

ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)

1. INTRODUCTION

The purpose of this Environmental Management Programme (EMPr) is to ensure 'good environmental practice' by taking a holistic approach to the management of environmental impacts during the construction and operation of the clearance of 10,9205ha of indigenous vegetation of which 62 272m² is located within an Ecological support area in order to establish a shopping centre with associated access and parking on Portion 36 and the Remaining Extent of Portion 216 of the Farm Zandfontein 317, JR, Gauteng Province. The development is planned to be a Phased development with Phase 1 being the development of a Shopping centre with associated access and parking on Portion 36 and Phase 2 being the development of a shopping centre with associated access and parking on the Remaining Extent of Portion 216.

The Alternative considered entails the establishment of a shopping centre with associated access and parking on Portion 36 (phase 1) and a high density residential development on the Remaining Extent of Portion 216 (Phase 2). This option is considered to be a viable option as an Alternative as there is a housing shortage in the area. The developer intends to revert to this option should it prove to be more viable in future. In this assessment, both options have been considered.

This EMPr therefore sets out the methods by which proper environmental controls are to be implemented by the applicant and his nominated contractor. However, where necessary, these methods have been expanded upon and additional issues addressed in order to ensure that all environmental aspects are appropriately considered and monitored.

It is important to note that this EMPr is focused primarily on the construction and operational phases of the project. Design specifications from an environmental point of view were taken into consideration, the Environmental Assessment Practitioner (EAP) have provided input with regard to possible mitigation measures for reducing environmental impacts.

This EMPr is also intended to ensure that the principles of sound Environmental Management and the general "Duty of Care" specified in the National Environmental Management Act are promoted on site during all phases of the development

This EMPr has been designed to suit the particular activities and needs of the clearance of 10,9205ha of indigenous vegetation, of which 62 272m² is located within an Ecological Support Area, in order to establish the development, and incorporates specific project mitigation measures. This EMPr therefore identifies the following:

- Construction and operation activities that will impact on the environment;
- Specifications with which the contractor shall comply in order to protect the environment from the identified impacts; and

➤ Actions that shall be taken in the event of non-compliance.

It is important to note that the EMPr is a dynamic document subject to similar influences and changes as are brought by variations to the provisions of the project specification. Any substantial changes shall be submitted to the contractor, resident engineer and relevant environmental authorities in writing for approval.

A professional team consisting of the following experts have been assembled in order to ensure the success of the proposed development:

- Geo-Technical Engineer
- Civil Engineer and traffic engineer
- A Heritage Specialist.
- A Fauna and Flora Habitat specialist
- Specialist were appointed to conduct an Economical Feasibility study.
- A Specialist was appointed to conduct a Waste Classification study
- Registered Environmental Assessment Practitioner (EAP)

They were responsible for the following actions:

- 1) The EAP was contracted by **GHDEVCO PROPRIETY LIMITED** as their Independent Environmental Assessment Practitioner.
- 2) A **Geo-Technical Engineer** was appointed to assess the suitability of the site in terms of geological features.
- 3) The **Civil Engineer** was appointed to determine the capability of existing infrastructure to be linked to proposed development and available bulk services.
- 4) A **Heritage Specialist** has been appointed to determine the possible impact of the development on Archaeological and Cultural features.
- 5) A **Botanical specialist** has been appointed to determine the impact of the proposed development on the Fauna and Flora of the area.
- 6) An Engineer was appointed to conduct a **Traffic Impact Assessment** to determine the impact of the proposed development on the existing road infrastructure of the area.
- 7) An **Economical Feasibility study** was conducted to determine the need for the proposed development.
- 8) A Specialist was appointed to conduct a **Waste Classification**. The need for a waste classification was triggered by a phase 1 shallow soil engineering geological assessment conducted. During the evaluation, fly-Ash and Slag fill were encountered at four of the nine test pits. The report indicated that the material could be hazardous and should be analysed.
- 9) An Environmental Screening Process was conducted by the EAP to ensure that all the relevant Environmental Legislation is taken into consideration.
- 10) Desk top studies were conducted and alternatives assessed.
- 11) Site inspections were carried out to verify the outcomes of the desktop studies, and the preferred alternative defined.
- 12) A full Public Participation Process is being followed to obtain inputs from interested and affected parties.
- 13) All the information obtained from the above mentioned processes is being used to assess the Environmental Impact that the proposed development may have on the Environment and vice versa.

The inputs from Specialists, interested and affected parties, together with the knowledge of the EAP is being used to determine measures to avoid, mitigate and manage potential impacts. These measures are described in the Environmental Management Programme.

2. Contents of the Environmental Management Programme

The contents of an EMPr, shown below, are contained in Appendix 4 of the NEMA EIA Regulations 982 of 2014 as amended and published in Appendix 4 of Government Notice No. R 326 of 2017.

1. (1) An EMPr must comply with section 24N of the Act and include-
 - (a) details of
 - (i) the EAP who prepared the EMPr; and
 - (ii) the expertise of that EAP to prepare an EMPr, including a curriculum vitae;
 - (b) a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;
 - (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 any areas that should be avoided, including buffers;
 - (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) planning and design;
 - (ii) pre-construction activities;
 - (iii) construction activities;
 - (iv) rehabilitation of the environment after construction and where applicable post closure; and
 - (v) where relevant, operation activities;
 - (f) a description of proposed impact management actions, identifying the manner in which the impact management outcomes and outcomes contemplated in paragraphs (d) will be achieved, and must, where applicable, include actions to –
 - (i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;
 - (ii) comply with any prescribed environmental management standards or practices;
 - (iii) comply with any applicable provisions of the Act regarding closure, where applicable; and
 - (iv) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;
 - (g) the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);
 - (h) the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);
 - (i) an indication of the persons who will be responsible for the implementation of the impact management actions;
 - (j) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;
 - (k) the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);
 - (l) a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;
 - (m) an environmental awareness plan describing the manner in which-

- | |
|--|
| <p>(i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and</p> <p>(ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and</p> <p>(n) any specific information that may be required by the competent authority.</p> |
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3. Details of Environmental Assessment Practitioner

Environmental Assessment Practitioner (EAP): ¹	Mr. JP de Villiers of AB Enviro Consult CC		
Contact person:	Mr. JP de Villiers		
Postal address:	7 Louis Leipoldt Street		
Postal code:	2531	Cell:	083 548 8105
Telephone:	071 202 4027	Fax:	018 293 0671
E-mail:	jp@abenviro.co.za		

4. Expertise of the Environmental Assessment Practitioner

AB Enviro Consult (CC) is a registered consultancy, owned and operated as an independent unit by the registered owner and consultant: **Prof. A.B. de Villiers**

- **Mr J.P. De Villiers** joined the consultancy during 2004
- **Mrs J.E. du Plooy** is a consultant since 2001

Over a period of 26 years (1996-2022) this consultancy has successfully applied for, and obtained positive ROD's and EA's for more than 380 projects. Environmental Control Officer's duties are also performed on various projects.

Mr. JP de Villiers holds a M.Sc. in Geography from the North West University's Department of Geography and Environmental Management. He started as a junior EAP in 2004 with AB Enviro Consult and was promoted in 2007 to senior EAP. During 2011 he was appointed as the Manager of the North West

University, EIA Pro-Bono Office. This office is an initiative of, and funded by, the DEA. (This was a three year contract between DEA and NWU that was extended by one year) As Manager of this office, Mr. de Villiers had the following responsibilities:

- Conduct Environmental Impact Assessments for municipalities on a pro-bono basis.
- Provide environmental management training to North West Municipalities.
- Provide environmental assistance to North West Municipalities.
- Undertake research related to Environmental Impact Management within the North West Municipal Context.
- Marketing for stakeholder 'pro-bono' expert donations.
- Marketing for corporate 'pro-bono' funding.

As EAP, Mr. de Villiers has been directly involved in obtaining 308 Environmental Authorizations and has performed the duties of Environmental Control Officer (ECO) for 32 developments. His responsibilities as Senior EAP includes the following:

Duties pertaining to Basic Assessments, EIA and Scoping and Section 24 G Applications:

- Marketing and communication with clients
- Communication with authorities, source and analyse relevant baseline information and undertake site inspections
- Compile Environmental Application Form for the project and submit to the authorities
- Compile an *information requirements list* that is distributed to the project team. The Information required would assist with completion of the Report.
- Identify key interested and affected parties (I&APs)
- Compilation of terms of reference for specialist studies
- Commission specialist studies
- Compile and publish media notices in relevant newspapers
- Compile and place poster/s along the boundary of the site
- Hold a public meeting / Open House / focus meeting with I&APs
- Receive and address comments from public
- Undertake assessment phase by assessing and evaluating potential impacts identified.
- Review and manage specialist studies.
- Compile and distribute Draft Reports (Including Environmental Management Programmes)
- Should the Reports require substantial changes, these changes are incorporated into the final reports and distributed
- Address comments received on the final Report, finalise Report and submit to authorities
- Once the decision is issued, all I&Ps are formally informed of the decision

Duties pertaining to Environmental Control Officer

- Preparation (Compilation) and submission of Environmental Control Document.
- Training of and leasing with the Engineers Representative.
- Communicate with the Contractor.
- A monthly visit to the site during the construction period. Should any Environmental incident occur, an immediate site visit is undertaken.
- Monitoring and auditing according to the approved EMP and EA.
- Compilation of a written audit report for each site visits during the construction phase
- Liaising with the Compliance section of the Competent Authority

ACADEMIC AND PROFESSIONAL QUALIFICATIONS PROF DE VILLIERS

Post-Matric Qualifications

<u>YEAR</u>	<u>Qualification</u>	<u>Institution</u>	<u>Field of Study</u>
1968	B.Sc.	PU FOR CHE	Geography, Geology
1970	HONNS. B.Sc.	PU FOR CHE	Soil Science
1974	M.Sc.	PU FOR CHE	Geography
1981	Ph.D.	UOFS	Geography

ACADEMIC AND PROFESSIONAL QUALIFICATIONS MR J.P. DE VILLIERS

<u>YEAR</u>	<u>Qualification</u>	<u>Institution</u>	<u>Field of Study</u>
1993	BA	PU FOR CHE	Geography, Economics
1994	HED	PU FOR CHE	Geography Economics
2006	B.Sc.(Honns) Cum Laude	North-West University	Environmental Management
2007	M.Sc.	North-West University	Geography

PROFESSIONAL QUALIFICATIONS AND REGISTRATIONS

<u>YEAR</u>	<u>Qualification/ Registration</u>	<u>Institution</u>	<u>Field of Study</u>
2008	Basic Principles of Ecological Rehabilitation and Mine Closure	Centre for Environmental Management (North West University)	Ecological Rehabilitation
2019	Registered as Environmental assessment Practitioner	EAPASA Registration number: 2019/808	
2020-2022	International Association for impact assessment South Africa (IAIASA)	IAIASA Member	

ACADEMIC AND PROFESSIONAL QUALIFICATIONS MRS J.E. DU PLOOY

<u>YEAR</u>	<u>Qualification</u>	<u>Institution</u>	<u>Field of Study</u>
1999	BA	PU FOR CHE	Geography, Tourism
2000	BA (Honns) Cum Laude	PU FOR CHE	Geography
2003	Master's degree in Environmental Management	PU FOR CHE	Environmental Management
2001	Aquabase Intro	AQUABASE	Hydrology
2001	Geomedia Professional	INTERTECH	GIS
2001	Map Info	SPATIAL TECHNOLOGY	GIS
2019	Registered as Environmental assessment Practitioner	EAPASA Registration number: 2019/1573	
2020-2022	International Association for impact assessment South Africa (IAIASA)	IAIASA Member	

5. DESCRIPTION OF THE ACTIVITY

This proposed development entails the clearance of 10,9205ha of indigenous vegetation, of which 62 272m² is located within an Ecological Support Area, in order to establish a shopping centre. The development is planned to be a Phased development with Phase 1 being the development of a Shopping centre with associated access and parking on Portion 36 and Phase 2 being the development of a shopping centre with associated access and parking on the Remaining Extent of Portion 216.

The Alternative considered entails the establishment of a shopping centre with associated access and parking on Portion 36 (phase 1) and a high density residential development on the Remaining Extent of Portion 216 (Phase 2). This option is considered to be a viable option as an Alternative as there is a housing shortage in the area. The developer intends to revert to this option should it prove to be more viable in future. In this assessment, both options has been considered.

Please see Figure 1 for a copy of the proposed Layout plan and Figure 2 and 3 for an artist's impression of the proposed development. The following development parameters are proposed:

Phase 1	
Description	Area in square meters
SHOP 01	1578 m ²
SHOP 02 (LIQUOR STORE)	149 m ²
SHOP 03	149 m ²
SHOP 04 (ATM)	9 m ²
SHOP 05	139 m ²
SHOP 06 (SLEEPMASTERS)	111 m ²
SHOP 07 (PHARMACY)	523 m ²
SHOP 08	50 m ²
SHOP 09	398 m ²
SHOP 10 (PEP HOME)	249 m ²
SHOP 11	128 m ²
SHOP 12 (ATM)	9 m ²
SHOP 13 (RUSSELS)	350 m ²
SHOP 14 (PEP)	350 m ²
SHOP 15	199 m ²
SHOP 16 (PEP CELL)	50 m ²
SHOP 17 (ACKERMANS)	378 m ²
SHOP 18 (SPAR)	1 800 m ²
SHOP 19 (LIQUOR STORE)	298 m ²
SHOP 20 (HARDWARE)	1 370 m ²
DRIVE THRU 01	225 m ²
DRIVE THRU 02	305 m ²
TOTAL GROSS LEASABLE AREA	8 817 m²
PARKING PROVIDED	575 Parking Bays
Phase 2	
Description	Area in square meters
SHOP 101	669 m ²
SHOP 102	298 m ²
SHOP 103	423 m ²
SHOP 104	50 m ²
SHOP 105	423 m ²
SHOP 106	447 m ²
SHOP 107	448 m ²

SHOP 108	199 m ²
SHOP 109	199 m ²
SHOP 110	199 m ²
SHOP 111 (ATM)	9 m ²
SHOP 112	3184 m ²
SHOP 113	520 m ²
SHOP 114	197 m ²
SHOP 115	199 m ²
SHOP 116	527 m ²
SHOP 117	199 m ²
SHOP 118	199 m ²
SHOP 119	398 m ²
SHOP 120	100m ²
SHOP 121	398 m ²
SHOP 122	249 m ²
SHOP 123	249 m ²
SHOP 124	249 m ²
SHOP 125	448 m ²
SHOP 126	439 m ²
SHOP 127 (ATM)	9 m ²
SHOP 128	1168 m ²
SHOP 129	476 m ²
SHOP 130	50 m ²
SHOP 131	471 m ²
TOTAL GROSS LEASABLE AREA	12 988 m²
PARKING PROVIDED	788 Parking Bays
TOTAL GROSS LEASABLE AREA FOR PHASE 1 AND 2	21 805 m²
TOTAL PARKING PROVIDED FOR PHASE 1 AND 2	1 363 Parking Bays

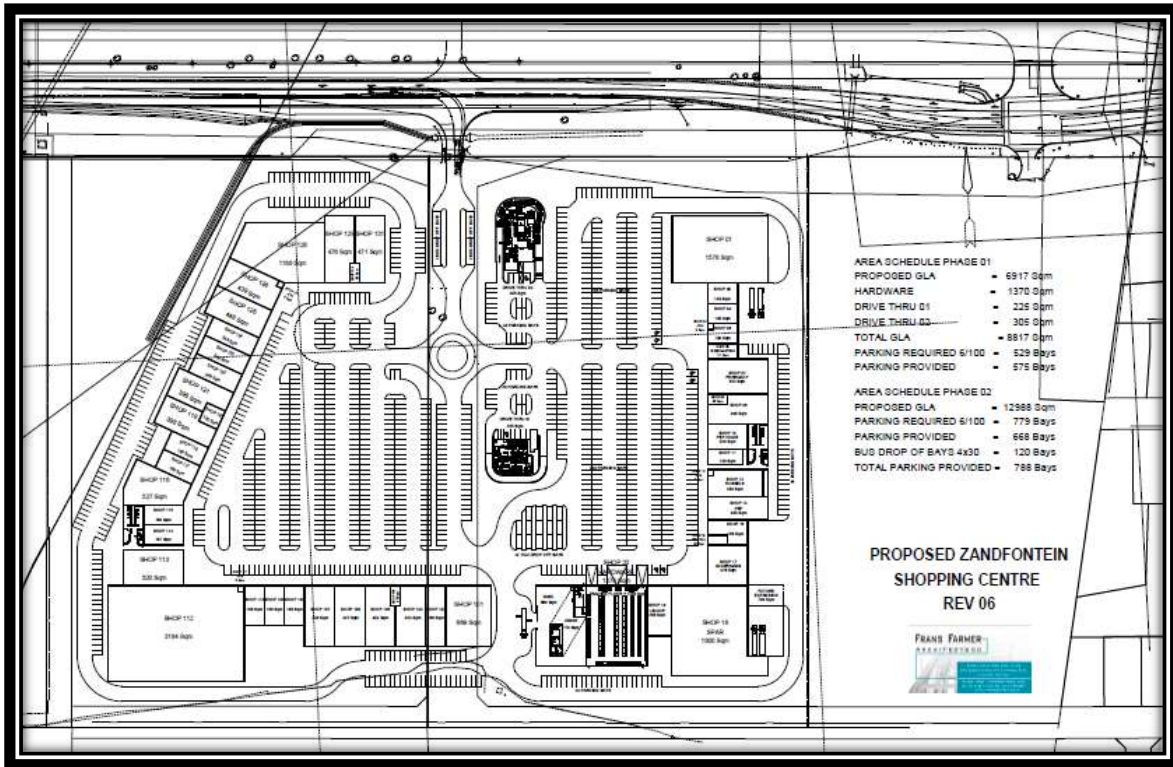


Figure 1: Proposed layout plan



Figure 2: Artist's impression of the proposed development



Figure 3: Artist's impression of the proposed development

3.1 BULK SERVICES

3.1.1 ROADS

3.1.1.1 Existing roads

The nearest road, constructed to the local authority (Gautrans) standards is Van Der Hoff road, situated on the Northern boundary of the development.

3.1.1.2 Proposed new infrastructure

It is proposed that the property obtain access from Van Der Hoff Road on the Northern boundary of the property. The proposed new access road towards the development with the relevant road upgrades will be determined by Gautrans based on the traffic impact study conducted by an appointed traffic engineer. The necessary approvals to construct the proposed access have been granted by the applicable authorities. See letter of approval below.



Roads and Transport Department Transportation Planning Division

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My ref: V10/1/2/1-Z1(Ptn 36&206)
Your ref: C2963/01AS
Contact person: Glacia Khumalo
Section: Intelligent Transport System and Traffic Engineering

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Civil Concepts (Pty) Ltd
PO Box 36148
Menlo Park
0102
Fax No.: 012 460 0005
mail@civilconcepts.co.za

07 September 2021

Dear Sir/Madam

ACCESS STUDY FOR THE RETAIL DEVELOPMENT TO BE LOCATED ON PORTIONS 36 AND 216 OF THE FARM ZANDFONTEIN 317-JR

Access study dated June 2021 prepared by Civil Concepts refers.

A. COMMENTS BY TRAFFIC IMPACT ASSESSMENT MANAGEMENT SUB-SECTION: Glacia Khumalo (glaciat@tshwane.gov.za, 012 358-3421)

The Traffic Impact Assessment Report prepared by Civil Concepts Consulting Engineers dated November 2019, received July 2021 refers:

CONDITIONS TO BE COMPLIED WITH PRIOR TO PROMULGATION

1. SPECIFIC CONDITIONS OF APPROVAL

1.1 The land use rights must be limited to the following and must be included in the Annexure T before approval of this application:

1.1.1 Industrial 1: Retail Centre limited to 9 538 m²

CONDITIONS TO BE COMPLIED WITH PRIOR TO THE APPROVAL OF ANY SITEDEVELOPMENT PLAN(S)

2. GENERAL CONDITIONS OF APPROVAL

2.1. Access Aspects

Roads and Transport • Paiee en Vervoer • Lefapha la Ditsela le Dipelangwa • Limhyango wezeeNdiela nezokuThutha • Kgoro ya Ditsela le Dinamehwa • Malesho wa Vhuendi na Dzibeda • Ndzewulo ya Megondzo na Vutleketi • Limhyango Wezemigwago Nezithuthi

ACCESS STUDY FOR THE RETAIL DEVELOPMENT TO BE LOCATED ON PORTIONS 36 AND 216 OF THE FARM ZANDFONTEIN 317-JR

2.1.1 Access to the site/development will be taken along new Link Road 100m away from its intersection with Van Der Hoff Road, and must be to the satisfaction of the City of Tshwane (CoT).

CONDITIONS TO BE COMPLIED WITH PRIOR TO THE ISSUING OF AN OCCUPATION CERTIFICATE

2.2. Road Upgrades

2.2.1 The proposed roads improvements discussed under section 9 of the report must be implemented at the applicant's own cost as follows:

2.2.1.1 Construct a new access road intersecting with Van Der Hoff Road R514 to form a new signalised junction. The intersection layout must be implemented as follows:

- **On the Eastern Approach:** Provide a left-turn slip of 60m storage length, a through lane with 120m storage length, and 120m long receiving lane.
- **On the Southern Approach:** Construct the southern leg of the T-junction i.e. Provide a left-turn lane, a right turn lane and a receiving.
- **On the Western Approach:** Provide exclusive right-turning lane of 60m storage length, an additional through lane of 120m storage length and left-turn slip of 60m storage length, a through lane of 120m long, and 120m long receiving lane.

2.2.2 All road infrastructure upgrades to roads under the jurisdiction of the CoT must be according to relevant, approved municipal standards.

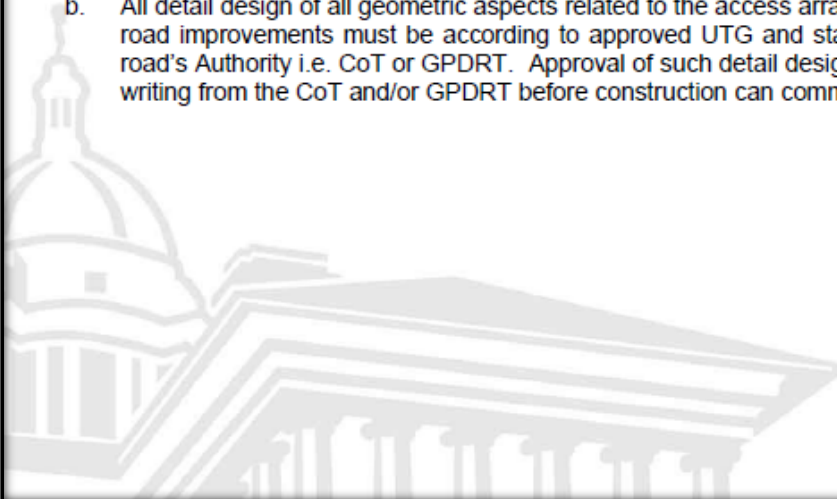
2.2.3 The applicant will be responsible to obtain any additional land to increase existing road reserve width that may be required for the provision of new roads or transportation infrastructure applicable to this development.

2.2.4 Road upgrades identified must be designed and constructed to the requirements and specifications of the relevant roads authority under which jurisdiction the specific route reserves.

2.3 Way Leaves

2.3.1 Before any construction work of whatever nature will be allowed, the following is to be obtained by the Developer:

- a. Way-leave approval from the metropolitan (CoT) and provincial (GPDRT) roads authorities for work within the relevant road reserves.
- b. All detail design of all geometric aspects related to the access arrangements and external road improvements must be according to approved UTG and standards of the relevant road's Authority i.e. CoT or GPDRT. Approval of such detail designs must be obtained in writing from the CoT and/or GPDRT before construction can commence.



ACCESS STUDY FOR THE RETAIL DEVELOPMENT TO BE LOCATED ON PORTIONS 36 AND 216 OF THE FARM ZANDFONTEIN 317-JR

2.4 Conditions for Land Use Applications

2.4.1 In addition to any other applicable road and transport infrastructure upgrades, the following facilities must be provided:

2.4.1.1 All loading and off-loading activities must take place on site and turning facilities for delivery vehicles must also be provided on site.

2.4.1.2 On-site parking, with sufficient manoeuvring space must be provided at the ratios as per Tshwane Town Planning Scheme, 2008, revised 2014 and it remains the responsibility of the applicant / land owners to ensure that sufficient parking is available on site. Should insufficient parking be available, additional parking must be provided or if not possible the land use must be restricted. All parts of the erf upon which motor vehicles are allowed to move or park must be provided with a permanent dust free surface.

2.4.2 A complete Site Development Plan must be submitted at the cost of the applicant, for approval by this Division, before any building construction may commence. Details regarding access, parking layout, site circulation, loading areas and stormwater drainage must be clearly shown on the Site Development Plan.

2.4.3 No building plans may be approved before a site development plan has been approved by this Division.

2.4.4 A non-removable physical barrier, preventing vehicular and pedestrian movement, must be erected on all the street erf boundaries, the approved accesses excluded.

2.4.5 Existing public and non-motorised transport infrastructure, e.g. cycle and pedestrian facilities, must be retained or replaced where affected by the proposed road upgrades.

2.5 Other comments

2.5.1 The traffic impact assessment only evaluates the traffic operations and does not evaluate neither the exact access positions nor the geometric designs. Approval of these aspects must be discussed separately with this Division. The approval of the Traffic Impact Study also does not imply that the alignment of any of the proposed roads is approved nor does this letter imply any conditions relating to the change in land-use process.

2.5.2 All internal road works, provision of sidewalks and provision of on-site parking as well as any costs associated with the proposed access to the site will all be for the account of the developer.

2.5.3 The applicant must comply with the access arrangements, parking demand and road upgrades as it will be agreed upon in further engagements between the Council and the developer.



ACCESS STUDY FOR THE RETAIL DEVELOPMENT TO BE LOCATED ON PORTIONS 36 AND 216 OF THE FARM ZANDFONTEIN 317-JR

A. COMMENTS BY TRAFFIC SYSTEMS MANAGEMENT:

Felicia Mbele (feliciamb2@tshwane.gov.za, 012 358-7725)

The study is supported subject to the following conditions:

- A recommended walkway of 1.8m wide or more, must be provided along Van der Hoff (aligning with the upgraded road), and the new Link road (from Van der Hoff intersection all the way to the access), and along the site frontage.
- Safe pedestrian crossing (RPC, pedestrian painted crossing lines, Zebra crossing etc.) is required and must be provided.
- A detailed design drawing for the proposed Traffic circle on the Site layout plan is required.
- Universal access (Pedestrian ramps) must be accommodated, proposed position to be shown on the drawing.

B. COMMENTS BY INTEGRATED TRANSPORT PLANNING:

Lerato Seakamela (leratosea@tshwane.gov.za, 012358 -1461)

The study is supported subject to the following condition:

- The developer must provide Pick up and drop off facilities for taxis on site at their own cost.

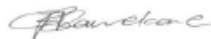
The applicant must engage further and come to an agreement with the Transport Planning Division, Integrated Transport Planning Section of the Transport and Roads Department of the CoT regarding the provision of public transport stated.

C. COMMENTS BY TRAFFIC SIGNALS MANAGEMENT:

Tebogo Lekalakala (tebogole@tshwane.gov.za, 012 358-7632)

- Left turning movement from the southern leg must also be permitted on phase C.

Kind Regards,



Lourens Swanepoel

For: DIVISIONAL HEAD: TRANSPORTATION PLANNING DIVISION

On request, this document can be provided in another official language.



3.1.2. STORMWATER DRAINAGE – Status and technical requirements

3.1.2.1 Existing storm water reticulation

An earth shaped stormwater channel currently runs thru the property entering the South Western corner of the property and exit close to the North Eastern corner, discharging into the road reserve. The natural slope of the remainder of the proposed development drains towards the North Eastern corner. The closest Tshwane council stormwater infrastructure is a low point concrete outlet structure, connected to a 1050dia pipe located in the City of Tshwane road reserve between Van Der Hoff Road & Malie Street on the North Eastern corner of development.

No flood lines are situated adjacent any boundary of the proposed township.

3.1.2.2 Proposed new infra-structure

Major Storm water System

The major storm flow will surface flow via the new internal parking area towards the North Eastern boundary of the site, where it will overflow to the lower laying area.

Minor Storm water System

A new proposed internal stormwater piped system will be designed and constructed for the 5 year flood. The internal system will connect to a newly constructed City of Tshwane stormwater pipe within the road reserve, which will convey the stormwater up to the existing 1050dia council stormwater main, situated on the North Eastern corner of the development.

The existing earth shaped stormwater channel will have to be re-routed in a controlled manner along the Western boundary line to discharge into Gautrans road reserve. The material, construction and testing of the storm water drainage system will comply with the SABS 1200 specifications.

The stormwater discharge will depend on the approval of all applicable authorities.

3.1.3 SEWAGE RETICULATION

3.1.3.1 Existing sewer reticulation

Existing 225dia sewer main is located along the Northern boundary line of the development. The pipe is located outside the road reserve, inside the building line & protected by a servitude in favour of the City of Tshwane.

3.1.3.2 Proposed new infrastructure

New 160dia Upvc pipes will be installed on the perimeter of the building to drain towards the existing 225dia council main along the Northern boundary. The proposed new 160dia erf connection will connect to an existing sewer manhole which is located in the lowest North Eastern corner. Council confirmed that the existing network do have sufficient capacity to accommodate the proposed development. Further upgrades will have to be confirmed by City of Tshwane Municipality.

3.1.3.3 Materials and construction

The proposed materials, construction and testing of the sewage reticulation Complies with the SABS 1200 specification.

Sewer pipes and fittings are uPVC Maincore class 400.

Manholes are 1 050 mm internal diameter, precast concrete manholes, constructed of dolomite aggregate (SABS 1294), with step irons (BS 1247). Type 2A (SABS 558) manhole covers will be used for carriageways and Type 4 (SABS 558) for servitudes.

3.1.3.4 Indicative sewage flow calculations

Flow calculations.

Sewer outflow = Total area 10 000m² @ 0.6kl/100m²/day = 60kl/day
= 60 000/24 x 3600
= 0.69l/s

3.1.4 PROVISION OF WATER

3.1.4.1 Existing water reticulation

City of Tshwane municipality indicated a 400dia & 700dia bulk water line which run within the Van Der Hoff road reserve along the Northern boundary line. These pipes are bulk supply mains and do not serve as networks distribution mains. The closest reticulation network line, is a 76dia Asbestos line installed parallel to the bulk mains up to the North Eastern corner of the property, connecting to a ring main network in Theo Slabbert Street which are approximately 700m towards the Eastern side of the proposed new development. Council confirmed that this pipe will not have sufficient capacity to accommodate the fire requirements for the development.

3.1.4.2 Proposed new infrastructure

Council suggest to upgrade the 76dia AC council main to a new 160dia Upvc Class 12 pipe, towards the existing 76dia water ring main network in Theo Slabbert Avenue which will have sufficient capacity to accommodate development. The approximate distance towards the connection is measured as 700m. Further upgrades will have to be confirmed by City of Tshwane Municipality.

3.1.4.3 Materials and construction

It is proposed that the materials, construction and testing of the water reticulation comply with the SABS 1200 series of specifications.

The more important materials may be summarized as follows:

- Pipe - uPVC class 12
- Bends - uPVC class 12
- Fitting: - uPVC class 12
- Valves - Class 16 gate valve SABS 664, non-rising spindle, anti-Clockwise closing, flanged

3.1.4.4 Water demand calculations

Flow calculations (Existing retail phase)

$$\begin{aligned}\text{Water demand} &= \text{Total area } 10\,000\text{m}^2 @ 0.4\text{kl}/100\text{m}^2/\text{day} = 40\text{kl}/\text{day} \\ &= 40\,000/24 \times 3600 \\ &= 0.46\text{l}/\text{s}\end{aligned}$$

6. DESCRIPTION OF THE PROPERTY

The property is located on Portion 36 and the Remaining Extent of Portion 216 of the Farm Zandfontein 317, JR, Gauteng Province. The proposed development falls within the City of Tshwane Metropolitan Municipality area of jurisdiction. The site is located within the urban edge and along the R514 road towards Hartbeesspoort dam. The proposed site is bound by the R514 (Van Der Hoff Rd) to the North, informal settlements to the South, Impala Truck City to the East and vacant land to the West. The street addresses are known as 1311 and 1321 Van der Hoff Street as for Portion 216 and Portion 36, respectively. See Figure 4 for a copy of the Locality Map.

The site is situated towards the north of the Witwatersberg ridge, with a regional slope direction towards the north to north-east. The site is situated between approximately 1 295 and 1 290 mamsl. The site-specific drainage is towards the NNE.

Although according to the Gauteng C-Plan, an area of 62 272m² is located within an Ecological Support area the Fauna and Flora Habitat survey conducted for the site has found that Vegetation as the site is **extensively disturbed**, modified and at some places transformed. A mixture of alien invasive and indigenous plant species exists at the site. Ecological sensitivity at the site is low.

According to the Screening Report generated, using the National Web Based Environmental Screening Tool, the site is located within the Gauteng Provincial Environmental Management Framework (GPEMF) Zone 1 and partially in Zone 5.

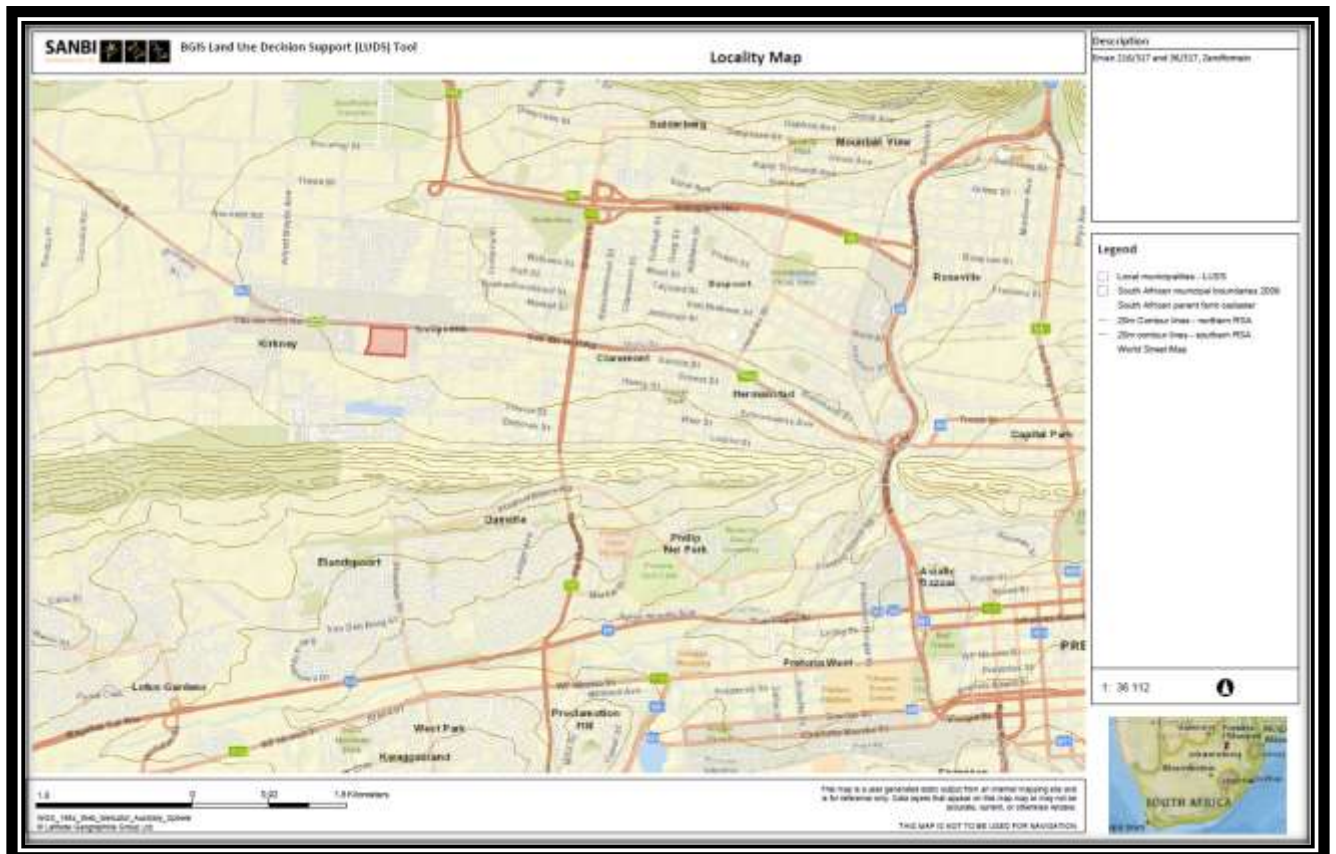


FIGURE 4: Locality Map

The Surveyor-general 21-digit site reference number are:

T	O	J	R	0	0	0	0	0	0	0	0	3	1	7	0	0	0	3	6
T	O	J	R	0	0	0	0	0	0	0	0	3	1	7	0	0	2	1	6

Site Co-ordinates

	Latitude (S):			Longitude (E):		
Alternative S1 (preferred or only site alternative)	25°	43'	01,30"	28°	06'	58.57"

7. DESCRIPTION OF THE ENVIRONMENT THAT MAY BE AFFECTED BY THE PROJECT

7.1 BIO-PHYSICAL ASPECTS

7.1.1 GEOLOGY TOPOGRAPHY AND SOIL

RockSoil Consult (Pty) Ltd. was appointed by ProPlan Technologies, representing GHDEVCO (Pty) Ltd., to conduct a Phase 1 shallow soil engineering geological assessment on Portion 216 and Portion 36 of the Farm Zandfontein 317-JR, Ward 55, Region 3, City of Tshwane Metropolitan Municipality, Gauteng Province, South Africa.

An initial fieldwork phase was conducted on 29 September 2021. A draft report, RS21041 V1.0, dated 15 December 2021 was provided to the client for commentary. The draft report stated that fill is present on-site and that infill work is recommended, including infill test pitting and waste classification. The client appointed an independent consultant to conduct the waste classification. The results are not available at the time of writing this report. The planners/developers should refer to the specialist input for planning and/or design purposes.

Infill test pitting was attempted by RockSoil Consult (Pty) Ltd. on 7 February 2022 to establish the vertical and lateral extent of the fill; however, the site was not trafficable due to excessive ongoing precipitation over the period, ponding water and saturated soft clay rendering the majority of the site inaccessible. The excavation equipment got stuck in the attempts and the infill test pitting was abandoned for time being. Re-establishment during a dryer period was suggested. The client requested formalisation of the report considering the available data obtained/available to date.

This report serves as a Phase 1 detailed shallow soil investigation considering the available data to date. The waste classification is addressed in a separate specialist report. This investigation is limited to a shallow soil engineering geological investigation with test pits positioned across the accessible areas of the site.

The area is seemingly zoned as Industrial 1 and mainly surrounded by Industrial 1 with Residential 1 and Industrial 2 towards the east and south-east and Residential 1, limited Residential 2, Special and Educational zonings in the immediate region. The planners should refer to registered and planned servitudes and/or planned routes that may bisect the site/s. Informal settlements are present towards the south and partially on the southern extent of the area of interest.

The site is situated towards the north of the Witwatersberg ridge, with a regional slope direction towards the north to north-east. The site is situated between approximately 1 295 and 1 290 mamsl. The site-specific drainage is towards the NNE. Localised high-spots of weathered shale fill is present towards the south-eastern portion of Erf 36. Relatively flat-lying areas are present that is expected to result in surface ponding immediately after heavy downpours.

The ground surface is mainly highly disturbed, and the presence of historic works, excavations, fill and foundations were identified, especially on the eastern erf, PTN 36. The 1:50 000-scale topographical sheet indicates historic excavations across the majority of PTN36. The 1:50 000-scale geological sheet indicates historic workings (mainly sand and clay pits) towards the south of the sites of interest. The 1:50 000-scale geological sheet indicates structures on PTN36 with notes on an historic brick works present on PTN36. The infrastructure was demolished; however, indications of the excavations/workings and foundation remains were identified during this assessment. Shallow concrete slabs were encountered on PTN36, indicating the presence of historic structures/foundations and relatively thick fill of mix origin were encountered across the site.

Geology

According to the 1:50 000 geological sheet 2528CA Pretoria, the site is underlain by shale of the Silverton Formation (T3mS) with quartzite of the Daspoort Formation (T3dQ) of the Pretoria Group towards the far south of the site with two thick diabase intrusions striking east-west through the northern and southern parts of the erven with a 30° to 45° dip to the north.

A large sand deposit (SG) is indicated to the south of the erven with brick-clay and shale (CS) on and immediately south of the erven.

This site is not underlain by potentially soluble dolomite or limestone formations and a dolomite stability investigation is therefore not required.

According to the geological maps and accompanied explanation no specific mineral deposits, except the sand/clay deposits for fine aggregate/brick-clay, are present on the site, and from surface evidence most of this material has been mined out.

The different materials or soil horizons encountered on this site is grouped into 9 material groups, namely:

1. Un-engineered fill of mix origin;
2. Surficial fill of shale origin (localised stockpiled);
3. Surficial fill Ash/Slag mix origin (centre site portion backfill);
4. Topsoil and/or colluvium;
5. Alluvium;
6. Residual shale;
7. Shale rock;
8. Residual diabase; and
9. Diabase rock.

The materials encountered are discussed in the following sections.

Un-engineered Fill of Mix Origin

Un-engineered fill of mix origin was encountered in all of the test pits excavated. The thickness of the fill varies between 0.20 m (TP07) to >2.70 m (TP02). The fill material varies between brick rubble to

residual diabase, topsoil and shale to dolerite residuum. Vertical and lateral extent of the fill, as encountered in the test pits excavated in the accessible portions of the site, is significant.

Surficial Fill of Shale Origin (Localised Stockpile)

Two stockpiles (Roughly 1 900 to 2 000m³ in total) of mainly weathered and residual shale origin is present on site, south of TP05 and west of TP10. The material contains a high percentage of highly to moderately weathered sub-angular to platy to slab-like shale gravel to small cobbles and scattered medium to large boulders.

Surficial Fill Ash/Slag Mix Origin (Centre Site Portion Backfill)

Un-engineered and uncontrolled ash, slag and soil mixtures are present across the central site portion. The majority of the centre site portion were not accessible at the time of conducting this investigation due to extensive surface borrows of generally between ≈ 0.5 and ≈ 1.1 m in depth, where the slag is extracted by the local community. Infill investigation was attempted during early February and the site were inaccessible by the TLB due to wet/saturated/ponding water conditions and soft upper soils. The thickness of the fill in the centre site portion is unknown. Test pit TP02 was terminated in fill at 2.7 mbgl (practical reach of the TLB in the material type). Fill of mix origin was encountered from surface to 0.6 mbgl, some slag and mix origin fill from 0.6 to 1.8 mbgl from where construction rubble comprising mainly brick fill was encountered from 1.8 mbgl to termination depth of 2.7 mbgl.

Topsoil and/or Colluvium

The natural topsoil and/or reworked colluvium horizon was encountered in test pits TP01 (0.50 to 1.70 mbgl), TP03 (0.60 to 0.80 mbgl), TP09 (0.50 to 0.90 mbgl), TP10 (1.10 to 1.90 mbgl), TP11 (0.50 to 0.90 mbgl) and TP12 (1.10 to 1.90 mbgl). The natural profile is generally identifiable by the lack of uncontrolled fill and material of mix origin and the upper slightly organic grey topsoil horizon that serves as a marker between the upper fill and lower natural soil profile.

Alluvium

Transported fine alluvial soils were encountered in test pits TP01, TP03, TP04, TP06, TP07, TP08, TP09, TP10, TP11 and TP12. Test pits TP02 and TP05 were terminated in fill and on an historic foundation/slab. The alluvium is generally identifiable by the grey colour and high fines content with scattered sub-angular to sub-rounded quartzite or quartz gravel and/or pebbles.

Residual Shale

Residual shale was logged in test pits TP03, TP04 and TP06. The level of confidence in the material origin is generally fair to low due to the deeply weathered and reworked profiles.

Shale Rock

Shallow shale rock was not confirmed during this shallow soil investigation. It is expected that the majority of the site is underlain by shale of the Silverton Formation, at depth.

Residual Diabase

Residual diabase was not encountered during this shallow soil investigation. Residual diabase may however be encountered with deeper or infill investigations, especially towards the southern boundary and northern boundary of the area of interest, as indicated by the 1:50 000-scale geological sheet.

Diabase Rock

Diabase rock was not confirmed during this shallow soil assessment; however, may be present towards the northern and southern site boundaries, as indicated on the 1:50 000-scale geological sheet.

Seasonal Seepage Water or Perched Water Tables

No seepage water was encountered in any of the test pits excavated on 29 September 2021. The eastern and centre portions of the area of interest are disturbed and the natural seepage water and/or water tables are expected to be affected by the workings. Some staining and Fe and Mn nodules (pedocrete formation) were recorded in some of the profiles, indicating expected seasonal seepage water conditions. Seasonal seepage water may be experienced at depths of between, but not limited to ≈ 1.0 and 3.2 mbgl.

Infill test pitting was attempted on 7 February 2022. The site was mainly inaccessible due to excessive water ponding and soft non-trafficable upper soils. Only two test pits were excavated during this infill investigation attempt (test pits TP11 and TP12). No water seepage was recorded by the field personnel during the open inspection periods of the test pits (+/- 30minutes per test pit).

Undermined Ground

The ground surface is mainly highly disturbed, and the presence of historic works, excavations, fill and foundations were identified, especially on the eastern erf, PTN 36.

The 1:50 000-scale topographical sheet indicate historic excavations across the majority of PTN36. The 1:50 000-scale geological sheet indicate historic workings (mainly sand and clay pits) towards the south of the sites of interest.

The 1:50 000-scale geological sheet indicates structures on PTN36 with notes on an historic brick works present on PTN36.

The infrastructure was demolished; however, indications of the excavations/workings and foundation remains were identified during this assessment. Shallow concrete slabs were encountered on PTN36, indicating the presence of historic structures/foundations and relatively thick fill of mix origin were encountered across the site.

Mining activities were limited to surface excavations and no surface instability due to undermining activities can occur. The excavation depths and thickness of backfill in the inaccessible centre portion of the area of interest could not be established during this shallow soil assessment that was limited to inspection depths of the TLB and current accessibility of the site.

Geotechnical Solutions

Geotechnical solutions generally eliminate or reduce the total soil movements to within limits which can be tolerated by buildings without distress by means of one of the following (SANS10400-H, 2012):

- a) Removal of the soil horizons that cause unacceptable differential movements and replacement of these horizons with inert material suitably compacted or the reuse of the excavated material as founding material in a compacted form;
- b) Founding of the wall footings at a deeper level than is commonly associated with normal construction, i.e. a suitable founding horizon below the horizons within which relatively large movements might take place (where soil conditions allow); and
- c) Densification of the soil horizons that cause unacceptable differential movement by means of surface compaction.

7.1.2 CLIMATE

The regional climate is considered “Cwa” according to the Köppen-Geiger climate classification (Climate-Data, 2021).

The average annual temperature is ~18.4°C with an average annual rainfall of ~661 mm. The temperature is highest on average in January, at around an average of 22.3°C. The lowest average temperature in the year occurs in July, at around an average of 12.0°C.

The variation in the precipitation between the driest and wettest months is ~115 mm. The variation in annual temperature is around 10.3°C. Most of the precipitation occurs from November to March.

The regional average, minimum and maximum temperatures are presented in **Table 1**. The regional average monthly rainfall and average amount of rainy days for each month is presented in **Table 2**.

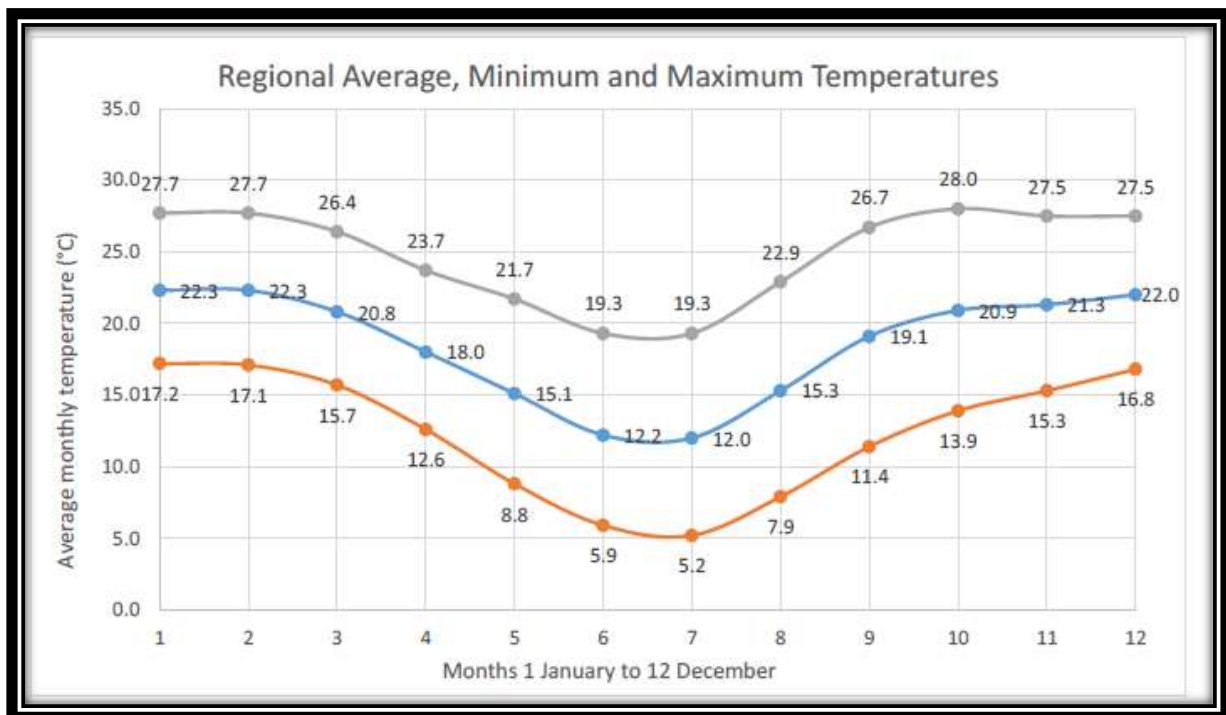


Table 1: Regional average, minimum and maximum temperatures (Climate-Data, 2021)

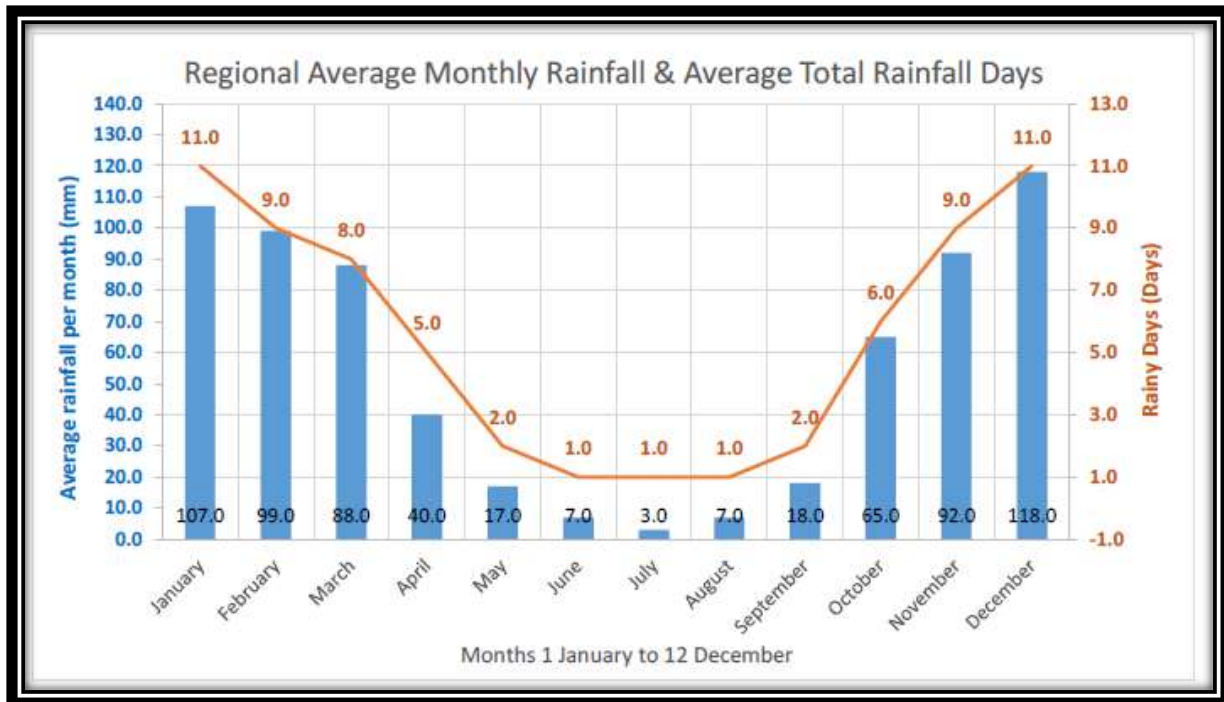


Table 2: Regional average monthly rainfall & average total rainfall days (Climate-Data, 2021)

Climate Change

According to: WIREs Climate Change 2014, 5605-620. Doi:10.1002/wcc.295: “Climate change is a key concern within South Africa. Mean annual temperatures have increased by at least 1.5 times the observed global average of 0.65°C over the past five decades and extreme rainfall events have increased in frequency. These changes are likely to continue. Climate change poses a significant threat to South Africa’s water resources, food security, health, infrastructure, as well as its ecosystem services and biodiversity. Considering South Africa’s high levels of poverty and inequality, these impacts pose critical challenges for national development. In relation to water, impact studies for the water resources sector have begun to look beyond changes in streamflow to changes in the timing of flows and the partitioning of streamflow into base flows and stormflows, reservoir yields, and extreme hydrological events. Spatially the eastern seaboard and central interior of the country are likely to experience increases in water runoff. Higher frequencies of flooding and drought events are projected for the future. Complexities of the hydrological cycle, influences of land use and management and the linkages to society, health, and the economy indicate far higher levels of complexity in the water resources sector than in other sectors. What has emerged is that land uses that currently have significant impacts on catchment water resources will place proportionally greater demands on the catchment’s water resources if the climate were to become drier. The influence of climate change on water quality is an emerging research field in South Africa, with assessments limited to water temperature and non-point source nitrogen and phosphorus movement. A critical interaction that has not been explored is between changes in water quality and quantity and the combined impacts, such changes might have impact on various types of water use, e.g., irrigation, domestic consumption, or aquatic ecosystems support”.

7.1.3 SURFACE DRAINAGE

An earth shaped stormwater channel current runs thru the property entering the South Western corner of the property and exit close to the North Eastern corner, discharging into the road reserve. The natural slope of the remainder of the proposed development drains towards the North Eastern corner. The closest Tshwane council stormwater infrastructure is a low point concrete outlet structure, connected to

a 1050dia pipe located in the City of Tshwane road reserve between Van Der Hoff Road & Malie Street on the North Eastern corner of development.

No flood lines are situated adjacent any boundary of the proposed township.

Absence of wetlands

Wetlands such as floodplain wetlands, channelled valley-bottom wetlands, unchannelled valley-bottom wetlands, depressions, seeps and wetland flats appear to be absent at the site. In conclusion no wetlands are found at the site.

7.1.4 GROUND WATER

No seepage water was encountered in any of the test pits excavated on 29 September 2021. The eastern and centre portions of the area of interest are disturbed and the natural seepage water and/or water tables are expected to be affected by the workings. Some staining and Fe and Mn nodules (pedocrete formation) were recorded in some of the profiles, indicating expected seasonal seepage water conditions. Seasonal seepage water may be experienced at depths of between, but not limited to \approx 1.0 and 3.2 mbgl.

Infill test pitting was attempted on 7 February 2022. The site was mainly inaccessible due to excessive water ponding and soft non-trafficable upper soils. Only two test pits were excavated during this infill investigation attempt (test pits TP11 and TP12). No water seepage was recorded by the field personnel during the open inspection periods of the test pits (+/- 30minutes per test pit). Infiltration of seepage water can be expected during and towards the end of the wet season.

7.1.5 FAUNA AND FLORA

The site is situated at the Savanna Biome (Mucina & Rutherford 2006). Savanna Biome at the site is represented by the Moot Plains Bushveld vegetation type (Mucina & Rutherford 2006) of which an outline follows.

SVcb 8 Moot Plains Bushveld

In South Africa Moot Plains Bushveld is found in North West and Gauteng Provinces. Main belt of this vegetation type occurs immediately south of the Magaliesberg from the Selons River Valley in the West through Maanhaarrand, filling the valley bottom of the Magalies River, proceeding east of the Hartebeestpoort Dam between the Magaliesberg and Daspoort mountain ranges to Pretoria. It also occurs as a narrow belt immediately north of the Magaliesberg from Rustenburg in the west to just east of the Crocodile River in the east; also south of the Swartruggens-Zeerust line. Altitude at this vegetation type is typically about 1050-1450 m.

Vegetation and landscape features comprise open to closed, low, often thorny savanna dominated by various species of *Acacia* in the bottomlands and plains as well as woodlands of varying height and density on the lower hillsides. Herbaceous layer is dominated by grasses (Mucina & Rutherford, 2009).

Important taxa: Small trees: *Acacia nilotica*, *Acacia tortilis* subsp. *heteracantha*, *Searsia lancea*. Tall shrubs: *Buddleja saligna*, *Euclea undulata*, *Olea europaea* subsp. *africana*, *Grewia occidentalis*, *Gymnosporia polyacantha*, *Mystroxydon aethiopicum* subsp. *burkeanum*. Low shrubs: *Aptosimum elongatum*, *Felicia fascicularis*, *Lantana rugosa*, *Teucrium trifidum*. Succulent shrub: *Kalanchoe paniculata*. Woody Climber: *Jasminum breviflorum*. Herbaceous climber: *Lotononis bainesii*.

found at the site and these include *Argemone ochroleuca*, *Datura ferox*, *Datura stramonium*, *Gomphrena celosioides*, *Schkuhria pinnata*, *Tagetes minuta*, *Conyza bonariensis*, *Malva parviflora*, *Verbena aristigera*, *Bidens bipinnata*, *Bidens pilosa* and *Flaveria bidentis*.

- Rocky ridges are absent at the site.
- No wetlands appear to be present at the site.
- Savanna at the site is represented by the Moot Plains Bushveld (SVcb 8) vegetation type which is not listed as a Threatened Ecosystem, according to the National List of Threatened Ecosystems (2011).
- Threatened and Near Threatened animal and plant species appear to be absent. Other animal or plant species of particular conservation concern also appear to be absent at the site.
- The scope for the site to be a corridor of particular conservation importance is small.
- Ecological sensitivity at the site is low.
- Following the mitigations which will be upheld and planned footprint for development all the impact risks listed above are moderate or low.
- If the development is approved continued monitoring and eradication of alien invasive plant species are imperative. It is in particular declared alien invasive species such as *Melia azedarach* (Syringa) and alien invasive Australian *Acacia* species (Australian wattles) that should not be allowed to establish.

If the development is approved an opportunity presents itself to cultivate indigenous plant species which would benefit urban nature conservation

7.2. SOCIO ECONOMIC FACTORS

7.2.1. SOCIAL AMENITIES

Tshwane Metropolitan Municipality's SDF highlights the fact that retail is one of the most dynamic urban land uses or activities of our cities, towns and rural areas. The retail sector is a significant catalyst for urban development in Tshwane. Shopping centers have influenced and changed the spatial direction in many areas. The demand for retail space is mainly driven by consumer characteristics and profiles, population numbers and growth, and the level of disposable income per subarea. In addition, the success of the retail sector is very much a function of economic conditions on the macro and micro level, changes in shopping behavior, new retail formats, changes in the rest of the urban environment, as well as shopper preferences. Lifestyles play an important role in what goods and services consumers purchase.

The site has excellent visibility from the R514 (Hermanstad/Van der Hoff Road). The (R514) Retail/Commercial and Industrial development corridor accommodates approximately 15,000 workers, of which 62% are industrial/commercial workers and 14% retail workers. This area is regarded as the twelfth largest job opportunity node in Tshwane. Most of the activities, especially retail are taking place to the East of the R55 (Dense level of activity. Other businesses along this road are automotive related, Chicken farms and nurseries. The proposed site is located in a developing node. Buses and taxis currently drive past the site. The planned PWV9 freeway could have positive spin-offs for the envisaged retail development when it materializes. The proposed and currently underway residential developments could be expected to increase the market for the planned centre.

The R514 is a retail corridor especially to the East. The retail that is currently interacting with the R514 traffic currently have poor or complicated access from the R514. Therefore, this retail development should have good micro access from the R514. The opinion is being held that the proposed development will strengthen the retail sector within the area, due to the provision of a shopping centre within the urban area. The impacts of the proposed shopping centre on the economy of the area are considered to be long term in duration, local in extent with a high (positive) significance. The likelihood of these impacts materialising, should the development be established is considered to be definite.

During the construction phase, temporary employment will be created. The increased employment in the area during the construction phase will also result in increased expenditure, which, in addition, will mean that more than just the proposed jobs required for the construction on the site will be created due to economic spin-offs that will result.

The retail study conducted for the proposed development concluded that: *“A neighbourhood type centre is suitable for the site. The retail could grow organically as the residential and commercial market grows in the node.”*

7.2.2. AIR QUALITY

“The extent and toxicity of emissions is not necessarily a concise indicator of contributions to ground-level air pollution concentrations or of risks to health and the environment. Such contributions are also a function of the height of emission, temporal variations in the release of pollutants, and the proximity of the source to the people or the environment affected by exposure to the pollutant (such as, for instance, children, or the elderly, or people who are ill, or others who may be particularly sensitive receptors to a specific pollutant above a certain concentration). If an industry is operating close to a school or hospital or centre for the elderly, the potential exposure (in combination with the other contributing factors) is high.

Three factors govern the significance of household fuel-burning emissions:

- (i) the low level of emissions (that is, their height above the ground is generally about 3 m, within people’s breathing zone);*
- (ii) the simultaneous occurrence of peak emissions (during the coldest months of winter and in the early mornings and throughout the evenings) and poor atmospheric dispersion (stable atmosphere with low wind speeds, with the possible development of temperature inversions); and*
- (iii) the release of such emissions within high human exposure areas, given that such emissions generally occur in dense, low-income settlements where population density is high (in addition, the pollution is not only outdoors, but frequently indoors as well, due to poor ventilation, so it affects the whole family).*

The significance of vehicle emissions as contributors to air-pollutant concentrations and health risks is similarly increased by the low level (close to the ground) of the emissions, and their proximity to highly populated areas – on highways, for example, with emissions being particularly high when traffic is congested. Vehicle emissions tend to peak early in the morning and in the evenings, when the potential for atmospheric dispersion is reduced (for example, wind speeds are generally low in the early mornings and evenings, reducing their potential for dispersing pollution).

Given the high volumes of pollutants emitted from fuel-burning within the industrial and power-generation sectors, their contribution to ambient concentrations and public health risks is often lower than might be expected. This is because these sources are generally characterized by constant releases, relatively high above ground level, and further away from residential settlements than are household fuel-burning and vehicle emissions.

Ranking the significance of different sources of pollution on the basis of the total emissions for which each source is responsible would, for example, place industrial emissions above household fuel-burning. If the aim is to reduce impacts on human health, however, then household fuel-burning would need to be targeted as a top priority (Scorgie et al., 2004d).

Historically, air pollution control in South Africa has primarily emphasized the implementation of 'command and control' measures in the industrial sector. The shift from source-based control, to the management of the air that people breathe, emphasizes the importance of targeting a wider range of sources and using more flexible and varied approaches. It means paying greater attention to ambient air quality, as it is more important (and more cost-effective, in many cases) to make sure that the ambient air complies with air quality standards. This approach ensures that human and environmental health is protected and that the cumulative impact of pollution from a number of sources is addressed.

Approaches adopted or considered for future implementation have included: regulation (for example, the use of Atmospheric Emission Licences for Listed Activities); market instruments (such as atmospheric user-charges and pollution taxes); the potential for voluntary agreements, education and awareness raising; and emissions trading. International experience shows that adopting a mix of instruments and interventions is more effective than using a single instrument to improve air quality across various types of source. Although direct regulation remains important in controlling industrial sources, there is evidence that specifying emission limits is more effective than specifying the use of particular technologies, so as to give companies flexibility in selecting the method of achieving success that suits them best. This approach is advocated as being more cost-effective and more likely to stimulate technological advances in pollution control methods and production processes.

For large point sources (that is, sources of pollution that are concentrated on one site, but that have large, constant volumes of many types of pollution) that are few in number, instruments such as emissions trading have been advocated as an effective way to manage pollutant emissions and reduce the costs of compliance.

Implementing an efficient social protection system to alleviate poverty is central to maintaining conditions that facilitate not only economic growth but also environmental sustainability. Many South African households – including those with access to electricity – use coal, wood, and paraffin, due to the relative cost-effectiveness of such fuels for heating (that is, space heating) and cooking purposes.

Many low-cost housing developments and informal settlements are located close to industrial and mining operations, as such land is both available and inexpensive. Poorer communities are more likely to suffer from poor service delivery, including inadequate waste removal that sometimes results in refuse being set alight illegally. These examples show that poverty alleviation could help to improve air quality by enabling people to choose practices that are friendlier to the environment.”

https://www.environment.gov.za/sites/default/files/docs/stateofair_airqualityand_sustainable_development.pdf Date visited: 17/03/2020.

The proposed development is planned and will eventually be developed with the above mentioned in mind. In addition to the above, it should be noted that the project will however create a certain amount of dust during the construction phase. If proper dust suppression measures are implemented this variable will have very little impact (low in intensity and significance during the construction phase).

7.2.3. NOISE

A certain amount of noise will be generated during the construction phase of the project. Noise levels should however rarely exceed the allowable limits. It is unlikely that the project will create any more noise during the operational phase than that already experienced on site with it being bordered by the R514.

7.2.4. ARCHAEOLOGY AND CULTURAL SITES

Background research indicates that there are some cultural heritage sites and features in the larger geographical area within which the study area falls. No sites, features or material of cultural heritage (archaeological and/or historical) origin or significance were found in the study & development area during the assessment. The area would have been used in the historical past for agricultural purposes, while recent urban residential & industrial related developments and activities have had a major impact on the area. Encroaching informal settlement has also impacted on the area. Aerial images of the study and proposed development area footprint from 2005 onwards clearly shows the impacts of activities such as quarrying, other developments and the dumping of refuse and building material on the land. If any sites or features with a cultural heritage origin did exist here in the past it would have been extensively disturbed or destroyed as a result.

It should be noted that although all efforts are made to locate, identify and record all possible cultural heritage sites and features (including archaeological remains) there is always a possibility that some might have been missed as a result of grass cover and other factors. The subterranean nature of these resources (including low stone-packed or unmarked graves) should also be taken into consideration. Should any previously unknown or invisible sites, features or material be uncovered during any development actions then an expert should be contacted to investigate and provide recommendations on the way forward.

Finally, based on the desktop research & physical field assessment of the area it is recommended that the proposed development can continue taking the above measures into consideration.

7.2.5 AESTHETICS

Although the site is located within an Ecological support area, vegetation at the site appears to be degraded, modified or in some areas transformed. Vegetation at the site is **extensively disturbed**, modified and at some places transformed. A mixture of alien invasive and indigenous plant species exists at the site. Threatened and Near Threatened animal and plant species appear to be absent. Other animal or plant species of particular conservation concern also appear to be absent at the site.

The ground surface is highly disturbed, and the presence of historic works, excavations, fill and foundations were identified. The 1:50 000-scale topographical sheet indicates historic excavations across the majority of Portion 36. The 1:50 000-scale geological sheet indicates historic workings (mainly sand and clay pits) towards the south of the sites of interest. The 1:50 000-scale geological

sheet indicates structures on Portion 36 with notes on a historic brick works present on Portion 36. The infrastructure was demolished; however, indications of the excavations/workings and foundation remains were identified during this assessment. Shallow concrete slabs were encountered on Portion 36, indicating the presence of historic structures/foundations and relatively thick fill of mix origin were encountered across the site.

As mentioned above, Slag, Ash and G5 Ash has been dumped on the site and has the potential to generate acid that could potentially pollute the soil and ground water of the area. If the development is approved, these waste materials will be removed to a suitable waste site where it will be contained.

An earth shaped stormwater channel currently runs through the property entering the South Western corner of the property and exit close to the North Eastern corner, discharging into the road reserve. The natural slope of the remainder of the proposed development drains towards the North Eastern corner. The closest Tshwane council stormwater infrastructure is a low point concrete outlet structure, connected to a 1050dia pipe located in the City of Tshwane road reserve between Van Der Hoff Road & Malie Street on the North Eastern corner of development.

The existing earth shaped stormwater channel will have to be re-routed in a controlled manner along the Western boundary line to discharge into Gautrans road reserve. The material, construction and testing of the storm water drainage system will comply with the SABS 1200 specifications. The impact of the formalization of the storm water structures in the area is considered to be long term in duration, local in extent with a high (positive) significance. The likelihood of these impacts materialising, should the development be established is considered to be definite.

No sites, features or material of cultural heritage (archaeological and/or historical) origin or significance were found in the study & development area during the assessment.

Visual Intrusion is defined as the level of compatibility or congruence of the project with the particular qualities of the area, or its 'sense of place'. This is related to the idea of context and maintaining the integrity of the landscape or townscape.

High visual intrusion – results in a noticeable change or is discordant with the surroundings;

Moderate visual intrusion – partially fits into the surroundings, but clearly noticeable;

Low visual intrusion – minimal change or blends in well with the surroundings.

The proposed development will change the scenic resources of the local area from an undeveloped site to a shopping Centre. The visual intrusion is considered to be moderate as the proposed development fits into the surroundings but will be noticeable.

The proposed development will require additional lighting on and in buildings and possibly along roads. This will change the night landscape from unlit to lit

8. ENVIRONMENTAL MANAGEMENT OBJECTIVES AND TARGETS

The following table is a summary of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process.

ENVIRONMENTAL ASPECTS	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS
DOCUMENTATION AND TRAINING		
The necessary documentation must be available in the site office	Ensure that all concerned is aware of the EMPr and related environmental aspects	Availability of documents Trained and informed workforce.
SITE ACCESS & TRAFFIC MANAGEMENT		
Access roads may increase the construction footprints	Construction vehicles, machinery and workers must be restricted to the designated access roads, and may not drive through undeveloped vegetation outside of the existing access route except where that vegetation falls within the authorised working area (development footprint) at the site.	Minimizing eradication of vegetation.
VEGETATION CLEARING		
Vegetation will be cleared from within the footprint of the working area, before earthmoving and construction activities commence.	Vegetation clearing may only commence once the working area has been clearly demarcated to the ECO's satisfaction.	Land clearing must be restricted to the demarcated working area, and no vegetation may be cleared outside of the demarcated working area.
TOPSOIL & SUBSOIL MANAGEMENT		
Topsoil (where present) will be removed from any area where physical disturbance of the surface will occur.	Removed topsoil and subsoil should be stockpiled for the duration of the active construction period, and utilized for the final landscaping and rehabilitation of disturbed areas on site	The topsoil must be adequately protected from being blown away or eroded by storm water. Removed subsoil should be stockpiled separately from topsoil. Topsoil should be the final layer applied during rehabilitation, after subsoil/ spoil material has been placed and shaped on the site
EXCAVATIONS & EARTHWORKS		
It will be necessary to employ heavy machinery (excavators, back-actors, bulldozers, dump trucks etc.) for the earthmoving required	Use of heavy machinery can substantially increase the likelihood, intensity and significance of potential negative environmental impacts, and it is thus essential that earthworks be performed under constant supervision, and that operators must be made aware of all the environmental obligations, as there is always the potential to inflict damage to sensitive areas.	Use of machinery should be restricted to only that which is strictly required, and the unnecessary or excessive movement/ use of such machinery must be kept to a minimum. Machinery must enter and exit the site via the indicated access roads and not in any other location. Excavations and earth-moving may only take place within the demarcated working area
DANGEROUS AND TOXIC MATERIALS (CHEMICALS)		
Safe storage of chemicals See also below for further aspects on this subject	Clean environment	No spills of chemicals

ENVIRONMENTAL ASPECTS	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS
<p>Vegetation</p> <p>The contractor must avoid vegetated areas that will not be cleared.</p>	<ul style="list-style-type: none"> • Minimise disturbance and loss of soil • Minimise construction footprint <p>Minimise impacts on vegetation</p>	<p>Limit impact on vegetation</p>
<p>Waste management</p> <p>Any illegal dumping of waste must not be tolerated. This aspect must be closely monitored and reported on; proof of legal dumping must be able to be produced on request. Bins must be clearly marked for ease of management. Sufficient closed containers must be strategically located around the construction site to handle the amount of litter, wastes, rubbish, debris, and builder's wastes generated on the site.</p>	<ul style="list-style-type: none"> • Sustainable management of waste; to keep the site neat and tidy. This will control potential influx of vermin and flies thereby minimising the potential of diseases on site and the surrounding environment. It will also minimise the potential to pollute soils, water resources and natural habitats 	<ul style="list-style-type: none"> • Disposal of rubble and refuse in an appropriate manner with no rubble and refuse lying on site • Sufficient containers available on site
<p>Dust</p> <p>Dust production must be controlled by regular watering of roads and works area, should the need arise.</p>	<p>Reduce dust fall out</p>	<p>No visible signs of dust</p>
<p>SAFETY</p>	<p>Children's access to construction site controlled,</p> <p>Access to construction camp controlled</p> <p>Safety aspects considered</p>	<p>No children on construction site</p> <p>Safety fence and controlled access available</p> <p>Safety signs with necessary information displayed</p>

9. ENVIRONMENTAL IMPACT MANAGEMENT OUTCOMES

9.1 ASSESSMENT CRITERIA

Impacts were rated and are discussed in detail – see BAR for detailed impact assessment.

9.2 ENVIRONMENTAL IMPACT MANAGEMENT OUTCOMES

9.2.1 THE FOLLOWING ENVIRONMENTAL IMPACT MANAGEMENT OUTCOMES HAS BEEN IDENTIFIED FOR THE “NON-OPERATIONAL” (PRE-CONSTRUCTION AND CONSTRUCTION PHASE) PHASE OF THE PROPOSED DEVELOPMENT:

1. A full copy of the signed EA from GDARD in terms of NEMA, granting approval for the development must be available on site
2. A copy of the EMPr as well as any amendments thereof must be available on site.
3. Conduct an infill geotechnical investigation to establish the vertical and lateral extent of the expected and partially identified fill region towards the centre portion of the investigated area (currently assigned Zone II), once the site is accessible/trafficable
4. Slag, Ash and G5 Ash should be removed and disposed of at a suitable licensed site (GLB+). The waste has been classified as Type 3 waste.
5. A suitably qualified ECO must be appointed.
6. Impacts on the environment must be minimised during site establishment and the development footprint must be kept to the approved development area.
7. Vegetation clearing may not commence until such time as the development footprint has been clearly defined.
8. No clearance of vegetation outside of the development footprint may occur.
9. At the end of the construction phase the site and its surrounding area must be free from any pollution that originated as a result of the construction activities.
10. No disturbance of topsoil & subsoil may commence until such time as the development footprint has been clearly defined.
11. No disturbance of topsoil & subsoil outside of the development footprint may occur.
12. At the end of the construction phase the site and its surrounding area must be free from any chemical, fuel, oil and cement spills that originated as a result of the construction activities.
13. At the end of the construction phase the site and its surrounding area must be free from any sewage that originated as a result of the construction activities.
14. At the end of the construction phase the site and its surrounding area must be free from any hazardous or general waste pollution that originated as a result of the construction activities.
15. Dust prevention measures must be applied to minimise the generation of dust.
16. Noise prevention measures must be applied to minimise the generation of unnecessary noise pollution as a result of construction activities on site.

17. Absolutely no burning of waste is permitted.
18. Fires will only be allowed in facilities especially constructed for this purpose.
19. No hunting of animals will be allowed.
20. No intentional destruction of any sites, features or material of cultural heritage (archaeological and/or historical) origin or significance may occur.
21. All Contractors and sub-contractors must abide to the rules and regulations of the Occupational Health and Safety Act, 85 of 1993.

10. MITIGATION MEASURES

NON-OPERATIONAL ENVIRONMENTAL MANAGEMENT PROGRAMME					
ENVIRONMENTAL ASPECT	ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME	ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS			RESPONSIBLE PERSON
		Pre-construction phase	Construction phase	Operational phase	
ENVIRONMENTAL DOCUMENTATION REPORTING AND COMPLIANCE	A full copy of the signed EA from GDARD in terms of NEMA, granting approval for the development must be available on site	Obtain the Environmental Authorization and plan to have a copy of the signed EA on site.	Ensure that a signed copy of the EA is available in the site office	No action required	The Applicant, assisted by the EAP to be monitored by the ECO
	A copy of the EMPr as well as any amendments thereof must be available on site	Ensure that a site specific EMPr is compiled and approved and plan to have a copy of the approved document on site	Ensure that a copy of the approved EMPr is available in the site office	No action required	The Applicant, assisted by the EAP to be monitored by the ECO
	A suitably qualified ECO must be appointed.	Prior to the start of construction activities, an ECO must be appointed to ensure that an Environmental	Ensure that the ECO document is available on site and that everyone on site is informed and trained regarding their Environmental obligations in terms of the EA and EMPr.	No action required	The Applicant and the ECO

NON-OPERATIONAL ENVIRONMENTAL MANAGEMENT PROGRAMME					
ENVIRONMENTAL ASPECT	ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME	ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS			RESPONSIBLE PERSON
		Pre-construction phase	Construction phase	Operational phase	
		Control document is compiled. This document must explain the roles and responsibilities of everyone involved and must also contain an Environmental awareness training manual.	Records of training sessions must be kept on site.		
			ECO's report must be an item on monthly site meeting agenda	No action required	The project manager.
		The ECO must ensure that the contractor provides method statements for the various environmental aspects.	The method statements must be available in the site office	No action required	The Applicant and the contractor must ensure that the method statements are developed and approved by the ECO
SITE ESTABLISHMENT	Impacts on the environment must be minimised during site	A Land surveyor must peg the parameters of the	Construction vehicles, machinery and workers must be restricted to only operate within the approved development footprint.	No action required	The developer must ensure that a Land surveyor

NON-OPERATIONAL ENVIRONMENTAL MANAGEMENT PROGRAMME					
ENVIRONMENTAL ASPECT	ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME	ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS			RESPONSIBLE PERSON
		Pre-construction phase	Construction phase	Operational phase	
	establishment and the development footprint must be kept to the approved development area.	development footprint.	<p>The development footprint must be clearly demarcated and the extent of this area must be communicated to all contractors and sub-contractors.</p> <p>Existing access roads must be utilised to access the site camp(s) and working/ construction areas</p> <p>Appropriate traffic management strategies must be implemented to ensure the safety of construction vehicles and other road-users. If needed, signage to warn other road users of the presence of construction vehicles should be erected at appropriate locations, where the signage will be clearly visible to potentially affected road users.</p>		pegs the parameters of the development footprint and that all concerned are trained in this regard. The ECO will monitor compliance.
GEOLOGY AND SOIL					
The ground surface is highly disturbed, and the presence of historic works, excavations, fill and foundations were identified. The 1:50 000-scale topographical sheet indicates historic	Construction must be in accordance with the recommendations as prescribed by the Geo-Technical Engineer.	Considering the special site conditions with reference to 1) historic workings, 2) remanence of infrastructure and foundations, 3) presence of	Remove and replace uncontrolled and un-engineered backfill with controlled and engineered backfill as per designs of the Engineer.	No action required	Developer and Geo-Technical Engineer.

NON-OPERATIONAL ENVIRONMENTAL MANAGEMENT PROGRAMME					
ENVIRONMENTAL ASPECT	ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME	ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS			RESPONSIBLE PERSON
		Pre-construction phase	Construction phase	Operational phase	
excavations across the majority of PTN36. The 1:50 000-scale geological sheet indicates historic workings (mainly sand and clay pits) towards the south of the sites of interest. The 1:50 000-scale geological sheet indicates structures on Portion 36 with notes on an historic brick works present on Portion 36. The infrastructure was demolished; however, indications of the excavations/workings and foundation remains were identified during this assessment. Shallow concrete slabs were encountered on Portion		significant uncontrolled and un-engineered backfill and restricted accessibility, the following are recommended: a) It will be in the best interest of the client and role-players to conduct an infill geotechnical investigation to establish the vertical and lateral extent of the expected and partially identified fill region towards the centre portion of the investigated area (currently assigned Zone II), once the site is accessible/trafficable			

NON-OPERATIONAL ENVIRONMENTAL MANAGEMENT PROGRAMME					
ENVIRONMENTAL ASPECT	ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME	ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS			RESPONSIBLE PERSON
		Pre-construction phase	Construction phase	Operational phase	
36, indicating the presence of historic structures/foundations and relatively thick fill of mix origin were encountered across the site					
Slag, Ash and G5 Ash have been dumped on site	At the end of construction, no Slag, Ash and G5 Ash will be allowed to remain on site.	Additional analyses performed on the sampled material indicate that all three samples have the potential to generate acid. Considering the rock classification, both the Ash and G5 Ash classify as Type I rock, which is potentially acid-forming, while the Slag has moderate acid-forming potential. When the results were compared to the	Remove Slag, Ash and G5 Ash to a suitable licenced site (GLB+).	No action required.	Developer and Geo-Technical Engineer.

NON-OPERATIONAL ENVIRONMENTAL MANAGEMENT PROGRAMME					
ENVIRONMENTAL ASPECT	ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME	ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS			RESPONSIBLE PERSON
		Pre-construction phase	Construction phase	Operational phase	
		NPR screening criteria, all the samples were likely to generate AMD. The material should be removed and disposed of at a suitable licenced site (GLB+). The waste has been classified as Type 3 waste.			
VEGETATION CLEARING	<p>Vegetation clearing may not commence until such time as the development footprint has been clearly defined.</p> <p>No clearance of vegetation outside of the development footprint may occur.</p>	A Land surveyor must peg the parameters of the development footprint.	<p>Land clearing must be restricted to the demarcated working area, and no vegetation may be cleared outside of the demarcated working area.</p> <p>Eradicate alien invasive plant species as described in the specialist's report.</p> <p>Avoid clearing the entire site, instead only clear areas required for foundations.</p> <p>Prohibit vehicular or pedestrian access into natural areas beyond the demarcated boundary of the construction area.</p>	No action required	The developer must ensure that a Land surveyor pegs the parameters of the development footprint and that all concerned are trained in this regard. The ECO will monitor compliance.

NON-OPERATIONAL ENVIRONMENTAL MANAGEMENT PROGRAMME					
ENVIRONMENTAL ASPECT	ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME	ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS			RESPONSIBLE PERSON
		Pre-construction phase	Construction phase	Operational phase	
			<p>The clearing of vegetation and disturbance of soils should be done considering the potential for subsequent erosion.</p> <p>Cleared vegetation and debris that has not been utilized must be collected and disposed of at a suitable waste disposal site. Under no circumstances may it be burned on site.</p> <p>The modified grassland can be removed as sods and stored within modified areas – remove alien invasive vegetation prior to storing grasslands sods in transformed areas. The sods must preferably be removed during the winter months and be replanted by latest springtime. The sods should not be stacked on top of each other. Once construction is completed, these sods should be used to rehabilitate the disturbed areas from where they have been removed. In the absence of timely rainfall, the sods should be watered well after planting and at least twice more over the next 2 weeks.</p>		

NON-OPERATIONAL ENVIRONMENTAL MANAGEMENT PROGRAMME					
ENVIRONMENTAL ASPECT	ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME	ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS			RESPONSIBLE PERSON
		Pre-construction phase	Construction phase	Operational phase	
			No painting or marking of rocks or vegetation to identify locality or other information will be allowed. Marking should be done by steel stakes with tags, if required. All temporary markings will be removed upon completion.		
STORM AND WASTE WATER MANAGEMENT	At the end of the construction phase the site and its surrounding area must be free from any pollution that originated as a result of the construction activities.	The developer must compile a storm water management plan.	Runoff from the cement/ concrete batching areas must be strictly controlled, and contaminated water must be collected, stored and either treated or disposed of off-site, at a location approved by the project manager	No action required	The developer must ensure that a storm water management plan is developed. The ECO must monitor compliance.
			All spillage of oil onto concrete surfaces must be controlled by the use of an approved absorbent material and the used absorbent material disposed of at an appropriate waste disposal facility.		
			No wastewater may run freely into any naturally vegetated areas. Run-off containing high sediment loads must not be released into drainage channels		
			Approval must be obtained from DW&S for any activities that require authorisation in terms of Section 39 of the National Water Act, 1998 (Act No. 36 of 1998).		

NON-OPERATIONAL ENVIRONMENTAL MANAGEMENT PROGRAMME					
ENVIRONMENTAL ASPECT	ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME	ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS			RESPONSIBLE PERSON
		Pre-construction phase	Construction phase	Operational phase	
			<p>Surface water or storm water must not be allowed to concentrate, or to flow down cut or fill sloped routes without erosion protection measures being in place</p>		
			<p>Ensure that storm water channels do not discharge straight down contours. These must be aligned at such an angle to the contours that they have the least possible gradient</p>		
			<p>To reduce the loss of material by erosion, the contractor must ensure that disturbance on site is kept to a minimum. The contractor is responsible for rehabilitating all eroded areas in such a way that the erosion potential is minimised after construction has been completed</p>		

NON-OPERATIONAL ENVIRONMENTAL MANAGEMENT PROGRAMME					
ENVIRONMENTAL ASPECT	ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME	ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS			RESPONSIBLE PERSON
		Pre-construction phase	Construction phase	Operational phase	
TOPSOIL & SUBSOIL	<p>No disturbance of topsoil & subsoil may commence until such time as the development footprint has been clearly defined.</p> <p>No disturbance of topsoil & subsoil outside of the development footprint may occur.</p>	A Land surveyor must peg the parameters of the development footprint.	<p>All areas to be stripped firstly of topsoil and fertile soils and stockpiled in a designated area.</p> <p>Do not mix sub-soil with topsoil and fertile soils.</p> <p>Topsoil and fertile soil to be protected from contamination (i.e. hydrocarbons or infertile material).</p> <p>Topsoil and fertile soil stockpiles to be protected from weathering conditions such as covering the stockpiles with indigenous, non-invasive vegetation.</p> <p>Removed topsoil and subsoil should be stockpiled for the duration of the active construction period, and utilized for the final landscaping and rehabilitation of disturbed areas.</p> <p>The topsoil must be adequately protected from being blown away or eroded by storm water. The topsoil storage area must be located on a level area outside of any surface drainage/ storm-water channels, and at a location where it can be protected from disturbance during</p>	No action required	<p>The developer must ensure that a Land surveyor pegs the parameters of the development footprint and that all concerned are trained in this regard.</p> <p>The Contractor will be responsible for the removal and correct stockpiling of the topsoil and subsoil.</p> <p>The ECO will monitor compliance.</p>

NON-OPERATIONAL ENVIRONMENTAL MANAGEMENT PROGRAMME					
ENVIRONMENTAL ASPECT	ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME	ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS			RESPONSIBLE PERSON
		Pre-construction phase	Construction phase	Operational phase	
			<p>construction and where it will not interfere with construction activities.</p> <p>Removed subsoil should be stockpiled separately from topsoil.</p> <p>Handling of topsoil should be minimized as much as possible, and the location of the topsoil berm should be chosen carefully to avoid needing to relocate the topsoil berm at a later date. Ideally, topsoil is to be handled twice only, once to strip and stockpile, and once to replace, level, shape and scarify.</p> <p>The topsoil berm may be a few meters wide but should ideally not be more than 0.5m high to allow sufficient light and air penetration.</p> <p>Topsoil should be the final layer applied during rehabilitation, after subsoil/ spoil material has been placed and shaped.</p>		
DANGEROUS AND TOXIC MATERIALS	At the end of the construction phase the site and its surrounding area must be free from any chemical, fuel, oil and cement spills that	CHEMICALS			The Contractor will be responsible for providing method statements. He will also be responsible for
		The Contractor must provide method statements for the storage and handling of chemicals on site.	<p>All hazardous substances must be stored in suitable containers as defined in the Method Statement;</p> <p>Containers must be clearly marked to indicate contents, quantities and safety requirements</p>	No Action required	

NON-OPERATIONAL ENVIRONMENTAL MANAGEMENT PROGRAMME					
ENVIRONMENTAL ASPECT	ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME	ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS			RESPONSIBLE PERSON
		Pre-construction phase	Construction phase	Operational phase	
	originated as a result of the construction activities.		<p>All storage areas must be bunded. The bunded area must be of sufficient capacity to contain a spill / leak from the stored containers</p> <p>Bunded areas to be suitably lined with a SABS approved liner</p> <p>An Alphabetical Hazardous Chemical Substance (HCS) control sheet must be drawn up and kept up to date on a continuous basis</p> <p>All hazardous chemicals that will be used on site must have Material Safety Data Sheets (MSDS);</p> <p>All employees working with HCS must be trained in the safe use of the substance and according to the safety data sheet</p> <p>Employees handling hazardous substances / materials must be aware of the potential impacts and follow appropriate safety measures. Appropriate personal protective equipment must be made available</p>		<p>training of staff in this regard.</p> <p>The ECO will monitor compliance.</p>
		FUEL AND OIL			
		The Contractor must provide method statements for the	The Contractor must ensure that diesel and other liquid fuel, oil and hydraulic fluid is stored in appropriate storage tanks or in bowsers	No Action required	The Contractor will be responsible for providing method statements. He will also be

NON-OPERATIONAL ENVIRONMENTAL MANAGEMENT PROGRAMME					
ENVIRONMENTAL ASPECT	ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME	ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS			RESPONSIBLE PERSON
		Pre-construction phase	Construction phase	Operational phase	
		storage and handling of fuel and oil on site.	<p>The tanks/ bowsers must be situated on a smooth impermeable surface (concrete) with a permanent bund. The impermeable lining must extend to the crest of the bund and the volume inside the bund must be 110% of the total capacity of all the storage tanks/ bowsers</p> <p>The floor of the bund must be sloped, draining to an oil separator</p> <p>Provision must be made for refuelling at the storage area by protecting the soil with an impermeable groundcover. Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained</p> <p>All empty externally dirty drums must be stored on a drip tray or within a bunded area</p> <p>Spill kits must be available on site and in all vehicles that transport hydrocarbons for dispensing to other vehicles on the construction site. Spill kits must be made up of material/product that is in line with environmental best practice (SUNSORB is a recommended product that is environmentally friendly)</p>		<p>responsible for training of staff in this regard.</p> <p>The ECO will monitor compliance.</p>

NON-OPERATIONAL ENVIRONMENTAL MANAGEMENT PROGRAMME					
ENVIRONMENTAL ASPECT	ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME	ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS			RESPONSIBLE PERSON
		Pre-construction phase	Construction phase	Operational phase	
			<p>Where refuelling away from the dedicated refuelling station is required, a mobile refuelling unit must be used. Appropriate ground protection such as drip trays must be used</p> <p>The responsible operator must have the required training to make use of the spill kit in emergency situations</p> <p>In the event of a spill, contaminated soil must be collected in containers and stored in a central location and disposed of according to the National Environmental Management: Waste Act 59 of 2008.</p> <p>During servicing of vehicles or equipment, a suitable drip tray must be used to prevent spills onto the soil.</p> <p>Leaking equipment must be repaired immediately or be removed from site to facilitate repair</p> <p>Construction area must be monitored for oil and fuel spills</p> <p>Drip trays (minimum of 10cm deep) must be placed under all vehicles that stand for more than 24 hours. Vehicles suspected of leaking must not be left unattended, drip trays must be utilised. The surface area of the drip trays will</p>		

NON-OPERATIONAL ENVIRONMENTAL MANAGEMENT PROGRAMME					
ENVIRONMENTAL ASPECT	ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME	ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS			RESPONSIBLE PERSON
		Pre-construction phase	Construction phase	Operational phase	
			be dependent on the vehicle and must be large enough to catch any hydrocarbons that may leak from the vehicle while standing.		
		CONCRETE AND CEMENT			
		The contractors must provide and maintain a method statement for "cement and concrete batching". The method statement must provide information on proposed storage, washing & disposal of cement, packaging, tools and plants	The mixing of concrete must only be done at specifically selected sites on mortar boards or similar structures to contain run-off into soils rocky outcrops, streams and natural vegetation	No Action required	The Contractor will be responsible for providing method statements. He will also be responsible for training of staff in this regard. The ECO will monitor compliance.
			Cleaning of cement mixing and handling equipment must be done using proper cleaning trays		
			All empty containers must be stored in a dedicated area and later removed from the site for appropriate disposal at a licensed facility		
			Any spillage that may occur must be investigated and immediate remedial action must be taken		
			The visible remains either of concrete, solid, or from washings, must be physically removed immediately or disposed of as waste to a registered landfill site		
			Cement batching areas must be located in an area where residues are contained and that the location does not fall within storm water channels		

NON-OPERATIONAL ENVIRONMENTAL MANAGEMENT PROGRAMME					
ENVIRONMENTAL ASPECT	ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME	ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS			RESPONSIBLE PERSON
		Pre-construction phase	Construction phase	Operational phase	
TOILETS AND ABLUTION FACILITIES	At the end of the construction phase the site and its surrounding area must be free from any sewage that originated as a result of the construction activities.	The contractor must provide method statement for the operation and maintenance of toilets and ablution facilities.	The contractor is responsible for providing all sanitary arrangements for his and the sub-contractors team. A minimum of one chemical toilet must be provided per 30 persons and should include male and female toilets.	No Action required	The Contractor will be responsible for providing method statements. He will also be responsible for training of staff in this regard. The ECO will monitor compliance.
			Sanitary arrangements must be to the satisfaction of the ECO. The contractor must keep the toilets in a clean, neat and hygienic condition. The contractor must supply toilet paper to all toilets at all times. Toilet paper dispensers must be provided in all toilets		
			The contractor must be responsible for the cleaning, maintenance and servicing of the toilets. The contractor must ensure that no spillage occurs when the toilets are cleaned or emptied.		
			The use of ablution facilities and or mobile toilets must be used at all times and no indiscriminate use of the veld for the purposes of ablutions must be permitted under any circumstances		
			Toilets out on site must be secured to the ground and have a sufficient locking mechanism operational at all times		

NON-OPERATIONAL ENVIRONMENTAL MANAGEMENT PROGRAMME					
ENVIRONMENTAL ASPECT	ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME	ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS			RESPONSIBLE PERSON
		Pre-construction phase	Construction phase	Operational phase	
WASTE MANAGEMENT	At the end of the construction phase the site and its surrounding area must be free from any hazardous or general waste pollution that originated as a result of the construction activities.	The contractors must provide and maintain a method statement for "solid waste management". The method statement must provide information on the proposed licensed facility to be utilised and details must be kept of record keeping for auditing purposes	Waste must be separated into recyclable and non-recyclable waste, and must be separated as follows: <ul style="list-style-type: none"> • Hazardous waste: including (but not limited to) old oil, paint, etc. • General waste: including (but not limited to) paper, plastic, glass and construction rubble 	No Action required	The Contractor will be responsible for providing method statements. He will also be responsible for training of staff in this regard. The ECO will monitor compliance.
			Any illegal dumping of waste must not be tolerated, this action will result in a fine and if required further legal action will be taken. This aspect must be closely monitored and reported on; proof of legal dumping must be able to be produced on request.		
			Bins must be clearly marked for ease of management		
			All refuse bins must have a lid secured so that animals cannot gain access		
			Sufficient closed containers must be strategically located around the construction site to handle the amount of litter, wastes, rubbish, debris, and builder's waste generated on the site		
			Subcontractor(s) contracts must contain a clause to the effect that the disposal of all		

NON-OPERATIONAL ENVIRONMENTAL MANAGEMENT PROGRAMME					
ENVIRONMENTAL ASPECT	ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME	ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS			RESPONSIBLE PERSON
		Pre-construction phase	Construction phase	Operational phase	
			<p>construction-generated refuse / waste to an officially approved dumping site is the responsibility of the subcontractor in question and that the subcontractors are bound to the management activities stipulated in this EMP. Proof of this undertaking must be issued to the ECO</p> <p>All solid and chemical wastes that are generated must be removed and disposed of at a licensed waste disposal site. The contractor is to provide proof of such to the ECO</p> <p>Chemical containers and packaging brought onto the site must be removed for disposal at a suitable site</p> <p>A suitably positioned and clearly demarcated waste collection site must be identified and provided The waste collection site must be maintained in a clean and orderly manner. A covered container (Like a skip, with a cover), must be used to contain refuse from campsite bins, rubble and other construction material</p>		
DUST	Dust prevention measures must be applied to minimise the generation of dust.	The contractors must provide and maintain a method statement for "dust control". The	All forms of dust pollution must be managed in terms of the National Environmental Management: Air quality Act, 2004 (Act No 39 of 2004)).	No Action required	The Contractor will be responsible for providing method statements. He

NON-OPERATIONAL ENVIRONMENTAL MANAGEMENT PROGRAMME					
ENVIRONMENTAL ASPECT	ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME	ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS			RESPONSIBLE PERSON
		Pre-construction phase	Construction phase	Operational phase	
		method statement must provide information on the proposed source of water to be utilised.	<p>Acceptable dust fall rates for residential areas are: Dust fall rate (D) (mg/m²/day, 30 days average): D<600 Permitted frequency of exceeding dust fall rate: Two within a year, not sequential months</p> <p>A standard test method to be used for measuring dust fall rate and the guideline for locating sampling points shall be ASTM D1739. The latest version of this method shall be used.</p> <p>Removal of vegetation must be avoided until such time as soil stripping is required and similarly exposed surfaces must be revegetated or stabilised as soon as is practically possible.</p> <p>Excavation, handling and transport of erodible materials must be avoided under high wind conditions or when a visible dust plume is present</p> <p>The construction camp must be watered during dry and windy conditions to control dust fallout.</p>		<p>will also be responsible for training of staff in this regard.</p> <p>The ECO will monitor compliance.</p>

NON-OPERATIONAL ENVIRONMENTAL MANAGEMENT PROGRAMME					
ENVIRONMENTAL ASPECT	ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME	ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS			RESPONSIBLE PERSON
		Pre-construction phase	Construction phase	Operational phase	
			<p>Dust production must be controlled by regular watering of roads and work area, should the need arise</p> <p>During high wind conditions, the ECO must evaluate the situation and make recommendations as to whether dust damping measures are adequate, or whether working will cease altogether until the wind speed drops to an acceptable level</p> <p>Where possible, soil stockpiles must be located in sheltered areas where they are not exposed to the erosive effects of the wind</p> <p>Where erosion of stockpiles becomes a problem, erosion control measures must be implemented at the discretion of the ECO</p> <p>Vehicle speeds must not exceed 40 km/h along dust roads or 20 km/h when traversing unconsolidated and non-vegetated areas</p>		
NOISE	Noise prevention measures must be applied to minimise the generation of unnecessary noise pollution as a result of	The contractors must provide and maintain a method statement for noise.	<p>All vehicles and machinery must be fitted with appropriate silencing technology and must be properly maintained.</p> <p>Develop a Code of Conduct for the construction phase in terms of behaviour of construction staff. Operating hours as determined by the environmental authorisation are adhered to</p>	No Action required	The Contractor will be responsible for providing method statements. He will also be responsible for

NON-OPERATIONAL ENVIRONMENTAL MANAGEMENT PROGRAMME					
ENVIRONMENTAL ASPECT	ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME	ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS			RESPONSIBLE PERSON
		Pre-construction phase	Construction phase	Operational phase	
	construction activities on site.		<p>during the development phase. Where not defined, it must be ensured that development activities must still meet the impact management outcome related to noise Management.</p> <p>It is proposed that normal working hours are between 08h00 and 17h00 (Mondays to Saturdays). No work will be allowed on Sundays or outside of the abovementioned hours.</p> <p>Any complaints received by the Contractor regarding noise must be recorded and communicated. Where possible or applicable, provide transport to and from the site on a daily basis for construction workers.</p>		<p>training of staff in this regard.</p> <p>The ECO will monitor compliance.</p>
FIRES	Absolutely no burning of waste is permitted.	The contractors must provide and maintain a method statement for "fires", clearly indicating where and for what, fires will be utilised	Absolutely no burning of waste is permitted.	No Action required	The Contractor will be responsible for providing method statements. He will also be responsible for training of staff in this regard.
	Fires will only be allowed in facilities especially constructed for this purpose.		Fires will only be allowed in facilities especially constructed for this purpose within fenced Contractor's camps. Wood, charcoal or anthracite are the only fuels permitted to be used for fires. The contractor must provide sufficient wood (fuel) for this purpose.		

NON-OPERATIONAL ENVIRONMENTAL MANAGEMENT PROGRAMME					
ENVIRONMENTAL ASPECT	ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME	ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS			RESPONSIBLE PERSON
		Pre-construction phase	Construction phase	Operational phase	
		plus details on the fuel to be utilised	<p>Fires within the designated areas must be small in scale so as to prevent excessive smoke being released into the air.</p> <p>The contractor must designate a smoking area for the labour force so as to prevent unanticipated incidents of veldt fires.</p> <p>No wood is to be collected, chopped or felled for fires from private or public property as well as from no-go or sensitive areas within the site and any surrounding natural vegetation</p>		The ECO will monitor compliance.
FAUNA	No hunting of animals will be allowed.	Plan to ensure that all activities on site must comply with the regulations of the Animal Protection Act, 1962 (Act No. 71 of 1962)	<p>All construction workers must be informed that the intentional killing of any animal is not permitted as faunal species are a benefit to society. Poaching is illegal and it must be a condition of employment that any employee caught poaching will be dismissed. Employees must be trained on how to deal with fauna species as intentional killing will not be tolerated. In the case of a problem animal e.g. a large snake, a specialist must be called in to safely relocate the animal.</p> <p>Environmental induction training and awareness must include aspects dealing in safety with wild animals into and on site. Focus on animals such as snakes and other reptiles</p>	No Action required	<p>The Contractor will be responsible for providing method statements. He will also be responsible for training of staff in this regard.</p> <p>The ECO will monitor compliance.</p>

NON-OPERATIONAL ENVIRONMENTAL MANAGEMENT PROGRAMME					
ENVIRONMENTAL ASPECT	ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME	ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS			RESPONSIBLE PERSON
		Pre-construction phase	Construction phase	Operational phase	
			that often generate fear by telling workers how to move safely away and to whom to report the sighting. Workers should also be informed where snakes most often hide so that they can be vigilant when lifting stones, etc.		
HERITAGE	No intentional destruction of any sites, features or material of cultural heritage (archaeological and/or historical) origin or significance may occur.	Conduct a Phase 1 HIA for the development to identify any sites, features or material of cultural heritage (archaeological and/or historical) origin or significance.	<p>In terms of the National Heritage Act, 1999 (Act No. 25 of 1999), construction personnel must be alert and must inform the local heritage agency within 48 hours should they come across any signs of heritage resources.</p> <p>Carry out general monitoring of excavations for potential fossils, artefacts and material of heritage importance.</p> <p>Should any archaeological artefacts be exposed during site activities, work on the area where the artefacts were found must cease immediately and the ECO must be notified immediately.</p> <p>All work must cease immediately, if any human remains are uncovered. Such material, if exposed, must be reported to the South African Police Services, so that a systematic and professional investigation can be undertaken. Sufficient time must be allowed to</p>	No action required	<p>The developer and applicant.</p> <p>Study to be conducted by a suitable qualified specialist.</p> <p>Findings to be monitored by the ECO.</p>

NON-OPERATIONAL ENVIRONMENTAL MANAGEMENT PROGRAMME					
ENVIRONMENTAL ASPECT	ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME	ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS			RESPONSIBLE PERSON
		Pre-construction phase	Construction phase	Operational phase	
			remove/collect such material before development recommences		
CRIME, SAFETY AND SECURITY	All Contractors and sub-contractors must abide to the rules and regulations of the Occupational Health and Safety Act, 85 of 1993.	Plan to appoint a health and safety officer for the construction site.	The site and crew are to be managed in strict accordance with the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) and the National Building Regulations	No actions required	Health and safety officer.
		Compile an Emergency Response Action Plan (ERAP) prior to the commencement of the project	The contractor must ensure that all emergency procedures are in place prior to commencing work. Emergency procedures must include (but not be limited to) fire, spills, contamination of the ground, accidents to employees, use of hazardous substances and materials, etc.		
			The contractor must ensure that lists of all emergency telephone numbers / contact persons are kept up to date and that all numbers and names are posted at relevant locations throughout the construction site.		
			Identify fire hazards, demarcate and restrict public access to these areas as well as notify the local authority of any potential threats e.g. large brush stockpiles, fuels etc		
			All unattended open excavations must be adequately fenced or demarcated.		

NON-OPERATIONAL ENVIRONMENTAL MANAGEMENT PROGRAMME					
ENVIRONMENTAL ASPECT	ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME	ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS			RESPONSIBLE PERSON
		Pre-construction phase	Construction phase	Operational phase	
			<p>Maintain an incidents and complaints register in which all incidents or complaints involving the public are logged.</p> <p>Ensure that the workforce is sensitised to the effects of sexually transmitted diseases, especially HIV AIDS. The Contractor must ensure that information posters on AIDS are displayed in the Contractor Camp area</p> <p>Workers must be instructed not to trespass onto adjacent land. Trespassers will be prosecuted.</p>		

11. ENVIRONMENTAL AWARENESS PLAN

11.1 INTRODUCTION

Training is essential for ensuring that the EMP provisions are implemented efficiently and effectively. It is vital that all personnel are adequately trained to perform their designated tasks to an acceptable standard.

The Construction Contractor and the Operator of the facility must make allowance for all construction workers (including all subcontractors) and operators of the site during the operational phase that will be working at the site, to attend environmental awareness training sessions (undertaken by the ECO) before commencing work on site. During this training, the ECO will explain the EMP and the conditions contained therein. Attention will be given to the construction and operational processes and how the EMP fits into these processes.

In addition to training, general environmental awareness must be fostered among the project's workforce to encourage the implementation of environmentally sound practices throughout its duration. This ensures that environmental accidents are minimized and environmental compliance maximized.

Environmental awareness training and education should be ongoing throughout the construction phase, and should be undertaken regularly if deemed necessary (especially if it becomes apparent that there are repeat contraventions of the conditions of the EMP), or as new workers come to site. Translators should be utilized where needed.

Environmental awareness could be fostered in the following manner:

- Induction course for all workers on site, before commencing work on site.
- Refresher courses as and when required.
- Daily toolbox talks at the start of each day with all workers coming on site, where workers might be alerted to particular environmental concerns associated with their tasks for that day or the area/habitat in which they are working.

Courses must be given by suitably qualified personnel and in a language and medium understood by workers/employees.

11.2 ORGANISATIONAL STRUCTURE

This section describes the roles and responsibilities of the key stakeholders involved in the development, implementation and review of the EMP.

11.2.1 PROJECT PROPONENT

The Project Proponent will be the ***GHDEVCO PROPRIETY LIMITED***. Ultimately, they will be responsible for the development and implementation of the EMP and for ensuring that the conditions in

the eventual Environmental Authorization (EA) are satisfied. Although construction activities will be contracted out, the liability associated with non-compliance still rests with the Project Proponent. The Project Proponent (and not the Contractor or operator of the facility) is therefore responsible for liaising directly with the relevant authorities with respect to the preparation and implementation of the EMP and meeting EA conditions.

The Project Proponent must inform the Contractor and Operator of the facility of the EA and EMP obligations, as well as **Method Statements** to be prepared and environmental training to be undertaken by the Contractor in terms of these obligations.

The Project Proponent must identify a **Project Manager (PM)** who has overall responsibility for managing the Project, Contractors, Operators and for ensuring that the environmental management requirements are met. During the construction phase, the Project Manager will be the Proponent's construction manager; during the operations phase this role will be fulfilled by the operations manager.

All decisions regarding environmental procedures and protocol must be approved by the Project Manager, who also has the authority to stop any construction activity in contravention of the EMP or EA.

An **Environmental Control Officer (ECO)** must be employed by the Project Proponent for the duration of the project. The ECO should have appropriate training and experience in the implementation of environmental management specifications. The ECO provides feedback to the Project Manager regarding all environmental matters. Contractors are answerable to the ECO (or Project Manager, depending on contractual arrangements) for non-compliance with the requirements stated in the EMP or EA.

11.2.2 ENVIRONMENTAL CONTROL OFFICER (ECO)

The appointed Environmental Control Officer (ECO) is responsible for monitoring the site at regular intervals (including pre-construction set-up and final rehabilitation), in order to ensure that the provisions of this EMP is adhered to and that sound environmental management is ensuing on site.

The ECO must inspect all areas of the site that may be affected by construction-related activities, including the working area, site camp, stockpile areas and access roads. After each ECO inspection the ECO must compile an ECO report detailing the ECO's observations on site, any instances of non-compliance and any issues or aspects that require attention, follow-up or remedial action. The ECO reports must be submitted to the Applicant, the ER, Construction Contractor(s) and the Competent Authority. The ECO inspection reports should include both photographic and written records.

The ECO will have the following responsibilities:

- Maintenance, update and review of the EMP.
- Liaison between the Project Proponent, Contractors, authorities and other lead stakeholders on all environmental concerns.
- Compilation and administration of an environmental monitoring plan to ensure that the environmental management measures are implemented and are effective.

- Monitoring the performance of the Contractor (and Sub-contractors) and ensuring compliance with the EMP and associated Method Statements.
- Validating the regular site inspection reports, which are to be prepared by the Contractor's Environmental Officer (EO).
- Checking the EO's *record of environmental incidents* (spills, impacts, legal transgressions etc) as well as corrective and preventive actions taken.
- Checking the EO's *public complaints register* in which all complaints are recorded, as well as action taken.
- Issuing of site instructions to the Contractor for corrective actions required.
- Assisting in the resolution of conflicts.
- Communication of all modifications to the EMP to the relevant stakeholders.
- Conducting regular audits to ensure that the system for implementing the EMP is operating effectively.

11.2.3 CONTRACTOR

The Contractor should appoint a **Contractor's Representative**, who is responsible for the on-site implementation of the EMP and EA. The Contractor's representative can be the site agent; site engineer; a dedicated environmental officer; or an independent consultant. The Contractor must ensure that the Contractor's Representative is suitably qualified to perform the necessary tasks and is appointed at a level such that she/he can interact effectively with other site Contractors, labourers, the Environmental Control Officer and the public. The Contractor's Representative ensures that all Sub-contractors working under the Contractor abide by the requirements of the EMP.

The Contractor is answerable to the Project Manager (PM) for all environmental issues associated with the project. Contractor performance will, amongst others, be assessed on health, safety and environmental management criteria.

The Contractor will be required to provide the following **Method Statements**, setting out in detail how the management actions contained in an EMP and EA will be implemented in order to ensure that the environmental management objectives are achieved. The Method Statements must be reviewed and approved by the Project Proponent.

- > Stockpiles
- > Excavation stabilisation
- > Oil and chemicals
- > Cement
- > Storage of fuel and oils

- > Use of dangerous and toxic materials
- > Toilets and ablution facilities
- > Waste Management
- > Dust
- > Workshop equipment, maintenance and storage
- > Noise
- > Fires
- > Erosion and sedimentation
- > Flora and Fauna (Including no-go areas)
- > Crime, safety and security
- > Hydrology

The Contractor may appoint an **Environmental Officer (EO)**, or officers, if more than one is required. Their primary role is to coordinate the environmental management activities of the Contractor on site. The EO may be required to perform the following roles:

- Support the ECO in the monitoring and execution of the Contractors or Sub-contractors' Method Statements by maintaining a permanent presence on site.
- Inspect the site as required to ensure adherence to the management actions of the EMP, EA and the Method Statements.
- Complete Site Inspection Forms on a regular basis (eg. daily or weekly).
- Provide inputs to the regular (eg. monthly) environment report to be prepared by the ECO.
- Liaise with the construction team on issues related to implementation of, and compliance with, the EMP and EA.
- Maintain a *record of environmental incidents* (spills, impacts, legal transgressions etc) as well as corrective and preventive actions taken, for submission to the Project Proponent.
- Maintain a *public complaints register* in which all complaints are recorded, as well as action taken, for submission to the Project Proponent.

11.3 CHECKLISTS

The table below provide the main mitigation measures and/or management interventions to minimise or reduce the negative impacts and enhance positive impacts identified by the specialists associated with the proposed development.

The intent is for the document to be a live, dynamic document that should be maintained and updated throughout the project lifecycle, *inter alia*, by including the necessary Environmental Authorisation from the approving Authority as an attachment.

The table below provide the main mitigation measures and/or management interventions appropriate to the Planning and Construction Phases of the proposed project. The tables present the objectives to be achieved and the management actions that need to be implemented in order to reduce the negative impacts and enhance the positive impacts per management activity. The associated monitoring and implementation frequencies and the responsible person(s) are indicated.

Activity/Impact	Action Required	Responsible Party	Monitoring Frequency
1. Construction and operational activities planning	The construction/operational activities must conform to the conditions of authorisation contained in the Environmental Authorisation and mitigation measures contained within this EMPr	Proponent	Continuous
2. Appointment of the ECO	The Proponent must appoint an independent Environmental Control Officer (ECO) who must monitor the Contractor's compliance with the EMPr and who must complete ECO checklist reports (audits) on a regular basis (at least once a month).	Proponent	Once-off
	The Proponent must provide the ECO with a copy of the EMPr.	ECO	Once-off
	The ECO must form part of the project management team and should attend the monthly project progress meetings.	ECO	Continuous
	The Contractor must ensure that the construction crew attend an environmental briefing and training session presented by the ECO prior to commencing activities on site.	ECO, Contractor	Once-off
3. EMPr	This EMPr must be made binding to the main Contractor and to individual Contractors, and must be included in the documentation for the construction contract.	Proponent	Once-off
4. Licences/ permits and permissions	The Proponent must ensure that all pertinent licences/permits, certificates and permissions required for the project have been obtained prior to any activities commencing on site and ensure that they are strictly enforced/adhered to. These documents must be made available on site at all times, and the Contractor must be made aware of their content.	Contractor, Proponent, ECO	Prior to commencement of work
	The Contractor must maintain a database of all pertinent permits and permissions required for the contract.	Contractor, Proponent, ECO	Continuous
5. Method Statements	The Contractor must submit written Method Statements to the PM and ECO for the activities identified during consultation.	Contractor, PM, ECO	As required
	Method Statements must be submitted at least five working days prior to the proposed commencement of work on an activity to allow the PM (and/or ECO) time to study and approve the method statement.	Contractor, PM, ECO	As required
	The Contractor may not commence work on that activity until such time as the Method Statement has been approved in writing.	Contractor, PM, ECO	Continuous
	The Contractor must carry out the activities in accordance with the approved Method Statement.	Contractor, PM, ECO	Continuous

Activity/Impact	Action Required	Responsible Party	Monitoring Frequency
	Under certain circumstances, the PM may require changes to an approved Method Statement. In such cases the proposed changes must be agreed upon in writing between the Contractor and the PM, and appropriate records retained.	Contractor, PM, ECO	Continuous
	Approved Method Statements must be readily available on the site and must be communicated to all relevant personnel. Approval of the Method Statement shall not absolve the Contractor from any of his/her obligations or responsibilities in terms of the EMPr specifications.	Contractor, Proponent	Continuous
6. Existing services and infrastructure	The Contractor must ensure that existing services (e.g. roads, pipelines, power lines and telephone services) are not damaged or disrupted unless required by the contract and with the permission of the PM, ensuring the necessary way-leaves; permissions and permits are in place.	Contractor, PM, ECO	Continuous
	The Contractor must be responsible for the repair and reinstatement of any existing infrastructure that is damaged, or services which are interrupted, at his/her own cost.	Contractor	As required
	The Contractor must adhere to any time limits for the repairs that may be stipulated by the PM in consultation with the Contractor.	Contractor, ECO	As required
7. Environmental incidents	The Contractor must take timeous corrective action to mitigate an incident appropriate to the nature and scale of the incident and must also rehabilitate any residual environmental damage caused by the incident or by the mitigation measures themselves. The Contractor must adhere to any time limits for such corrective actions that may be stipulated by the ECO in consultation with the PM.	ECO, Contractor	Continuous
8. Labour	Local labour must be used wherever possible to stimulate the local economy.	Contractor	Once-off
	The Contractor should use labour intensive construction measures where appropriate, practical and financially feasible.	Contractor	Once-off
	The workforce should be trained to benefit individuals beyond the completion of the project.	Contractor	Once-off
	The Contractor should use local suppliers where possible.	Contractor	Once-off
	The PM must ensure that all staff working on the project must be in possession of a South African Identity Document or a relevant work permit. A register must be kept on site of all staff working on site.	PM	Continuous
	Equal opportunities for employment should be created to ensure that all sectors of society (especially women) have equal access to such opportunities.	Contractor	Continuous
9. Training of staff	The Contractor must ensure that all construction staff receive environmental awareness training concerning, amongst others, the prevention of accidental spillage of hazardous chemicals and oil; pollution of water resources (both surface and groundwater), air pollution and litter control and identification of archaeological artefacts, protection of any animals encountered on site, no-go areas, the use of toilets and basic sanitation, and basic health and safety on site.	Contractor, ECO	Once-off
	It is the Contractor's responsibility to provide the site foreman with environmental training (including explaining the content of the EMPr and any Conditions of Approval) and is to ensure that the foreman has sufficient understanding to pass this information onto the construction staff.	Contractor, ECO	Once-off
	Training must be provided to the staff members in the use of the appropriate fire-fighting equipment.	Contractor, Health and Safety Officer	Once-off
	The Contractor must ensure that all staff operating machinery/construction vehicles are adequately trained to carry out the designated tasks.	Contractor, Health and Safety Officer	Once-off

Activity/Impact	Action Required	Responsible Party	Monitoring Frequency
10. Worker health and safety	<p>A Health and Safety Plan must be developed and implemented by the Contractor for the construction period to ensure worker safety.</p> <p>Should any injury be obtained as a result of work the Contractor must ensure the necessary medical attention is received.</p> <p>The necessary Health and Safety file and incident register must be kept on site at all times.</p>	Contractor, Health and Safety Officer	Continuous
11. Site access & traffic management	<p>Construction vehicles, machinery and workers must be restricted to the designated access roads, and may not drive through undeveloped vegetation outside of the existing access route except where that vegetation falls within the authorised working area (development footprint) at the site.</p>	Contractor ECO	Continuous
12. Vegetation clearing	<p>Vegetation clearing may only commence once the working area has been clearly demarcated to the ECO's satisfaction.</p>	Proponent Contractor ECO	Once-off
13. EMPr	<p>This EMPr must be made binding to the main Contractor and to individual Contractors, and must be included in the tender documentation for the construction contract.</p>	Proponent	Once-off
14. Topsoil & subsoil management	<p>Removed topsoil and subsoil should be stockpiled for the duration of the active construction period, and utilized for the final landscaping and rehabilitation of disturbed areas on site.</p> <p>The topsoil must be adequately protected from being blown away or eroded by storm water.</p> <p>Removed subsoil should be stockpiled separately from topsoil.</p> <p>Topsoil should be the final layer applied during rehabilitation, after subsoil/ spoil material has been placed and shaped on the site</p>	Contractor ECO	Continuous
15. Excavations earthworks &	<p>Use of heavy machinery can substantially increase the likelihood, intensity and significance of potential negative environmental impacts, and it is thus essential that earthworks be performed under constant supervision, and that operators must be made aware of all the environmental obligations, as there is always the potential to inflict damage to sensitive areas.</p> <p>Use of machinery should be restricted to only that which is strictly required, and the unnecessary or excessive movement/ use of such machinery must be kept to a minimum.</p> <p>Machinery must enter and exit the site via the indicated access roads, and may not enter/ exit the river channel at any other location.</p> <p>Excavations and earth-moving may only take place within the demarcated working area</p>	Contractor ECO	Continuous
16. Groundwater contamination	<p>Ensure vehicles are serviced and refuelled in bunded areas</p>	Contractor	Continuous
	<p>Ensure vehicles are checked weekly for faults and serviced timeously if faulty</p>	Contractor	As required
	<p>Should any leaks occur ensure contaminated soil is dug up to 1 cm below the level of visible contamination and disposed of as hazardous waste</p>	Contractor	As required
	<p>Drip trays should be placed under all vehicles remaining stationary for more than 24 hours</p>	Contractor	Continuous
17. Noise	<p>Limit construction activities to normal working hours</p>	Contractor	Continuous

Activity/Impact	Action Required	Responsible Party	Monitoring Frequency
	Coincide any excessively noisy activities to minimise duration of inconvenience	Contractor	As required
	Ensure noise standards are complied with and that construction staff are provided with personal protective equipment when undertaking noisy operations	Contractor	Continuous
18. Safety	No children on construction site. Safety fence and controlled access should be enforced Safety signs with necessary information displayed	Proponent Contractor ECO	Continuous
19. No go areas	Any sensitive areas identified as such by the ECO need to be considered no-go areas.	Contractor, ECO	Monthly
20. Stockpiles	Soil stockpiles must not be situated within 50m of any water course.	Contractor, ECO	Monthly
	If stockpiles are exposed to windy conditions or heavy rain, they should be covered either by vegetation or cloth, depending on the duration of the project. Stockpiles may further be protected by the construction of berms or low brick walls around their bases.	Contractor, ECO	Monthly
	Stockpiles must be kept clear of weeds and alien vegetation growth by regular weeding.	Contractor, ECO	Monthly
	Where contamination of soil is expected, analysis must be done prior to disposal of excess soil to determine the appropriate disposal method. Proof from an applicable waste disposal site where contaminated soils are dumped if and when a spillage / leakage occur must be provided to the ECO upon request.	Contractor, ECO	Monthly
	Stockpiles must not exceed 2m in height unless otherwise permitted by the PM and / or ECO.	Contractor, ECO	Monthly
21. Erosion control	Wind screening and stormwater control must be undertaken where required by the ECO to prevent soil loss from the site.	Contractor, ECO	Twice monthly
	The use of silt fences and sand bags must be implemented in areas that are susceptible to erosion, if required by the ECO. Other erosion control measures that can be implemented are as follows: <ul style="list-style-type: none"> • Brush packing with cleared vegetation; • Mulch or chip packing; • Planting of vegetation; and • Hydro-seeding / hand sowing. 	Contractor, ECO Contractor, ECO	Twice monthly
	Sensitive areas need to be identified prior to construction so that the necessary precautions can be implemented.	Contractor, ECO	Twice monthly
	All erosion control mechanisms need to be regularly maintained.	Contractor, ECO	Twice monthly
	Re-vegetation of disturbed surfaces must occur as soon as possible after construction activities are completed.	Contractor, ECO	Twice monthly
	No impediment to the natural water flow o site other than approved erosion control or rehabilitation works is permitted.	Contractor, ECO	Twice monthly
	Stockpiles not used in three (3) months after stripping should be seeded to prevent dust and erosion, as advised by the ECO	Contractor, ECO	Twice monthly
22. Hazardous materials	Use and or storage of materials, fuels and chemicals which could potentially leak into the ground must be controlled.	Contractor, ECO	Monthly
	Any hazardous substances must be stored at least 50m from any of the watercourses on site in a bunded area.	Contractor, ECO	Monthly
	The Contractor must ensure that potentially harmful materials are properly stored in a dry, secure, ventilated environment, with concrete or sealed flooring and a means of preventing unauthorised entry. Such materials may also be temporarily stored on drip-trays.	Contractor, ECO	Monthly

Activity/Impact	Action Required	Responsible Party	Monitoring Frequency
	Contaminated wastewater must be managed by the Contractor to ensure existing water resources on the site are not contaminated. All wastewater from general activities in the camp must be collected and removed from the site for appropriate disposal at a licenced waste disposal facility or sewage works.	Contractor, ECO	Monthly
	All storage tanks containing hazardous materials must be placed in bunded containment areas with sealed surfaces. The bund wall must be high enough to contain 110% of the total volume of the stored hazardous material. Such bunded areas must be regularly emptied of accumulated rainwater. Wastewater from such emptying, if contaminated, must be disposed at an appropriately licenced waste disposal facility or sewage works.	Contractor, ECO	Monthly
	In the event of a spill, the Contractor must take prompt action to clear polluted areas and prevent spreading of the pollutants. The Contractor will be liable to arrange for professional service providers to clear affected areas, if required.	Contractor, ECO	As required
	Proper facilities for the storage of oils, paints, grease, fuels, chemicals and any hazardous materials to be used must be provided to prevent the migration of spillage into the ground and groundwater. These pollution prevention measures for storage must include a bunded containment area with a wall high enough to contain at least 110% of any stored volume. This containment area must be sited at least 50m away from any drainage line, in a site approved by the ECO.	Contractor, ECO	Monthly
	Cement storage and batching must only take place in a bunded area, and any runoff		
	Any spillage, which may occur, must be investigated and immediate action must be taken. This must be reported to the ECO and to the relevant authorities if so required by the ECO.	Contractor, ECO	As required
23. Cement and concrete batching	Concrete must not be mixed on the ground, but in a bunded area with any runoff captured for disposal as hazardous wastewater.	Contractor, ECO	Continuous
	The batching area is to be located in an area of low environmental sensitivity, as approved by the ECO.	Contractor, ECO	Once-off
	Cement bags must only be stored in a covered, bunded area and not directly on the ground. Used cement bags must be disposed of as hazardous waste.	Contractor, ECO	Weekly
24. Hydrology and stormwater	Silt fences must be used where required by the ECO to remove any suspended silt from stormwater before it enters the stormwater system.	Contractor, ECO	Monthly
	Temporary cut-off drains and berms must be used where necessary to capture stormwater and promote infiltration.	Contractor, ECO	Monthly
	Stormwater and surface water must be diverted away from excavation trenches, and care must be taken to avoid surface stormwater from the site running into the seasonal pan on the site.	Contractor, ECO	Monthly
	No rubble, litter or sand may be deposited into any freshwater systems or water courses.	Contractor, ECO	Monthly
25. General materials handling, use and storage	Choice of location for storage areas must take into account prevailing winds, distances to the seasonal watercourses (50m minimum), general onsite topography and water erosion potential of the soil. Impervious surfaces must be provided where necessary.	Contractor, ECO, Health and Safety Officer	Once-off
	Storage areas must be designated, demarcated and fenced. Storage areas must be secure so as to minimize the risk of crime. They must also be safe from access by unauthorised persons. Fire prevention facilities must be present at all storage facilities.	Contractor, ECO	Monthly

Activity/Impact	Action Required	Responsible Party	Monitoring Frequency
	Material Safety Data Sheets (MSDSs) must be readily available on site for all chemicals and hazardous substances to be used on site. Where possible, the available MSDSs should include information on ecological impacts and measures to minimise negative environmental impacts during accidental spills.	Contractor, ECO, Health and Safety Officer	Once-off, as required
	Clear signage must be placed at all storage areas containing hazardous substances / materials.	Contractor, ECO, Health and Safety Officer	Once-off
	The Contractor must be responsible for the training and education of all personnel on site who will be handling the hazardous material about its proper use, handling and disposal. The Contractor must ensure that information on the management of spill and accidental ingestion is kept on site. Staff dealing with these materials / substances must be aware of their potential impacts and follow the appropriate safety measures.	Contractor, Health and Safety Officer	Once-off
	The provisions of the Hazardous Chemical Substances Regulations promulgated in terms of the Occupational Health and Safety Act 85 of 1993 and the SABS Code of Practice must be adhered to. This applies to solvents and other chemicals possibly used in the construction time.	Contractor, Health and Safety Officer	Continuous
	The Contractor must ensure that its staff is made aware of the health risks associated with any hazardous substances used and has been provided with the appropriate protective clothing/equipment in case of spillages or accidents and have received the necessary training.	Contractor, Health and Safety Officer	Continuous
	All excess cement and concrete mixes must be contained on the construction site prior to disposal off site.	Contractor, ECO	Monthly
	Hazardous substances must be stored at least 50m away from any water bodies on site to avoid pollution.	Contractor, ECO	Monthly
26. Fuel storage	Topsoil and subsoil to be protected from contamination.	Contractor, ECO	Monthly
	Fuel and material storage must be away from stockpiles on site in appropriate containers in a bunded area.	Contractor, ECO	Twice monthly
	Chemicals must be mixed on an impermeable surface and provisions must be made to contain spillages or overflows into the soil.	Contractor, ECO	Monthly
	Any storage tanks containing hazardous materials must be placed in bunded containment areas with sealed surfaces. The bund walls must be high enough to contain 110% of the total volume of the stored hazardous material. Drip trays may be used for temporary storage of such materials.	Contractor, ECO	Monthly
	Contaminated soil must be contained and disposed of off-site at an approved hazardous waste disposal site.	Contractor, ECO	Monthly
27. Transportation	Material must be appropriately secured to ensure safe passage between destinations during transportation. Loads must have appropriate cover to prevent them spilling from the vehicle during transit. The Contractor must be responsible for any clean-up resulting from the failure by his employees or suppliers to properly secure transported materials.	Contractor, ECO, Health and Safety Officer	Monthly
28. General waste management	Litter generated by the construction crew must be separated on site into general waste and recyclables and collected in covered rubbish bins. General waste is to be removed to a licenced landfill site on a weekly basis and recyclables must be taken to a recycling centre monthly.	Contractor, ECO	Weekly/ Monthly
	Ensure that no refuse wastes are burnt on the premises or on surrounding premises. No fires shall be allowed on site, unless in designated areas approved by the PM and by the ECO or by the Health and Safety Officer.	Contractor, ECO, PM, Health and Safety Officer	Monthly

Activity/Impact	Action Required	Responsible Party	Monitoring Frequency
	The Contractor must supply waste bins/skips throughout the site at locations where construction personnel are working. The bins must be provided with lids and an external closing mechanism to prevent their contents blowing out and must be scavenger-proof to deter animals that may be attracted to the waste. The Contractor must ensure that all personnel immediately deposit all waste in the waste bins for removal by the Contractor. Bins must be emptied on a weekly basis and the waste removed to the construction camp where it must be properly contained in scavenger, water and windproof containers until disposed of. The bins must not be used for any purposes other than waste collection.	Contractor, ECO	Monthly
	Ensure that no litter, refuse, wastes, rubbish, rubble, debris and builders waste generated on the premises be placed, dumped or deposited on adjacent/surrounding properties during or after the construction period of the project.	Contractor, ECO	Monthly
	If possible and feasible, all waste generated on site must be separated into glass, plastic, paper, metal and wood and recycled.	Contractor, ECO	Monthly
29. Hazardous waste management	The waste, resulting from the use of hazardous materials, must be disposed of at a registered hazardous waste disposal site by a certified waste disposal Contractor as approved by the ECO. A disposal certificate must be obtained from the disposal Contractor.	Contractor, ECO	As required
	Staff must be trained in the identification of hazardous waste.	Contractor, ECO	As required
	Temporary storage and disposal of hazardous waste is regulated by legislation which must be complied with, i.e. the Occupational Health and Safety Act.	Contractor, ECO	Monthly
30. Noise	The Contractor must aim to adhere to the relevant noise regulations and limit noise to within standard working hours.	Contractor, ECO	Monthly
	Construction site camp and other noisy facilities must be located well away from noise sensitive neighbours.	Contractor, ECO	Once-off
	Truck traffic must be routed away from noise sensitive areas, where possible.	Contractor, ECO	As required
	All noise and sounds generated must adhere to SABS 0103 specifications for maximum allowable noise levels for residential areas. No pure tone sirens or hooters may be utilised except where required in terms of SABS standards or in emergencies.	Contractor, ECO	Monthly
	Noisy operations must be combined so that they occur where possible at the same time.	Contractor, ECO	Monthly
	Construction activities must be contained to reasonable working hours. Night-time activities near noise sensitive receptors must not be allowed.	Contractor, ECO	Monthly
	With regard to unavoidable noisy construction activities, the Contractor must liaise with local residents to inform them of such events.	Contractor	As required
	As construction workers operate in a noisy environment, it must be ensured that their working conditions comply with the requirements of the Occupational Health and Safety Act (Act No 85 of 1993). Where necessary, ear protection gear must be worn.	Contractor, ECO, Health and Safety Officer	Monthly
	Noise suppression measures must be applied to all construction equipment where required. Construction equipment must be kept in good working order and where appropriate fitted with silencers which are kept in good working order. Should the vehicles or equipment not be in good working order, the Contractor may be instructed to remove the offending vehicle or machinery from site.	Contractor, ECO, Health and Safety Officer	Monthly

Activity/Impact	Action Required	Responsible Party	Monitoring Frequency
31. Worker health and safety	Safety measures, work procedures and first aid must be implemented on site.	Contractor, , Health and Safety Officer	Monthly
	A Health and Safety Plan in terms of the Occupational Health and Safety Act (Act No. 85 of 1993) must be drawn up to ensure worker safety.	Contractor, Health and Safety Officer	Once-off
	Workers must be thoroughly trained in using potentially dangerous equipment.	Contractor, Health and Safety Officer	As required
	Contractors must ensure that all equipment is maintained in a safe operating condition.	Contractor	Monthly
	A safety officer must be appointed.	Contractor	Once-off
	A record of health and safety incidents must be kept on site.	Contractor, , Health and Safety Officer	Monthly
	Any health and safety incidents must be reported to the project manager immediately.	Contractor, , Health and Safety Officer	As required
	First aid facilities must be available on site at all times. All incidents requiring first aid occurring on site must be recorded in the incidents book on site.	Contractor, , Health and Safety Officer	Monthly
	A record must be kept of medication administered or precautions taken and the time and dates when this was done. This can then be used as evidence in court should any claims be instituted against the Contractor.	Contractor, , Health and Safety Officer	Monthly
32. Personal Protective Equipment	Material stockpiles or stacks must be stable and well secured to avoid collapse and possible injury to site workers / local residents.	Contractor, ECO, Health and Safety Officer	Monthly
	Personal Protective Equipment (PPE) must be made available to all construction staff and must be compulsory. Hard hats and safety shoes must be worn at all times and other PPE worn where necessary i.e. dust masks, ear plugs etc.	Contractor, ECO, Health and Safety Officer	Monthly
	No person is to enter the portion of the site where construction activities are being undertaken without the necessary PPE.	Contractor, ECO, Health and Safety Officer	Monthly
33. Fauna and Flora	SABS Standards and specifications governing dangerous processes such as welding must be strictly applied, with a view to proper protection of the public and workers.	Contractor, ECO, Health and Safety Officer	As required
	Implement the eradication programme for invasive species in terms of the Conservation of Agricultural Resources Act (Act No. 43 of 1983).	Contractor, ECO	Monthly
	Institute the rehabilitation of areas as soon as construction activity allows it.	Contractor, ECO	As required
	No disturbance, capture or injury of any fauna will be permitted. Should any fauna be found on site it must be removed from site by the ECO or a suitably qualified person.	Contractor, ECO	Continuous

12. MONITORING, AUDITING AND REPORTING

The Applicant ***GHDEVCO PROPRIETY LIMITED*** is responsible for ensuring that all environmental management measures prescribed in this EMP, as well as any other conditions specified by the relevant authorities, are implemented and adhered to during all phases of the

proposed development. The Applicant may delegate the responsibilities for implementing the requirements to other persons/entities, however the Applicant remains responsible for ensuring that the delegated responsibilities are carried out.

It is the responsibility of the project team or their delegate to ensure that regular monitoring of environmental issues addressed in this management plan is undertaken. The applicant is responsible for the monitoring of the infrastructure.

Site inspections to determine maintenance needs during the operational phase are imperative for good housekeeping.

Internal environmental audits must be undertaken at regular monthly intervals throughout the construction phase to ensure compliance.

The applicant will be responsible for maintaining a database of all records pertaining to the environment for the study area.

All incidents such as spills of toxic or any other substance that may negatively affect the environment must be reported to the relevant authorities.

FINES

The ECO can impose fines on the Contractor for any contraventions of this EMPR. The imposition of fines will enable the ECO to ensure that the requirements of the EMPR are taken seriously by the Contractor.

The Contractor shall be advised in writing of the nature of the infringement and the amount of the fine. The Contractor shall also take the necessary steps (e.g. training) to prevent a recurrence of the infringement.

The Contractor is also advised that the imposition of spot fines does not replace any legal proceedings the authorities, landowners and/or members of the public may institute against the Contractor.

In addition to the fine, the Contractor shall be required to make good any damage caused as a result of the infringement at his own expense.