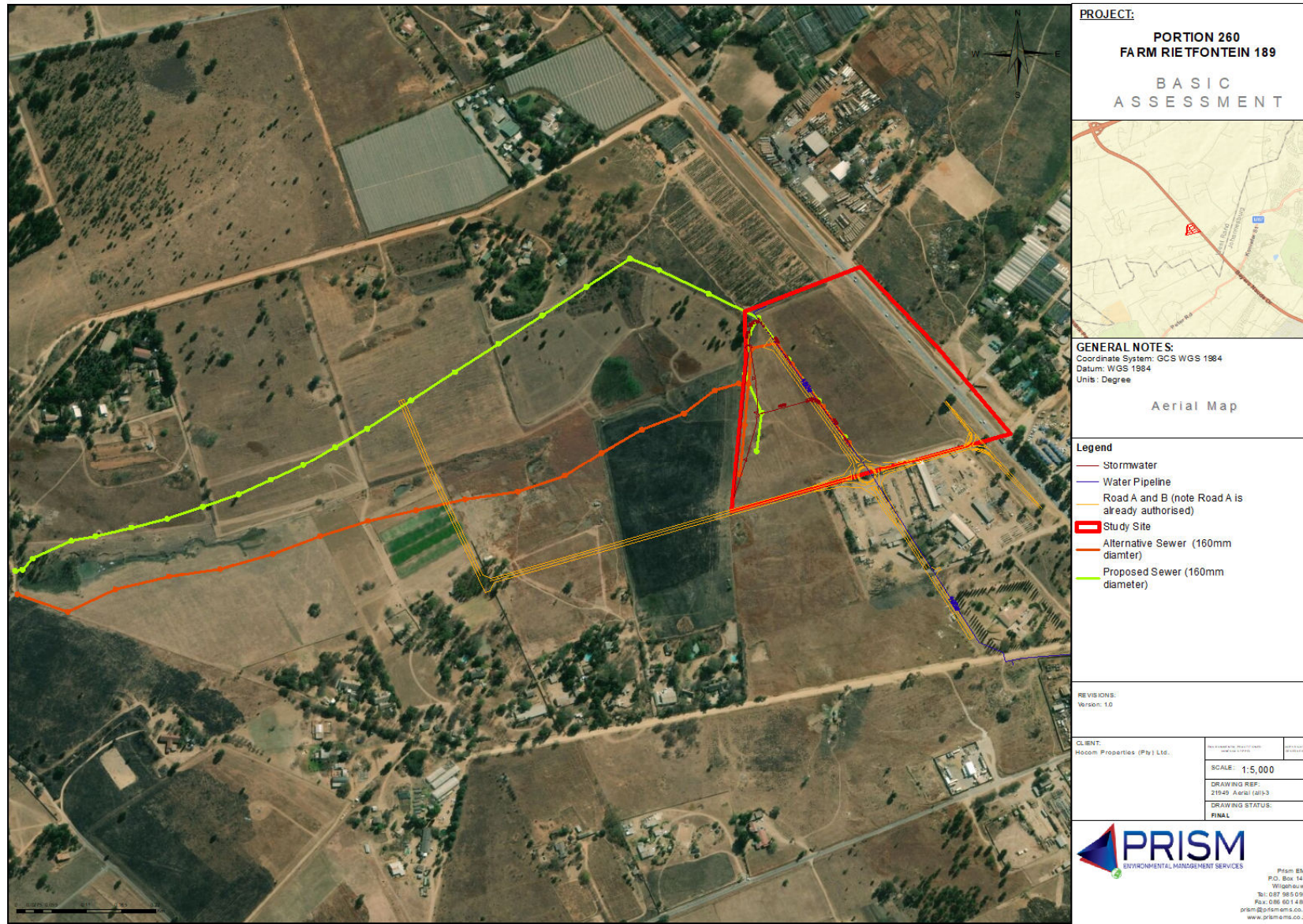


Figure 1-2: Aerial Locality Map (with both the proposals and alternatives shown)

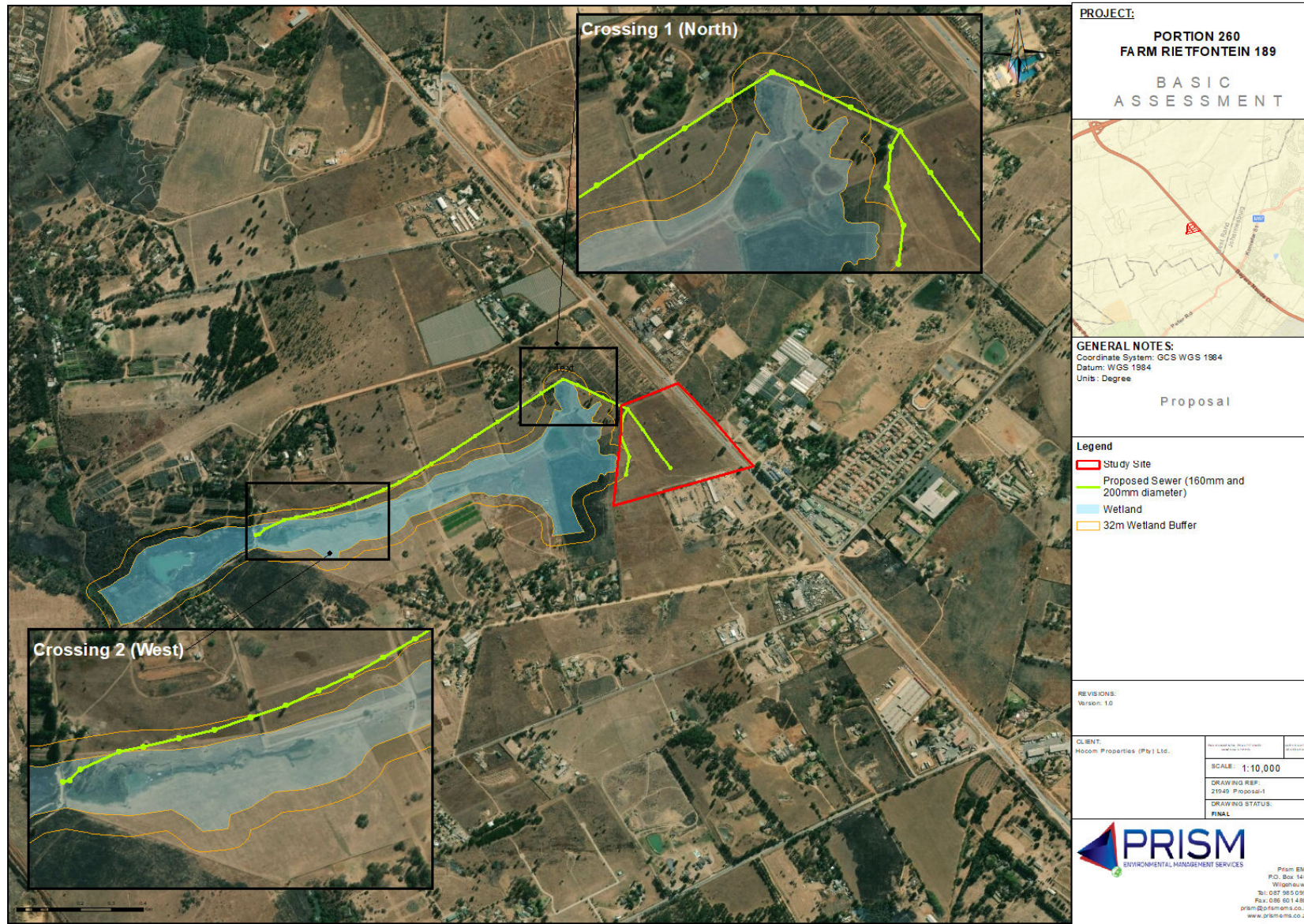


Figure 1-3: Proposed Sewer (Proposal)

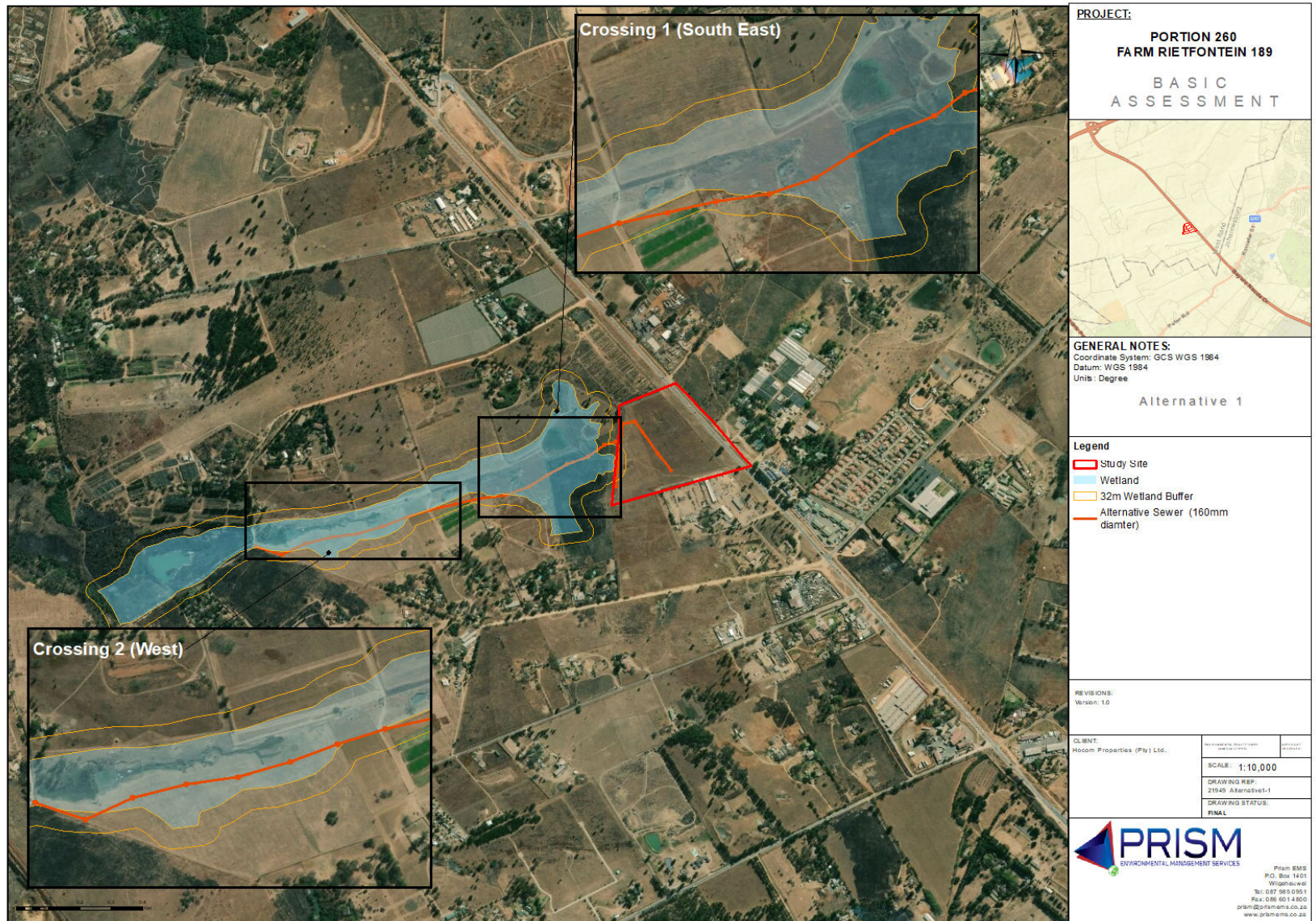
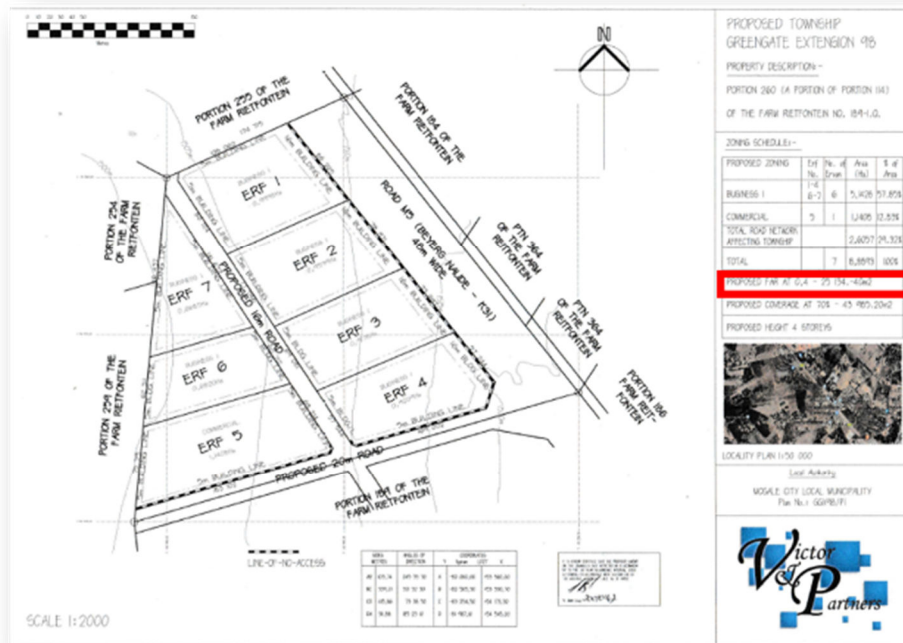


Figure 1-4: Alternative Sewer





PROPOSED ZONING	Erf No.	No. of Erven	Area (Ha)	% of Area
BUSINESS 1	1-4 6-7	6	5,1428	57.85%
COMMERCIAL	5	1	1,1408	12.83%
TOTAL ROAD NETWORK AFFECTING TOWNSHIP			2,6057	29.32%
TOTAL		7	8,8893	100%

PROPOSED FAR AT 0,4 - 25 134,40m<sup>2</sup>

PROPOSED COVERAGE AT 70% - 43 985,20m<sup>2</sup>

PROPOSED HEIGHT 4 STOREYS

Figure 1-5: Proposed Layout with FAR of 0.4

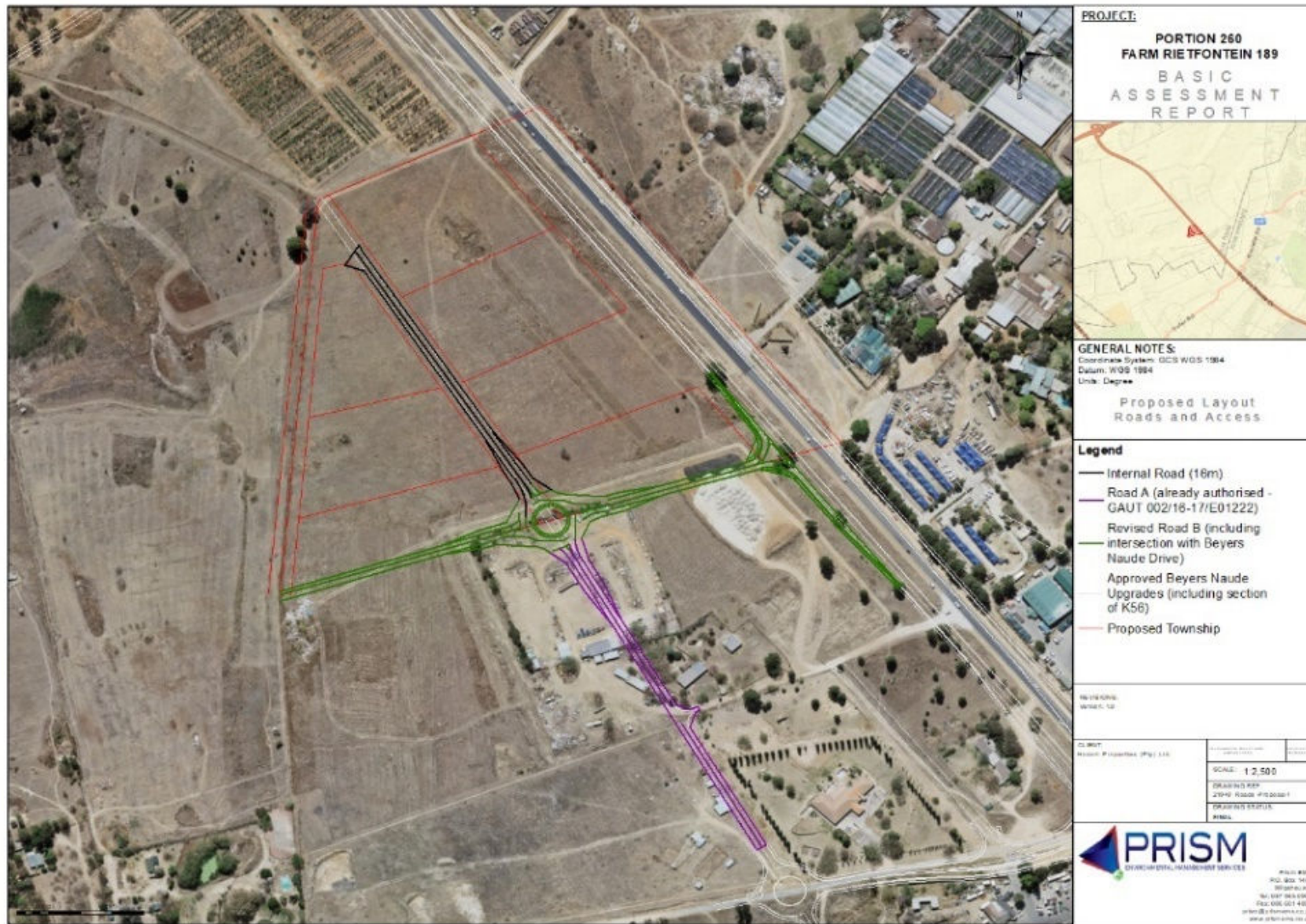


Figure 1-6: Access Arrangements for Proposed Layout (FAR = 0.4)



Figure 1-7: Alternative Layout with FAR of 0.8

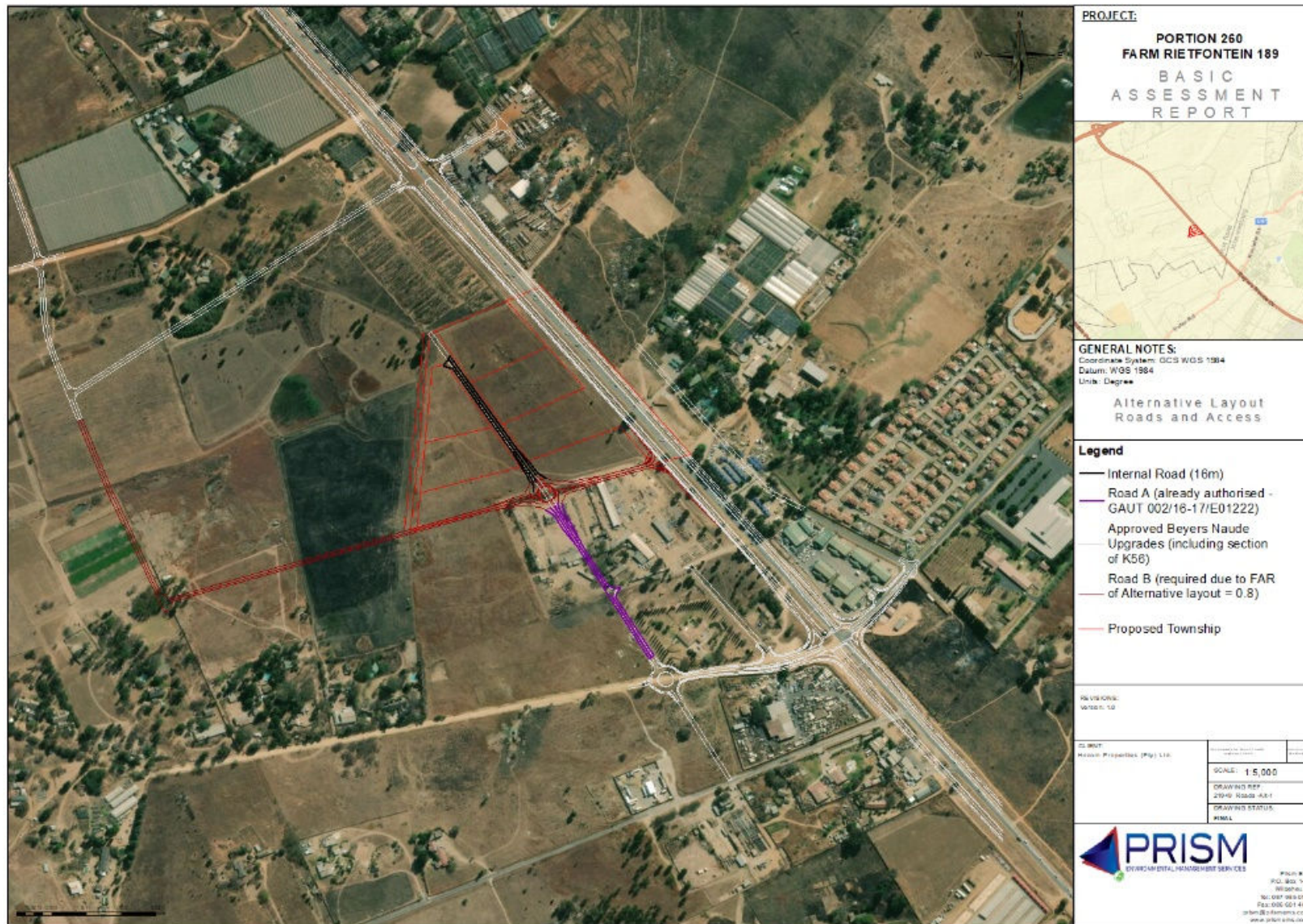


Figure 1-8: Roads and Access – Alternative Layout

## 2 EMPr REQUIREMENTS AND REPORT OUTLINE

The contents of this EMPr has been compiled according to the prescribed minimum legal requirements contained in Appendix 4 of the EIA Regulations, 2014 (as amended). Refer to **Table 2-1** below. Additional sections have been added to the report for purposes of best environmental practice.

**Table 2-1: Contents of EMPr**

Chapter Number	Chapter Name	Requirements included in Appendix 4 of 2014 EIA Regulations
1.	Introduction	-
2.	EMPr Requirements and Report Outline	-
3.	Details of EAP	(a) details of (i) the EAP who prepared the EMPr; and (ii) the expertise of that EAP to prepare an EMPr, including a curriculum vitae;
4.	Project Description and Activities, Aspects, and Impacts	(b) a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description.
5.	Environmental Sensitivity	(c) a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;
6.	Goals and Objectives	(d) a 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; (ii) pre-construction activities; (iii) construction activities; (iv) rehabilitation of the environment after construction and where applicable post closure; and (v) where relevant, operation activities; (e) a description and identification of impact management outcomes required for the aspects contemplated in paragraph (d)
7.	General Roles and Responsibilities	(i) an indication of the persons who will be responsible for the implementation of the impact management actions

Chapter Number	Chapter Name	Requirements included in Appendix 4 of 2014 EIA Regulations
8.	Environmental Awareness Plan	<p>(m) an environmental awareness plan describing the manner in which-</p> <ul style="list-style-type: none"> <li>(i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and</li> <li>(ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and</li> </ul>
9.	Waste Management Plan	-
10.	Emergency Preparedness Plan	-
11.	Monitoring Programme	<p>(g) the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);</p> <p>(h) the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);</p> <p>(j) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;</p> <p>(k) the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);</p> <p>(l) a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;</p>
12.	EMPr	<p>(f) a description of 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 -</p> <ul style="list-style-type: none"> <li>(i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;</li> <li>(ii) comply with any prescribed environmental management standards or practices;</li> <li>(iii) comply with any applicable provisions of the Act regarding closure, where applicable; and</li> <li>(iv) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;</li> </ul>

### 3 DETAILS OF THE EAP

Prism EMS have been appointed to undertake the required Environmental Authorisation process in terms of the 2014 Environmental Impact Assessment (EIA) Regulations. Details and expertise of the Environmental Assessment Practitioner (EAP) who prepared the EMPr is provided in **Table 3-1** and Curriculum Vitae is appended in Appendix I2 of the Basic Assessment Report.

**Table 3-1.: Details of the EAP.**

<b>EAP:</b>	Vanessa Stippel
<b>Company:</b>	Prism Environmental Management Services
<b>Qualifications:</b>	MSc. Ecology, Environment and Conservation
<b>Experience:</b>	9 years
<b>Affiliation/ Registration</b>	Professional Member of Southern African Institute of Ecologists and Environmental Scientists SACNASP Pr.Sci.Nat. (116221) Registered EAP (2019/175)
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Principal EAP	De Wet Botha (17 years' Experience)	MA. Env. Man. (PHED)	South African Council for Natural Scientific Professions (SACNASP) registered Scientist   Pr.Sci.Nat. (119979) Registered Member of Environmental Assessment Practitioners Association of South Africa (EAPASA)(2019/1209) Member of the International Association for Impact Assessors (IAIAsa) (1653) Member of the Gauteng Wetland Forum Member of the South African Wetland Society	Project Director and Wetland Specialist

## 4 PROJECT DESCRIPTION AND ACTIVITIES, ASPECTS, AND IMPACTS

### 4.1 Project Description

The proposed development of Portion 260 of the Farm Rietfontein 189 IQ involves a mix use development which includes a broad range of uses including Business 1 and Commercial Uses. This aims to serve growing residential areas around the area. The following primary rights are being applied for:

- Erf 1 – 4 | Business 1 (As per Scheme: Shops, Office use, Dwelling Units, Residential Use, Hotel and Restaurant)
- Erf 5 | Commercial (As per Scheme: - Warehousing and Distribution)
- Erf 6-7 | Business 1 As per Scheme: Shops, Office use, Dwelling Units, Residential Use, Hotel and Restaurant)

Table 4-1 provides an overview of the planned uses and developmental controls.

**Table 4-1: Proposed Land Use**

	<b>Erf 1 -4</b>	<b>Erf 5</b>	<b>Erf 6-7</b>
<b>Use Zone</b>	Business 1	Commercial	Business 1
<b>Primary Rights</b>	As per Scheme - Shops, Office use, Dwelling Units, Residential Use, Hotel and Restaurant	As per Scheme - Warehousing and Distribution	As per Scheme: Shops, Office use, Dwelling Units, Residential Use, Hotel and Restaurant
<b>Uses with Special Consent</b>	As per Scheme - Place of Instruction, Place of Amusement, Service Industry, Commercial Use, Public Garage, <i>Filling Station*</i> , Place of Public Worship, Social Hall, Parking Garage and Special Use	As per Scheme	As per Scheme - Place of Instruction, Place of Amusement, Service Industry, Commercial Use, Public Garage, Filling Station, Place of Public Worship, Social Hall, Parking Garage and Special Use
<b>Density</b>	No density applicable	No density applicable	A maximum of 70 Dwelling units per hectare
<b>Coverage</b>	Shall not exceed 60%	Shall not exceed 60%	Shall not exceed 60%
<b>Floor Area Ratio</b>	Shall not exceed <u>0,4</u>	Shall not exceed <u>0,4</u>	Shall not exceed <u>0,4</u>
<b>Height</b>	4 storeys	4 storeys	4 storeys

*\*Please note that should a filling station be required at a later stage, a separate application will be undertaken.*



Necessary roads and services required for the development will also be put in place. These include:

The following bulk and internal services will be put in place.

- Water
  - The area is currently supplied from the Honeydew Reservoirs (Johannesburg Water), through a bulk meter connection on the municipal boundary in Jubilee Street. An existing 110mm dia. municipal water pipeline is traversing the proposed development parallel to Beyers Naude Drive.
  - This line will be abandoned and a new 160mm dia. municipal water pipeline will be installed in the new service road connecting to the existing 160mm dia. municipal water pipeline located in Valley Road.
  - The average daily demand for the proposed township is 307.2 kl/day.
- Sewer
  - No existing municipal sewer infrastructure is located adjacent to the proposed development. The nearest connection point is situated approximately 1.1 km west from the proposed township.
  - A new 160mm and 200mm dia. external sewer network will be constructed along the natural drainage course flowing in a westerly direction towards the existing municipal sewer network.
  - Dry Weather Flow (DWF) for the proposed township is 230.4 kl/day
- Stormwater
  - Stormwater attenuation will be provided for the 1:5 as well as the 1:25 year storm event such that the pre-development runoff is not exceeded. An industry guideline of 350 m<sup>3</sup>/ha will be used for the sizing of the attenuation ponds.
  - The stormwater network will be designed in order to safely channel the runoff from a 1:10 year storm event, to the nearby natural drainage course.
  - The internal roads will be provided with kerb inlets at strategic points to catch stormwater runoff from the development.
  - The underground system will consist of "Interlocking Joint" concrete pipes with a minimum diameter of 450mm (up to 675mm diameter) and discharged in the bio-retention pond.
- The bio-retention pond will include an earth berm with crest protect with stone pitching and vegetation will be put in place to promote sheet flow into the wetland. Electricity
  - The proposed development will require approximately 3639 kVA electrical capacity.
  - Preliminary information suggests that the township will be supplied by Eskom from the existing 86 KV Dalkeith Substation from the 11kV Kromdraai feeder line which is adjacent to the property. The substation and line both have spare capacity.
  - Internal services will consist of an 11KV underground cable supplying miniature substations.
- Roads
  - A Traffic Impact Assessment has been undertaken to better understand the traffic impact of the development as well as to identify the necessary road upgrades required by the proposed development. Based on the development size, the construction of the following roads will be required:

- Road A The construction of a new Class 5a (commercial local) road – 7.4m wide in a 20m road reserve
- Road B The construction of a new Class 4a (commercial collector) road – 7.4m wide in a 25m road reserve (from Beyers Naude Drive along the southern boundary to the western corner of the site)
- The following intersection improvements are required:
  - Intersection 4: Valley Road – Ibis Lane / Beyers Naude Drive- The construction of a second exclusive right-turn lane (90m) on the southern approach, and an additional through lane on the western and eastern approaches (90m). The additional through lane in a westbound direction will be constructed up to the planned marginal intersection (Intersection 9).
  - Intersection 7: Boland Road – Indaba Lane /Beyers Naude Drive - The implementation of traffic signals and the construction of exclusive turning lanes (60m) on the northern and southern approaches.
  - Intersection 8: Planned K56 / Beyers Naude Drive - The implementation of traffic signals and the construction of exclusive turning lanes (60m) on the northern and southern approaches.
  - Intersection 9: Road B / Beyers Naude Drive – The construction of a marginal intersection with an exclusive left-turn lane on the eastern approach.
  - Intersection 11: Road B / Road A - The construction of a two-lane roundabout (45m inscribed diameter).
- Access to the application site will be obtained from Beyers Naude Drive in accordance with the Road Master Plan via the intersection with Valley Road – Ibis Lane and a new Class 5 road (i.e. Road A). Additional access is also proposed from Beyers Naude Drive via a proposed new marginal access (Class 4a road) with Beyers Naude Drive on the eastern boundary of the site (i.e. Road B).
- An internal road will also be put in place and will be 16m in width.

**It should be noted however that Road A was assessed and approved as part of the upgrade of Beyers Naude Drive as they are associated roads (GAUT 002/16-17/E01222)**

#### 4.1.1 Timeframes

The proposed development will be constructed in line with the following timeframes, see Table 4-2.

**Table 4-2: Operational hours for construction phases.**

Period	Open	Close
Weekdays	07:00	18:00
Saturdays	07:00	15:00
Sunday	Only when required	
Public holidays	Only when required	

#### 4.1.2 Ancillary Infrastructure Required for Construction

No major infrastructure is required on site for the construction of the development. The required ancillary infrastructure for the purposes of supporting services is discussed below.

##### 4.1.2.1 Security

A construction camp will be erected on site for the duration of the construction. This camp will be fenced for security purposes. A security guard will also be posted on site during non-operational times. A wall will be erected around the property boundary as part of the development project.

##### 4.1.2.2 Sanitation

During the construction phase of the project, chemical toilets will be placed on site for the duration of the construction phase.

##### 4.1.2.3 Construction Camp and Laydown Areas

Designated areas will be established during the construction phase for construction equipment and vehicles. These will all be located outside the 32m buffer of the wetland.

## 5 ENVIRONMENTAL SENSITIVITY

Figure 5-1 provides an overview of overall sensitivity of the study area. The following should be noted:

- **Wetlands and 32m wetland buffer**– this area must be demarcated and only construction related to authorized infrastructure can occur within this area. Due to the fact that Wetland achieved a Moderate overall Present Ecological State (PES), and a moderate Ecological Importance and Sensitivity (EIS) score. The sensitivity is given as **Low-Medium** for the 32m buffer and **Medium** for the wetland area.
- A Baseline Ecological Habitat Assessment was undertaken. From a desktop perspective, the proposed development occurs within the Egoli Granite Grassland (Endangered) vegetation type. According to the Gauteng Conservation Plan, the proposed sewer line and Road A and B (as part of the alternative layout only), traverses a small section of an Ecological Support Area (ESA) and Zone 3 of the GPEMF. The site was actively surveyed to determine the current status of the habitats on site. Two main habitat types were identified within the study site, namely:
  - Wetland with associated 32m buffer (**Medium**); and
  - Secondary vegetation with scattered patches of alien invasive plant species (**Low**).
- It should however be noted that two SCC were identified on site, namely *Hypoxis hemerocallidea* and *Boophone disticha*. Whilst these species are classified as “Least Concern” in terms of Red Data List, GDARD has confirmed that they should be considered as “Orange List” species in Gauteng due to provincial level pressures. Therefore, in order to mitigate impacts to these species, a Search and Rescue and Relocation Plan has been devised and included in Appendix E of the Baseline Ecological Assessment.
- All adjacent properties to Portion 260 must be viewed as sensitive and contractors must ensure access has been granted prior to entering any private properties. All noise, dust and security measures must be implemented as per the EMPr.

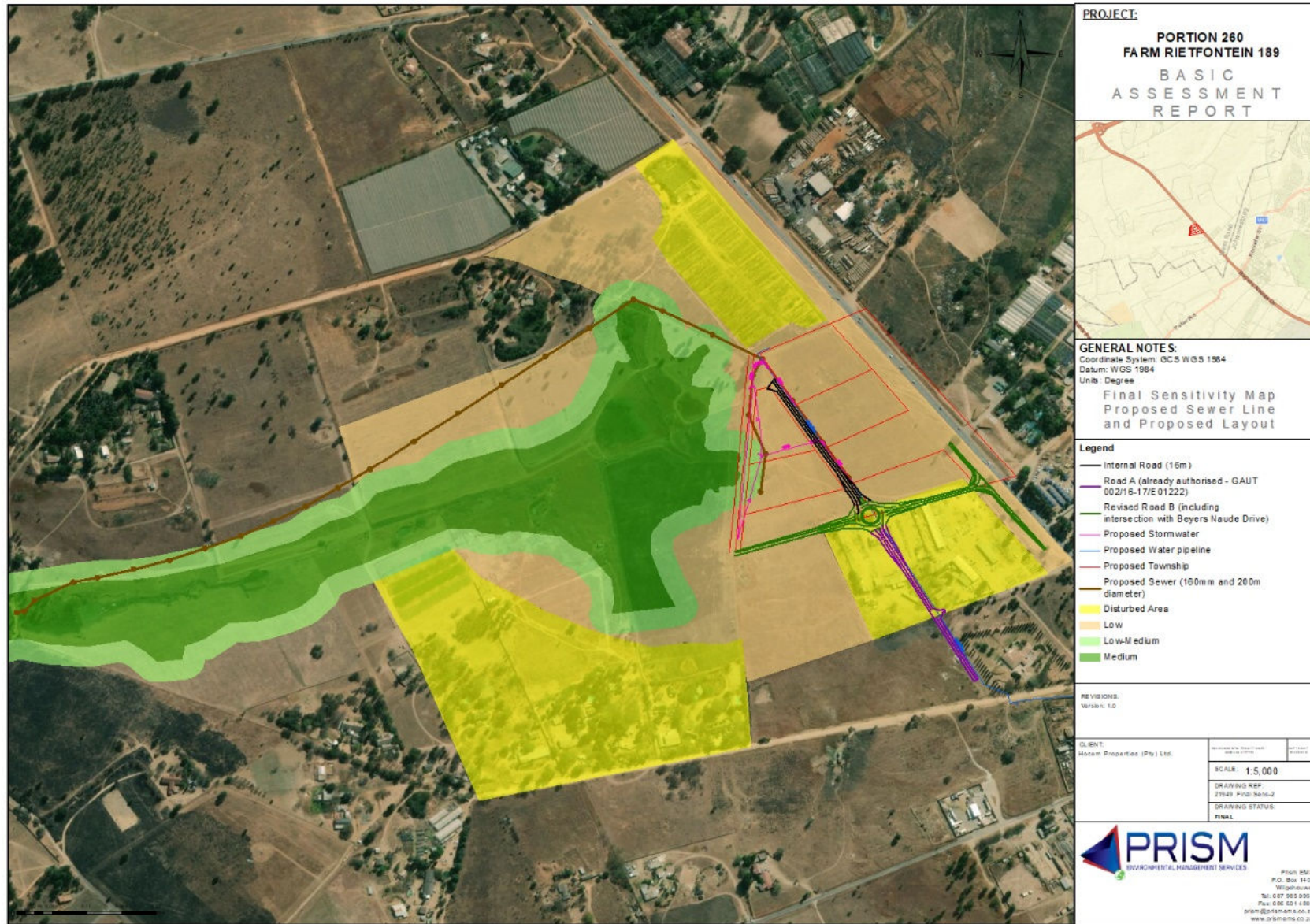


Figure 5-1: Overall Sensitivity Map

## 6 GOALS AND OBJECTIVES

The **EMPr** provides performance criteria required to address potential environmental impacts during the construction and operational phases of the proposed development.

This document incorporates the relevant recommendations of the Basic Assessment Report and other environmental studies and at a high level aims to provide the following:

- Establish **management objectives** for the Development in order to enhance benefits and minimise adverse environmental impacts;
- Describe **actions** required to achieve management objectives; and
- Outline institutional structures and roles required to implement the EMPr.

### 6.1 Key Objectives of the EMPr

The key objectives of the EMPr for the construction and operation phases of the proposed Development are as follows:

- To ensure effective communication with stakeholders and regulatory authorities;
- To ensure good housekeeping practices and general neatness on site;
- To mitigate any possible negative impacts identified in the EMPr for the construction and operational phase of the development;
- To prevent pollution to the receiving environment that may emanate directly or indirectly from the source (development activities) both during the construction and operational phases;
- To preserve flora and fauna;
- To preserve topsoil for optimal rehabilitation and landscaping following construction;
- To control the establishment of alien invasive plants during the construction phase of the project, as well as following rehabilitation of designated construction camp areas within the site thereafter.
- To ensure water saving and recycling mechanisms are implemented and adhered to;
- To ensure that all legislative requirements are met by the proposed development.

Following each site visit an audit report must be compiled to relay any non-compliance issues that need to be addressed, as well as compliance matters.

### 6.2 Impact Management Outcomes

Through effective implementation of the environmental management measures, the following outcomes must be achieved:

- All relevant authorisations, licences and approvals are in place prior to the commencement of construction.
- A formal document control system is in place to ensure all relevant documents are in place prior to commencement.

- Site specific method statements are compiled and approved.
- Proper management of sensitive features through identification and barricading.
- Planning and layout of construction site is undertaken responsibly to ensure protection of sensitive environmental features.
- Environmental awareness creation and training is undertaken prior to construction commencement to minimise environmental impacts and ensure compliance to relevant legislation and authorisations.
- Ensure that all possible causes of dust are mitigated as far as possible to minimise impacts to the surrounding environment
- All vehicles/plant on site must be properly maintained to reduce emission sources.
- Ensure that noise disturbance to surrounding areas are minimised and that construction activities comply with the Noise Control Regulations and the provisions of South African National Standards; Environmental, Health and Safety (EHS) Guidelines, World Health Organisation (WHO, 2002).
- Construction activities are managed correctly to ensure no negative impacts to water quality. This includes proper management of ablution facilities, workshop and equipment and concrete batching and mixing.
- Ensure minimal impacts to the flow regime of the wetland through poor stormwater management
- Ensure minimal impact to wetland habitat
- Ensure minimal impact to wetland biota
- Ensure that minimal disturbance of geomorphology during construction
- Domestic waste must be managed properly to ensure minimal impacts.
- Construction waste must be managed properly to ensure minimal impacts.
- Hazardous waste must be managed properly to ensure minimal impacts.
- Effective management of topsoil, in order to minimise the impact of construction activities.
- Changes to topography to be planned properly to prevent negative impacts.
- Ensure that all possible causes of erosion are mitigated as far as possible to minimise impacts to the site and surrounding environment
- Ensure that all possible causes of soil pollution are mitigated as far as possible to minimise impacts to the site and surrounding environment
- Electricity reduction mechanisms to be implemented.
- Water conservation mechanisms to be implemented.
- Fuel conservation mechanisms to be implemented.
- Raw materials conservation mechanisms to be implemented.
- No loss of habitat outside the approved footprint.
- Minimal disturbance to fauna occurs during construction.
- Ensure that minimal disturbance of ecological systems and natural corridors takes place during construction.
- Ensure that minimal disturbance of ecological life cycles due to noise and lighting.
- Ensure proper management of alien invasive species
- Minimise potential pollution incidents due to construction.
- A safe working environment for contractors/construction workers and the public is provided.

- Effective and safe storage of hydrocarbons on site, in order to minimise the
- impact of hydrocarbons on the environment
- Minimise potential fire incidents during construction.
- Proper management of construction activities to minimise disturbance to visual environment.
- Proper management of labour force is undertaken to ensure that there are no security-related issues or disturbance to tenants or landowners outside the construction footprint.
- Minimal disturbances to traffic due to road upgrades.
- No adverse impact on the historical and cultural inheritance of the area.
- Proper management of construction activities to minimise disturbance to sense of place.
- Preferential use of local contractors and suppliers.
- Proper management of labour force is undertaken to ensure that there is optimal use of local labourers and local contractors.
- Adequate reinstatement and rehabilitation of construction areas
- Residential development must comply with acceptable noise levels.
- Proper maintenance of connection to sewer line and proper management of stormwater
- Ensure Stormwater is properly managed
- Limited impact to habitat during operation
- Limited impact to biota during operation
- Limited impact to geomorphology during operation
- Proper management of waste.
- Ensure that all possible causes of erosion are mitigated as far as possible to minimise impacts to the site and surrounding environment
- Minimal loss of vegetation to fire
- Minimal disturbance of fauna during operation
- Minimal disturbance of ecological life cycles during operation
- Proper management of pollution sources to prevent pollution incidents on site.
- Minimise potential impacts/incidents
- Minimal safety and security issues.
- Minimal traffic disturbances related to the operation of the dealership.
- Preferential use of local contractors and suppliers.
- Proper management of labour force is undertaken to ensure that there is optimal use of local labourers and local contractors.



## 7 GENERAL ROLES AND RESPONSIBILITIES

There are various role players that are involved in responsible environmental management. An overview of the applicable role players and institutional arrangements are provided in **Figure 7-1**. Information on each role player is then provided in the subsections below.

### 7.1 Competent Authorities

Due to the fact that the proposed development takes place in Gauteng and activities are triggered in terms of the EIA Regulations, 2014 (National Environmental Management Act, 1998 (NEMA), the Gauteng Department of Agriculture and Rural Development (GDARD) is the relevant competent authority.

#### 7.1.1 Gauteng Department of Agriculture and Rural Development (GDARD)

GDARD is the mandated authority in terms of NEMA that determined whether an Environmental Authorisation (EA) will be issued for the project, following a decision-making process conducted as part of the EIA. Conditions will be included in the EA, which need to be complied with by the project applicant. The EMPr will need to be updated to take into account these conditions.

GDARD also fulfils a compliance and enforcement role with regards to the EA. The Department may perform random inspections to check compliance. GDARD will also review the monitoring and auditing reports compiled by the ECO.

Amendments may be required to the EMPr, based on adaptive management to the site conditions and the technical requirements of the project. These amendments will need to be approved by GDARD.

### 7.2 Authorisation Holder

Hocom Properties (Pty) Ltd. is the applicant in terms of NEMA and is ultimately responsible for the development and implementation of the EMPr and ensuring that the conditions in the EA are satisfied. The liability for non-compliance also rests with the Authorisation Holder. Details of the Authorisation holder are contained in **Table 7-1**.

**Table 7-1.: Details of the Applicant.**

<b>Applicant:</b>	Hocom Properties (Pty) Ltd
<b>Contact Person:</b>	Jonathan Fitzgerald
<b>Address:</b>	PO 904 Ruimsig, 1732

## 7.3 Consultants

### 7.3.1 Project Manager

In order to ensure that the proposed development is constructed as per the relevant designs and requirements, a project manager will be responsible for managing the planning, design and construction phases of the project. The Project Manager will furthermore also be required to tend to any environmental matters at the request of the Environmental Control Officer (ECO). The Project Manager shall assist the ECO where necessary and shall have the following responsibilities in terms of the implementation of the EMPr:

- Regular site inspections;
- Reviewing and approving the Contractor's Method Statements;
- Assisting the Contractor in finding environmentally responsible solutions to problems with input from the ECO where necessary; and
- Communicating all environmental issues to the ECO.

Due to concerns raised by I&APs, a specific member of the project management team should be appointed as the landowner liaison officer and contact with the landowners must be made before any entry to the private property is made.

## 7.4 Contractors

Contractors will be responsible for constructing the proposed Development and associated infrastructure. All contractor/s employed by the developer in respect of any aspect of the construction of the subject site, will be bound by all and any agreement between the developer and the contractor, to ensure compliance with the Environmental Authorisation, mitigating measures included in the Specialist Studies, as well as this EMPr. The responsibilities include:

- Taking full responsibility for each of his/her employees.
- Be familiar with the contents of the EMPr and the specifications contained herein.
- Comply with the Environmental Specifications contained in the EMPr and subsequent revisions.
- Confirm legislative requirements for the construction works and ensure that appropriate permissions and permits have been obtained before commencing activities.
- Prepare Method Statements, programme of activities and drawings/plans for submission to the ECO when requested.
- Undertake daily site inspections to monitor environmental performance and compliance with the Environmental Specifications.
- Notify the ECO immediately in the event of any accident or infringements of the Environmental Specifications and ensure appropriate remedial action is taken.
- Notify the ECO at least 10 working days in advance of any activity he has reason to believe may have significant adverse environmental impacts, with specific reference to blasting, so that mitigatory measures may be implemented timeously.

## 7.5 Independent ECO

A competent and independent ECO must be appointed and will undertake bimonthly inspections with monthly reporting on site as well as biyearly auditing against the EMPr and EA. The aforementioned report must be submitted to Hocom Properties Pty) Ltd. and GDARD for their records.

The ECO will also check the following:

- The record of environmental incidents (spills, impacts, legal transgressions, etc.) as well as corrective and preventive actions taken;
- The public complaints register in which all complaints are recorded, as well as actions taken; and
- Results from the environmental monitoring programme (water quality etc.).

In terms of Audits, the ECO will be required to ensure the following:

- All documentation (e.g. audit/monitoring/compliance reports and notifications) required to be submitted to the Department in terms of the EA.
- The holder of the EA must submit an environmental audit report to the Department within 30 days of the completion of the construction phase (i.e. within 30 days of site handover) and within 30 days of completion of rehabilitation activities.
- The Environmental Audit Report must indicate the date of the audit, the name of the auditor and the outcome of the audit in terms of compliance with the EA conditions as well as the requirements of an approved EMPr.
- Records relating to monitoring and auditing must be kept on site and made available for inspection to any relevant and competent authority in respect of this development.

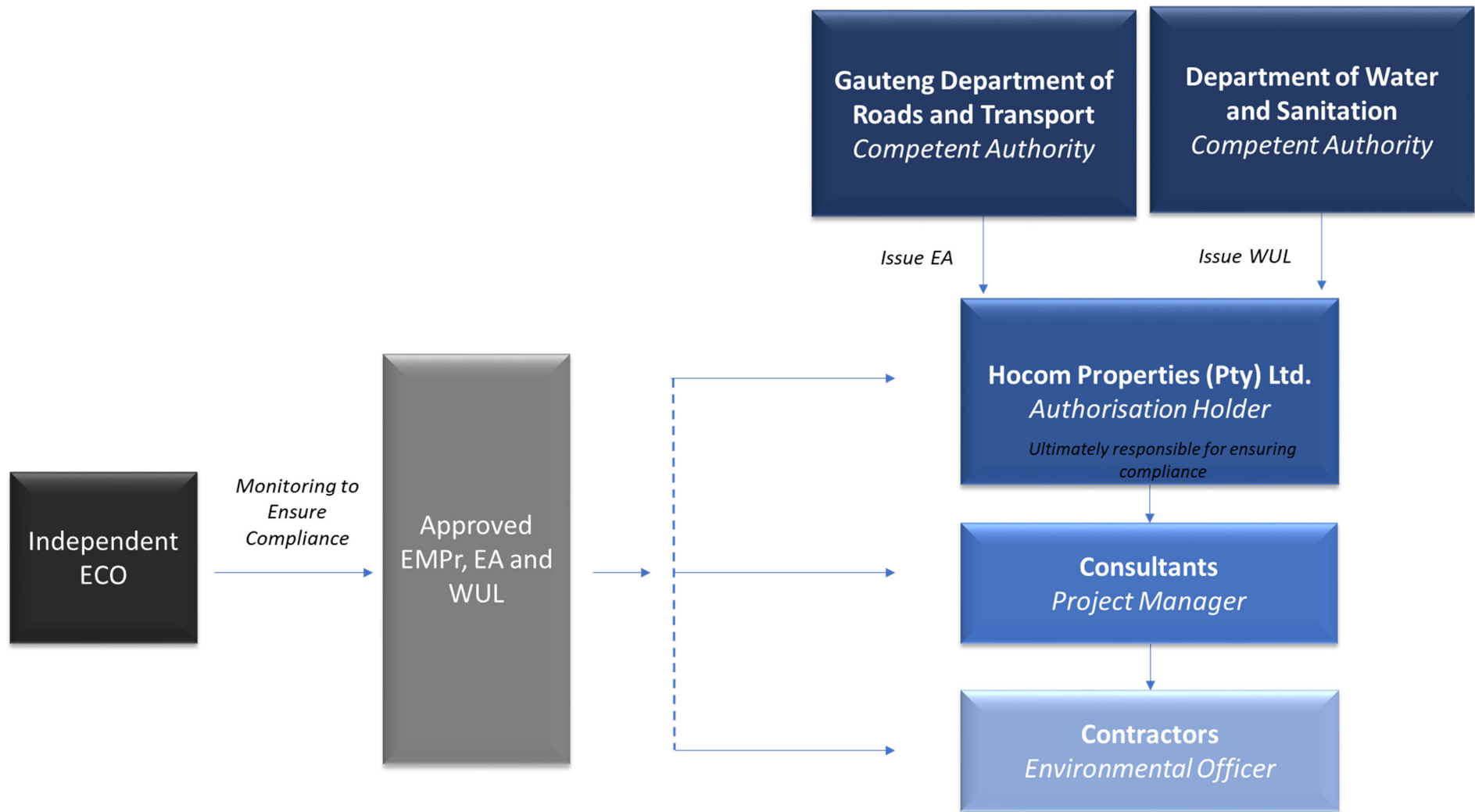


Figure 7-1: Roles and responsibilities.

## 8 ENVIRONMENTAL AWARENESS PLAN

**Training** aims to create an understanding of environmental management obligations and prescriptive measures governing the execution of the project. It is generally geared towards project team members that require a higher-level of appreciation of the environmental management context and implementation framework for the project. In contrast, **Environmental Awareness Creation** strives to foster a general attentiveness amongst the construction workforce to sensitive environmental features and an understanding of implementing environmental best practices. The Environmental Awareness Plan for the Development incorporates both training and environmental awareness to ensure that the proposed development is implemented in line with the requirements of the EMPr and that environmental sensitivities on site are managed correctly.

As part of this, Hocom Properties (Pty) Ltd. is committed to remaining responsible and accountable for environmental practices on site. Being accountable for environmental practices undertaken during working tasks and activities remain the responsibility of both employer and employee awareness of the potential environmental impacts that could result from these activities.

All potential incidents to the environment may be effectively minimised through effective training and awareness of the employees using any of the following methods:

- Supervisory meetings (weekly);
- Induction training (annually);
- EMP Training (annually); and
- External environmental and/or health and safety courses (when applicable).

These methods are discussed below in more detail.

### 8.1 Meetings

Weekly supervisory meetings are ideal to facilitate awareness of specific environmental dangers pertaining to each week. Various topics may be discussed during these meetings and must be recorded or logged. All attendees at each meeting must sign an attendance register, these records must be kept on file at the administration office. Topics for discussion may include:

- Topics applicable to the entire operation;
- Area specific topics (e.g. heritage); and
- General environmental awareness:
  - Waste management
  - Spillages
  - Saving water
  - Electricity consumption
  - Dust control
  - Noise generation

- Housekeeping
- Indigenous Vegetation
- Alien vegetation
- Fire-making

Should issues be identified by the ECO, these can also be addressed during these weekly meetings.

## 8.2 EMPr Training

Aspects of the EMPr must be selected and discussed at training workshops at least annually. Such training topics may be focused around the incidents that are frequently reported during the previous year and may be focused around the following:

- Hydrocarbon spillages;
- Stormwater Control;
- Waste Management;
- Monitoring Protocols; and
- Safety topics.

Workers should be informed that they may refuse work that is harmful to human health and/or the environment.

## 8.3 Induction Training

All new employees are required to undergo induction training prior to commencement of work. Returning and existing employees must undergo repeat induction training at least annually. Environmental awareness training must form part of the induction and must include the basic topics relating to the environment:

- Main environmental legislation (e.g. NEM:WA<sup>1</sup> or NWA<sup>2</sup>);
- Constitutional right pertaining to the environment;
- Waste Management hierarchy;
- Environmental, social and economic concerns;
- Sensitive environmental features; and
- Prevention of poaching.

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<sup>1</sup> National Environmental Management Waste Act (NEM:WA), 2008 (Act No. 59 of 2008)

<sup>2</sup> National Water Act (NWA), 1998, (Act No. 36 of 1998)

## 9 WASTE MANAGEMENT PLAN

In order to ensure waste is properly dealt with, waste management is included in the EMPr. In addition, a **Waste Management Plan** is discussed below.

### 9.1 Legal Requirements

Section 16 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008), as amended states that –

*“A holder of waste must, within the holder’s power, take all reasonable measures to –*

- *Avoid the generation of waste and where such generation cannot be avoided, to minimise the toxicity and amounts of waste that are generated;*
- **Reduce, reuse, recycle and recover waste;**
- *Where waste must be disposed of, ensure that the waste is treated and disposed of in an environmentally sound manner;*
- *Manage the waste in such a manner that it does not endanger health or the environment or cause a nuisance through noise, odour or visual impacts;*
- *Prevent any employee or any person under his or her supervision from contravening this Act;*
- *Prevent the waste from being used for any unauthorised purpose.*

Only temporary storage of waste is allowed (once of storage of waste for a period less than 90 days). The volume of material should be limited to less than 100m<sup>3</sup> of general waste and less than 80m<sup>3</sup> of hazardous waste. Should this be exceeded the Norms and Standards for the Storage of Waste will need to be complied with.

### 9.2 Waste Hierarchy

Management objectives provided in this EMPr are aligned to the waste management hierarchy indicated in Figure 9-1.

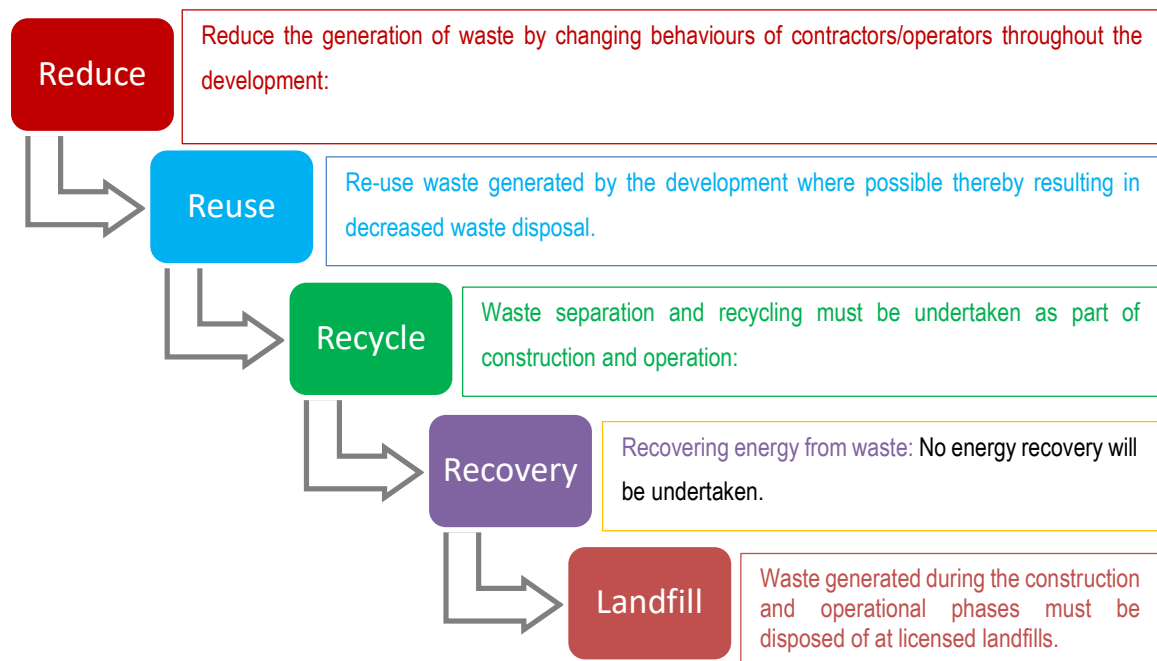


Figure 9-1: Waste Hierarchy.

### 9.3 Waste Management Actions

The following waste management actions must be implemented in order to ensure the objectives included in the waste hierarchy above are met.

#### 9.3.1 Waste Avoidance and Reduction

Avoidance and reduction should be practiced wherever possible. Recommended actions include: but are not limited to:

- Bulk buying of materials to reduce the volume of packaging required.
- Avoidance of materials/items/brands that are heavily packaged, have a short lifespan or are low quality.
- Buying items that last longer and can be repaired.
- Buying items in refillable containers.
- Environmental awareness training should focus on management of waste and all construction workers should be aware of the importance of waste minimisation and avoidance.

#### 9.3.2 Recycling

Recycling should be practiced whenever waste prevention or reuse is not possible, provided that any such recycling is cost effective, taking into consideration environmental benefits, financial costs and community interests.



Potential priority recyclable waste streams include:

- Used Oil;
- Paper;
- Glass;
- Tyres;
- Plastics;
- Building rubble; and
- Electronic waste.

The following actions must be implemented:

- To reduce or avoid the need for sorting after collection, the categories of distinctively marked waste receptacles must be provided in order to receive waste as it is generated.
- These receptacles shall be fitted with a tight cover.
- All types of waste collection receptacles shall be clearly marked with the type of waste they are receiving.
- Obtain and label recycling containers for office waste, aluminium, steel, glass, ferrous metals, nonferrous metals, waste timber.
- Locate these containers within office buildings and trailers.
- Establish a recycled material collection schedule.
- Arrange full bins to be hauled away.

### 9.3.3 Waste Disposal

The contractor is responsible for removal of all waste from the site, generated through the contractor's activities. The contractor shall ensure that all waste is removed to an appropriately licensed waste management facilities (the following source may be utilised – [www.sawic.org.za](http://www.sawic.org.za)). During operation, waste that is not collected for recycling must be collected by the municipality or by a municipality approved 3<sup>rd</sup> party collector.

In addition, it should be noted that the classification of waste determines the handling methods and the ultimate disposal of the material. All **hazardous waste** that may be generated by construction and operation must be managed as follows:

- Characterise the waste to determine if it is general or hazardous (Use the Appendix 1 of the Norms and Standards for the Classification of Waste for landfill to determine whether additional classification is required).
- Obtain and provide an acceptable container with a label.
- Place hazardous waste material in the container.
- Inspect the container on a regular basis.

- Haul the full container to the licenced and correct disposal site.
- Provide documentary evidence of proper disposal of the waste.

In addition, the following actions must also be undertaken:

- Provide waste skips on site. These skips should be sufficient in number, the skip storage area should be kept clean, skips should be emptied and replaced before overflowing or spillage occurs.
- Skips should be covered to prevent waste blowing away.
- Vermin / weatherproof bins will be provided in sufficient numbers and capacity to store domestic waste. These bins must be kept closed to reduce odour build-up and emptied regularly to avoid overfilling and other associated nuisances.
- Ensure that solid waste is transported so as to avoid waste spills en-route.
- No waste shall be buried or burned anywhere on the site.
- Permits to transport/dispose of waste must be in place.

## 10 EMERGENCY PREPAREDNESS PLAN

### 10.1 Potential Emergencies

The following potential emergencies that may occur on site include:

- Environmental Incidents:
  - Fuel and hydrocarbon spillages; and
  - Fire Hazards.
- Safety Incidents:
  - Injuries related to operation of heavy machinery such as Front-End Loaders, Excavators, Mobile Crushers etc. during construction;
  - Driving related accidents and incidents from Trucks on site during construction;
  - Accidents during earth moving, levelling and rehabilitation activities; and
  - Criminal incidents such as theft or potential violent crime during construction and operation.

### 10.2 Emergency Plan

#### 10.2.1 Emergency Assemblage Area

A central area on site must be demarcated with appropriate signage for the gathering of all employees and visitors on site in the event of an emergency.

#### 10.2.2 Emergency Procedures

The following procedures must be compiled in order for the identified potential emergencies to be managed effectively:

- Drill and evacuation procedure for any emergency related incidents containing information on the following:
  - Reporting structure for all incidents
  - Emergency contact information (e.g. telephone numbers)
  - Procedure to be followed for the specific emergency
  - First Aid information
- Spillages of fuel and hydrocarbons:
  - Immediate action plan (e.g. use of spill kits) to prevent spill for spreading
  - Reporting of incident to manager and supervisor to advise on next steps
- Procedure for Theft and Crime:
  - Details on security system on site
  - Emergency response units
  - Panic alarms
  - Details of community response units

### 10.2.3 Emergency Contact Information

A list of potential emergency contact centers specific to the area must be drawn up and displayed on common notice boards for all employees to access. The following emergency centers must be sourced:

- Nationwide emergency response;
- Cellphone Emergency;
- Ambulance;
- Hospitals;
- Fire Response; and
- Police.

This list must be checked and updated at least quarterly to ensure that the information remains up to date.

## 11 MONITORING PROGRAMME

Monitoring is required to ensure that the receiving environment at the proposed Development is suitably safeguarded against the identified potential impacts, and to ensure that the environmental management requirements are adequately implemented and adhered to during the execution of the project.

The method of monitoring the implementation of the management and mitigation measures stipulated within the EMPr are indicated in **Table 11-1**.

**Table 11-1: Method of monitoring implementation of EMPr**

Method	Frequency	Responsibility	Main Topics	Outcome
Internal Inspections	Daily – Weekly	Project Manager	<ul style="list-style-type: none"> <li>Observe housekeeping practices</li> <li>Check for spillages, leaks or any other sources of pollution</li> <li>Observe waste management</li> <li>Observe stormwater control</li> </ul>	<ul style="list-style-type: none"> <li>Based on observations identify need for protocols / procedures and compile where needed in order to comply with EMPr</li> <li>Verbally inform employees on any identified issues</li> </ul>
External Inspections	Bimonthly	ECO	<ul style="list-style-type: none"> <li>Check compliance with management measures in EMPr</li> </ul>	<ul style="list-style-type: none"> <li>Based on observations identify need for protocols / procedures and compile where needed in order to comply with EMPr</li> <li>Verbally inform employees on any identified issues.</li> <li>Information from inspections will be used to compile monthly report.</li> <li>Photos from inspections to be utilised in monthly reporting.</li> </ul>
External audits	Annual	ECO	<ul style="list-style-type: none"> <li>Check compliance with management measures in EMPr</li> </ul>	<ul style="list-style-type: none"> <li>Compile audit report with recommendations / actions where non-compliance was identified</li> </ul>

Method	Frequency	Responsibility	Main Topics	Outcome
Management Meetings	Quarterly – Bi-annually	Management	<ul style="list-style-type: none"> <li>Discuss (problem solve) recurring issues or actions that require management intervention</li> </ul>	<ul style="list-style-type: none"> <li>Record minutes of main points of discussion</li> <li>Implement outcome actions of meeting</li> </ul>
<u>Rehabilitation Audits</u>	<u>At completion of sewer pipeline and then again in 6 months</u>	<u>ECO</u>	<ul style="list-style-type: none"> <li><u>Check compliance with management measures in EMPr (in relation to rehabilitation)</u></li> </ul>	<ul style="list-style-type: none"> <li><u>Based on observations identify need for protocols / procedures and compile where needed in order to comply with EMPr</u></li> <li><u>Verbally inform employees on any identified issues.</u></li> <li><u>Information from inspections will be used to compile monthly report.</u></li> <li><u>Photos from inspections to be utilised in monthly reporting.</u></li> </ul>

## 11.1 Compliance Monitoring and Auditing

### 11.1.1 Environmental Audits

The mechanism for monitoring compliance with the management and mitigation measures stipulated within the EMPr must include an audit undertaken by an independent Environmental Control Officer (ECO) as discussed in Section 7.5.

The objective of the environmental audit is to:

- Report on the level of compliance with the conditions of the environmental authorisation and the management and mitigation measures stipulated within the EMPr;
- The extent to which the avoidance, management and mitigation measures provided in Section 12 achieve the objectives and outcomes in Section 6;
- Identify and assess new impacts and risks as a result of undertaking the activities;
- Evaluate the effectiveness of the management and mitigation measures generated in the EMPr;
- Identify shortcomings in the EMPr;
- Identify the need for any changes to the avoidance, management and mitigation measures provided for in the EMPr.

### 11.1.2 Procedure

The following methodology or procedure is to be used for assessment of the management and mitigation measures of the EMPr:

- **Pre-site preparation:** prior to the site inspection a review of the management measures contained in the EMPr, and a checklist must be drawn up.
- **Site inspection:** the Development must be traversed on foot and must include an assessment of each major component of the facility.
- **Documentation review:** after the site inspection a documentation review must be undertaken by requesting specific key documentation relating to the proposed development.

### 11.1.3 Evaluation Criteria

During evaluation of the EMPr, the following criteria must be used:

- Management measures stipulated in the plan;
- Environmental monitoring required;
- Legal requirements; and
- Best practice observations.

The scores and description used in the evaluation of the EMPr are indicated in Table 11-2. Where any indication of non-compliance is determined, recommended actions will be provided.

**Table 11-2: Description of scoring during evaluation of the findings.**

Score	Evaluation	Description
N/A	Not Applicable	Not applicable and will not be implemented or discussed/assessed.
0	Major Non-Compliance	Relates to the absence of a requirement needed to be implemented or the total breakdown of a process. A number of minor non-compliances listed against the same requirement may represent a total breakdown of a process and thus could collectively be a major non-compliance.
1	Minor Non-Compliance	The requirement is partially implemented or non-compliant.
2	Observation	Relates to a matter about which the Assessor is concerned but which cannot be clearly stated as non-compliance. Observations also indicate trends which may result in a future non-compliance.
3	Compliant	The project management plans and procedures are executed in a managed fashion (planned, tracked, verified and adjusted) based upon defined activities, inputs and outputs. Objective evidence is available for each process.

### 11.1.4 Reporting

All inspections undertaken as part of internal / external auditing must be provided in the form of a report. External audits will be submitted to the competent authority as required by the EIA Regulations, 2014.

## 11.2 Penalties

In order to ensure that there is adequate motivation for the contractor to comply with the conditions set out in the EMPr, the following applies with regards to penalties:

- The Contractor will comply with the environmental requirements on an ongoing basis, and any failure on their part to do so will entitle the Project Manager, in consultation with the Environmental Manager and ECO, to certify the imposition of a fine subject to the details set out in the EMPr.
- The Project Manager, Environmental Manager and any other specific personnel as designated by the Project Manager may alter the Schedule of Fines for this specific project.
- Fines may be issued per incident at the discretion of the Project Manager. Such fines will be issued in addition to any remedial costs incurred as a result of noncompliance with the requirements of the EMPr and documents supporting thereof. Fines may be omitted from construction guarantees as supplied by the contractor.
- The Project Manager and ECO will be the judge as to what constitutes a transgression in terms of the above clause. Further, note that in the event that transgressions continue to an unacceptable level the client may cancel the contract.
- Where the Contractor inflicts non-repairable damage upon the environment or fails to comply with any of the environmental requirements, he will be liable to pay a penalty fine over and above any other contractual consequence. This may also lead into a Rectification Application in terms of Section 24G of the NEMA, which could lead to certain fines and / or prosecution.
- The Contractor is deemed NOT to have complied with this specification if:-
  - Within the boundaries of the site, site extensions and access roads there is evidence of contravention of the requirements of the EMPr.
  - Environmental damage ensues due to negligence.
  - The Contractor fails to respond adequately to complaints from the public.
  - Legal action is instituted against the developer in terms of Environmental laws due to any action / activities undertaken by the Contractor.
- Payment of any fines in terms of the contract will not absolve the offender from being liable from prosecution in terms of any law.
- A record of penalties will be maintained within the procurement department, and may influence later commissions awarded to the contractor.



## 12 EMPr

### 12.1 Pre-Construction

General requirements during the pre-construction phase include the following:

- Design to consider and incorporate environmental requirements
- Define and communicate roles and responsibilities for the implementation of the EMPr;
- Ensure that all structures within the construction area are identified and recorded;
- Determine and document the road conditions; and
- Develop and implement an environmental awareness programme.

Specific management measures related to the identified environmental aspects follow:

Table 12-1: Management measures to be implemented during pre-construction.

Potential Impact	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
<b>LEGISLATIVE REQUIREMENTS AND DOCUMENT CONTROL</b>				
General Requirements	All relevant authorisations, licences and approvals are in place prior to the commencement of construction.	<ul style="list-style-type: none"> <li>• Approvals to be in place prior to construction.</li> </ul>	Once off prior to construction	Project Manager
	A formal document control system is in place to ensure all relevant documents are in place prior to commencement.	<ul style="list-style-type: none"> <li>• An environmental file/document control system must be designed and put in place.</li> <li>• Prior to construction, the following documents must be included in the file:                             <ul style="list-style-type: none"> <li>○ WUL</li> <li>○ EMPr</li> <li>○ EA</li> </ul> </li> </ul>	Once off prior to construction	Project Manager
	<u>MCLM's and WRDM requirements are taken into account as necessary</u>	<ul style="list-style-type: none"> <li>• <u>The applicant must comply with and submit a Landscape Development Plan to this office that is in line with all relevant provisions contained under MCLM's Urban Greening &amp; Biodiversity Preservation By-Laws (2017).</u></li> <li>• <u>During the detailed design, water and energy conservation measures should be investigated and implemented if feasible.</u></li> <li>• <u>A copy of the Environmental Authorisation and Water Use License must be submitted to MCLM.</u></li> <li>• <u>Building plans to be approved prior to construction</u></li> </ul>	<u>Once off prior to construction</u>	<u>Project Manager</u>

Potential Impact	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
	<u>Updated Stormwater Management Plan and Site Development Plan</u>	<ul style="list-style-type: none"> <li>• <u>The final Site Development Plan which is finalized through the townplanning process must be submitted to GDARD prior to development. No buildings or infrastructure are permitted within the wetland buffer.</u></li> <li>• <u>The Stormwater Management Plan should be updated to ensure that all stormwater infrastructure is out of the wetland buffer. The updated SWMP should be submitted to GDARD prior to construction.</u></li> <li>• <u>The updated SWMP should incorporate the requirements of MCLM including:</u></li> <li>• <u>The surfacing for driveways and parking areas must be permeable (within the confines of slopes of less than 5 degrees);</u></li> <li>• <u>The sheet flow must be directed into onsite infiltration trenches, filter drains, filter strips and/or artificial wetlands rather than gulleys and pipes.</u></li> <li>• <u>Ensure that all outlet structures are adequately designed to prevent</u></li> <li>• <u>erosion</u></li> </ul>	<u>Once off prior to construction</u>	<u>Project Manager</u>
	Site specific method statements are compiled and approved.	<ul style="list-style-type: none"> <li>• Based on the EMPr, the contractor must compile specific method statements which must be approved by the Project manager prior to construction. At a minimum this should include:                             <ul style="list-style-type: none"> <li>○ Method Statement for site clearing;</li> <li>○ Method Statement for establishing the construction camp;</li> <li>○ Method Statement with regard to waste and wastewater management;</li> <li>○ Method Statement to show procedures for dealing with possible emergencies that can occur, such as fire and accidental leaks and spillage of carbon fuels and oils;</li> <li>○ Method Statement for dust control;</li> <li>○ Method Statement for the storage and handling of hazardous substances;</li> <li>○ Method Statement for controlling alien invasive species and noxious weeds; and</li> </ul> </li> </ul>	Prior to construction	EO to compile Project manager to approve

Potential Impact	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
		<ul style="list-style-type: none"> <li>○ Method Statement for rehabilitation of construction footprint.</li> </ul>		
<b>BARRICADING OF SENSITIVE FEATURES</b>				
Loss/disturbance of sensitive features	Proper management of sensitive features through identification and barricading.	<ul style="list-style-type: none"> <li>● Prior to construction, the ECO should peg/demarcate the 32m wetland buffer so that all construction related activity (other than authorised activities) remains outside this sensitive area. <b>All barricades must be in place prior to construction.</b></li> <li>● Prior to construction, a site walk must be undertaken by the ECO and all <i>Hypoxis hemerocallidea</i> and <i>Boophone disticha</i> must be identified and demarcated. The Search, Rescue and Relocation Plan included in Appendix 13.1 must be implemented.</li> </ul>	Once off prior to construction	ECO/Specialist
Loss/disturbance of heritage	Proper management of potential heritage resources prior to construction as per the requirements of the Heritage Specialist.	<ul style="list-style-type: none"> <li>● <b>Note:</b> No heritage resources were identified during the specialist study.</li> <li>● A heritage walk down of all linear developments must be conducted prior to development</li> </ul>	Once off prior to construction	ECO/Heritage Specialist
<b>SITE PLANNING AND LAYOUT</b>				
Loss/disturbance of sensitive features	Planning and layout of construction site is undertaken responsibly to ensure protection of sensitive environmental features.	<ul style="list-style-type: none"> <li>● Contractor to submit a site plan to the ECO and Project Manager for comment. The site plan must be approved by the Project Manager prior to the establishment of the site. The plan must show the following): <ul style="list-style-type: none"> <li>○ Sensitive environmental features;</li> <li>○ Buildings and structures;</li> <li>○ Contractors' camp and lay down areas;</li> <li>○ Site offices;</li> <li>○ Roads and access routes;</li> <li>○ Temporary waste storage areas</li> <li>○ Site toilets and ablutions;</li> <li>○ Topsoil stockpiles areas;</li> <li>○ Construction materials stores areas;</li> <li>○ Workshops; and</li> <li>○ Hazardous substance stores.</li> </ul> </li> </ul>	Once off prior to construction	Contractor to compile plan, ECO to comment, Project Manager to approve.

Potential Impact	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
		<ul style="list-style-type: none"> <li>• Authorised construction footprint to be pegged</li> <li>• Ablution facilities must be located at outside 32m buffer area.</li> </ul>		
<b>ENVIRONMENTAL AWARENESS CREATION – INDUCTION</b>				
General Requirements	Environmental awareness creation and training is undertaken prior to construction commencement to minimise environmental impacts and ensure compliance to relevant legislation and authorisations.	<ul style="list-style-type: none"> <li>• ECO to induct relevant contractor managers at the start of the project. This induction should provide an overview of the authorisation and the EMPr. The environmental awareness training course for management shall include all management and foremen.</li> <li>• The Contractor must arrange that all of his employees and those of his sub-contractor go through the project specific environmental awareness induction before the commencement of construction and as and when new staff or sub-contractors are brought on site.</li> <li>• A system must be in place to ensure all new employees have received training.</li> <li>• All attendees shall remain for the duration of the course and sign an attendance register that clearly indicates participant's names on completion. A copy of the attendance register is to be retained by the ECO/Project Manager.</li> </ul>	Once off prior to construction	ECO to induct construction managers/ Environmental officer (EO) Contractor to induct all workers
<b>ACCESS AGREEMENTS</b>				
<u>Impacts to landowners affected by services</u>	<u>Access agreements to be in place prior to development of road or other services</u>	<ul style="list-style-type: none"> <li>• <u>Access to all private properties will be negotiated between the developer and the landowner in question. Issues regarding compensation will be dealt with as part of this contractual stage.</u></li> <li>• <u>Access to private property will only be allowed by consent.</u></li> <li>• <u>Potential to allow connection to the new sewer line should be discussed and implemented if feasible and acceptable to the landowner in question.</u></li> </ul>	<u>Once of prior to construction</u>	<u>Applicant/Project Manager</u>

## 12.2 Construction

Mitigation measures for all activities related to construction are provided below. The mitigation measures included in the Baseline Ecological Status Assessment, Wetland Assessment and Heritage Impact Assessment undertaken as part of the Basic Assessment Report have also been incorporated below. Management actions are linked to a specific impact and overall management objective. Information on the institutional responsibilities and the frequency of the actions is also provided.

Table 12-2: Management measures to be implemented during construction.

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
<b>ATMOSPHERIC EMISSIONS</b>					
Dust emissions	Site Clearing General construction activities	Ensure that all possible causes of dust are mitigated as far as possible to minimise impacts to the surrounding environment	<ul style="list-style-type: none"> <li>A speed limit of 20km/h must be maintained on all dirt roads.</li> <li>Dust suppression by means of either water or biodegradable chemical agent is required.</li> </ul>	Daily	Contractor to implement actions ECO to monitor
Emissions from vehicles and equipment (CO <sub>2</sub> , NO <sub>x</sub> , SO <sub>x</sub> , VOC's etc.)	Use of vehicles and plant during construction	All vehicles/plant on site must be properly maintained to reduce emission sources.	<ul style="list-style-type: none"> <li>All vehicles used during the project should be properly maintained and in good working order.</li> <li>A maintenance schedule should be drawn up to ensure all vehicles are serviced at the proper interval.</li> <li>All vehicles and other machinery should comply with road worthy requirements and comply with legislation in terms of allowable emissions.</li> </ul>	As required by maintenance schedule	Contractor to implement actions ECO to monitor
<b>NOISE</b>					
Noise increase due to construction activities	General construction activities	Ensure that noise disturbance to surrounding areas are minimised and that construction activities comply with the Noise Control Regulations and the provisions of South African National Standards; Environmental, Health and Safety (EHS) Guidelines, World Health Organisation (WHO, 2002).	<ul style="list-style-type: none"> <li>The provisions of SANS 10103:2008 will apply to all areas within audible distance of residents or adjacent landowners.</li> <li>Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels.</li> <li>Construction activities should be limited to daytime only.</li> <li><u>Regulation 13(2) of the Gauteng Noise Control Regulations issued in terms of the Environment Conservation Act (Act 73 of 1989), as well as the West Rand District Municipality's Air Quality Management By-Laws (Notice 717 of 31 May 2012) must be adhered to.</u> <ul style="list-style-type: none"> <li><u>No noise nuisance or noise disturbance above threshold levels, as defined in terms of the said Act, will be allowed at any given time;</u></li> <li><u>The permissible day time ambient noise level of 55 dB (A) - measured on the property boundary - may not be exceed at any given time;</u></li> </ul> </li> </ul>	Daily	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			<ul style="list-style-type: none"> <li>○ <u>The permissible night time ambient noise levels at any time may not exceed 45 dB (A) - measured on the property boundary - may not be exceed at any given time;</u></li> <li>○ <u>In any event, the volume of sound shall be so controlled that it will not be unreasonably loud, raucous, disturbing or a nuisance; and</u></li> <li>○ <u>No loud music to be played after 22h00 at night</u></li> </ul>		
<b>DISCHARGE TO SURFACE WATER</b>					
Water Quality	Site Camp Workshop Concrete mixing Construction activities	Construction activities are managed correctly to ensure no negative impacts to water quality. This includes proper management of ablution facilities, workshop and equipment and concrete batching and mixing.	<ul style="list-style-type: none"> <li>● The following mitigation measures suggested by the wetland specialist apply: <ul style="list-style-type: none"> <li>○ Stock piling outside the wetland area, stormwater management, dry season construction, filtration.</li> </ul> </li> <li>● In addition, the following general measures should be implemented:</li> <li>● Toilets <ul style="list-style-type: none"> <li>○ Chemical toilets must be supplied and maintained during the construction phase</li> <li>○ Ablution facilities (chemical toilets) are to be provided by the Contractor, at a ratio of 1:10.</li> <li>○ Ablution facilities (chemical toilets) must be erected within 100m from all workplaces but within the development footprint.</li> <li>○ Toilets are to be secured to the ground, and must have a closing mechanism.</li> <li>○ Toilet paper must be provided at these facilities and must be serviced once per week.</li> <li>○ Certified contractors to maintain and remove chemical toilets regularly.</li> <li>○ The contractor must ensure that spillage does not occur when toilets are cleaned/serviced and contents must be properly stored and disposed of.</li> <li>○ Discharge of waste into the environment and/or burial of waste are strictly prohibited.</li> <li>○ Sanitary arrangements must be to the satisfaction of the PM, ECO, the local authorities and the applicable legal requirements.</li> </ul> </li> </ul>	Daily	Contractor to implement actions ECO to monitor



Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			<ul style="list-style-type: none"> <li>• Proper storage of hazardous material                             <ul style="list-style-type: none"> <li>○ Hazardous materials to be suitably stored to prevent environmental contamination and visual impacts. Storage requirements to be determined based on chemical qualities of material and Material Safety Data Sheets (MSDS). At a minimum, hazardous chemical substances (HCS) must be stored at a designated area that meets the following requirements:                                     <ul style="list-style-type: none"> <li>▪ Earthed</li> <li>▪ Fire extinguisher must be present</li> <li>▪ Relevant signage to be displayed including No Smoking/ No open flames; Hazardous Chemical Substance Store; Type of HCS (e.g. Diesel); Maximum contents volume and Fire extinguisher</li> </ul> </li> <li>○ Storage areas should be located outside of the 32 buffer.</li> <li>○ Hazardous substances must be stored and handled in accordance with the appropriate legislation and standards, which include the Hazardous Substances Act (Act No. 15 of 1973), the Occupational Health and Safety Act (No. 85 of 1993), relevant associated Regulations, and applicable SANS and international standards.</li> <li>○ Any hazardous materials (apart from fuel) must be stored within a lockable store with a sealed floor. Suitable ventilation to be provided.</li> <li>○ All storage tanks containing hazardous materials must be placed in bunded containment areas with impermeable surfaces. The bunded area must be able to contain 110% of the total volume of the stored hazardous material.</li> </ul> </li> <li>• Spillages                             <ul style="list-style-type: none"> <li>○ In the event of spillages of hazardous substances, the appropriate clean up and disposal measures are to be implemented.</li> </ul> </li> </ul>		

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			<ul style="list-style-type: none"> <li>○ The contractor must ensure that necessary materials and equipment are available on site to deal with spills of any hazardous materials present</li> <li>○ The ECO and Project Manager must be notified of all significant spillages.</li> <li>• Training <ul style="list-style-type: none"> <li>○ Staff that will be handling hazardous materials must be trained to do so.</li> </ul> </li> <li>• General <ul style="list-style-type: none"> <li>○ Drip trays must be placed under all vehicles when immobile for longer than 24 hours. Vehicles suspected of leaking must be monitored and conduct a pre-start-up inspection checklist.</li> <li>○ Drip trays must be checked and replaced for vehicles standing (parked) for prolonged periods.</li> <li>○ Drip trays must be of a sufficient size and volume to collect any hydrocarbon leakages from a stationary vehicle.</li> <li>○ Spill kits (absorbent material) must be available on site and in all vehicles that transport hydrocarbons for dispensing to other vehicles on the construction site.</li> <li>○ Spilled substances must be contained in impermeable containers for removal to a licensed hazardous waste site.</li> </ul> </li> </ul>		
Flow regime	Construction activities Stormwater management	Ensure minimal impacts to the flow regime of the wetland through poor stormwater management	<ul style="list-style-type: none"> <li>• The following mitigation measures suggested by the wetland specialist apply: <ul style="list-style-type: none"> <li>○ Stock piling outside the wetland area, stormwater management, dry season construction, filtration.</li> </ul> </li> <li>• In addition, the following general measures should be implemented: <ul style="list-style-type: none"> <li>○ Instability and erosion of steep slopes must be stabilised immediately. Re-vegetation in consultation with landscape architect and ECO should be done if and where required.</li> </ul> </li> </ul>	Daily	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			<ul style="list-style-type: none"> <li>○ To reduce the loss of material by erosion, disturbance must be kept to a minimum.</li> <li>○ Where possible, natural vegetation should be retained to reduce the risk of erosion.</li> <li>○ Silt fences must be used to stabilise the site, reduce erosion and silt entering the natural environment. No unchecked silt may enter the natural environment.</li> <li>○ Proper stormwater management as per the approved stormwater management plan.</li> <li>○ Increased run-off during construction should be managed using berms, temporary cut-off drains, attenuation ponds or other suitable structures, in consultation with the ECO and resident Engineer.</li> <li>○ Stormwater management system is to be installed as soon as possible following site establishment, to attenuate stormwater during the construction phase, as well as during the operational phase.</li> <li>○ Surface-water run-off and stormwater must be directed away from trenches and areas of excavation.</li> </ul>		
Habitat	General construction activities	Ensure minimal impact to wetland habitat	<ul style="list-style-type: none"> <li>● The following mitigation measures suggested by the wetland specialist apply:                             <ul style="list-style-type: none"> <li>○ Stock piling outside the wetland area, minimal ingress and egress.</li> </ul> </li> <li>● In addition, the following general measures should be implemented:                             <ul style="list-style-type: none"> <li>○ The wetland area should be declared 'no-go' area's during the construction and must be demarcated prior to construction;</li> <li>○ All laydown, storage areas etc. should be restricted to within the development footprint;</li> <li>○ Compilation and implementation of a Wetland Rehabilitation Plan.</li> </ul> </li> </ul>	Once off (design and approval) Implementation – ongoing	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
Biota	General construction activities	Ensure minimal impact to wetland biota	<ul style="list-style-type: none"> <li>• The following mitigation measures suggested by the wetland specialist apply:                             <ul style="list-style-type: none"> <li>○ Stock piling outside the wetland area, minimal ingress and egress.</li> </ul> </li> <li>• In addition, the following general measures should be implemented:                             <ul style="list-style-type: none"> <li>○ The wetland area should be declared ‘no-go’ area’s during the construction and must be demarcated prior to construction;</li> <li>○ Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests entering the site;</li> <li>○ No trapping, killing or poisoning of any wildlife should be allowed on site;</li> <li>○ Staff should be educated about the sensitivity of faunal species and measures should be put in place to deal with any species that are encountered during the construction process. The intentional killing of any animals including snakes, insects, lizards, birds or other animals should be strictly prohibited.</li> </ul> </li> </ul>	Daily	Contractor to implement actions ECO to monitor
Geomorphology	General construction activities Stormwater management	Ensure that minimal disturbance of geomorphology during construction	<ul style="list-style-type: none"> <li>• The following mitigation measures suggested by the wetland specialist apply:                             <ul style="list-style-type: none"> <li>○ Stormwater management design and erosion control measures.</li> </ul> </li> <li>• In addition, the following general measures should be implemented:                             <ul style="list-style-type: none"> <li>○ Instability and erosion of steep slopes must be stabilised immediately. Re-vegetation in consultation with landscape architect and ECO should be done if and where required.</li> <li>○ To reduce the loss of material by erosion, disturbance must be kept to a minimum.</li> <li>○ Where possible, natural vegetation should be retained to reduce the risk of erosion.</li> </ul> </li> </ul>	Daily	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			<ul style="list-style-type: none"> <li>○ Proper stormwater management as per the approved stormwater management plan.</li> <li>○ Increased run-off during construction should be managed using berms, temporary cut-off drains, attenuation ponds or other suitable structures, in consultation with the ECO and resident Engineer.</li> <li>○ Stormwater management system is to be installed as soon as possible following site establishment, to attenuate stormwater during the construction phase, as well as during the operational phase.</li> <li>○ Surface-water run-off and stormwater must be directed away from trenches and areas of excavation.</li> </ul>		
<b>WASTE GENERATION</b>					
Domestic Waste	Waste generation, storage and disposal	Domestic waste must be managed properly to ensure minimal impacts.	<ul style="list-style-type: none"> <li>● Waste recycling to be put in place.</li> <li>● Domestic waste must be stored in containers labelled or colour coded for general waste.</li> <li>● Vermin / weatherproof bins will be provided in sufficient numbers and capacity to store domestic waste.</li> <li>● Containers must be emptied frequently before reaching capacity</li> <li>● Solid waste shall only be stored in the designated general waste storage area which must be enclosed and impermeable.</li> <li>● No waste shall be buried or burned anywhere on the construction site.</li> <li>● All solid waste shall be disposed of by a certified contractor, off-site, at an approved landfill site if no municipal services is available. The Contractor shall supply the ECO with a certificate of disposal for auditing purposes.</li> <li>● Avoidance, reduction and reuse should be practiced wherever possible – see waste management plan.</li> <li>● Waste may not cause any nuisance (e.g. odour)</li> </ul>	Daily	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			<ul style="list-style-type: none"> <li>Records of waste manifest documents must be retained at the administration office</li> </ul>		
Construction Waste	Waste generation, storage and disposal	Construction waste must be managed properly to ensure minimal impacts.	<ul style="list-style-type: none"> <li>Construction waste must be collected and put into suitable closed bins on a daily basis.</li> <li>Provide waste skips on site. These skips should be sufficient in number, the skip storage area should be kept clean, skips should be emptied and replaced before overflowing or spillage occurs. Skips should be covered to prevent waste blowing away.</li> <li>Construction rubble must be disposed of at a registered landfill site.</li> <li>Avoidance, reduction, and reuse should be practiced wherever possible – see waste management plan.</li> <li>Records of waste manifest documents must be retained at the administration office.</li> </ul>	Daily	Contractor to implement actions ECO to monitor
Hazardous waste	Waste generation, storage and disposal	Hazardous waste must be managed properly to ensure minimal impacts.	<ul style="list-style-type: none"> <li>The classification of waste determines the handling methods and the ultimate disposal of the material. The contractor shall manage hazardous waste that are anticipated to be generated by his operations as follows:                             <ul style="list-style-type: none"> <li>Characterise the waste to determine if it is general or hazardous (Use the Appendix 1 of the Norms and Standards for the Classification of Waste for landfill to determine whether additional classification is required).</li> <li>Obtain and provide an acceptable container with a label.</li> <li>Place hazardous waste material in the container.</li> <li>Inspect the container on a regular basis</li> <li>Haul the full container to the licenced and correct disposal site.</li> <li>Provide documentary evidence of proper disposal of the waste.</li> </ul> </li> <li>Only temporary storage of waste is allowed (once of storage of waste for a period less than 90 days). The volume of material should be limited to less than 80m<sup>3</sup> of hazardous waste. Should this be exceeded the Norms and</li> </ul>	Daily	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			<p>Standards for the Storage of Waste will need to be complied with.</p> <ul style="list-style-type: none"> <li>Containers must be emptied frequently before reaching capacity</li> <li>All hazardous waste must be disposed of at the nearest hazardous landfill</li> <li>Waste may not cause any nuisance (e.g. contamination)</li> <li>Records of waste manifest documents must be retained at the administration office</li> <li>Certificates of registration must be retained for transporters of hazardous waste and retained in record at the administration office.</li> </ul>		
<b>SOIL ALTERATION</b>					
Loss of topsoil	Site clearing	Effective management of topsoil, in order to minimise the impact of construction activities.	<ul style="list-style-type: none"> <li>During site preparation, topsoil and subsoil must be stripped separately from each other and must be stored separately from spoil material for use in the rehabilitation phase.</li> <li>Topsoil should be protected from wind and rain, as well as contamination from diesel, concrete or wastewater. Topsoil stockpiles should be checked on a monthly basis to ensure that this is the case.</li> <li>Topsoil should be used in landscaping and rehabilitation where possible.</li> </ul>	At start of construction. Checks to occur on a monthly basis	Contractor to implement actions ECO to monitor
<u>Impact to sheep grazing land and irrigated fields</u>	<u>Sewer Pipeline clearing and trenching</u>	<u>Effective management of the installation of the sewer pipeline to reduce impacts on agricultural land</u>	<ul style="list-style-type: none"> <li><u>Proposed Sewer Pipeline to be implemented so that there is no impact to irrigated land.</u></li> <li><u>Where possible the construction of the pipeline will be undertaken in sections in line with property boundaries. Based on discussions with the engineer, it is understood that the excavation, laying of pipeline and closing of the excavation of approximately 300m will take 1 week. It is therefore feasible that the pipeline be developed property by property so to limit the time that each property is impacted. Grazing would therefore be limited for a short period only.</u></li> <li><u>The right of way/servitude for the pipeline is 3m. No additional clearing of excavation will be permitted.</u></li> </ul>	<u>During sewer pipeline installation, weekly checks Inspections after completion and again in 6 months</u>	<u>Contractor to implement actions ECO to monitor</u>

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			<ul style="list-style-type: none"> <li>• <u>During site preparation, topsoil and subsoil must be stripped separately from each other and must be stored separately from spoil material for use in the rehabilitation phase.</u></li> <li>• <u>Programme the backfill of excavations so that subsoil is deposited first, followed by the topsoil.</u></li> <li>• <u>Monitor backfilled areas for subsidence (as the backfill settles) and fill depressions using available material.</u></li> <li>• <u>Execute top soiling activity prior to the rainy season or any expected wet weather conditions.</u></li> <li>• <u>Replace and redistribute stockpiled topsoil together with herbaceous vegetation, overlying grass and other fine organic matter. Replace topsoil to the original depth.</u></li> <li>• <u>Place topsoil in the same area from where it was stripped.</u></li> <li>• <u>Rip and/or scarify all areas following the application of topsoil to facilitate mixing of the upper most layers.</u></li> <li>• <u>No litter, rubble or any other construction material shall remain on site once the pipeline is completed.</u></li> <li>• <u>ECO to undertake a rehabilitation audit at the completion of the pipeline and then again in 6 months to ensure that rehabilitation has been undertaken as necessary and to ensure no undue alien invasive plant species are establishing.</u></li> </ul>		
Alteration of topography	Site clearing Landscaping Construction activities	Changes to topography to be planned properly to prevent negative impacts.	<ul style="list-style-type: none"> <li>• Changes to topography must be properly designed and landscaped.</li> <li>• Stormwater management measures must be implemented to ensure these changes to not impact on stormwater.</li> </ul>	Ongoing	Contractor to implement actions ECO to monitor
Soil erosion	Site clearing Landscaping Construction activities	Ensure that all possible causes of erosion are mitigated as far as possible to minimise impacts to the site and surrounding environment	<ul style="list-style-type: none"> <li>• Instability and erosion of steep slopes must be stabilised immediately. Re-vegetation in consultation with landscape architect and ECO should be done if required.</li> <li>• To reduce the loss of material by erosion, disturbance must be kept to a minimum.</li> <li>• If clearing of slopes occur within the rainy season, earth berms must be created along the up-slope side of the construction area.</li> </ul>	Ongoing	Contractor to implement actions ECO to monitor



Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			<ul style="list-style-type: none"> <li>Where possible, natural vegetation should be retained to reduce the risk of erosion.</li> <li>Should erosion occur due to negligence on the part of the Contractor, the Contractor will be responsible for reinstatement of the eroded area to its former state at his own expense. Any surface water pollution occurring as a result of this negligence will be cleaned up by the Contractor or a nominated clean up organisation at the expenses of the Contractor.</li> </ul>		
Soil pollution	Site camp Storage of materials Ablution facilities Storage of Waste Workshop area	Ensure that all possible causes of soil pollution are mitigated as far as possible to minimise impacts to the site and surrounding environment	<ul style="list-style-type: none"> <li>All vehicle/equipment maintenance and washing must be done in the workshop area, equipped with a bund wall and grease trap oil separator.</li> <li>Workshop area must be monitored for fuel and oil spills.</li> <li>Spills must be cleaned up immediately and remediated to the satisfaction of the ECO and PM.</li> <li>Spill kits must be comprehensive and available on site at all times. An adequate supply of absorbent material must be available to accommodate emergency spills.</li> <li>Also see mitigation measures related to water quality and storage of hazardous material.</li> </ul>	Ongoing	Contractor to implement actions ECO to monitor
<b>RESOURCE CONSUMPTION</b>					
Electricity consumption	General site activities	Electricity reduction mechanisms to be implemented.	<ul style="list-style-type: none"> <li>Enforce electricity reduction strategies</li> <li>Environmental awareness training</li> </ul>	Ongoing	Contractor to implement actions ECO to monitor
Water consumption	General site activities	Water conservation mechanisms to be implemented.	<ul style="list-style-type: none"> <li>Enforce water saving strategies including design of recycling and reuse, rainwater harvesting etc.</li> <li>Environmental awareness training.</li> </ul>	Ongoing	Contractor to implement actions ECO to monitor
Fuel consumption	Fuelling of plant, vehicles and generators	Fuel conservation mechanisms to be implemented.	<ul style="list-style-type: none"> <li>Record and monitor fuel consumption regularly</li> <li>Reduce theft of fuel (increase security)</li> </ul>	Ongoing	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
Raw materials consumption	General construction activities requiring raw materials	Raw materials conservation mechanisms to be implemented.	<ul style="list-style-type: none"> <li>Promote effective use of raw materials.</li> </ul>	Ongoing	Contractor to implement actions ECO to monitor
<b>EFFECTS ON BIODIVERSITY</b>					
Loss of habitat due to Clearing due to digging and laying foundations , Construction camps & lay down areas and Stochastic events such as fire	Site clearing Construction activities.	No loss of habitat outside the approved footprint.	<ul style="list-style-type: none"> <li>Proper management of site establishment:                             <ul style="list-style-type: none"> <li>Locate construction camp in area where sensitive environmental features will not be impacted on. The location should be approved by the ECO, Project Manager and EO.</li> <li>Construction camp should be fenced, and access control should be exercised.</li> <li>The extent of the site should by all means be limited, to avoid any additional clearance of vegetation</li> <li>Construction and laydown areas should be established -outside of the wetland 32m buffer.</li> </ul> </li> <li>All construction activities (other than those authorised) must be outside of the wetland 32m buffer</li> <li>Fires shall only be permitted in specially designated areas and under controlled circumstances.</li> <li>Proper management of site clearing:                             <ul style="list-style-type: none"> <li>Restrict site clearing activities to construction area /domain.</li> <li>Clearing of vegetation to be conducted in a phased manner (where possible).</li> </ul> </li> <li>All laydown, storage areas etc should be restricted to within the Project area and all access roads must be kept within this area or from existing access roads.</li> <li>A qualified environmental control officer must be on site when construction begins to identify species that will be directly disturbed and to relocate fauna/flora that is found during construction (including all reptiles and amphibians).</li> </ul>	Ongoing	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			<ul style="list-style-type: none"> <li>• Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events. This will also reduce the likelihood of encroachment by alien invasive plant species.</li> <li>• Compilation of and implementation of an alien vegetation management plan for the entire site.</li> <li>• It is recommended that all <i>Hypoxis hemerocallidea</i> and the one <i>Boophane disticha</i> species should be removed prior to construction activities and either relocated to a similar type of environment or implemented within the landscaping plan of the proposed development. A Search, Rescue and Relocation plan has been compiled and should be implemented.</li> </ul>		
Loss of fauna - Staff or construction workers poaching and hunting, Intentional killing of fauna and Vegetation and ground clearing	Site clearing Construction activities.	Minimal disturbance to fauna occurs during construction.	<ul style="list-style-type: none"> <li>• No sensitive faunal species were identified on site and the Ecological Specialist noted that the site is disturbed. The following recommendations by the specialist will be implemented: <ul style="list-style-type: none"> <li>○ Snaring and hunting of fauna by construction workers on or adjacent to the study area are strictly prohibited.</li> <li>○ Killing of fauna on or adjacent to the study area are strictly prohibited. Should any fauna species be found on site, the ECO should be conducted asap to provide recommendation or mitigation measures.</li> <li>○ Clearing of vegetation is not allowed within the 32m buffer of the wetland area other than for authorised activities.-</li> </ul> </li> </ul> <p>In addition, the following general requirements should be adhered to:</p> <ul style="list-style-type: none"> <li>○ Before construction starts, construction workers must be educated with regards to littering and poaching.</li> <li>○ Environmental awareness training should be provided to contractors regarding disturbance to</li> </ul>	Ongoing	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			animals. Particular emphasis should be placed on talks regarding snakes.		
Disruption of ecological life cycles due to the restriction of species movement	Site clearing Construction activities.	Ensure that minimal disturbance of ecological systems and natural corridors takes place during construction.	<ul style="list-style-type: none"> <li>• The Ecological Specialist noted that the site is disturbed. The following recommendations by the specialist will be implemented: <ul style="list-style-type: none"> <li>○ Trenches and other linear barriers should not be kept open for too long, especially not staying open over night.</li> <li>○ Stormwater and road infrastructure should be designed in such a way that it will have minimal impact on the environmental, especially the wetland area.</li> <li>○ Clearing of vegetation is not allowed within the 32m buffer of the wetland area (other than for authorised activities).</li> </ul> </li> <li>• In Addition, the following should be undertaken: <ul style="list-style-type: none"> <li>○ All laydown, storage areas etc should be restricted to within the Project area;</li> <li>○ Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events. This will also reduce the likelihood of encroachment by alien invasive plant species.</li> <li>○ Compilation of and implementation of an alien vegetation management plan for the entire site.</li> </ul> </li> </ul>	Ongoing	Contractor to implement actions ECO to monitor
Disruption of ecological life cycles due to noise and lighting	Site clearing Construction activities.	Ensure that minimal disturbance of ecological life cycles due to noise and lighting.	<ul style="list-style-type: none"> <li>• Construction must be restricted to hours of 07:00 and 17:00. Should construction activities need to continue over a weekend/public holiday or is expected to be excessively noisy, all Interested and Affected Parties and the ECO must be notified in advance.</li> </ul>	Ongoing Contractor to implement actions	ECO to monitor
Introduction of alien flora affecting native faunal assemblages	Site clearing Construction activities.	Ensure proper management of alien invasive species	<ul style="list-style-type: none"> <li>• Compilation of and implementation of an alien vegetation management plan for the entire site.</li> </ul>	Ongoing Contractor to implement actions	ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			<ul style="list-style-type: none"> <li>'Alien, invasive species found within the construction area should be eradicated as far as possible and disposed of at a registered site.</li> <li>Measures to prevent siltation from entering the wetland area, should be implemented throughout the construction phase.</li> </ul>		
<b>INCIDENTS, ACCIDENTS, AND POTENTIAL EMERGENCY SITUATIONS</b>					
Pollution incidents	Workshop Site Camp Storage of Hazardous material Use of plant and vehicles	Minimise potential pollution incidents due to construction.	<ul style="list-style-type: none"> <li>Proper emergency response procedure to be in place for dealing with spill or leaks at the construction site.</li> <li>Ensure that the necessary materials and equipment for dealing with spills and leaks are available on site, where practicable.</li> <li>Remediation of the spill areas will be undertaken to the satisfaction of the Project Manager.</li> <li>In the event of a hydrocarbon spill, the source of the spillage will be isolated and contained. The area will be cordoned off and secured.</li> <li>The Contractor will ensure that there is always a supply of an appropriate absorbent material readily available to absorb, breakdown and where possible, encapsulate a minor hydrocarbon spillage.</li> <li>All staff on site will be made aware of actions to be taken in case of a spillage.</li> <li>Provide contact details of person to be notified in a case of spillages – signage to be displayed at strategic points within the construction domain (e.g. workshop, fuel storage area, hazardous material containers).</li> </ul>	Daily	Contractor to implement actions ECO to monitor
Health and safety	General construction activities	A safe working environment for contractors/construction workers and the public is provided.	<ul style="list-style-type: none"> <li>Appointed Safety Agent.</li> <li>Contractor to submit a Health and Safety Plan, prepared in accordance with the Health and Safety Specification, for approval prior to the commencement of work.</li> <li>All construction personal must be clearly identifiable. All employees must also be issued with employee cards for identification purposes.</li> </ul>	Appointment and Plan – once off at start, other actions, ongoing	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			<ul style="list-style-type: none"> <li>• All workers will be supplied with the required Personal Protective Equipment as per the Occupational Health and Safety Act (Act No. 85 of 1993).</li> <li>• Fencing and barriers will be in place in accordance with the Occupational Health and Safety Act (Act No. 85 of 1993).</li> <li>• Applicable notice boards and hazard warning notices will be put in place and secured. Night hazards will be indicated suitably (e.g. reflectors, lighting, traffic signage).</li> <li>• Maintain access control to prevent access of the public to the construction areas, as far as practicable.</li> <li>• 24-hour security and access control.</li> <li>• Health and Safety awareness training.</li> <li>• A Dedicated Occupational Health and Safety system to be implemented by Contractor's Safety Officer. To be monitored and audited by the Client's Safety Agent, in terms of the Construction Regulations (2003).</li> </ul>		
Storage of hydrocarbons	Storage of fuel of Site Camp Workshop areas	Effective and safe storage of hydrocarbons on site, in order to minimise the impact of hydrocarbons on the environment	<ul style="list-style-type: none"> <li>• Proper storage of hydrocarbons                             <ul style="list-style-type: none"> <li>○ Storage requirements to be determined based on chemical qualities of material and Material Safety Data Sheets (MSDS). At a minimum, hazardous chemical substances (HCS) must be stored at a designated area that meets the following requirements:                                     <ul style="list-style-type: none"> <li>▪ Earthed</li> <li>▪ Fire extinguisher must be present</li> <li>▪ Relevant signage to be displayed including No Smoking/ No open flames; Hazardous Chemical Substance Store; Type of HCS (e.g. Diesel); Maximum contents volume and Fire extinguisher</li> </ul> </li> </ul> </li> <li>• Storage areas should be located 100m from the edge of wetlands.</li> <li>• Hazardous substances must be stored and handled in accordance with the appropriate legislation and standards, which include the Hazardous Substances Act (Act No. 15 of 1973), the Occupational Health and Safety Act (No. 85</li> </ul>	Ongoing	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			<p>of 1993), relevant associated Regulations, and applicable SANS and international standards.</p> <ul style="list-style-type: none"> <li>• Any hazardous materials (apart from fuel) must be stored within a lockable store with a sealed floor. Suitable ventilation to be provided.</li> <li>• All storage tanks containing hazardous materials must be placed in bunded containment areas with impermeable surfaces. The bunded area must be able to contain 110% of the total volume of the stored hazardous material.</li> <li>• Spillages <ul style="list-style-type: none"> <li>○ In the event of spillages of hazardous substances, the appropriate clean up and disposal measures are to be implemented.</li> <li>○ The contractor must ensure that necessary materials and equipment are available on site to deal with spills of any hazardous materials present</li> <li>○ The ECO and Project Manager must be notified of all significant spillages.</li> </ul> </li> </ul>		
Fire	Storage of fuel Site Camp Workshop areas General Construction Activities	Minimise potential fire incidents during construction.	<ul style="list-style-type: none"> <li>• Appropriate emergency response to be in place for dealing with fire at the construction site.</li> <li>• All fire control mechanisms (firefighting equipment) will be routinely inspected by a qualified investigator for efficacy thereof and be approved by local fire services.</li> <li>• All staff on site will be made aware of general fire prevention and control methods, and the name of the responsible person to alert to the presence of a fire.</li> <li>• Burning of waste is not permitted.</li> <li>• Suitable precautions will be taken (e.g. suitable fire extinguishers, water bowsers, welding curtains) when working with welding or grinding equipment.</li> <li>• Designated smoking areas should be provided, with special bins for discarding of cigarette butts</li> </ul>	Ongoing	Contractor to implement actions ECO to monitor
<b>SOCIAL</b>					

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
Visual impact	General Construction activities Site camp	Proper management of construction activities to minimise disturbance to visual environment.	<ul style="list-style-type: none"> <li>Suitable screening to be put in place during construction to minimise visual impacts.</li> <li>No littering to be allowed.</li> <li>Good housekeeping practices to be followed</li> </ul>	Ongoing	Contractor to implement actions ECO to monitor
Safety and security	General construction activities	Proper management of labour force is undertaken to ensure that there are no security-related issues or disturbance to tenants or landowners outside the construction footprint.	<ul style="list-style-type: none"> <li>24-hour access control to the site and 24-hour security.</li> <li>Workers found to be engaging in activities such as excessive consumption of alcohol, drug use or selling of any such items on site must be disciplined.</li> <li>All workers must be easily identifiable with name tags and appropriate safety vests etc.</li> <li>Access to private property must be by agreement only.</li> <li>A landowner liaison officer should be appointed and contact with the landowners must be made before any entry to the private property is made.</li> <li>The sewer pipeline should be phased so that the impact is localised to one property at a time and once completed, access to the site by workers will not be permitted.</li> </ul>	Ongoing	Contractor to implement actions ECO to monitor
Traffic disruptions	General construction activities	Minimal disturbances to traffic due to road upgrades.	<ul style="list-style-type: none"> <li>Traffic warning and calming measures will be put in place when construction activities may impact on traffic flow.</li> </ul>	Ongoing	Contractor to implement actions ECO to monitor
Loss of cultural heritage	General Construction activities Site clearing	No adverse impact on the historical and cultural inheritance of the area.	<ul style="list-style-type: none"> <li>A Heritage Impact Assessment was undertaken, and the following mitigation measures recommended: <ul style="list-style-type: none"> <li>A heritage walk down of all linear developments must be conducted prior to development;</li> <li>Confirmation of any burial sites within the study area during the public participation process; and</li> <li>Implementation of a chance find procedure. <ul style="list-style-type: none"> <li>If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and</li> </ul> </li> </ul> </li> </ul>	Ongoing	Contractor to implement actions ECO to monitor



Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			<p>report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.</p> <ul style="list-style-type: none"> <li>It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area.</li> <li>The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA.</li> </ul>		
Loss of sense of place	General Construction activities Site camp	Proper management of construction activities to minimise disturbance to sense of place.	<ul style="list-style-type: none"> <li>Suitable screening to be put in place during construction to minimise visual impacts.</li> <li>No littering to be allowed.</li> <li>Good housekeeping practices to be followed.</li> </ul>	Ongoing	Contractor to implement actions ECO to monitor
<b>ECONOMIC</b>					
Decline/increase in economy	Supplier and contractor selection	Preferential use of local contractors and suppliers.	<ul style="list-style-type: none"> <li>Local contractors and suppliers to be used during the construction phase as far as possible.</li> </ul>	Ongoing	Contractor to implement actions ECO to monitor
<u>Impact to private infrastructure and property (including livestock)</u>	<u>General construction activities – services and roads</u>	<u>Impacts to landowners affected by services and roads are minimized through proper management of construction activities</u>	<ul style="list-style-type: none"> <li><u>All workers must be easily identifiable with name tags and appropriate safety vests etc.</u></li> <li><u>Access to private property must be by agreement only.</u></li> <li><u>A landowner liaison officer should be appointed and contact with the landowners must be made before any entry to the private property is made.</u></li> <li><u>The sewer pipeline should be phased so that the impact is localised to one property at a time and once completed, access to the site by workers will not be permitted.</u></li> <li><u>Should electric fencing or fencing need to be removed this must be agreed to by affected landowners. All electric fencing/fencing must be replaced as soon as construction in the property is completed.</u></li> </ul>	Ongoing	<u>Contractor to implement actions</u> <u>ECO to monitor</u>

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			<ul style="list-style-type: none"> <li>An Issues Register should be set up and all comments, queries and complaints should be noted. Details on how these issues have been resolved should be noted.</li> </ul>		
Employment	Employment of construction workers	Proper management of labour force is undertaken to ensure that there is optimal use of local labourers and local contractors.	<ul style="list-style-type: none"> <li>Wherever possible labour, materials and services must be sourced locally.</li> </ul>	Ongoing	Contractor to implement actions ECO to monitor
<b>REHABILITATION AND LANDSCAPING</b>					
General	Rehabilitation and landscaping activities	Adequate reinstatement and rehabilitation of construction areas	<ul style="list-style-type: none"> <li>In line with the requirements the National Environmental Management: Biodiversity Act (Alien and Invasive Species Regulations, 2014), the following must be undertaken: <ul style="list-style-type: none"> <li>Eradicate all Listed Invasive Species (Category 1a), if present;</li> <li>Control all Listed Invasive Species (Category 1b), if present;</li> <li>Apply for a permit for all Listed Invasive Species (Category 2), if present;</li> <li>Apply for exemption for all Listed Invasive Species (Category 3), if present.</li> </ul> </li> <li>After the construction phase, the area to be reinstated to the same or better condition than it was prior to construction.</li> <li>Clear and completely remove from site all construction plant, equipment, storage containers, temporary fencing, temporary services, and fixtures</li> <li>Ensure that all access roads utilised during construction are returned to a usable state and/or a state no worse than prior to construction.</li> <li>Inert waste and rubble</li> </ul>	Ongoing	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			<ul style="list-style-type: none"> <li>○ Clear the site of all inert waste and rubble, including surplus rock, foundations and batching plant aggregates. After the material has been removed, the site shall be re-instated and rehabilitated.</li> <li>○ Remove from site all domestic waste and dispose of in the approved manner at a registered waste disposal site, or with a registered service provider.</li> <li>● Hazardous waste and pollution control               <ul style="list-style-type: none"> <li>○ Remove from site all pollution containment structures.</li> <li>○ Remove from site all temporary sanitary infrastructure and waste water disposal systems.</li> <li>○ Take care to avoid leaks, overflows and spills and dispose of any waste in the approved manner</li> </ul> </li> <li>● Control of Invasive Plant species:               <ul style="list-style-type: none"> <li>○ Control invasive plant species and noxious weeds by means of extraction, cutting or other approved methods.</li> <li>○ Encroachment of alien vegetation should be monitored regularly and controlled; the area must be kept clear of all invader plants as per the Conservation of Agricultural Resources Act, 1983 (Act No 43 of 1983). Rehabilitation measures must be employed until such a time as indigenous species is established.</li> <li>○ As much vegetation growth as possible should be promoted within the proposed replacement in order to protect soils and to reduce the percentage of the surface area which is left as bare ground. In this regard special mention is made of the need to use indigenous vegetation species as the first choice during landscaping</li> </ul> </li> <li>● Landscaping               <ul style="list-style-type: none"> <li>○ Make safe all excavations outside of the construction area by backfilling and grading, as required.</li> </ul> </li> </ul>		

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			<ul style="list-style-type: none"> <li>○ In general, no slopes steeper than 1(V):3(H) are permitted in cut-and-fill areas, unless otherwise specified by the landscaping plan.</li> <li>○ Programme the backfill of excavations so that subsoil is deposited first, followed by the topsoil.</li> <li>○ Monitor backfilled areas for subsidence (as the backfill settles) and fill depressions using available material.</li> <li>○ Shape the area surrounding the development to blend in with the surrounding landscape, where possible. Landscaping shall be done through the use of indigenous plant species, following water conscious design principles.</li> <li>○ Ensure that no excavated material or stockpiles are left on site and that all material remaining after backfilling is landscaped to blend in with the surrounding landscape.</li> <li>● Topsoil replacement and soil amelioration               <ul style="list-style-type: none"> <li>○ Execute top soiling activity prior to the rainy season or any expected wet weather conditions.</li> <li>○ Execute topsoil placement only after all construction work has ceased.</li> <li>○ 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. Replace topsoil to the original depth.</li> <li>○ 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.</li> <li>○ The suitability of substitute material will be determined by means of a soil analysis addressing soil fraction, fertility, pH and drainage.</li> <li>○ Do not use topsoil suspected to be contaminated with the seed of alien vegetation. Alternatively, the soil is to be appropriately treated.</li> </ul> </li> </ul>		

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			<ul style="list-style-type: none"> <li>○ Ensure that storm water run-off is not channelled alongside the gentle mounding, but that it is taken diagonally across it.</li> <li>○ Shape remaining stockpiled topsoil not utilised elsewhere in an acceptable manner so as to blend in with the local surrounding area.</li> <li>○ After topsoil placement is complete, spread available stripped vegetation randomly by hand over the top-soiled area</li> <li>● Ripping and scarifying               <ul style="list-style-type: none"> <li>○ Rip and/or scarify all areas following the application of topsoil to facilitate mixing of the upper most layers. Whether ripping and/or scarifying is necessary will be determined based on the site conditions immediately before these works begin.</li> <li>○ Rip and/or scarify all disturbed areas (and other specified)</li> </ul> </li> </ul>		

### **12.3 Operation**

Mitigation measures for all activities related to operation are provided below. Management actions are linked to a specific impact and overall management objective. Information on the institutional responsibilities and the frequency of the actions is also provided.

Table 12-3: Management measures to be implemented during operation.

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
<b>NOISE</b>					
Noise increase	General operational activities	Residential development must comply with acceptable noise levels.	<ul style="list-style-type: none"> <li>The proposed residential development is in line with activities and uses in the area and will not provide significant noise pollution.</li> <li>The Body corporate should develop rules and regulations to manage noise in line with applicable by-laws.</li> </ul>	Ongoing	Authorisation Holder
<b>DISCHARGE TO WATER</b>					
Water quality	General operational activities Stormwater	Proper maintenance of connection to sewer line and proper management of stormwater	<ul style="list-style-type: none"> <li>An Outline Scheme Report has been undertaken and noted that sewer will connect to an existing sewer line and be treated at an existing Treatment works. Maintenance and management of the sewer line (must be undertaken as per Mogale City Local Municipality's requirements.</li> <li>In addition, the following mitigation measures from the Wetland specialist must be implemented: <ul style="list-style-type: none"> <li>Rehabilitation of construction impacted area, continuous monitoring. Storm water management.</li> </ul> </li> </ul>	Ongoing	Authorisation Holder
Flow Regime	General operational activities Stormwater	Ensure Stormwater is properly managed	<ul style="list-style-type: none"> <li>The following mitigation measures from the Wetland specialist must be implemented: <ul style="list-style-type: none"> <li>Rehabilitation of construction impacted area, continuous monitoring. Storm water management.</li> </ul> </li> <li>Further, Alternative 1 is not preferred as the deeper and smaller attenuation pond impacts on wetland interflows. The proposal should therefore be authorised.</li> </ul>	Ongoing	Authorisation Holder
Habitat	General Operational activities	Limited impact to habitat during operation	<ul style="list-style-type: none"> <li>The following mitigation measures from the Wetland specialist must be implemented: <ul style="list-style-type: none"> <li>Rehabilitation of construction impacted area, continuous monitoring. Storm water management.</li> </ul> </li> </ul>	Ongoing	Authorisation Holder
Biota	General Operational activities	Limited impact to biota during operation	<ul style="list-style-type: none"> <li>The following mitigation measures from the Wetland specialist must be implemented: <ul style="list-style-type: none"> <li>Rehabilitation of construction impacted area, continuous monitoring. Storm water management.</li> </ul> </li> </ul>		

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
Geomorphology	General Operational activities	Limited impact to geomorphology during operation	<ul style="list-style-type: none"> <li>The following mitigation measures from the Wetland specialist must be implemented: Rehabilitation of construction impacted area.</li> </ul>		
<b>WASTE GENERATION</b>					
Domestic Waste	Waste management	Proper management of waste.	<ul style="list-style-type: none"> <li>Recyclable waste streams must be separated from other waste streams. Waste to be separated into recyclable and non-recyclable waste. Waste separation needs to occur before waste is collected.</li> <li>Solid waste shall only be stored in the designated general waste storage area which must be enclosed and impermeable.</li> <li>All solid waste shall be disposed of by a certified contractor, off-site, at an approved landfill site if no municipal services are available.</li> <li><u>MCLM has confirmed that they shall render a service for collection and removal of waste from the premises. The occupier of the premises must notify the municipality in advance (at least one month before occupation) of the date of occupation of the premises. The municipality shall charge applicable tariffs for the collection and removal of the waste. Private waste transporters can be used only if approved by the MCLM, otherwise transportation of the waste without authorisation by the municipality is an offence.</u></li> <li>Avoidance, reduction, re-use and recycling should be practiced wherever possible.</li> </ul>	Ongoing	Authorisation holder
<b>SOIL ALTERATION</b>					
Soil erosion	General operational activities	Ensure that all possible causes of erosion are mitigated as far as possible to minimise impacts to the site and surrounding environment	<ul style="list-style-type: none"> <li>Stormwater management system to be implemented to reduce erosion.</li> <li>Landscaping to minimise soil erosion.</li> </ul>	Ongoing	Authorisation holder
<b>EFFECTS ON BIODIVERSITY</b>					
Loss of existing habitat due to loss of	General operational activities	Minimal loss of vegetation to fire	<ul style="list-style-type: none"> <li>Fire extinguishers must be placed on the property.</li> </ul>	Ongoing	Authorisation holder



Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
vegetation due to fire					
Direct mortality of fauna	General operational activities	Minimal disturbance of fauna	<ul style="list-style-type: none"> <li>'It is not expected that any fauna will be found on site during operation. The Body Corporate must include the requirement in their rule book that should any be found that the relevant organisation be called to safely remove the species.</li> </ul>	Ongoing	Authorisation holder
Disruption of ecological life cycles due to the restriction of species movement	General operational activities	Minimal disturbance of ecological life cycles	<ul style="list-style-type: none"> <li>'Stormwater and road infrastructure should be designed in such a way that it will have minimal impact on the environmental, especially the wetland area. Maintenance should be undertaken as per the requirements of the stormwater management plan.</li> </ul>	Ongoing	Authorisation holder
<b>INCIDENTS, ACCIDENTS, AND POTENTIAL EMERGENCY SITUATIONS</b>					
Pollution incidents	General operational activities	Proper management of pollution sources to prevent pollution incidents on site.	<ul style="list-style-type: none"> <li>Proper maintenance and management of sewer infrastructure to ensure no pollution incidents or spillages.</li> </ul>	Ongoing	Authorisation holder
Health and safety	General operational activities	Minimise potential impacts/incidents	<ul style="list-style-type: none"> <li>24-hour security and access control.</li> </ul>	Ongoing	Authorisation holder
<b>SOCIAL</b>					
Safety and security	General operational activities	Minimal safety and security issues.	<ul style="list-style-type: none"> <li>24-hour access control to the site and 24-hour security.</li> </ul>	Ongoing	Authorisation holder
Traffic Disruptions	General operational activities	Minimal traffic disturbances related to the operation of the dealership.	<ul style="list-style-type: none"> <li>Road access as discussed in the Traffic Impact Assessment to be implemented.</li> </ul>	Ongoing	Authorisation holder

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
Decline/increase in economy	Supplier selection	Preferential use of local contractors and suppliers.	<ul style="list-style-type: none"> <li>Local contractors and suppliers to be used during the construction phase as far as possible.</li> </ul>	Ongoing	Authorisation holder
Employment	Employment of permanent staff	Proper management of labour force is undertaken to ensure that there is optimal use of local labourers and local contractors.	<ul style="list-style-type: none"> <li>Wherever possible labour, materials and services must be sourced locally.</li> </ul>	Ongoing	Authorisation holder

## 13 APPENDICES

### 13.1 Proposed Rescue And Relocation Plan For The Red Data Listed Plant Species, *Hypoxis Hemerocallidea* And *Boophone Disticha* Found On The Proposed Development Site

#### 13.1.1 General information

*Hypoxis hemerocallidea* falls within the botanical family Hypoxidaceae. The members of this family are fairly small to medium-sized herbaceous plants, with grass-like leaves and an invisible stem which is modified into a corm or rhizome (a rounded underground storage organ resembling a bulb). The flowers are borne on leafless shoots known as scrapes and are trimerous (arranged in whorls of three) and radically symmetric. The plant is easily recognizable by its yellow star-shaped flowers and strap-like leaves. *Hypoxis hemerocallidea* favours grassland, preferring full sunlight, although it is known to occur in other habitat types. The leaves of *Hypoxis hemerocallidea* are distinctly three-ranked and arching and are densely covered with hairs.

*Hypoxis hemerocallidea* is one of the most commonly used species in the traditional medicinal plant trade and is currently also used in primary health care as an immune booster for patients with HIV/AIDS. The rootstock is used in the treatment of urinary infections, heart weakness, internal tumours and nervous disorders. The plant is also currently used to alleviate many immune related ailments, such as colds, flu, arthritis tumours and cancers ([www.plantzafrica.com](http://www.plantzafrica.com)).

As *Hypoxis hemerocallidea* is a relatively hardy bulbous plant, with a shallow root structure, it is suitable for relocation to areas of similar habitat. A “rescue and relocation” plan is therefore proposed for these individuals. This is perceived to be a viable mitigation measure for ensuring the ongoing survival of this species in the area, as an area is already designated for conservation on the site.

*Boophone Disticha* falls within the botanical family Amaryllidaceae. This family consists mostly of bulbous plants, which occurs naturally throughout the tropics and warm temperate regions of the world. All Amaryllidaceae are perennials and apart from *Clivia*, *Cryptostephanus* and *Scadoxus*, which have rhizomes, the majority have bulbous storage organs. While growing, the bulb is kept sufficiently deep below ground by special roots that lengthen and contract. Most often the leaves are strap-shaped and smooth but occasionally they have unusual shapes, markings and coverings. Amaryllidaceae usually have numerous flowers held in an umbrella-like cluster at the end of a leafless stem, called a scape ([www.plantzafrica.com](http://www.plantzafrica.com)).

*Boophone disticha* is a deciduous bulbous plant with a thick covering of dry scales above the ground. The large, round heads have short stems and appear to grow directly from the bulb, almost at ground level. The colour of the flowers varies from shades of pink to red and are sweetly scented (July to Oct.). The pedicels (flower stalks) elongate after flowering to form a large seed-head. This breaks off at the top of the scape (stalk) and tumbles across the veld, dispersing the seed. The greyish-green leaves are erect, arranged in

a conspicuous fan and are usually produced after flowering. This spring-flowering species will flower even if it does not receive any water in winter ([www.plantzafrica.com](http://www.plantzafrica.com)).

*Boophone disticha* has many medicinal uses. Traditional healers use it to treat pain and wounds. Parts of the plant are used by certain African tribes and by some Europeans to cure various ailments: the outer covering of the bulb is applied to boils and abscesses; fresh leaves are used to stop bleeding of wounds ([www.plantzafrica.com](http://www.plantzafrica.com)).

The plant thrives in full sun in well-drained, sandy soil and in rocky areas. It should be planted in a protected area, although it can stand drought it does not like frost. The bulb should be planted in such a way that the neck and part of the bulb show above the ground. The plants seem to grow equally well in well-drained, sandy soil and in hard ground, but they take a long time to flower after being moved. The bulbs do not produce flowers until they are quite large ([www.plantzafrica.com](http://www.plantzafrica.com)).

The “rescue and relocation” plan must be undertaken prior to the onset of the construction phase of the development and must be completed by an appropriate service provider.

### 13.1.2 Proposed “Rescue and Relocation” Plan

#### 13.1.2.1 Step 1 – Service Provide to be Appointed

An appropriate service provider must be appointed to conduct and manage the operation.

#### 13.1.2.2 Step 2– Notification of the Department

An email entitled "request for medicinal plant rescue operation" must be sent to GOARD (Aibertina.Setsiba@gauteng.gov.za or Calvin.Johnas@gauteng.gov.za) within a minimum of six weeks prior to site clearance. The following documents must be attached to the email:

- A scanned version of the Environmental Authorisation (EA);
- A map clearly showing the location of the site;
- A plant species list on site; and
- The site layout plan, clearly indicating which areas are to be retained as natural open space.

The email should also indicate

- The size of the site;
- The contact details (telephone, fax and email) of the environmental control officer, who must make themselves available during rescue operations; and
- The contact details (telephone, fax and email) of the project proponent and/ or landowner.

#### **13.1.2.3 Step 3- Location of Species**

Each individual plant located outside the areas of medium ecological sensitivity needs to be located, correctly identified (*Hypoxis hemerocallidea* is sometimes confused with other species of *Hypoxis*, such as *Hypoxis iridifolia*) and marked, using a brightly coloured marker to ensure visual location later.

#### **13.1.2.4 Step 4 – Removal of Species**

To safely remove each individual plant, minimal damage to the corm must be ensured. The hole must be dug approximately 30 cm from the base of the plant and at least 30 cm deep to ensure minimal damage. Removal of the plant from its site should be done with care, pushing the plant up from the corm/rootstock. The plant should not be pulled from the soil using the leaves.

#### **13.1.2.5 Step 5 – Storage of Plants**

Once removed, the plants must be placed in appropriately sized propagating bags (dependent on each individual plant), utilising soil directly from the site. Should the soil prove to be of poor quality, organic fertilizer or compost must be added to the soil. These plants must be cared for until completion of the construction phase of the development. As these plants can tolerate moderate bouts of water stress, caution must be taken not to over-water or drown the individuals. Over-watering would also cause leeching of the soil, reducing nutrients available to the plants.

#### **13.1.2.6 Step 6 – Relocation within footprint**

Once the construction phase is complete, the plants must be relocated on the property. Plants can either be transferred to the existing *Hypoxis hemerocallidea/ Boophone disticha* community or may be incorporated into the cultivated gardens of the development. Should plants be transferred to the existing community, caution must be taken not to damage other species of plant in the area. Holes must be dug prior to transfer of plants and must be large enough to ensure plants do not become dislodged during heavy rainfall.

## 13.2 Aquatic Resources Rehabilitation Plan

### 13.3 Monitoring and Auditing Programme