

APPENDIX H: ENVIRONMENTAL MANAGEMENT PROGRAMME

Appendix H1: EMPr

1



DRAFT

**ENVIRONMENTAL
MANAGEMENT PROGRAMME**



ENVIRONMENTAL AND SOCIAL ADVISORY SERVICES

THE PROPOSED DEVELOPMENT OF A VILLAGE ESTATE FOR ABANDONED AND ORPHANED CHILDREN, DE DEUR, GAUTENG

REFERENCE GAUT: 002/19-20/E0045

ENVIRONMENTAL MANAGEMENT PROGRAMME

DRAFT

Prepared for:



Door of Hope Children's Mission
8 Copelia Avenue, Glenvista Ext 3
Johannesburg, 2091
South Africa

Prepared by:



CAPE TOWN
The Point, Suite 408, 4th Floor
76 Regent Road, Sea Point
Cape Town, 8060
South Africa

*Also in Grahamstown, East London, Johannesburg, Port
Elizabeth, Maputo (Mozambique) and Romsey (UK)*

www.cesnet.co.za

NOVEMBER 2019



REVISIONS TRACKING TABLE

CES Report Revision and Tracking Schedule

Document Title:	Environmental Management Programme: The proposed Development of a Village Estate for Abandoned and Orphaned Children, De Deur, Gauteng.		
Client Name & Address:	Door of Hope Children’s Mission		
Document Reference	GAUT: 002/19-20/E0045		
Status:	Draft Report		
Issue Date:	October 2019		
Lead Author:	Mr Roberto Almanza	CES	
Reviewer:	Ms Tarryn Martin	CES	
Study Leader/ Registered Environmental Assessment Practitioner – Approval:	Dr Ted Avis	CES	
Report Distribution	<i>Circulated to</i>	<i>No. of hard copies</i>	<i>No. electronic copies</i>
	Jeffrey Nel	0	1
	GDARD	2	1
	Biodiversity Sub-Directorate	1	1
	Municipal Library	1	0

This document has been prepared in accordance with the scope of CES’s appointment and contains intellectual property and proprietary information that is protected by copyright in favour of CES. The document may therefore not be reproduced, used or distributed to any third party without the prior written consent of CES. This document is prepared exclusively for use by CES’s client. CES accepts no liability for any use of this document other than by its client and only for the purposes for which it was prepared. No person other than the client may copy (in whole or in part), use or rely on the contents of this document, without the prior written permission of CES. The document is subject to all confidentiality, copyright, trade secrets rules and intellectual property law and practices of South Africa.





TABLE OF CONTENTS

1	INTRODUCTION	1
1.1	Design EMPr.....	1
1.2	Construction EMPr	2
1.3	Operational and Maintenance EMPr	2
2	CONTENTS OF THE EMPr.....	3
3	BACKGROUND INFORMATION	5
3.1	Project Description	5
3.1.1	<i>Location and Site Description</i>	<i>5</i>
3.1.2	<i>Project Concept</i>	<i>5</i>
3.1.3	<i>Detailed Description of the Proposed Development</i>	<i>6</i>
3.1.4	<i>Supporting Infrastructure</i>	<i>9</i>
3.1.5	<i>Phases of the Development Process</i>	<i>13</i>
3.2	The Environmental Policy	16
3.3	Environmental Objectives and Targets	17
3.4	Environmental Legislation and Guidelines	17
3.5	Details of EAP	18
4	IMPACT ASSESSMENT AND MITIGATION SUMMARY	19
4.1	Summary of the Impacts and Mitigation Measures Associated with the Development.....	19
5	ENVIRONMENTAL MANAGEMENT SYSTEM.....	31
5.1	Reporting.....	31
5.1.1	<i>Administration.....</i>	<i>31</i>
5.1.2	<i>Record keeping.....</i>	<i>31</i>
5.1.3	<i>Document control.....</i>	<i>32</i>
5.2	Construction phase	32
5.2.1	<i>Clearing of the Site</i>	<i>32</i>
5.2.2	<i>Excavation, hauling and placement.....</i>	<i>32</i>
5.2.3	<i>Construction Activities and Equipment.....</i>	<i>33</i>
5.2.4	<i>Good housekeeping.....</i>	<i>33</i>
5.2.5	<i>Solid waste management.....</i>	<i>33</i>
5.2.6	<i>Water use</i>	<i>33</i>
5.2.7	<i>Contaminated water.....</i>	<i>34</i>



5.2.8	<i>Hazardous substances</i>	34
5.2.9	<i>Cement and mixing of concrete</i>	34
5.2.10	<i>Fuel (petrol and diesel) and oil</i>	35
5.2.11	<i>Ablution facilities</i>	36
5.2.12	<i>Eating areas</i>	36
5.2.13	<i>Site structures</i>	36
5.2.14	<i>Lights</i>	37
5.2.15	<i>Noise</i>	37
5.2.16	<i>Dust Control</i>	37
5.2.17	<i>Environmental awareness training</i>	37
5.2.18	<i>Fire control</i>	38
5.2.19	<i>Emergency Procedures</i>	39
5.2.20	<i>Protection of natural features</i>	39
5.2.21	<i>Protection of flora and fauna</i>	40
5.2.22	<i>Protection of heritage features</i>	40
5.2.23	<i>Vegetation Clearance</i>	40
5.2.24	<i>Alien Vegetation Clearance</i>	41
5.2.25	<i>Revegetation</i>	41
5.2.26	<i>Topsoil</i>	41
5.2.27	<i>Stormwater Management</i>	42
5.2.28	<i>Erosion and sedimentation control</i>	42
5.2.29	<i>Aesthetics</i>	42
5.2.30	<i>Community relations</i>	42
5.3	Operation Phase	43
5.3.1	<i>Solid waste management</i>	43
5.3.2	<i>Water use</i>	43
5.3.3	<i>Contaminated water</i>	43
5.3.4	<i>Ablution facilities</i>	43
5.3.5	<i>Lights</i>	43
5.3.6	<i>Emergency procedures</i>	43
5.3.7	<i>Protection of natural features</i>	44
5.3.8	<i>Stormwater management</i>	44
6	ENVIRONMENTAL MANAGEMENT PROTOCOL	45
6.1	Roles and Responsibilities	45
6.1.1	<i>Applicant/Developer</i>	45
6.1.2	<i>Contractor</i>	45



6.1.3 *Environmental Control Officer* 45

6.2 Additional Mitigation Measures 46

6.2.1 *Pre-Construction*..... 46

6.2.2 *Construction Phase*..... 46

6.2.3 *Operational Phase* 46

7 ENVIRONMENTAL AWARENESS 47

8 CONCLUSION..... 48

ANNEXURE 1: METHOD STATEMENTS 49

ANNEXURE 2: BASIC ENVIRONMENTAL EDUCATION COURSE OUTLINE 52

ANNEXURE 3: DETAILS AND CVS OF THE PROJECT TEAM 56

ANNEXURE 4: SITE SENSITIVITY MAP 57

LIST OF TABLES

Table 2-1: Contents of an EMPr 3

Table 3-1: Water design criteria summary 11

Table 3-2: Sewerage design criteria summary. 12

Table 3-3: Proposed development per phase..... 14

LIST OF FIGURES

Figure 3-1: Project Location. 5

Figure 3-2: Proposed Site Development Plan. 8

Figure 3-3: Three-bedroom Housing Unit. 9

Figure 3-4: Package Plant Design..... 12

Figure 3-5: Proposed Regional Drainage Areas, Attenuation Ponds and Cut-off Channels. 15

Figure 3-6: Typical section through the attenuation pond outlet. 16



1 INTRODUCTION

An Environmental Management Programme (EMPr) must consist of a set of mitigation, monitoring and institutional measures to be taken during the implementation and operation of the proposed project to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels. The EMPr also details the actions needed to implement these measures.

An EMPr can be defined as, “*an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented; and that the positive benefits of the project are enhanced*”. The EMPr is an important tool used to ensure the sound environmental management of projects, provided the specifications are implemented and the user understands the contents of the report and the reasons for the implementation of certain specifications. The EMPr has the following objectives:

- To state standards and guidelines which are required to be achieved in terms of environmental legislation;
- To set out the mitigation measures and environmental specifications which are required to be implemented for all phases of the project in order to minimise the extent of environmental impacts, and to manage environmental impacts and where possible to improve the condition of the environment;
- To provide guidance regarding method statements which are required to be implemented to achieve the environmental specifications;
- To define corrective actions, this must be taken in the event of non-compliance with the specifications; and
- To prevent long-term or permanent environmental degradation.

There are four broad categories of EMPrs: Design EMPr, Construction EMPr, Operational EMPr and Decommissioning EMPr. The objectives of these EMPrs are all the same and include identifying the possible environmental impacts of the proposed activity and developing measures to minimise, mitigate and manage the negative impacts while enhancing the positive ones. The difference between these EMPrs is related to the different mitigation measures required for the different stages of the project life cycle. The proposed children’s village will not be decommissioned in the foreseeable future, and thus the decommissioning phase for this development is not assessed further in this report. Each remaining category of the EMPr is discussed in more detail below.

1.1 DESIGN EMPr

The Design EMPr is an integral component of the project life cycle and requires interaction between the developer (design engineers and/or contractors) and the environmental consultant to ensure that the developers are aware of the environmental constraints that must be considered and incorporated into the final design of the project. The format of this design EMPr is a checklist in nature to ensure that all specifications are included in the design phase. The design EMPr phase requires ongoing and in-depth discussions between the final design team and the environmental control officer (ECO). The developer will have to cost for, and be available for, ongoing discussions with the ECO at all stages of the final design. The majority of the work is undertaken at a desktop level and thus impacts are negligible and will not be discussed in further detail.



1.2 CONSTRUCTION EMPR

The Construction EMPr details the environmental management system/framework within which construction activities will be governed for the Construction Phase. The Construction EMPr consists of various actions, initiatives and systems that the contractor will have to ensure are in place and are undertaken. The Construction EMPr consists of both a management system and environmental specifications which contain detailed specifications that will need to be undertaken or adhered to by the contractor.

The Construction EMPr will need to be developed in parallel with the final design stages, and constructive input must be invited from the selected contractor. Sound environmental management is orientated around a pragmatic, unambiguous but enforceable set of guidelines and specifications, and for this reason it is imperative that the contractor, while being bound by the EMPr, fully understands it and has had input into its final development. For this reason the final construction EMPr will need to be signed off after input from the selected contractor prior to the initiation of construction activities. It should, however, be noted that the contractor must tender on the existing document and that in areas of uncertainty, a precautionary approach to the environmental guidelines and specifications must be adopted.

1.3 OPERATIONAL AND MAINTENANCE EMPR

The operational phase EMPr provides specific guidance related to operational activities associated with a particular development. Operational EMPrs are sometimes referred to as an Environmental Management System (EMS). Impacts during the operational phase of a development of this nature will be few in number and low in intensity. By taking pro-active measures during the construction phase, potential environmental impacts emanating during the operational phase will be minimised.

Monitoring of certain issues such as the success of vegetation re-establishment and erosion control will be required to continue during operation. The final Operational EMPr must be developed in conjunction with any other relevant stakeholders prior to the adoption thereof.



2 CONTENTS OF THE EMPr

The contents of the *Environmental Management Programme (EMPr)*, as it is defined the 2014 EIA Regulations published as Government Notice (GN) No R. 982 (amended in 2017 in GN R 326) in terms of Chapter 5 of the National Environmental Management Act (NEMA) (Act No. 107 of 1998, as amended) (Table 2.1 below).

Table 2-1: Contents of an EMPr

EMPr REQUIREMENTS ACCORDING TO APPENDIX 4 OF THE 2014 EIA REGULATIONS (AS AMENDED IN APRIL 2017)	SECTION OF REPORT
<i>An EMPr must comply with section 24N of the Act and include-</i>	
<i>a. Details of:</i>	Section 3.5 and Annexure 3
<i>i. the EAP who prepared the EMPr; and</i>	
<i>ii. the expertise of that EAP to prepare an EMPr, including a curriculum vitae.</i>	Annexure 3
<i>b. a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;</i>	Chapter 3
<i>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;</i>	Annexure 4
<i>d. a description of the impact management outcomes, 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>	
<i>i. Planning and design</i>	Chapter 4
<i>ii. Pre-construction activities</i>	
<i>iii. Construction activities</i>	
<i>iv. rehabilitation of the environment after construction and where applicable post closure; and</i>	
<i>v. where relevant, operation activities;</i>	
<i>f. description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraphs (d) will be achieved, and must, where applicable, include actions to -</i>	
<i>a. avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;</i>	Section 3.2 – Section 3.4 and Chapter 5
<i>b. comply with any prescribed environmental management standards or practices;</i>	
<i>c. comply with any applicable provisions of the Act regarding closure, where applicable; and</i>	
<i>d. comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;</i>	
<i>g. the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);</i>	Chapter 5 and Chapter 6
<i>h. the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);</i>	
<i>i. an indication of the persons who will be responsible for the implementation of the impact management actions;</i>	Chapter 6
<i>j. the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;</i>	



<p><i>k. the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);</i></p>	<p>Chapter 6</p>
<p><i>l. a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;</i></p>	<p>Chapter 6</p>
<p><i>m. an environmental awareness plan describing the manner in which-</i></p>	<p>Chapter 7</p>
<p><i>a. the applicant intends to inform his or her employees of any environmental risk which may result from their work; and</i></p>	
<p><i>b. risks must be dealt with in order to avoid pollution or the degradation of the environment; and</i></p>	<p>Nothing specified at this stage</p>
<p><i>n. any specific information that may be required by the competent authority.</i></p>	



3 BACKGROUND INFORMATION

3.1 PROJECT DESCRIPTION

3.1.1 Location and Site Description

The proposed site is located approximately 15 km south Johannesburg and 30 km north Vereeniging, on Portion 19 of the farm 332 Hartsenbergfontein in De Deur. The property is located within the Midvaal Local Municipality and Sedibeng District Municipality of the Gauteng Province (Figure 3-1). The site is mostly undeveloped and not in use. Although zoned as 'agricultural' no agricultural activities have taken place in recent years.



Figure 3-1: Project Location.

3.1.2 Project Concept

It is estimated that in South Africa there are currently over 2.5 million orphans (based on the Statistic SA 2018 General Household Survey and Mid-year population estimates). In Gauteng, it is estimated that 9.2% of the childhood population (i.e. 18 years old or younger) are orphans. Of this, approximately 1.7% or 78 817 children are “Double Orphaned” (i.e. a child whose



mother and father have both died). This value is increasing due to the rate of child abandonment rising and a significant drop in adoptions.

The Door of Hope currently operates three baby homes where babies enjoy the loving care of caregivers and volunteers. Two of the homes are based in Glenvista and one home in Berea. Door of Hope is affiliated with an adoption agency (Abba Specialist Adoption and Social Services) that facilitates their adoptions both in South Africa and other parts of the world. Not all babies are adopted due to parental involvement, special needs, illness or death. In the past 20 years Door of Hope has helped over 1 680 babies and has around 60 to 70 babies in care at any given time.

Door of Hope Children's Mission is a faith-based organisation (NGO, NPO) that wish to apply for environmental authorization to develop a private village estate for a possible 330 abandoned and orphaned children. Door of Hope aims to provide these children with a safe and loving home, either temporarily while awaiting adoption or permanently for those not adopted. Door of Hope has proposed 69 housing units (excluding the existing main dwelling). Most of these dwellings will be capable of housing six abandoned and orphan children, each with a house mother and or parents. Some of the dwellings will be used for staff families investing their lives into raising abandoned and orphan children on-site.

In doing so, the proposed development aims to addresses the South African Constitutional Right to have access to adequate housing and slightly reduces the resource burden on the state through ensuring private care of orphans. The Estate development will also create temporary and permanent job opportunities and aims to develop skills of the surrounding local community. The site development plan is shown below in Figure 3-2. This development plan illustrates the latest layout proposal.

3.1.3 Detailed Description of the Proposed Development

The detailed design of the proposed facility has been developed based on the abovementioned concept together with various refinements and revisions that have been made following specialist input and discussions with the applicant.

Of the 25.5 ha property, a minimum area of approximately 11.7 ha will remain unchanged as this constitutes a ridge, located in the southern part of the property, a drainage line, located in the middle of the property and a grave site, located in the north western part of the property. The remaining area (approximately 12.1 ha) will consist of the infrastructure mentioned below.

Residential Units

Two types of housing units are proposed, these include 59 three-bedroom units (approximately 170 m² each which includes the patios) and 10 two-bedroom units (approximately 124 m² which includes patios). Door of Hope will follow the guidelines in setting up the homes:

- Single-Parent family (Typically mothers) with up to 8 children total (6 vulnerable children living together with up to 2 biological children of the house mother).
- Two-Parent family (Mom and Dad) with up to 8 children total (6 vulnerable children living together with up to 2 biological children of the house parents).
- Investing family with 1 to 8 children total (1 to 6 vulnerable children together with 1 to 4 biological children of the investing family).
- Retirement People, preferably couples with no children at home.



The following numbers will be used in our planning which is the maximum number of children in a home:

Home Type	No. of Homes	Orphaned Children	Biological Children	Adults
Single and/ or two parent family	40	240	80	60
Investing family	30	90	90	60
Retirement people	Included under Investing family but no children in homes			
Totals	70	330	170	120

The walls of each house will be constructed of stumbebloc and/ or conventional brick and will be plastered and painted. Chromodek IBR roof sheeting will be used for the roofs. It has been proposed that general ‘green building principles’ will apply to all construction that will take place within the property. This includes the use of solar panels, thermosyphon solar geysers, rain water harvesting tanks, gas stoves, LED lighting and the use of building materials that require less maintenance.

The design of the buildings will also incorporate natural cross-ventilation (to minimise the need for mechanical ventilation), optimisation of sun exposure and the use of natural light.

Other Infrastructure

In addition to the 69 dwellings, the project will involve the construction and operation of the following:

- Administrative Offices;
- A school to cater for a maximum of 375 - 400 children. The school will only cater for the children who live on site and will receive the children from the ECD and will continue through to Grade 12;
- A baby house to cater for the care of 50-60 babies at any one time. This will be a single facility where children under the age of 2 can be cared for;
- An Early Childhood Development (ECD) Centre to cater for a maximum of 100 - 125 children. This is to ensure that toddlers and pre-school children are looked after while their guardians/house parents are not at home;
- Sports facilities including two grassed large fields, six hard courts and two fenced swimming pools. Certain recreational areas will be lit at night, preferably using solar flood lights and only when used.
- Two recreational centers;
- A library;
- A Dining hall;
- A Medical Centre;
- Therapy Offices;
- Storage facilities.;
- Outdoor gym and / or indoor gym (within the recreation center or school precinct) only for staff and residents;
- A multipurpose hall / church/ recreational facility;
- Maintenance workshops and storerooms; and
- Green spaces (subsistence farming gardens, orchards and food forests).

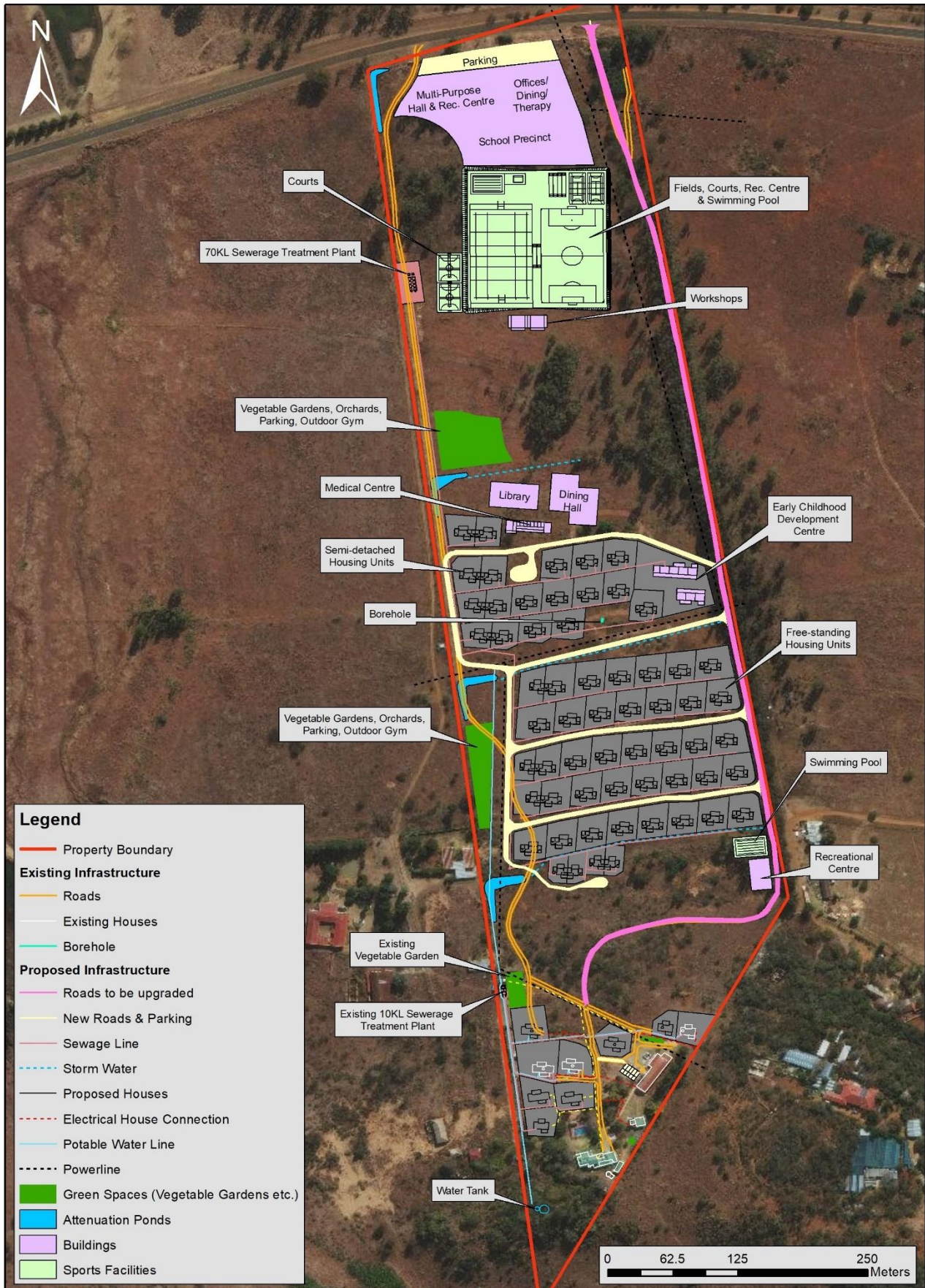


Figure 3-2: Proposed Site Development Plan.



Figure 3-3: Three-bedroom Housing Unit.

3.1.4 Supporting Infrastructure

Access Roads and Parking

The development can be accessed via Aloe Ridge Drive (D1781) which is an existing tarred road and is in good condition. A dirt road, running along the fence line on the western border of the site, currently connects Aloe Ridge Drive and the development site. However, an existing dirt road which runs primarily along the eastern border will eventually be upgraded and used as the main access road.

The main point of vehicle access to the site will be taken from Aloe Ridge Drive. A single entrance will be sufficient and is advisable for safety and security reasons. Currently a single lane entrance exists towards the north western corner of the property. However, double lane entrance will be constructed on the north eastern corner where the proposed upgraded road will meet Aloe Ridge Drive. This access point will be upgraded to a formal Gautrans Intersection. The design of the intersection is subject to approval of a Section (7) application from the Gauteng Department of Roads & Transport. This upgrade will cater for the increased number of cars and resultant traffic that can be expected during the operational phase of the facility. At capacity it is expected that 45-70 vehicles belonging to residents will be stationed on-site, with approximately 50-70 personnel vehicles entering and leaving the facility each weekday. With the reality of so many children on-site, all necessary traffic safety guidelines and design standards be adhered to. Designs will be aimed at keeping speeds below 40km/h.

All internal roads will be designed according to the Guidelines for Human Settlement Planning and Design (Red Book). The classification of roads for traffic flow inside the development are as follows:

Description	Roadway Width
Main Entrance Road	5.5 m
Distributing Loop Road	4.5 m
Individual Access Road (Serving up to 6 units)	3.0 m



The proposed pavement designs are based on anticipated traffic volumes and ground conditions. The design life of the proposed pavement is 20 years on provision that repairs to the surface will be necessary in order to maintain its skid resistance and impermeability. The following pavement design is proposed:

- **Surfacing:** 60 mm thick interlocking paving bricks unless a concrete road is sponsored.
- **Sub base:** 150 mm thick stabilised natural gravel compacted to 95 % of modified AASHTO density. Minimum UCS = 750 kPa at 100 % of modified AASHTO density – C4.
- **Upper selected sub grade:** 150 mm thick natural gravel compacted to 93 % of modified AASHTO density. Minimum CBR = 15 at 93 % of modified AASHTO density – G7 (in-situ or imported).
- **Fill (where required):** 150 mm thick layers compacted to 90 % of modified AASHTO density. Minimum CBR = 3 at 93 % of modified AASHTO density – G10.
- **Roadbed:** 150 mm thick layers compacted to 90 % of modified AASHTO density. Minimum CBR = 3 at 93 % of modified AASHTO density – G10.

Most housing units will have two parking bays for its residents (i.e. the house parents). Additional parking areas will be constructed near the entrance in the northern part of the property adjacent to the proposed school and offices. There will be space for at least 120 (min. SANS standard) parking bays which will be sufficient when taking parking regulations into account for schooling and offices. Some staff will also live on site which will then free up parking areas at the school and offices. The parking would be either 60 mm interlocking pavers or permeable eco paving.

Energy Sources

It is planned that the village estate will use both municipal electricity and solar energy for electricity generation. Solar energy generation will be incorporated into the design of the residential units and will include solar geysers. The generating capacity will however remain low, and additional energy will be sourced from the existing grid. Gas stoves will also be incorporated into the design of the residential units.

The current electricity point, is on a 25kVA transformer, meaning the 3-phase supply is providing 40 Amp's per phase. It is suggested that the applicant should apply for an upgrade to a 32 or 50 kVA transformer, which supplies 80 Amp's per phase.

Water Supply & Reticulation

No formal municipal bulk water infrastructure exists, nor could be found in the near vicinity of the proposed development. Water will be supplied from the existing borehole on site. An existing borehole can provide a constant daily supply of 10.5kl/hour/day, resulting in a constant daily supply of 252kl/day which can accommodate the proposed development's water demand. The water quality falls within the minimum standards of the South African National Drinking Water Standards (SANS 241:2015).

A new water tank will be installed at the highest point of the proposed development and smaller tanks at each unit. The water tank will provide a 48-hour storage capacity for the whole development, which amounts to a minimum size of 200m³. The storage capacity of the tank may be reduced because of the smaller 5 000 liter tanks will catch rainwater to be used in toilets and laundry.



In the proposed system, the raw sewage is introduced into a series of tanks, where it is contacted with air, blown into the tanks by means of a special blower so that the natural aerobic bacteria break down the sewage.

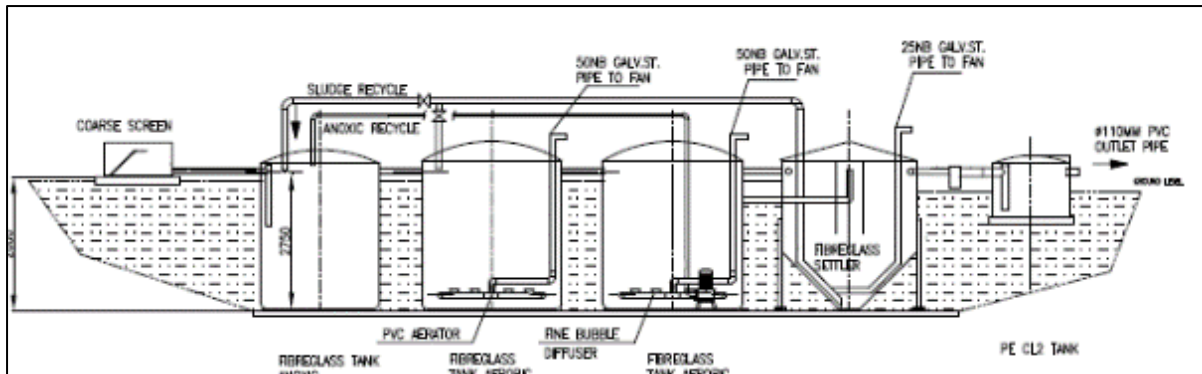


Figure 3-4: Package Plant Design.

In addition to the normal installation of this plant, it will be installed below Natural Ground Level (NGL) in an open reinforced concrete bunker. This open bunker will be constructed with a sloped floor to detect any sewerage leakages and spillage materials can be emptied with a “honey sucker” from a low point sump. The effluent water from the treatment plant is of agricultural quality and will be used for irrigation of the sports fields and gardens. The external and internal sewer drainage network will be designed to operate as a gravity system, by computer assisted “pipe-maker” and “model-maker” programs or equivalent. The design will be based the table below.

Table 3-2: Sewerage design criteria summary.

Design Standards																	
1	Sewerage outflow per day	<74.049 kl/day															
2	Peak factor	2.5															
3	Sewer capacity	Pipes Shall be designed to run at 70% full, measured in terms of flow depth															
4	Provision of stormwater infiltration	15%															
5	Flow formula	Manning n = 0.013															
6	Minimum velocities in sewers	0.75 m/s at full flow															
7	Minimum pipe size for reticulation	145 mm internal diameter															
8	Minimum gradients	<table border="1"> <thead> <tr> <th>Nominal o (mm)</th> <th>Minimum grade with depth of flow = 1/5 D and V = 0.6m/s</th> <th>Minimum grade with depth of flow = 1/2 D and V = 0.82m/s</th> </tr> </thead> <tbody> <tr> <td>160</td> <td>1/80</td> <td>1/100</td> </tr> <tr> <td>200</td> <td>1/120</td> <td>1/200</td> </tr> <tr> <td>250</td> <td>1/160</td> <td>1/240</td> </tr> <tr> <td>300</td> <td>1/200</td> <td>1/300</td> </tr> </tbody> </table>	Nominal o (mm)	Minimum grade with depth of flow = 1/5 D and V = 0.6m/s	Minimum grade with depth of flow = 1/2 D and V = 0.82m/s	160	1/80	1/100	200	1/120	1/200	250	1/160	1/240	300	1/200	1/300
Nominal o (mm)	Minimum grade with depth of flow = 1/5 D and V = 0.6m/s	Minimum grade with depth of flow = 1/2 D and V = 0.82m/s															
160	1/80	1/100															
200	1/120	1/200															
250	1/160	1/240															
300	1/200	1/300															
9	Fall through manholes	80 mm															
10	Depth of sewer <ul style="list-style-type: none"> In mid-blocks In street reserves 	1.2m depth to invert 1.5m depth to invert															
11	Maximum manhole spacing	110m															
12	Placement of sewers in road reserve	1m from erf boundary on high side of street															
13	Placement of sewer inside midblock	1m from boundary															
14	Dolomitic risk category	None															
15	Pipe material	uPVC															



	<ul style="list-style-type: none"> • Type • Class • Supply Lengths • Joints 	Class 400 12 m minimum uPVC
16	Sewer manholes	Concrete Manhole rings with steps

The internal sewer network would consist of 160mm diameter uPVC pipes and concrete manholes with a minimum diameter of 1m.

Stormwater Infrastructure

No existing stormwater systems are available on the development site. A drainage line transects the centre of the site and connects to a natural water stream channel located approximately 350m west of the proposed development. This stream flows in a northerly direction, crossing Aloe Ridge Drive through a culvert.

Based on pre- and post-construction stormwater run-off calculations, attenuation structures are required to ensure pre-development run-off discharge into the open veld west of the development. Due to the large area of the proposed development, the property has been divided into 4 defined regional drainage areas (RDA) and a stormwater attenuation structure has been proposed for each one.

All Regional Drainage Areas will drain towards the western boundary of the development via overland flow. A stormwater cut-off channel will be installed on each of the RDA’s northern boundary to channel the stormwater from each RDA to its respective attenuation pond. The internal stormwater network for each RDA will consist of a series of overland flow, ground channels and piped road crossings.

For each RDA the attenuated stormwater for the 1:5 and 1:25 year flood occurrence will be discharged through energy breaking structures into the open veld west of the development and flow in the form of sheet flow into the existing natural stream. The 1:50 year flood will discharge through an overflow structure, with energy breaking structures at the bottom, and flow in the form of sheet flow to the existing natural water stream.

The proposed attenuation structures will be constructed according to the attenuation parameters provided in Services Report for Roads and Stormwater, with an outlet culvert sized to attenuate the 1:5 and 1:25 year floods for each RDA. According to the parameters provided an overflow spillway would be provided to allow for the 1:50 year flood through the dam.

3.1.5 Phases of the Development Process

The most important facilities to be upgraded/developed would be the infrastructure as per phase 1. The project development plan is divided into five phases and is developed in terms of the urgency of the infrastructure required.

The development is dependent on funding which is received on an ongoing basis from various types of donations, both local and international. Project funding will be sourced and applied for to complete certain areas within these timeframes or sooner. At this time, it is projected that the full development could take up to 20 years to complete. The phases in the table will be rolled out on a continual basis and should take between 2 – 4 years each.



Table 3-3: Proposed development per phase.

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Infrastructure	<p>Bulk supply and earthworks: Sewage pipelines, water pipelines & Electricity upgrade</p> <p>35 KL Sewage Treatment Plant</p> <p>Primary 5.5m road</p> <p>Electrical reticulation for new buildings</p> <p>Secondary roads for new buildings</p>	<p>Attenuation ponds</p> <p>Electrical reticulation for new buildings</p> <p>Secondary roads for new buildings</p>	<p>Attenuation ponds</p> <p>35 KL Sewage Treatment Plant</p> <p>Electrical reticulation for new buildings</p> <p>Secondary roads for new buildings</p>	<p>Electrical reticulation for new buildings</p> <p>Secondary roads for new buildings</p>	<p>Electrical reticulation for new buildings</p> <p>Secondary roads for new buildings</p>
Facilities & Communal Areas	<p>Large dining hall</p> <p>Food Gardens</p>	<p>Medical clinic</p>	<p>Therapy offices</p>	<p>Administrative offices</p>	<p>Storage facilities</p> <p>Gym</p>
Schooling	<p>Early Childhood Development Centre</p>	<p>Junior School Phase</p> <p>Recreational centre</p>	<p>Intermediate School Phase</p> <p>Fields, Courts, Recreational centre, pools</p> <p>Maintenance workshops</p>	<p>Senior School Phase</p> <p>Multipurpose Hall</p>	<p>Library</p>
Residential	<p>Residential Units 01 - 14</p>	<p>Residential Units 15 - 28</p>	<p>Residential Units 29 - 42</p>	<p>Residential Units 43 - 56</p>	<p>Residential Units 57 - 69</p>

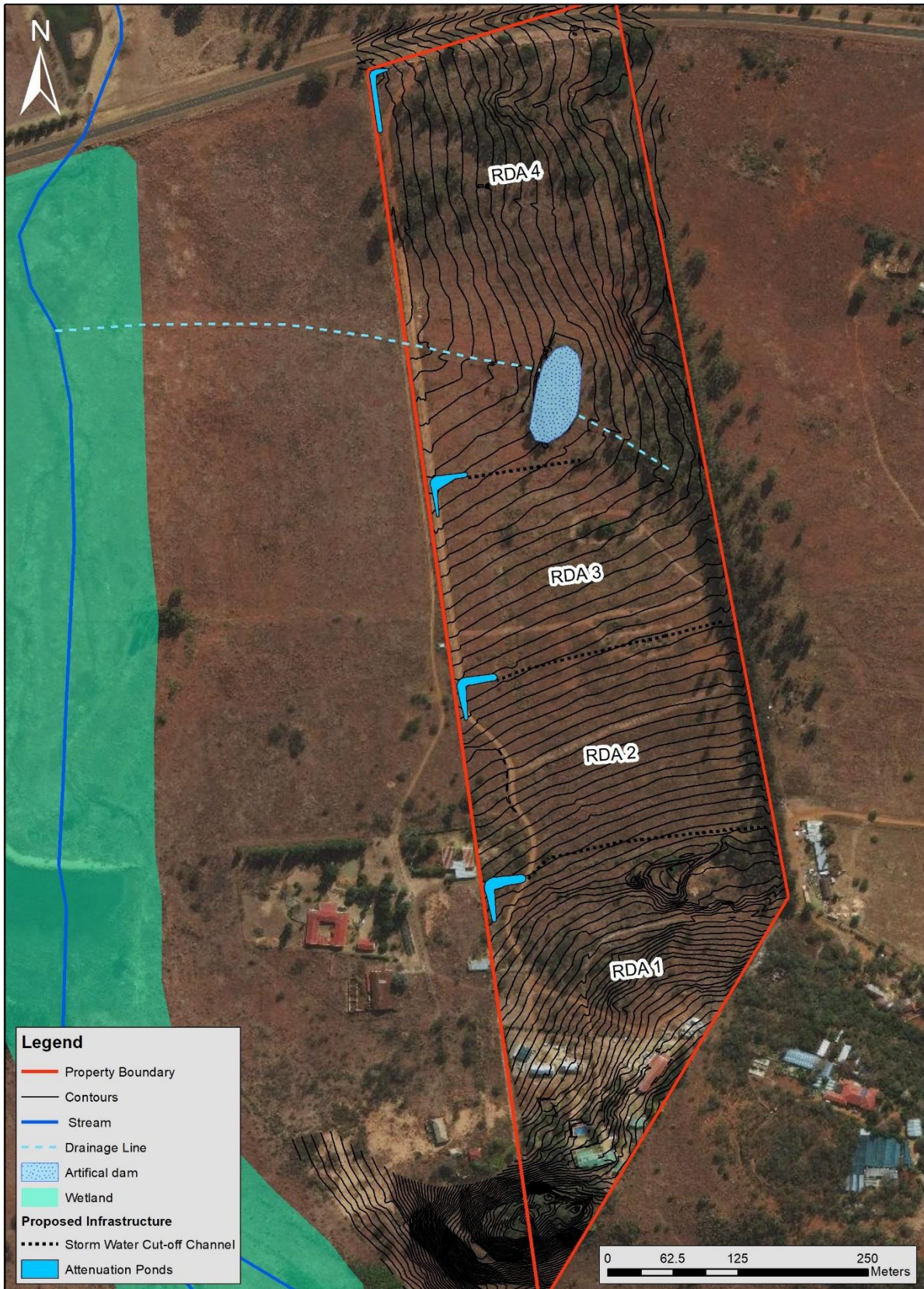


Figure 3-5: Proposed Regional Drainage Areas, Attenuation Ponds and Cut-off Channels.

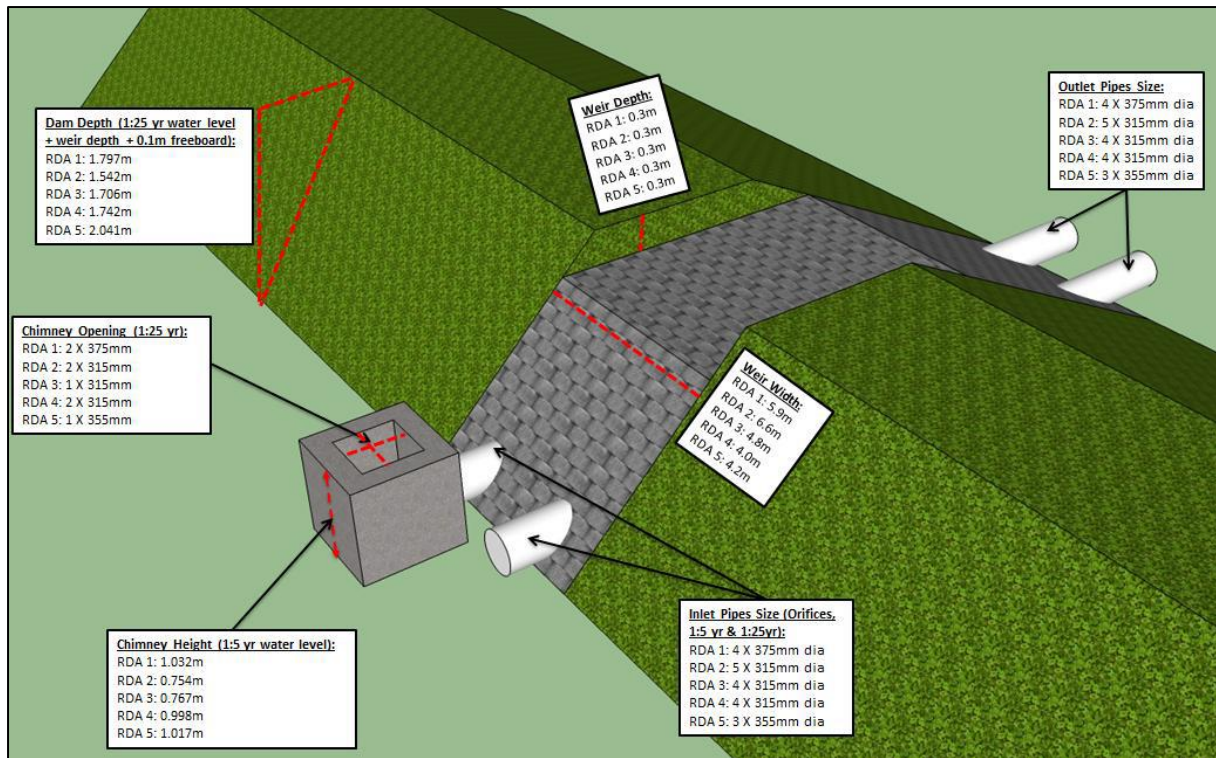


Figure 3-6: Typical section through the attenuation pond outlet.

3.2 THE ENVIRONMENTAL POLICY

The contractor is required to compile an Environmental Management Policy, which must consider the following:

- The contractor's mission, vision and core values;
- Guiding principles;
- Requirements of, and communication with I&APs;
- The environmental specifications and intentions of the specifications must be upheld;
- The need to work towards continual improvement;
- The obligation to prevent pollution and ecological degradation;
- The importance of coordination with other organisational policies (e.g. quality, occupational health and safety, etc.);
- Site activities will be conducted in a manner that does not create a nuisance, risk or hazard to the natural environment;
- Reference to specific local and/or regional conditions;
- Employee and public health and safety must be considered a priority; and
- A commitment to compliance with relevant environmental laws, regulations, by-laws and other criteria to which the contractor subscribes.

The contractor¹ is required to be familiar with the environmental policy (to be developed by the applicant) and all that it implies, and to adopt and implement the policy throughout the course of construction. The policy must be communicated to all employees and contractors (and sub-contractors of the contractor), and made available to the public, if requested.

¹ A contractor is defined as principal contractor, sub-contractors and any employees retained on this project.



3.3 ENVIRONMENTAL OBJECTIVES AND TARGETS

To meet the commitments detailed within the Environmental Management Policy, as well as those included within the environmental specifications of this EMP, the contractor shall develop environmental objectives and targets. The objectives and targets must conform to, and comply with, the following criteria:

- The objectives and targets shall constitute the overall goals for environmental performance identified in the environmental policy and strategy;
- When establishing objectives and targets, the contractor shall take into account the identified environmental aspects and associated environmental impacts, as well as the relevant findings from environmental reviews and/or audits;
- The targets must be set to achieve objectives within a specified timeframe;
- Targets must be specific and measurable;
- When the objectives and targets are set, the contractor must establish measurable Key Performance Indicators (KPIs). The latter will be used by the contractor as the basis for an Environmental Performance Evaluation System, and can provide information on both the environmental management and the operational systems. Objectives and targets need to apply broadly across the contractor's operations, as well as to site-specific and individual activities; and
- Objectives and targets must be reviewed from time to time in view of changed operational circumstances and/or changes in environmental legal requirements, and need to take into consideration the views of the I&APs.

3.4 ENVIRONMENTAL LEGISLATION AND GUIDELINES

The contractor must ensure that all South African legislation concerning the natural environment, pollution and the built environment is strictly enforced. Such legislation must include, but is not limited to the:

- The Constitution of the Republic of South Africa Act No. 108 of 1996;
- National Environmental Management Act No. 107 of 1998 as amended;
- National Heritage Resources Act, No 25 of 1999;
- National Environmental Management: Biodiversity Act 10 of 2004;
- National Environmental Management: Waste Management Act 59 of 2008;
- National Environmental Management: Air Quality Act 39 of 2004;
- The Environment Conservation Act No 73 of 1989;
- National Water Act, No 36 of 1998;
- National Forest Act, No 84 of 1998;
- Occupational Health and Safety Act 85 of 1993;
- Hazardous Substances Act No. 15 of 1973;
- National Environmental Management: Biodiversity Act, 2004 (Act no. 10 of 2004) – Alien and Invasive Species (AIS) Regulations; and
- All relevant provincial legislation, Municipal by-laws and ordinances.



3.5 DETAILS OF EAP

EAP: Dr Ted Avis

Company: CES

Contact Person: Mr Michael Johnson

Address: Block C, The Estuaries, Oxbow Crescent, Century City, Cape Town

Telephone: +27 21 045 0900

Fax: +27 46 622 6564

Website: www.cesnet.co.za

Email: m.johnson@cesnet.co.za

Please refer to Annexure 3 for the Curricula Vitae of the EAP and the project team.



4 IMPACT ASSESSMENT AND MITIGATION SUMMARY

This section provides an assessment of the pre-mitigation significance as well as the post-mitigation significance of the social and environmental impacts that may result from the major activities associated with the development.

4.1 SUMMARY OF THE IMPACTS AND MITIGATION MEASURES ASSOCIATED WITH THE DEVELOPMENT

The tables below show the significance of the impacts before and after mitigation is taken into account together with mitigation measures for each impact:

THEME	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
PLANNING & DESIGN PHASE				
GENERAL IMPACTS				
Compliance with relevant environmental legislation and policy	During the planning and design phase failure to comply with existing policies and legal obligations could lead to the project conflicting with local, provincial and national policies, legislation etc. This could result in legal non-compliance, fines, overall project failure or delays in construction activity and undue disturbance to the natural environment.	HIGH NEGATIVE	<ul style="list-style-type: none"> During the planning and design phase all relevant legislation and policy must be consulted and the proponent must ensure that the project is compliant with such legislation and policy. These should include (but are not restricted to): NEMA, Local and District Spatial Development Frameworks, Gauteng Conservation Plan (C-Plan), Local Municipal bylaws. All relevant permits and authorization must be in place prior to commencement of construction. 	LOW NEGATIVE
Sanitation	During the planning and design phase incorrect selection of technology could result in sewage infrastructure failure and the contamination of ground water, surface water and the wetland on the neighboring property.	HIGH NEGATIVE	<ul style="list-style-type: none"> During the planning and design phase appropriate technology that meets approved technical standards (SABS) should be selected. The sewage pipelines must be tested for defects and leakages before any trenches are closed. 	LOW NEGATIVE
Waste Management	During the planning and design phase failure to plan for the storage, handling and disposal of waste may lead to litter, pollution of the environment, unsanitary conditions and health risks.	MODERATE NEGATIVE	<ul style="list-style-type: none"> During the planning and design phase, a proper waste management plan for handling onsite waste must be designed. An appropriate area where waste can be stored before disposal (including recycling storage and sorting area) must be identified. The temporary storage facility/service yard must comply with the Norms and Standards for the Storage of Waste (2013). 	LOW NEGATIVE



THEME	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
Visual	During the planning and design phase inappropriate architectural design may lead to visual and aesthetic impacts.	MODERATE NEGATIVE	<ul style="list-style-type: none"> Vegetation should be considered in the design to mitigate visual impacts. 	LOW NEGATIVE
Traffic	During the planning and design phase inadequate planning for increased traffic entering the development could result in traffic congestion on the Aloe Ridge road during the construction and operation phase.	MODERATE NEGATIVE	<ul style="list-style-type: none"> During the planning and design phase appropriate planning should take place for the increased traffic to the development during the construction and operation phase, including traffic calming measures and relevant traffic safety measures (flagmen and temporary speed bumps during the construction phase). 	LOW NEGATIVE
AQUATIC & WETLAND IMPACTS				
Legal and policy compliance	During the planning and design phase non-compliance with the legal requirements and policies of South Africa that pertain to the aquatic environment and could later lead to damage to the aquatic environment may cause unnecessary delays in construction activities and potentially timely criminal cases, based on the severity of the non-compliance, being brought against the proponent and contractors.	MODERATE NEGATIVE	<ul style="list-style-type: none"> All legal matters pertaining to DWS permitting must be completed prior to any construction activity. <ul style="list-style-type: none"> In particular, all necessary Water Use Licenses must be in order for any of the following activities: <ul style="list-style-type: none"> Construction activities within the 1:100 year floodline, (or within 100 m of a watercourse) and within 500 m of a wetland or where infrastructure will traverse rivers or drainage lines (if applicable). Abstraction permit should boreholes be used for water supply for the development. 	LOW NEGATIVE
Scheduling of construction	During the planning and design phase inappropriate construction scheduling that does not take into account the seasonal requirements of the aquatic environment, e.g. allowing for unimpeded flood events, could lead to short-term (and potentially long-term) impacts on the aquatic environment such as excessive sediment mobilization, etc.	MODERATE NEGATIVE	<ul style="list-style-type: none"> Wherever possible, construction activities should be undertaken during the driest part of the year to minimize downstream sedimentation due to excavation, etc. When not possible, suitable stream diversion structures must be used to ensure the river is not negatively impacted by construction activity. 	LOW NEGATIVE
Stormwater management	During the planning and design phase the inappropriate design of stormwater structures and associated infrastructure may result in increased levels of erosion, sedimentation and pollution of the watercourses.	MODERATE NEGATIVE	<ul style="list-style-type: none"> During the planning and design phase appropriate stormwater structures must be designed to minimise erosion and sedimentation of watercourses, eg. cut-off drains. Pervious surfaces should be used for the parking lot, roads and footpaths where possible to promote infiltration and reduce concentrated runoff from hard surfaces. 	LOW NEGATIVE
Invasion of alien species	During the planning and design phase, failure to plan for the removal and management of alien vegetation could result in the invasion of alien vegetation in riparian and wetland areas during the construction and operation phase. This would have an adverse impact on the aquatic ecosystem.	MODERATE NEGATIVE	<ul style="list-style-type: none"> During the planning and design phase a Rehabilitation and Alien Vegetation Management Plan must be designed to reduce the establishment and spread of undesirable alien plant species. 	LOW NEGATIVE



THEME	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
ARCHAEOLOGICAL IMPACTS				
Potential damage to historical period feature	During the planning and design phase failure to plan for historical period feature Exigo-DOH-HP01 could result in the damage or permanent loss thereof	LOW NEGATIVE	<ul style="list-style-type: none"> Heritage site management plan. 	LOW NEGATIVE
Potential damage to burial sites	During the planning and design phase failure to plan for burial sites Exigo-DOH-BP01 could result in the damage or permanent loss thereof	LOW NEGATIVE	<ul style="list-style-type: none"> Heritage site management plan. 	LOW NEGATIVE

THEME	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
CONSTRUCTION PHASE				
GENERAL IMPACTS				
Compliance with relevant environmental legislation and policy	During the construction phase failure of the contractor to implement mitigation measures specified in the EMPr and EA as well as obtaining the relevant plant/tree removal permits from GDARD or DAFF could result in fines, overall project failure or delays in construction and undue disturbance to the natural environment.	HIGH NEGATIVE	<ul style="list-style-type: none"> During the construction phase the developer must employ an independent Environmental Control Officer (ECO) for the duration of the construction phase to audit the contractor's compliance with the specifications in the EA, EMPr and any other additional permits/authorisations. Do not commence construction until positive Environmental authorization has been received. 	LOW NEGATIVE
Stormwater management	During the construction phase, failure to implement effective stormwater management measures may lead to an increase in surface soil erosion and the contamination of stormwater and surrounding watercourses.	MODERATE NEGATIVE	<ul style="list-style-type: none"> During the construction phase, berms and swales must be placed in areas that may be prone to erosion. Temporary cut-off drains and berms may be required to capture storm water and promote infiltration. The construction site must be managed in a manner that prevents pollution to downstream watercourses or groundwater, due to suspended solids, silt or chemical pollutants. The project area must be monitored by an ECO on a regular basis during construction. Bare soil, as a result of vegetation clearing, should not be exposed for extended periods of time. 	LOW NEGATIVE
Sanitation	During the construction phase the lack of sufficient sanitation facilities and the inappropriate siting and servicing of the sanitation facilities could result in contamination of surface and ground water.	MODERATE NEGATIVE	<ul style="list-style-type: none"> During the construction phase adequate sanitary facilities must be provided for construction workers. The facilities must be regularly serviced to reduce the risk of surface or groundwater pollution. Sanitation facilities must not be located within 50 metres of any watercourse. 	LOW NEGATIVE



THEME	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
Waste Management	During the construction phase, littering on site may attract vermin, detract from the visual appeal of the area and pollute the surrounding areas.	MODERATE NEGATIVE	<ul style="list-style-type: none"> During the construction phase, a proper waste management plan for handling onsite waste must be implemented. There must be sufficient waste bins provided throughout the construction site for collecting waste. No waste must be buried or burned on site. The temporary storage facility/service yard must comply with the Norms and Standards for the Storage of Waste (2013). 	LOW NEGATIVE
Hazardous substances	During the construction phase, spillages of hazardous substances (such as used oils, paint, diesel etc.) may result in pollution of the surrounding environment including surface and groundwater resources.	MODERATE NEGATIVE	<ul style="list-style-type: none"> During the construction phase all oils, fuel and other maintenance equipment and supplies must be stored in a secure area with a bunded compacted surface. Maintenance of vehicles or machinery should not take place within 50 m of any watercourse and drip trays must be used. Spill kits must be kept on-site and maintained and utilized to clean up spills of hazardous substances. The spills of hazardous substances must be disposed of at a suitable waste disposal site and records kept. Cement and concrete must only be mixed in designated areas and on an impermeable surface. No concrete mixing must take place within 32 m of any watercourse. 	LOW NEGATIVE
Ecological Environment	<p>Degradation of topsoil</p> <p>Incorrect handling of topsoil could negatively affect the seed bank, inhibiting regrowth during rehabilitation.</p>	MODERATE NEGATIVE	<ul style="list-style-type: none"> Separate topsoil from subsoil during stockpiling. The first 150-200mm of soil is generally classified as topsoil. This must be removed and stockpiled separately to the remaining subsoil. Landscape the impacted areas with 150-200mm of topsoil on top of subsoil during rehabilitation. Topsoil must not be stockpiled higher than 2m or for longer than 1 year. 	LOW NEGATIVE
	<p>Ineffective Rehabilitation of Disturbed Areas</p> <p>During the construction phase ineffective rehabilitation of disturbed areas may lead to the permanent degradation of ecosystems as well as allow alien vegetation species to spread.</p>	MODERATE NEGATIVE	<ul style="list-style-type: none"> All impacted areas must be rehabilitated with species indigenous to the area. Only topsoil from the immediate area must be used for rehabilitation. All impacted areas must be restored as per the Rehabilitation Management Plan. 	LOW NEGATIVE
Visual	During the construction phase construction activity and the presence and use of large machinery on site and along access roads will result in a visual disturbance of the surrounding landscape.	MODERATE NEGATIVE	<ul style="list-style-type: none"> All construction activity should take place during daylight working hours (i.e. 7 – 5pm). All construction activity and equipment must be limited to the demarcated areas. 	LOW NEGATIVE



THEME	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
Air quality and dust control	During the construction phase dust generated from construction activities could be a nuisance during windy conditions.	MODERATE NEGATIVE	<ul style="list-style-type: none"> • During windy periods un-surfaced and un-vegetated areas should be dampened down. • Vegetation should be retained where possible as this will reduce dust travel. • Excavations and other clearing activities must only take place during agreed working times and permitting weather conditions to avoid drifting of sand and dust into neighbouring areas. • Any complaints or claims emanating from dust issues must be attended to immediately. 	LOW NEGATIVE
Noise pollution	During the construction phase construction activity and movement of heavy vehicles could result in an increase in ambient noise levels and become a nuisance for surrounding residents.	MODERATE NEGATIVE	<ul style="list-style-type: none"> • During construction, activities which include the movement of construction vehicles and the operation of machinery should be restricted to normal working hours (07:00am – 17:00pm). • There must be a complaints register on site for nearby residents to make complaints. These must be addressed and recorded. 	LOW NEGATIVE
Traffic	During the construction phase the transportation of construction equipment and increase in the use of the servitude road by heavy vehicles may lead to traffic congestion and road degradation.	MODERATE NEGATIVE	<ul style="list-style-type: none"> • During the construction phase local residents should be made aware of the presence of construction vehicles by making use of high-visibility signage. • Whenever possible, construction vehicles should be limited to low-volume periods. • Road condition should be recorded prior to construction vehicles making use of the roads and any damage caused by construction vehicles should be repaired immediately. • All traffic safety (flagmen) and traffic calming measures should be in place where traffic enters the main road. 	LOW NEGATIVE
On-site fire risk	During the construction phase, inadequate attention to fire safety awareness and available fire safety equipment could result in uncontrolled fires, posing a threat to animals, vegetation and the surrounding landowners.	HIGH NEGATIVE	<ul style="list-style-type: none"> • During the construction phase, in order to reduce the risk of fires: 	LOW NEGATIVE



THEME	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
			<ul style="list-style-type: none"> ➤ All flammable substances must be stored in dry areas which do not pose an ignition risk to the flammable substances. ➤ Smoking must not be permitted near flammable substances. ➤ All cooking must be done in demarcated areas with a low fire risk. ➤ No open fires will be allowed on site, unless in a demarcated area. ➤ The construction personnel must be educated regarding fires and fire management. ➤ Fire extinguishers must be available onsite. 	
Socio-economic	During the construction phase temporary job opportunities will be created.	LOW POSITIVE	<ul style="list-style-type: none"> • To optimize the benefit associated a labour policy should be put in place to ensure that the local people benefit as much as possible. 	MODERATE POSITIVE
	During the construction phase materials may be sourced from local businesses and this will result in a boost of the local economy of the immediate vicinity and surrounding areas.	MODERATE POSITIVE	<ul style="list-style-type: none"> • It is recommended that to optimize the benefit a procurement policy should be put in place to ensure that the local people and businesses benefit as much as possible. 	MODERATE POSITIVE
	During the construction phase the increased number of laborers in the area could result in an increase in security risks.	MODERATE NEGATIVE	<ul style="list-style-type: none"> • During the construction phase access to the site must be controlled to ensure no unauthorised people enter the premises. 	LOW NEGATIVE
AQUATIC & WETLAND IMPACTS				
Legal and policy compliance	During the construction phase non-compliance with the legal requirements and policies of South Africa as they pertain to the aquatic environment could lead to damage to the aquatic environment, unnecessary delays in construction activities, and potentially criminal cases, based on the severity of the non-compliance, being brought against the proponent and his/her contractors.	MODERATE NEGATIVE	<ul style="list-style-type: none"> • All construction related conditions in the Environmental Authorisation must be adhered to. • All conditions in the Water Use Licence must be adhered to especially relating to water monitoring etc (if required). • All conditions in any other permits must be adhered to. 	LOW NEGATIVE
Stormwater Management	During the construction phase the inappropriate routing of stormwater runoff will lead to stream sedimentation, adversely affecting the aquatic environment.	MODERATE NEGATIVE	<ul style="list-style-type: none"> • During the construction phase stormwater must be managed effectively to minimize the ingress of sediment-laden stormwater into the non-perennial river and/or into Wetland 2. 	LOW NEGATIVE
Invasion of alien species	During the construction phase, the removal of existing vegetation creates 'open' habitats that will inevitably be colonised by pioneer plant species. While this is part of a natural process of regeneration, which would ultimately lead to the re-establishment of a secondary vegetation cover, it also favours the establishment of undesirable species in the area. These species colonise areas of disturbance and once established, they are typically very difficult to eradicate and can pose a threat to the ecosystem.	MODERATE NEGATIVE	<ul style="list-style-type: none"> • Vehicles and machinery must park and operate within suitably designated areas to prevent unnecessary disturbance of the larger environment. • Vehicle and machinery use should also be limited within the moderate and high sensitivity areas. • Implement an Alien Management Plan during the construction phase. • Eradicate alien plants from the impacted area as they appear; and 	LOW NEGATIVE



THEME	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
	Failure to monitor alien vegetation during construction could lead to infestations.		<ul style="list-style-type: none"> Monitor the project area for any new growth of invasive plants until completion of construction. Short-term monitoring for a period of 12 months after construction has been completed should be conducted. 	
Water quality	During the construction phase, accidental contamination of wet concrete (highly alkaline) in the watercourses could result in flash kills of macro-invertebrates and fish species in the vicinity.	HIGH NEGATIVE	<ul style="list-style-type: none"> During the construction phase no concrete mixing must take place within 50 m of any river bank, drainage line or wetland. All concrete mixing must occur on impermeable surfaces. A serviced fire extinguisher (to neutralise pH levels if a spill occurs) must be available on site in the event that wet concrete is accidentally spilled into a river. The fire extinguisher must be sprayed onto the spilled wet concrete immediately and the remaining spill removed and disposed of appropriately. 	LOW NEGATIVE
	During the construction phase, accidental chemical spills or other spills (sewage, etc.) in the vicinity of the rivers and wetlands will result in water pollution, adversely affecting the aquatic ecosystem.	HIGH NEGATIVE	<ul style="list-style-type: none"> During the construction phase no machinery should be parked overnight within the moderate and high sensitivity areas. All stationary machinery must be equipped with a drip tray to retain any oil leaks. Chemicals used for construction must be stored safely on bunded surfaces in the construction site camp and not within the moderate or high sensitivity areas. Emergency plans must be in place in case of spillages. No ablution facilities should be located within moderate or high sensitivity areas. Chemical toilets must be regularly maintained/ serviced to prevent ground or surface water pollution. 	LOW NEGATIVE
Material Stockpiling	During the construction phase, stockpiling of construction materials within 50 m of a watercourse could result in erosion and mobilisation of the materials into the nearby watercourse, resulting in sedimentation and a decrease in water quality and aquatic habitat.	MODERATE NEGATIVE	<ul style="list-style-type: none"> During the construction phase no construction material must be stored within the moderate or high sensitivity areas. Stockpiles should not be placed within the moderate or high sensitivity areas. Stockpiles must be monitored for erosion and mobilisation of materials towards watercourses. If this is noted by an ECO, suitable cut-off drains or berms must be placed between the stockpile area and the nearest watercourse. Stockpiles should not exceed 1.5 m in height. Stockpiles should be covered during periods of gale force winds. 	LOW NEGATIVE
ECOLOGICAL IMPACTS				



THEME	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
Loss of vegetation communities	<p>Loss of grassland</p> <p>The proposed development will result in the permanent loss of natural grassland.</p>	MODERATE NEGATIVE	<ul style="list-style-type: none"> Keep the footprint of the construction as small as possible, the area of construction should be demarcated, and personnel not allowed to heavily use the surrounding natural vegetation. Avoid any construction or related activity occurring within the grasslands outside of the property. 	MODERATE NEGATIVE
	<p>Loss of ridge open thicket</p> <p>The proposed development will result in the loss of Open ridge thicket.</p>	HIGH NEGATIVE	<ul style="list-style-type: none"> Keep the footprint of the construction as small as possible, the area of construction should be demarcated, and personnel not allowed to heavily use the surrounding natural vegetation. Avoid any construction or related activity occurring within the grasslands outside of the property. The ridge should be demarcated as a no-go area and managed as a conservation area or open space within the development. 	HIGH NEGATIVE
Loss of Species of Conservation Concern and Biodiversity	<p>Loss of Species of Conservation Concern</p> <p>The building of the Hope Village Estate will result in the loss of SCC. Three SCC were recorded within the site during this site visit, with the likelihood of additional species being recorded after higher rainfall events during the growing season.</p>	MODERATE NEGATIVE	<ul style="list-style-type: none"> Keep the footprint of the construction as small as possible, the area of construction should be demarcated, and personnel not allowed to heavily use the surrounding natural vegetation. Any populations of SCC should be avoided wherever possible, where they cannot be avoided, every effort should be made to replant these individuals elsewhere in the landscaped gardens, or plant an equivalent or greater number of new individuals elsewhere in the gardens; A full site walk-through should be conducted in the summer prior to any construction activities to list all SCC and associated permits should be obtained for their removal or transplantation. 	LOW NEGATIVE
	<p>Loss of biodiversity in general</p> <p>As the construction of the Hope Village Estate will result in the loss of the natural vegetation of the site, this will in turn result in the loss of the species occurring within the site.</p>	MODERATE NEGATIVE	<ul style="list-style-type: none"> Keep the footprint of the construction as small as possible, the area of construction should be demarcated, and personnel not allowed to use the surrounding natural vegetation as a toilet, for dumping or as picnic sites. Where possible at least one (comprising the ridge) corridor of natural vegetation should be incorporated into the design of the estate to allow for the retention of biodiversity within the site. Any populations of SCC should be avoided wherever possible, where they cannot be avoided, every effort should be made to replant these individuals elsewhere in the gardens or plant an equivalent or greater number of new individuals elsewhere in the gardens. A full site walk-through should be conducted in the summer prior to any construction activities to list all SCC 	LOW NEGATIVE



THEME	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
			and associated permits should be obtained for their removal or transplantation.	
Ecosystem function and Process	Fragmentation This site is prone to fragmentation due to its location between a wetland (and associated moist grassland) to the west and a rocky outcrop to the east.	MODERATE NEGATIVE	Refer to mitigation measures listed above previous impact (Loss of Biodiversity in General).	LOW NEGATIVE
	Invasion of alien species The building of the Hope Village Estate will result in the influx of seeds and disturbance of existing seedbanks of alien invasive species.	MODERATE NEGATIVE	<ul style="list-style-type: none"> Any existing and new alien species must be removed as soon as possible after emergence. An alien vegetation management plan must be applied to the site to maintain the site free of alien invasions throughout the construction and operational phase of the development. 	LOW NEGATIVE
ARCHAEOLOGICAL IMPACTS				
Potential damage to historical period feature	During construction phase, excavation and construction activities could cause damage to historical period feature Exigo-DOH-HP01.	LOW	<ul style="list-style-type: none"> Frequent site monitoring by ECO as per the frequency recommended by the heritage specialist. 	LOW
Potential damage to burial sites	During construction phase, excavation and construction activities could cause damage to burial sites Exigo-DOH-BP01	HIGH	<ul style="list-style-type: none"> Site monitoring, avoidance, 50m conservation buffer, site management. Grave relocation subject to authorisations and permitting if impacted on. 	LOW
PALAEONTOLOGICAL IMPACTS				
Potential damage to palaeontological features	During construction phase, excavation and construction activities could potentially cause damage to palaeontological features.	LOW NEGATIVE	<ul style="list-style-type: none"> In the unlikely event of stromatolites being discovered in the Timeball Hill Formation, the ECO should follow the Chance Find Procedure. Although disturbed fossils should be collected and stored safely until it can be inspected by a palaeontologist, no attempt should be made to remove such accidentally discovered fossils from the rock by an unqualified person. 	LOW NEGATIVE

THEME	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
OPERATION PHASE				
GENERAL IMPACTS				
Management of water and energy	During the operational phase the inappropriate use of energy and water resources could lead to a reduction in these already scarce resources.	MODERATE NEGATIVE	<ul style="list-style-type: none"> During the operational phase effective monitoring and maintenance of all water reticulation infrastructure should be implemented to ensure there are no leakages. A meter should be installed to ensure that the abstraction quantities comply with the borehole yield certificate. Consumption of water should be monitored. 	LOW NEGATIVE



THEME	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
			<ul style="list-style-type: none"> Water-wise practices should be considered such as use of rainwater for non-potable water requirements. 	
Sanitation	During the operational phase failure of sanitation systems, lack of infrastructural maintenance coupled with poor operation may lead to sewage overflows resulting in contamination of the ground and surface water.	HIGH NEGATIVE	<ul style="list-style-type: none"> During the operational phase sewage infrastructure including the waste treatment plant must be properly managed and maintained. Sledge levels should be monitored and should be removed when ¾ full. During the operational phase there should be periodic inspections of the sewage systems to identify any system failure which could lead to contamination of the surrounding water bodies. Any leaks and failures of the sewer system must be fixed immediately and areas rehabilitated as needed. 	LOW NEGATIVE
Waste Management	During the operational phase inappropriate waste storage and disposal practices may lead to litter, pollution, attraction of pests (flies, vermin and monkeys) and general health risks.	MODERATE NEGATIVE	<ul style="list-style-type: none"> During the operational phase a waste management plan must be implemented to ensure appropriate handling, collection, processing and disposal of solid waste. (An adequate backup system for waste management should be in place in case of service delivery strikes). Reuse, recycling and separation-at-source of waste should be promoted. 	LOW NEGATIVE
Ecological Environment	<p>Invasion of Alien Species</p> <p>During the operational phase the disturbance of natural vegetation will increase the potential invasion by alien plant species. This coupled with the lack of an effective alien vegetation management plan may result in large scale alien plant invasion.</p>	MODERATE NEGATIVE	<ul style="list-style-type: none"> An Alien Vegetation Management Plan must be implemented during the operational phase to reduce the establishment and spread of undesirable alien invasive plant species. Alien invasive plants must be removed through appropriate methods such as hand pulling, application of chemicals, cutting, etc. as in accordance to the NEMBA: Alien Invasive Species Regulations. Removal must occur prior to plants developing seeds. 	LOW NEGATIVE
	<p>Ineffective Rehabilitation of disturbed areas</p> <p>During the operational phase, ineffective rehabilitation of disturbed areas may lead to the permanent degradation of ecosystems as well as allow alien vegetation species to expand.</p>	MODERATE NEGATIVE	<ul style="list-style-type: none"> All cleared areas must be continuously rehabilitated with indigenous vegetation from the area for 6 months into the Operational Phase, or until such time that the ECO is satisfied the all affected areas have been rehabilitated. 	LOW NEGATIVE
Visual	During the operation phase the new units and facilities will affect the view of the adjacent landowners and may affect the aesthetic appeal of the area.	MODERATE NEGATIVE	<ul style="list-style-type: none"> During the operation phase existing indigenous vegetation should remain where possible to act as a screen and limit the impact of the new units within the area. Appropriate walling or fencing that blends in with the surrounding neighbourhood and is not visually intrusive should be utilized and maintained. 	LOW NEGATIVE



THEME	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
Traffic	During the operational phase there will be an increase in traffic volume along the approach roads which could result in collisions, damage to the roads and a reduction in operation capacity.	MODERATE NEGATIVE	<ul style="list-style-type: none"> During the operation phase traffic calming measures (e.g. speed bumps / rumble strips) should be put in place at the entrance to the development to mitigate speeding in an area where children will be residing. 	LOW NEGATIVE
Socio-economic	During the operation phase there will likely be permanent employment opportunities.	HIGH POSITIVE	<ul style="list-style-type: none"> To optimize the benefit associated with job opportunities, a labour policy should be put in place to ensure that the local people benefit as much as possible. 	HIGH POSITIVE
	During the operational phase materials and products that are needed to run facility will be sourced from local businesses and this will result in a boost of the local economy of the immediate vicinity and surrounding areas.	MODERATE POSITIVE	<ul style="list-style-type: none"> It is recommended that to optimize the benefit a procurement policy should be put in place to ensure that the local people and businesses benefit as much as possible. 	MODERATE POSITIVE
	During the operation phase there will be an increase in housing for orphaned and abandoned children. In doing so the resources burden will be slightly reduced by ensuring private care of orphans.	HIGH POSITIVE	<ul style="list-style-type: none"> No mitigation required. 	HIGH POSITIVE
AQUATIC AND WETLAND IMPACTS				
Legal and policy compliance	During the operation phase non-compliance with the legal requirements and policies of South Africa as they pertain to the aquatic environment could lead to damage to the aquatic environment and potentially criminal cases, based on the severity of the non-compliance, being brought against the proponent and his/her contractors.	MODERATE NEGATIVE	<ul style="list-style-type: none"> All construction related conditions in the Environmental Authorisation must be adhered to. All conditions in the Water Use Licence must be adhered to especially relating to water monitoring etc (if required). All condition stipulated in any other additional permits must be adhered to. 	LOW NEGATIVE
Stormwater Management	During the operational phase stormwater infrastructure might not be adequate or effective and may result in soil erosion and sedimentation of watercourses.	MODERATE NEGATIVE	<ul style="list-style-type: none"> During the operational phase, stormwater management measures such as attenuation structures, channels, etc. must be properly maintained and monitored. If the stormwater management measures put in place are deemed insufficient, a qualified engineer must be approached to assist with additional storm water attenuation mechanisms and remediation. 	LOW NEGATIVE
Invasion of alien species	During the operational phase failure to implement an effective rehabilitation and alien vegetation removal plan post-construction could result in alien plant invasion within non-perennial river and Wetland 2.	MODERATE NEGATIVE	<ul style="list-style-type: none"> An alien vegetation removal and rehabilitation plan must be implemented post-construction. The effectiveness of this plan should be monitored on a biannually for the first year following construction or until such time as the ECO deems the rehabilitation sufficient. Alien plants must be removed from aquatic environments through appropriate methods such as hand pulling, cutting etc. This must be done under the supervision of the ECO. 	LOW NEGATIVE



THEME	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
Water quality	During the operational phase accidental spillages or leachate from the sewerage infrastructure could result in ground and surface water pollution.	HIGH NEGATIVE	<ul style="list-style-type: none"> During the operation phase the sewerage infrastructure must be properly maintained and must be monitored on a regular basis to ensure that the systems are functioning correctly. 	LOW NEGATIVE
Maintenance	During the operational phase inadequate maintenance of sewerage and water infrastructure could lead to spillages or leaks which may also result in erosion of the surrounding area	MODERATE NEGATIVE	<ul style="list-style-type: none"> During the operation phase all infrastructure must be maintained and monitored on a regular basis to check for leaks and any failures in the systems. 	LOW NEGATIVE
ARCHAEOLOGICAL IMPACTS				
Potential damage to Historical Period feature	N/A	N/A	N/A	N/A
Potential damage to burial sites	During operational phase, failure to implement an effective site management plan could result in damage to burial sites Exigo-DOH-BP01	HIGH NEGATIVE	<ul style="list-style-type: none"> Avoidance, 50m conservation buffer and implementation of site management plan. Grave relocation subject to authorisations and permitting if impacted on. 	LOW NEGATIVE



5 ENVIRONMENTAL MANAGEMENT SYSTEM

5.1 REPORTING

5.1.1 Administration

Before the contractor begins each construction activity, the contractor must give to the ECO and engineer a written method statement setting out the following:

- The type of construction activity;
- Locality where the activity will take place;
- Identification of impacts that might result from the activity;
- Identification of activities or aspects that may cause an impact;
- Methodology and/or specifications for impact prevention for each activity or aspect;
- Methodology and/or specific actions for impact containment for each activity or aspect;
- Emergency/disaster incident and reaction procedures; and
- Treatment and continued maintenance of impacted environment.

The contractor may provide such information in advance of any or all construction activities provided that new submissions shall be given to the ECO and/or engineer whenever there is a change or variation to the original. The ECO and/or engineer may provide comment on the methodology and procedures proposed by the contractor, but he shall not be responsible for the contractor's chosen measures of impact mitigation and emergency/disaster management systems. However, the contractor shall demonstrate at inception and at least once during the contract that the approved measures and procedures function properly. An example of a Method Statement is provided in [Annexure 1](#).

5.1.2 Record keeping

The engineer and the ECO will continuously monitor the contractor's adherence to the approved impact prevention procedures and the engineer shall issue to the contractor a notice of non-compliance whenever transgressions are observed. The ECO must document the nature and magnitude of the non-compliance in a designated register, the action taken to discontinue the non-compliance, the action taken to mitigate its effects and the results of the actions. The non-compliance shall be documented and reported to the engineer in the monthly report. These reports shall be made available to the authorities when requested.

The contractor shall ensure that an electronic filing system identifying all documentation related to the EMP is established. A list of reports likely to be generated during all phases of the Project is provided below, and all applicable documentation must be included in the environmental filing system catalogue or document retrieval index:

- Environmental Management Programme;
- Final design documents and diagrams issued to and by the contractor;
- All communications detailing changes of design/scope that may have environmental implications;
- Complaints register;



- Medical reports;
- Incident and accident reports;
- Emergency preparedness and response plans;
- Copies of all relevant environmental legislation;
- All relevant permits; and
- All method statements from the contractor for all phases of the project.

5.1.3 Document control

The contractor and resident engineer shall be responsible for establishing a procedure for electronic document control. The document control procedure must comply with the following requirements:

- Documents must be identifiable by organisation, division, function, activity and contact person;
- Every document must identify the personnel and their positions, who drafted and compiled the document, who reviewed and recommended approval, and who finally approved the document for distribution; and
- All documents must be dated, provided with a revision number and reference number, filed systematically, and retained for a five year period.

The contractor shall ensure that documents are periodically reviewed and revised, where necessary, and that current versions are available at all locations where operations essential to the functioning of the EMPr are performed. All documents shall be made available to the independent external auditor.

5.2 CONSTRUCTION PHASE

5.2.1 Clearing of the Site

In all areas where the contractor intends to, or is required to clear the natural vegetation and soil, either within the construction area, or at designated or instructed areas outside the construction area, a plan of action shall first be submitted to the engineer for his approval. The EMPr shall contain a photographic record and change/land reference of the areas to be disturbed. This shall be submitted to the engineer for his records before any disturbance/stockpiling may occur. The record shall be comprehensive and clear, allowing for easy identification during subsequent inspections.

The contractor shall be responsible for the re-establishment of vegetation within the development boundaries for all areas disturbed during construction. This includes, for example, service roads, stockpile areas, stop/go facilities, windrows and wherever material generated for, or from, road construction has to be stored temporarily or otherwise within the construction area, or at designated or instructed areas outside the construction area. This responsibility shall extend until expiry of the defect's notification period.

5.2.2 Excavation, hauling and placement

The contractor shall provide the engineer with detailed plans of his intended construction processes prior to starting any cut or fill or layer. The plans shall detail the number of personnel and plant to be used and the measures by which the impacts of pollution (noise, dust, litter, fuel, oil and sewage), erosion, vegetation destruction and deformation of landscape will be prevented, contained and rehabilitated. Particular attention shall also be given to the impact



that such activities will have on the adjacent built environment. The contractor shall demonstrate his “good housekeeping”, particularly with respect to closure at the end of every day so that the site is left in a safe condition from rainfall overnight or over periods when there is no construction activity.

5.2.3 Construction Activities and Equipment

- Construction will be restricted to daytime working hours;
- All noise-making equipment shall be turned off when not in use;
- All equipment shall be kept in good working order so as to limit noise emissions;
- All equipment shall be operated within specifications and capacity (i.e. do not overload machines);
- Compliance with the appropriate legislation with respect to noise is mandatory;
- The contractor will familiarise himself with, and adhere to, any local bylaws and regulations regarding the generation of noise;
- Construction staff must be given “noise sensitivity” training;
- The contractor will endeavour to keep noise generating activities associated with construction activities to a minimum;
- Modern low noise emission vehicles and equipment shall be favoured on site; and
- A well planned and co-ordinated “fast track” procedure is implemented to complete the total construction process in the area in the shortest possible time.

5.2.4 Good housekeeping

The contractor shall undertake “good housekeeping” practices during construction. This will help avoid disputes on responsibility and allow for the smooth running of the contract as a whole. Good housekeeping extends beyond the wise practice of construction methods that leaves production in a safe state from the ravages of weather to include the care for and preservation of the environment within which the site is situated.

5.2.5 Solid waste management

- No on-site burning, burying or dumping of any waste materials, litter or refuse shall occur.
- The contractor shall provide vermin and weatherproof bins with lids of sufficient number and capacity to store the solid waste produced on a daily basis. The lids shall be kept firmly on the bins at all times.
- Bins shall not be allowed to become overfull and shall be emptied at least once a day.
- The waste from bins may be temporarily stored on site in a central waste area that is weatherproof and scavenger-proof, and which the ECO has approved.
- Recyclable waste shall be disposed of into separate skips/bins and removed off-site for recycling.
- All solid waste shall be disposed of off-site at approved registered landfill site. The contractor shall supply the ECO with the appropriate disposal certificates.
- The contractor shall submit a solid waste management plan as part of the Pollution Control Method Statement to the ECO.

5.2.6 Water use

- All sources of water for construction purposes must be approved by the ECO in writing before any such sources can be used to obtain water.



- Where possible all wash water will be recycled for use, as wash water again or for dust suppression where applicable.

5.2.7 Contaminated water

- Potential pollutants of any kind and in any form shall be kept, stored, and used in such a manner that any escape can be contained and that the water table and surface water is not endangered. Water containing such pollutants as chemicals, washing detergents, sewerage, fuels, paints and solvents and hydrocarbons shall be contained and discharged into an impermeable storage facility for removal from the site or for recycling. This particularly applies to runoff from fuel depots/workshops/truck washing areas.
- Wash down areas shall be placed and constructed in such a manner so as to ensure that the surrounding areas are not polluted. The contractor shall notify the ECO immediately of any pollution incidents on Site.
- As part of the Pollution Control Method Statement, the contractor shall submit a plan to the ECO detailing how the contaminated water will be managed on site.

5.2.8 Hazardous substances

- The transportation and handling of hazardous substances must comply with the provisions of the Hazardous Substances Act (Act No.187 of 1993) and associated regulations as well as SABS 0228 and SABS 0229.
- The contractor shall also comply with all other applicable regional and local legislation and regulations with regard to the transport, use and disposal of hazardous substances. Hazardous chemical substances (as defined in the Regulations for Hazardous Chemical Substances) used during construction shall be stored in secondary containers. The relevant Material Safety Data Sheets (MSDS) shall be available on site. Procedures detailed in the MSDSs shall be followed in the event of an emergency situation.
- The contractor shall be responsible for the training and education of all personnel on site who will be handling hazardous materials about their proper use, handling and disposal.
- If potentially hazardous substances are to be stored or used on site, the contractor shall submit a Method Statement to the ECO detailing the substances / materials to be used, together with the transport, storage, handling and disposal procedures for the substances.

5.2.9 Cement and mixing of concrete

- The proposed location of cement mixing areas (including the location of cement stores and sand and aggregate stockpiles) shall be indicated on the site layout plan and approved by the ECO.
- The contractor shall ensure that minimal water is used for washing of concrete and cement mixing equipment.
- Used cement bags shall be disposed of in weatherproof bins on site to prevent the generation of wind-blown cement dust and the bags from blowing away.
- During construction, the contractor must ensure that concrete is mixed on mortar boards, all visible remains of concrete are removed and disposed of as waste and that all surplus aggregate is removed.



- As part of the Pollution Control and Concrete Mixing Method Statement, a plan detailing all actions to be taken to comply with the requirements shall be submitted to the ECO.

5.2.10 Fuel (petrol and diesel) and oil

Fuel Storage

- All construction materials including fuels and oil must be stored in demarcated areas that are contained within berms / bunds to avoid spread of any contamination into nearby rivers or drainage lines. Washing and cleaning of equipment must also be done in berms or bunds, in order to trap any cement and prevent excessive soil erosion. These sites must be re-vegetated after construction has been completed. Mechanical plant and bowsers must not be refuelled or serviced within or directly adjacent to any drainage line or waterbody.
- The location of the fuel storage area will be approved by the ECO. All necessary approvals with respect to fuel storage and dispensing shall be obtained from the appropriate authorities. Symbolic safety signs depicting “No Smoking”, “No Naked Lights” and “Danger” conforming to the requirement of SABS 1186 shall be prominently displayed in and around the fuel storage area. There shall be adequate fire-fighting equipment at the fuel storage area.
- The contractor shall ensure that all liquid fuels and oils are stored in tanks with lids, which are kept firmly shut and under lock and key at all times. The capacity of the tank shall be clearly displayed and the product contained within the tank clearly identified using the emergency information system detailed in SABS 0232 part 1.
- The tanks and bunded areas shall be covered by a roofed structure, taken off site to a disposal site approved by the ECO, and the material that absorbs / breaks-down or encapsulates minor hydrocarbon spillage shall be replenished.
- Only empty and externally clean tanks may be stored on the bare ground. Empty and externally dirty tanks shall be sealed and stored on an area where the ground has been protected.
- Adequate precautions shall be provided to prevent spillage during the filling of any tank and during the dispensing of the contents. The dispensing mechanism for the fuel storage tanks shall be stored in a waterproof container when not in use.
- As part of the required site layout for the construction camp, a plan shall be submitted to the ECO detailing the design, location and construction of the fuel storage area as well as for the filling and dispensing from storage tanks and for the type of absorbing / breaking-down or encapsulating material to be used.

Refuelling

- Where reasonably practical, machinery shall be refuelled at a designated re-fuelling area/depot or at a workshop as applicable. If this is not reasonably practical then the surface under the refuelling area shall be protected and appropriately bunded against pollution to the reasonable satisfaction of the ECO prior to any refuelling activities.
- If fuel is dispensed from drums, the proper dispensing equipment shall be used, and the drum shall not be tipped in order to dispense fuel. The contractor shall ensure that the appropriate fire-fighting equipment is present during refuelling operations.
- The contractor shall ensure that there is always a supply of absorbent material (e.g. in the form of spill kits) readily available to absorb/breakdown or where possible, be designed to encapsulate minor hydrocarbon spillages. Prior to any refuelling or maintenance activities, the ECO must approve this material.



Used oil and hydrocarbon contaminated materials

- Used oil shall be stored at a central location on site prior to removal off site for disposal at an approved disposal or recycling site.
- Old oil filters and oil, petrol and diesel-soaked material shall be treated as hazardous waste. The contractor shall remove all oil, petrol, and diesel-soaked sand immediately and shall dispose of it as hazardous waste or treat it on site with material that breaks-down or encapsulates such spillages as approved by the ECO.

5.2.11 Ablution facilities

- Washing, whether of the person or of personal effects, and acts of excretion and urination are strictly prohibited other than at the facilities provided. The contractor shall provide the necessary ablution facilities for all his personnel prior to the commencement of work and shall ensure that his personnel make use of the facilities.
- Toilet facilities shall be supplied by the contractor for the workers at a ratio of at least 1 toilet per 20 workers in areas approved by the ECO. No toilets will be erected within 20 m of any “no go” areas. Toilets shall be situated within 200m of any area where work is taking place in numbers sufficient to meet the ratio depicted above for the workers in the area. Mobile toilets (e.g. trailer mounted) must be considered for sites, where workers may be expected to cover large distances every day.
- The facilities shall be maintained in a hygienic state and serviced regularly. Toilet paper shall be provided. Temporary / portable toilets shall be secured to the ground to prevent them toppling due to wind or any other cause, to the satisfaction of the ECO.
- Discharge into the environment and burial of waste is strictly prohibited. The contractor shall ensure that no spillage occurs when the toilets are cleaned or emptied and that the contents are removed from the site. Toilets shall be emptied before the contractors’ holidays or any other temporary site closure.

5.2.12 Eating areas

- The contractor shall designate eating area(s), subject to the approval of the ECO. No cooking is allowed outside of the contractor’s camp area on site.
- At meal times all workers must eat in designated eating areas. These areas shall have shade for the workers. The eating areas may be in existing structures or in temporary / transportable structures that shall be well constructed using wood or metal for the frame and screened on the top and sides with shade cloth/canvas or other material to the satisfaction of the ECO. These areas shall be well demarcated and in locations approved by the ECO and shall not be within 20 m of any “no go” areas, on or adjacent to the site.
- Sufficient bins shall be present in these areas. All disposable food packaging must be disposed of in the bins after every meal.
- Plastic wrapping and polystyrene must be limited and where feasible, biodegradable containers and cutlery used.
- The area must be cleaned after every meal.
- The feeding or leaving of food for animals is strictly prohibited.

5.2.13 Site structures

- All site establishment components (as well as equipment) shall be positioned to limit visual intrusion on neighbours and the size of the land area disturbed. The type and colour of roofing and cladding materials to the contractor's temporary structures shall be selected to reduce reflection.



- The contractor shall supply and maintain adequate and suitable sheds for the storage of materials. Sheds for the storage of materials that may deteriorate or corrode if exposed to the weather shall be weatherproof, adequately ventilated and provided with raised floors.

5.2.14 Lights

- The contractor shall ensure that any lighting installed on the site for his activities does not cause a reasonably avoidable disturbance to the naturally-occurring fauna.

5.2.15 Noise

- The contractor shall take precautions to minimise noise generated on site (e.g. install and maintain silencers on machinery).
- The contractor shall comply with the Noise Induced Hearing Loss Regulations published under the Occupational Health and Safety Act.
- Appropriate directional and intensity settings are to be maintained on all hooters and sirens.
- Work will be limited to daylight hours
- No amplified music shall be allowed on site. The contractor shall not use sound amplification equipment on Site unless in emergency situations.

5.2.16 Dust Control

- The contractor shall be responsible for the continued control of dust arising from his operations. The contractor shall take all reasonable measures to minimize the generation of dust as a result of construction activities to the satisfaction of the ECO. Appropriate dust suppression measures include: spraying or dampening with water, using a commercial dust binder (such as Hydropam or Dustex), rotovating straw bales, planting of open cleared space and the scheduling of dust-generating activities. If the conditions are such that the contractor cannot satisfactorily dampen the dust, then the ECO may halt operations until such time as the conditions are more suitable for lower dust generating construction.
- Dampening of all gravel haul and access roads (if constructed) with water must be ongoing and special attention must be given to roads close to residential areas. Should dust still be a problem on any specific road, the allowable speed will be reduced to 20km/h. If dust is still a problem the road must be treated with a commercial dust binder, as required, to form a cohesive layer that will control the dust on the road.
- Areas that are to have the topsoil stripped for construction purposes must be limited and only stripped when work is about to take place.
- Other activities and situations that may result in a dust nuisance include: site clearance and other earth moving operations, open cleared space, stockpiles of topsoil or sand and activities associated with concrete mixing.
- The appropriate health and safety equipment (e.g. dust masks) must be worn by workers during the phases of dust-producing construction activity.
- During periods of strong winds, construction work which tends to produce large amounts of dust must be paused until such a time that the wind subsides.

5.2.17 Environmental awareness training

- Environmental awareness training courses shall be run for all personnel on site (See Annexure 2 for a proposed Basic Environmental Education Course). Two types of



courses shall be run, one for the contractor's and Subcontractor's management and one for all site staff and labourers. Courses shall be run in the morning during normal working hours at a suitable venue provided by the contractor. All attendees shall remain for the duration of the course and sign an attendance register on completion that clearly indicates participant's names, a copy of which shall be handed to the ECO.

- The size of each session shall be limited to 30 people. The contractor shall allow for sufficient sessions to train all personnel. Subsequent sessions shall be run for any new personnel coming onto site. A Method Statement with respect to the organisation of these courses shall be submitted.
- Notwithstanding the specific provisions of this clause it is incumbent upon the contractor to convey the sentiments of the EMP to all personnel and Subcontractors involved with the Works.

Training course for management and foremen

- The environmental awareness training course for management shall include all management staff and foremen. The course, which will be presented by the ECO, will be of approximately one-hour duration.
- The initial course shall be undertaken not less than 7 days prior to commencement of work on site. Subsequent courses shall be held as and when required.

Training course for site staff and supervisors

- The environmental awareness training course for site staff and labour shall be presented by the contractor's SHE Officer from material provided by the ECO unless otherwise required by the Project Specification. The course will be approximately one-hour long.
- The course shall be run not more than 7 days after commencement of work on site with sufficient sessions to accommodate all available personnel. Subsequent courses shall be held as and when required.

Construction personnel information posters

- The contractor shall erect and maintain information posters for the information of his employees depicting actions to be taken to ensure compliance with the Environmental EMP. Construction personnel information posters shall be laminated and erected in all eating areas, workshops and site offices. The contractor shall ensure that the construction personnel information posters are not damaged in any way, and shall replace them if any part becomes illegible.
- Examples of these posters will be supplied to the contractor by the ECO in electronic format.

5.2.18 Fire control

- The contractor shall take all the necessary precautions to ensure that fires are not started as a result of his activities on site.
- No open fires shall be permitted on the site.
- Smoking shall not be permitted in those areas where there is a fire hazard. Such areas shall include the workshop and fuel storage areas and any areas where the vegetation or other material is such as to support the rapid spreading of an initial flame.
- The contractor shall appoint a Fire Officer who shall be responsible for ensuring immediate and appropriate actions in the event of a fire and shall ensure that employees are aware of the procedures to be followed. The contractor shall forward the name of the Fire Officer to the ECO for his approval within 7 days of being on site.



- The contractor shall ensure that there is basic fire-fighting equipment available on site at all times. This shall include at least rubber beaters when working in urban open spaces and natural areas, and at least one fire extinguisher of the appropriate type when welding or other “hot” activities are undertaken.
- The contractor shall be liable for any expenses incurred by any organisations called to assist with fighting fires that were started as a result of his activities or personnel, and for any cost relating to the rehabilitation of burnt areas, or consequential damages.

5.2.19 Emergency Procedures

- Emergency procedures, including the names and contact details of responsible personnel and emergency services shall be made available to all staff and shall be clearly displayed at relevant locations at the site. The contractor shall advise the ECO of any emergencies on Site, together with a record of action taken, within 24 hours of the emergency occurring.
- Telephone numbers of emergency services shall also be posted conspicuously in the contractor’s office near the telephone.
- The contractor shall submit a Method Statement covering the procedures for the following emergencies:

Fire

- The contractor shall advise the relevant authority of a fire as soon as one starts and shall not wait until he can no longer control it.
- The contractor shall ensure that his employees are aware of the procedures to be followed in the event of a fire.

Accidental leaks and spillages

- The contractor shall ensure that his employees are aware of the procedures to be followed for dealing with spills and leaks, which shall include notifying the ECO and the relevant authorities. The contractor shall ensure that all the necessary materials and equipment for dealing with spills and leaks are available on site at all times. Treatment and remediation of the spill areas shall be undertaken to the reasonable satisfaction of the ECO.
- In the event of a hydrocarbon spill, the source of the spillage shall be isolated and the spillage contained. The area shall be cordoned off and secured. The contractor shall ensure that there is always a supply of absorbent material readily available to absorb/ breakdown or where possible, be designed to encapsulate minor hydrocarbon spillages. The quantities of such materials shall be able to handle a minimum of 200 l of hydrocarbon liquid spill.
- Any spills must be cleared and the contaminated soil/sludge disposed of in an appropriate manner, approved by the ECO, or at a licensed hazardous waste disposal site.

5.2.20 Protection of natural features

- The contractor shall not deface, paint, damage or mark any natural features (e.g. rock formations or trees) situated in or around the site for survey or other purposes unless agreed beforehand with the ECO. Any features affected by the contractor in contravention of this clause shall be restored / rehabilitated to the satisfaction of the ECO.



- The contractor shall not permit his employees to make use of any natural water sources for the purposes of swimming, personal washing and the washing of machinery or clothes.

5.2.21 Protection of flora and fauna

- Protected plant species must be removed from the designated construction footprint and relocated to adjacent areas of similar habitat that will not be affected by construction and used in landscaping once construction is complete. Permits will be required for the removal or destruction of protected species.
- Except to the extent necessary for the carrying out of the works, flora shall not be removed, damaged or disturbed nor shall any vegetation be planted.
- The removal and stockpiling of topsoil must also be carried out in accordance with the EMPr.
- Trapping, poisoning and/or shooting of animals is strictly forbidden. No domestic pets or livestock are permitted on site.
- The use of chemicals of all forms must be carefully controlled and monitored to avoid contamination of areas.
- Construction phases must allow for education of staff as to the significance of species of concern.

5.2.22 Protection of heritage features

- The Heritage specialist advised a 50m conservation buffer surrounding the grave sites. Construction managers/foremen must be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites.
- If concentrations of palaeontological/archaeological heritage material and human remains are uncovered during construction, all work must cease immediately and be reported to the South African Heritage Resources Agency (SAHRA) so that systematic and professional investigation/ excavation can be undertaken.
- Any person who causes intentional damage to archaeological or historical sites and/or artefacts could be penalised or legally prosecuted in terms of the National Heritage Resources Act 25 of 1999.

5.2.23 Vegetation Clearance

- Vegetation clearing and trampling must be avoided in areas demarcated as no-go areas.
- Temporary infrastructure such as the site camp, lay down areas and storage areas must be placed outside the 32m buffer from the river.
- Vegetation clearing must occur in parallel with the construction progress to minimise erosion and/or run-off. Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the river.
- The contractor must work according to a plan, which demarcates areas to be cleared. The plan must be part of the Project Layout Plan developed in the Site Design Phase.
- The minimum amount of vegetation clearance must take place.
- All plants not interfering with construction must be left undisturbed.
- Collection or wilful damage to any plants outside of the areas demarcated for clearing is not allowed.
- The contractor shall destroy all tagged alien vegetation within the designated area.



- The contractor will take care of seeds collected during the removal of alien vegetation in order to counter the spread of this vegetation type. Failure to do so may result in prosecution in terms of the Conservation of Agricultural Resources Act, Act 43 of 1983, which states that any person removing any weed (which includes alien vegetation) shall ensure that it is not able to reproduce itself.
- No breaking of branches, outside of the demarcated areas will be allowed without prior approval from the ECO.

5.2.24 Alien Vegetation Clearance

- The construction phase must employ eradication programmes to remove existing invasive alien plant species as well as the removal of any new invasive plant species, especially those categorized as 1, 2 and 3 on the NEMBA list.
- Long-term operational eradication programs to eradicate invasive alien plant species must be implemented if possible.

5.2.25 Revegetation

- All areas disturbed during construction shall be reinstated to a state that approximates or better the state that they were in before construction or will be planted as gardens within the property
- Cut and fill areas must be restored and reshaped.
- Areas compacted by vehicles during construction must be scarified to allow penetration of plant roots and the regrowth of natural vegetation and/or garden lawns.
- The revegetation programme must take cognisance of the climatic and seasonal conditions with the most favourable period being in spring and early summer.
- Plant lists with species indigenous and or endemic to the region must be proposed in place of exotics and used to plant the gardens where possible
- The transplanting of indigenous species within the study area must be done.
- It is also advised that an Environmental Control Officer, with a good understanding of the local flora be appointed during the construction phase. The ECO must be able to make clear recommendations with regards to the re-vegetation of the newly completed / disturbed areas, using species selected by an appropriate botanist. All alien plant re-growth must be monitored and, should it occur, these plants must be eradicated.

5.2.26 Topsoil

- Topsoil can only be stripped from the areas as indicated below:
 - Any area which is to be used for temporary storage of materials
 - Areas which could be polluted by any aspect of the construction activity; and
 - Areas designated for the dumping of soil.
- Stripping of topsoil will be undertaken in such a manner as to minimise erosion by wind or runoff.
- Areas from which the topsoil is to be removed will be cleared of any foreign material which may come to form part of the topsoil during removal including bricks, rubble, any waste material, litter, excess vegetation and any other material which could reduce the quality of the topsoil.
- The contractor shall ensure that subsoil and topsoil are not mixed during stripping, excavation, reinstatement and rehabilitation. If mixed with clay sub-soil the usefulness of the topsoil for rehabilitation of the site will be lost.
- Soils must be exposed for the minimum time possible once cleared.



- Topsoil will be temporarily stockpiled, separately from (clay) subsoil and rocky materials.
- Topsoil will be stockpiled in areas designated by the ECO.
- Stockpiles will either be vegetated with indigenous grasses or covered by a suitable fabric to prevent erosion and invasion of weeds.
- Stockpiled topsoil will not be compacted.

5.2.27 Stormwater Management

- Stormwater must be managed using suitable structures such as swales, gabions and rock rip-wrap so that any run-off from the development site is attenuated prior to discharge. Silt and sedimentation must be kept to a minimum, through the use of the above mentioned structures by also ensuring that all structures don't create any form of erosion.
- Natural run-off must be diverted to stormwater drains where these are available. The contractor shall take appropriate measures to prevent sand, silt and silt-laden waters from entering any nearby watercourses.

5.2.28 Erosion and sedimentation control

- The contractor shall take all reasonable measures to limit erosion and sedimentation due to construction activities and shall, in addition, comply with such detailed measures as may be required by the EMPr.
- Re-vegetate areas that have been disturbed as soon as possible.
- Where erosion and/or sedimentation, whether on or off the site, occurs despite the contractor complying with the foregoing, rectification shall be carried out in accordance with details specified by the ECO. Where erosion and/or sedimentation occur due to the fault of the contractor, rectification shall be carried out to the reasonable requirements of the ECO and at the expense of the contractor.

5.2.29 Aesthetics

- The contractor shall take reasonable measures to ensure that construction activities do not have an unreasonable impact on the aesthetics of the area.

5.2.30 Community relations

- If so required by the Project Specification, the contractor shall erect and maintain information boards in the positions, quantities, designs and dimensions specified. Such boards shall include contact details for complaints by members of the public in accordance with details provided by the ECO.
- The contractor shall keep a "Complaints Register" on site. The Register shall contain all contact details of the person who made the complaint, and information regarding the complaint itself and note the date and time that the complaint was resolved.
- The ECO shall be responsible for responding to queries and/or complaints and may request assistance from the contractor's management staff.
- Construction materials and other purchases relating to the project must be done, where possible, within the nearby community and at local shops.



5.3 OPERATION PHASE

5.3.1 Solid waste management

- No on-site burning, burying or dumping of any waste materials, litter or refuse shall occur.
- The applicant shall provide vermin and weatherproof bins with lids of sufficient number and capacity to store the solid waste produced on a daily basis. The lids shall be kept firmly on the bins at all times.
- Bins shall not be allowed to become overfull and shall be emptied regularly.
- The waste from bins may be temporarily stored on site in a central waste area that is weatherproof and scavenger proof.
- Recyclable waste shall be disposed of into separate skips/bins and removed off-site for recycling by an appointed contractor.
- All solid waste shall be disposed of off-site at an approved registered landfill site or collected by the municipal collection services.

5.3.2 Water use

- All sources of water for operational purposes must be approved by the relevant authority in writing before any such sources can be used to obtain water.
- Water efficient systems, such as dual-flush toilets and water-efficient taps must be used in order to save water.

5.3.3 Contaminated water

- Potential pollutants of any kind and in any form shall be kept, stored, and used in such a manner that any escape can be contained and that the water table and surface water is not endangered. Water containing such pollutants as chemicals, washing detergents, sewerage, fuels, paints and solvents and hydrocarbons shall be contained and discharged into an impermeable storage facility for removal from the site or for recycling.

5.3.4 Ablution facilities

- Washing, whether of the person or of personal effects, and acts of excretion and urination are strictly prohibited other than at the facilities provided.
- The facilities shall be maintained in a hygienic state and serviced regularly. Toilet paper shall be provided.
- Discharge into the environment and burial of waste is strictly prohibited.

5.3.5 Lights

- The applicant shall ensure that any lighting installed on the site for his activities does not cause a reasonably avoidable disturbance to the naturally-occurring fauna.

5.3.6 Emergency procedures

- Emergency procedures, including the names and contact details of responsible personnel and emergency services shall be made available to all staff and shall be clearly displayed at relevant locations at the site.



- Telephone numbers of emergency services shall also be posted conspicuously in the office(s) near the telephone.
- The applicant shall undergo these procedures for the following emergencies:
- The applicant shall advise the relevant authority of a fire as soon as one starts and shall not wait until he can no longer control it.
- The applicant shall ensure that his employees are aware of the procedures to be followed in the event of a fire.

5.3.7 Protection of natural features

- The applicant shall not deface, paint, damage or mark any natural features (e.g. rock formations or trees) situated in or around the site for survey or other purposes unless agreed beforehand with the ECO. Any features affected by the applicant in contravention of this clause shall be restored / rehabilitated to the satisfaction of the ECO.

5.3.8 Stormwater management

- Stormwater must be managed using suitable structures. Silt and sedimentation must be kept to a minimum, through the use of the above mentioned structures by also ensuring that all structures don't create any form of erosion.
- Natural run-off must be diverted to the nearest stormwater drains.



6 ENVIRONMENTAL MANAGEMENT PROTOCOL

6.1 ROLES AND RESPONSIBILITIES

6.1.1 Applicant/Developer

The applicant is the responsible entity for monitoring the implementation of the EMPr and compliance with the authorisation. However, if the applicant appoints a contractor to implement the project and hence implement the proposed mitigation measures documented in this EMPr on their behalf, then the successful contractor's responsibilities are outlined as per the section that follows.

6.1.2 Contractor

The successful contractor shall:

- Be responsible for the finalisation of the EMPr in terms of methodologies which are required to be implemented to achieve the environmental specifications contained herein and the relevant requirements contained in the EA;
- Be responsible for the overall implementation of the EMPr in accordance with the requirements of the developer and the EA;
- Ensure that all third parties who carry out all or part of the contractor's obligations under the contract comply with the requirements of this EMPr; and
- Ensure that the appointments of the ECO are subject to the approval of the developer.

6.1.3 Environmental Control Officer

For the purposes of implementing the conditions contained herein, the contractor shall appoint an ECO for the contract. The ECO shall be the responsible person for ensuring that the provisions of the EMPr as well as the EA are complied with during the construction period. The ECO will be responsible for issuing instructions to the contractor and where environmental considerations call for action to be taken. The ECO shall submit regular written reports to the applicant and the environmental authority as required. The ECO will be responsible for the monitoring, reviewing and verifying of compliance with the EMPr and conditions of the environmental authorisation by the contractor. The ECO's duties in this regard will include, *inter alia*, the following:

- Confirming that all the environmental authorisations and permits required in terms of the applicable legislation have been obtained prior to construction commencing;
- Monitoring and verifying that the EMPr, EA and contract are adhered to at all times and taking action if specifications are not followed;
- Monitoring and verifying that environmental impacts are kept to a minimum;
- Reviewing and approving construction method statements with input from the engineer, where necessary, in order to ensure that the environmental specifications contained within this EMPr and EA are adhered to;
- Inspecting the site and surrounding areas on a regular basis regarding compliance with the EMPr, EA and contract;
- Monitoring the undertaking by the contractor of environmental awareness training for all new personnel on site;



- Ensuring that activities on site comply with all relevant environmental legislation;
- Ordering the removal of, or issuing spot fines for person/s and/or equipment not complying with the specifications of the EMPr and/or environmental authorisation;
- Undertaking a continual internal review of the EMPr and submitting any changes for applicant and authority review and approval as applicable;
- Checking the register of complaints kept on site and ensuring that the correct actions are/were taken in response to these complaints;
- Checking that the required actions are/were undertaken to mitigate the impacts resulting from non-compliance;
- Reporting all incidences of non-compliance;
- Conducting annual environmental performance audits in respect of the activities undertaken relating to the project. The ECO shall also submit compliance audit reports to the competent authority, in accordance with the requirements of the environmental authorisation. Such reports shall be reviewed by the applicant, prior to submission;
- Keeping a photographic record of progress on site from an environmental perspective;
- Recommending additional environmental protection measures, should this be necessary; and
- Providing report back on any environmental issues at site meetings.

6.2 ADDITIONAL MITIGATION MEASURES

As part of the implementation and monitoring requirements, the employees involved in the proposed development must be trained in implementing and monitoring compliance with the EMPr and EA and to undertake the necessary monitoring and implementation of the prescribed mitigation measures detailed here.

6.2.1 Pre-Construction

- Notice must be given to surrounding land owners and businesses informing them of the intended date of commencement of construction;
- The necessary management plans need to be compiled. These include Traffic, Waste, Alien Vegetation and Archaeological Site Management Plans.

6.2.2 Construction Phase

- An ECO must be employed to ensure that the construction activities remain within the designated area and that no unauthorised activities occur;
- The ECO should submit site audits detailing the applicant's compliance with the EMPr;
- An efficient stormwater management system must be implemented during construction; and
- Workers must be educated on environmental management aspects.

6.2.3 Operational Phase

- Water efficient systems, such as dual-flush toilets and water-efficient taps should be used to use water sparingly;
- Waste removal must be properly managed at all times;
- Health, Safety and Environmental monitoring should take place regularly and reports compiled on an annual basis



7 ENVIRONMENTAL AWARENESS

Contractors shall ensure that its employees and any third party who carries out all or part of the Contractor's obligations are adequately trained with regard to the implementation of the EMPr, as well as regarding environmental legal requirements and obligations. Training shall be conducted by an independent person where necessary. Environment and health awareness training programmes must be targeted at two distinct levels of employment, i.e. management and labour. Environmental awareness training programmes shall contain the following information:

- The names, positions and responsibilities of personnel to be trained;
- The framework for appropriate training plans;
- The summarised content of each training course; and
- A schedule for the presentation of the training courses.

The person conducting training shall ensure that records of all training interventions are kept in accordance with the record keeping and documentation control requirements as set out in this EMPr. The training records shall verify each of the targeted personnel's training experience.

The Developer shall ensure that adequate environmental training takes place. All employees shall have been given an induction presentation on environmental awareness and the content of the EMPr. The presentation needs to be conducted in the language of the employees to ensure it is understood. The environmental training shall, as a minimum, include the following:

- The importance of conformance with all environmental policies;
- The environmental impacts, actual or potential, of their work activities;
- The environmental benefits of improved personal performance;
- Their roles and responsibilities in achieving conformance with the environmental policy and procedures, including emergency preparedness and response requirements;
- The potential consequences of departure from specified operating procedures;
- The mitigation measures required to be implemented when carrying out their work activities;
- Environmental legal requirements and obligations;
- Details regarding floral/faunal species of special concern and protected species, and the procedures to be followed should these be encountered during the construction of the proposed development, main access roads, approach roads or construction camps;
- The importance of not littering;
- The importance of using supplied toilet facilities;
- The need to use water sparingly;
- Details of and encouragement to minimise the production of waste and re-use, recover and recycle waste where possible; and
- Details regarding archaeological and/or historical sites which may be unearthed during construction and the procedures to be followed should these be encountered.

The Contractor must monitor the performance of construction workers to ensure that the points relayed during their introduction have been properly understood and are being followed. If necessary, a translator must be called to the site to further explain aspects of environmental or social behaviour that are unclear. An environmental training and awareness course has been provided in [Annexure 2](#).



8 CONCLUSION

Although all foreseeable actions and potential mitigations or management actions are contained in this document, the EMPr must be seen as a day-to-day management document. The EMPr thus sets out the environmental standards that are required to minimise the negative impacts and maximise the positive benefits of the proposed development as detailed in the BAR. The EMPr is a “live document”, and if continuously reviewed and managed correctly can result in successful construction and operation of the proposed development.

All attempts must be made to have this EMPr available, as part of any tender documentation, so that the contractors are made aware of the potential cost and timing implications needed to fulfil the implementation of the EMPr, thus adequately costing for these. Further guidance must also be taken on any conditions contained in the EA, if the project is granted approval, and that these conditions must be incorporated into the final EMPr.



ANNEXURE 1: METHOD STATEMENTS

Method statements need to be compiled by the Contractor for approval by the ECO. For the purposes of the environmental specification, a method statement is defined as a written submission by the Contractor to the ECO setting out the plant, materials, labour and method the Contractor proposes using to carry out an activity, in such detail that the ECO is enabled to assess whether the Contractor's proposal is in accordance with the EMPr and / or will produce results in accordance with EMPr.

The method statement shall cover applicable details with regard to:

- Construction procedures,
- Materials and equipment to be used,
- Transporting the equipment to and from site,
- How the equipment/ material will be moved while on site,
- How and where material will be stored,
- The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur,
- Timing and location of activities,
- Compliance/ non-compliance with the Specifications, and
- Any other information deemed necessary by the Engineer.

The Contractor shall abide by these approved method statements, and any activity covered by a method statement shall not commence until the ECO has approved the method statement. The method statement shall be submitted to the ECO not less than 20 days prior to the intended date of commencement of the activity, or as directed by the ECO.



METHOD STATEMENT

CONTRACT:..... **DATE:**.....

PROPOSED ACTIVITY (give title of method statement and reference number from the EMP):

WHAT WORK IS TO BE UNDERTAKEN (give a brief description of the works):

WHERE ARE THE WORKS TO BE UNDERTAKEN (where possible, provide an annotated plan and a full description of the extent of the works):

Start Date:	End Date:

START AND END DATE OF THE WORKS FOR WHICH THE METHOD STATEMENT IS REQUIRED:

HOW ARE THE WORKS TO BE UNDERTAKEN (provide as much detail as possible, including annotated sketches and plans where possible):

* Note: please attach extra pages if more space is required



DECLARATIONS

1) ENVIRONMENTAL CONTROL OFFICER

The work described in this Method Statement, if carried out according to the methodology described, is satisfactorily mitigated to prevent avoidable environmental harm:

(Signed)

(Print name)

Dated: _____

2) PERSON UNDERTAKING THE WORKS

I understand the contents of this Method Statement and the scope of the works required of me. I further understand that this Method Statement may be amended on application to other signatories and that the ECO will audit my compliance with the contents of this Method Statement

(Signed)

(Print name)

Dated: _____








ANNEXURE 2: BASIC ENVIRONMENTAL EDUCATION COURSE OUTLINE







<http://www.webweaver.nu/clipart/environmental.shtml>



Reasons why should we look after the environment

-  We have a right to a clean environment
-  A clean environment is essential to healthy living
-  All our basic needs come from the environment
-  A contract has been signed – development vs the environment
-  Penalties / fines could be issued

How to look after the environment

-  Report issues
-  Teamwork
-  Follow the set rules and guidelines (EA, EMPr, Method statements etc.)
-  Conserve, reuse and recycle



Tips and Guidelines

- Workers and equipment should not be allowed outside demarcated areas
- No swimming or polluting of water bodies allowed
- No damage / disturbance to vegetation or water bodies without consent / permits
- No disturbance allowed in no-go areas
- No hunting of animals
- Report all fires
- No burning or burying of waste
- No smoking near hazardous materials
- Training on fire fighting equipment
- Hazardous materials to be stored in designated and bunded areas
- Spill kits and drip trays a must
- Report all spills
- Control dust and Noise
- Maintain construction vehicles
- Availability and maintenance of sanitation facilities



Tips and Guidelines

- Only eat in designated areas
- Do not litter
- Vehicles to remain on approved tracks and adhere to speed limit
- Ensure emergency phone numbers are available
- Ensure PPE is worn
- Report fires, leaks and injuries
- Ask if unsure





ANNEXURE 3: DETAILS AND CVS OF THE PROJECT TEAM

Please refer to the Basic Assessment Report for details and CVs of the project team.



ANNEXURE 4: SITE SENSITIVITY MAP

