

**Appendix H:
Draft Environmental Management Program (EMPr)**

**PROPOSED RESIDENCES to be situated on Portion 350
of the FARM THE WILLOWS 340-JR
(City of Tshwane Metropolitan Municipality, Gauteng).**

Draft Environmental Management Program

September 2021

ENVIRONMENTAL ASSESSMENT PRACTITIONER:
PIERRE JOUBERT LANDSCAPE ARCHITECT & ENVIRONMENTAL PLANNER
15 Marikana street, Wierda Park Extension 2, Centurion, 0157
Cell: (072) 821 4982
Email: pierre.joubert.larchitect@gmail.com

APPLICANT: Anina van Aswegen
P.O. Box 15559, Lynn East, 0039
Cell: +27 (0)72 5812 117
Email: anina.vanaswegen@mb.co.za
Contact Person: Anina van Aswegen

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AUTHORS : *PIERRE JOUBERT LANDSCAPE ARCHITECT.*

CLIENT :

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.....
PIERRE JOUBERT

Practitioner: Environmental Assessment Practitioner.

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ABBREVIATIONS:

BA	Basic Assessment
BAR	Basic Assessment Report
COA	Conditions of Authorisation
CEMPr	Construction Phase Environmental Management Programme
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
ELO	Environmental Liaison Officer
EMPr	Environmental Management Programme
GDARD	Gauteng Department of Agriculture and Rural Development
NEMA	National Environmental Management Act (No. 107 of 1998)
OHS	Occupational Health and Safety Act (No. 85 of 1998)
NWA	National Water Act (No. 36 of 1998)
OEMP	Operational Phase Environmental Management Programme
SAHRA	South African Heritage Resources Agency

ACRONYMS & DEFINITIONS:

- Bund:** Enclosure under / around a storage facility to contain any spillage.
- Batch plant:** Site for the large-scale mixing and production of concrete or plaster, and associated equipment and materials.
- Contractor:** The principal persons /company undertaking the construction of the development.
- The main contractor as engaged by the Developer;
 - Selected subcontractors; and
 - Any other contractor from time to time engaged by the Developer directly in connection with the construction part of the Works.
- Contaminated water:** Means water contaminated by the Contractor's activities, e.g. concrete water and runoff from plant/ personnel wash areas.
- Construction camp:** Means the area designated for all temporary site offices, storage sheds and areas, parking areas, maintenance workshops, staff welfare facilities, accommodation, etc.

Construction Environmental Management Program (CEMP):

The construction phase Environmental Management Plan for this Proposed Residential Development, but specifically section 3 of the CEMP, containing the Environmental Specifications for Civil and Building Works, also forming part of the civils and building contract documentation.

Engineer: A person representing the Developer on site and who is responsible for the technical and contractual implementation of the works to be undertaken. This is usually the engineer, but may be any other person, such as an architect or project manager, authorized by the Developer to fulfill this role.

Environment: Means the surroundings within which humans exist and that are made up of -

- the land, water and atmosphere of the earth;
- micro-organisms, plant and animal life;
- any part or combination of the above and the interrelationships among and between them; - and,
- the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Environmental Education Programme:

An environmental education course for the Contractor's management staff and labour force, which informs them of the requirements of the CEMP. The ECO will present and co-ordinate courses.

Environmental Control Officer (ECO):

The individual or company appointed by the developer to ensure the implementation of the CEMP and suitable environmental management practices on site for the duration of the construction phase of the project.

Method Statement:

A written submission by the Contractor to the Engineer and ECO in response to the Specifications or a request by the Engineer, setting out the plant, materials, labour and method the Contractor proposes using to carry out an activity, identified by the relevant specification or the Engineer when requesting the Method Statement, in such detail that the Engineer is enabled to assess whether the Contractor's proposal is in accordance with the Specifications and/or will produce results in accordance with the Specifications.

The Method Statement shall cover applicable details with regard to:

- construction procedures,
- materials and plant to be used,
- getting the plant to and from site,
- how the plant/ material will be moved while on site,
- how and where material will be stored,
- the containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur,
- timing and location of activities,
- compliance/ non-compliance with the Specifications,
- any other information deemed necessary by the Engineer.

No Go Areas: Areas identified as being environmentally sensitive in some manner and delineated on plan, and on the site with pegs or fencing and which are out of bounds to unauthorised persons. Authorisation must be obtained prior to entry.

Potentially hazardous substance:

Is a substance which, in the reasonable opinion of the Engineer, can have a deleterious effect on the environment.

Reasonable: Means, unless the context indicates otherwise, reasonable in the opinion of the Engineer after he has consulted with a person, not an employee of the Employer, suitably experienced in "environmental implementation plans" and "environmental management plans" (both as defined in the National Environmental Management Act (No 107,1998)).

- Site:** The boundary and extent of development works and infrastructure, including any areas off the main site on which works are to be carried out in order to allow the development to proceed successfully.
- Solid waste:** Means all solid waste, including construction debris, chemical waste, excess cement/ concrete, wrapping materials, timber, tins and cans, drums, wire, nails, food and domestic waste (e.g. Plastic packets and wrappers).
- Specification:** A technical description of the standards of materials and workmanship that the Contractor is to use in the Works to be executed, the performance of the Works when completed and the manner in which payment is to be made.
- Works:** The construction operations and all related and incidental works, such as site works, earthworks, installation of services, rehabilitation etc, in connection with the execution and carrying to completion of the development.
- Top material:** This refers to any surface material in the construction area, whether it be soil, fine material or stones including vegetation.
- Topsoil:** Means the top 100 mm of soil and may include vegetation and rocks.

1 OVERVIEW

This document represents the Draft Environmental Management Programme (EMPr) for the PROPOSED RESIDENCES to be situated on Portion 350 of the FARM THE WILLOWS 340-JR (City of Tshwane Metropolitan Municipality, Gauteng) with related Civil services.

1.1 PURPOSE OF THE LEMP

The EMPr has been included in the Basic Assessment Report (BAR) in order to provide a link between the impacts identified in the Basic Assessment (BA) process and the actual environmental management on the ground during project implementation and operation.

The purpose of this document is to provide for environmental management throughout the various life-cycle stages of the proposed development. The following stages are included:

- Planning and design,
- Pre-construction and construction,
- Operation, and
- Closure.

Furthermore, this EMPr aims for alignment and optimisation of environmental management processes with conditions of authorisation that may arise, thereby ensuring that identified environmental considerations are efficiently and adequately taken into account during all stages of development.

1.2 LEGAL REQUIREMENTS OF ENVIRONMENTAL MANAGEMENT PROGRAMMES

Environmental Impact Assessment (EIA) Regulations were promulgated in terms of the National Environmental Management Amendment Act (as amended) ("NEMA") (Act 107 of 1998) Amendment of the Environmental Impact Assessment Regulations 2014, GNR: 324-327, 7 April 2017.

The proposed project triggers listed activities in terms of GN. R324, 7 April 2017: Listing notices 3 i.e:

(12) The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.

c. Gauteng

i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;

ii. Within Critical Biodiversity Areas or Ecological Support Areas identified in the Gauteng Conservation Plan or bioregional plans; or -

iii. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning'.

and also,

(15) The transformation of land bigger than 1000 square metres in size, to residential, retail, commercial, industrial or institutional use, where, such land was zoned open space, conservation or had an equivalent zoning, on or after 02 August 2010.

b. Gauteng

i. All areas'.

- *thereby* requiring the submission of a BAR for Environmental Authorisation (EA) to GDARD.

As such the applicant is required to submit an Environmental Management Programme (EMPr) that complies with regulations 19 and 23 of the NEMA EIA 2014 Regulations: Appendix 4, as well as the Department's Guideline for Environmental Management Programmes to be included with the BAR for the proposed activity. The EMPr must address the potential environmental impacts of the proposed activity on the environment throughout the project life-cycle i.e. impacts in respect of planning and design, preconstruction and construction activities, operation of the activity, rehabilitation of the environment and closure/decommissioning (if applicable).

Table 1 underneath lists the requirements of an EMPr as stipulated in the Regulations.

Table 1: Environmental management programme contemplated in regulations 19 and 23 of the NEMA EIA 2014 Regulations: Appendix 4 - listing the requirements of an EMPr.

Content of environmental management programme (EMPr)

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 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 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);

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);

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-

(i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and

(ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and

(n) any specific information that may be required by the competent authority.

(2) Where a government notice *gazetted* by the Minister provides for a generic EMPr, such generic EMPr as indicated in such notice will apply.

The legislation hereby aims to ensure that effective environmental management is implemented throughout the life cycle of the project via the translation of EIA management actions into the EMP.

This EMPr aims to meet the EMPr requirements as legislated by the NEMA Regulations. This document should thus be seen in an iterative context allowing for amendments throughout the life-cycle of the project, allowing for adjustments as new information is made available.

1.3 STRUCTURE OF THE EMPr

As discussed above, the EMPr aims to address environmental management throughout the project life-cycle, from planning and design, through construction, to operation and potential decommissioning. The EMPr has been structured to include the following sections:

1. Discussion summarising environmental management influencing the planning and design of the PROPOSED RESIDENCES to be situated on Portion 350 of the FARM THE WILLOWS 340-JR (City of Tshwane Metropolitan Municipality, Gauteng) (Chapter 2);
2. Construction EMPr based on identified impacts and mitigation measures from the BAR (Chapter 3);
3. Operational Framework based on identified impacts and mitigation measures from the BAR (Chapter 4); and –
4. Decommissioning Framework providing guidance on key considerations to be considered during decommissioning/closure (Chapter 5).

1.4 EXPERTISE OF ENVIRONMENTAL ASSESSMENT PRACTITIONERS

The NEMA 2014 EIA Regulation requires that a draft Environmental Management Programme must include the details of the person(s) who prepared the EMPr, and the expertise of that person to prepare an EMPr. In this regard, the *Curriculum Vitae* of the Environmental Assessment Practitioner who compiled the EMPr is included in *Appendix 3*.

1.5 ROLE PLAYERS

1.5.1 Developer

The developer remains ultimately responsible for ensuring that the development is implemented according to the requirements of the EMPr. Although the developer appoints specific role players to perform functions on his/her behalf, this responsibility is delegated. The developer is responsible for ensuring that sufficient resources (time, financial, human, equipment, etc.) are available to the other role players (e.g. the ECO, ELO and contractor) to efficiently perform their tasks in terms of the EMPr. The developer is liable for restoring the environment in the event of negligence leading to damage to the environment.

The developer must ensure that the EMPr is included in the tender documentation (i.e. if any) so that the contractor who is appointed is bound to the conditions of the EMPr. The developer must appoint an independent Environmental Control Officer (ECO) during the planning phase to oversee all the environmental aspects relating to the development.

1.5.2 Contractor

The contractor, as the developer's agent on site, is bound to the EMPr conditions through his/her contract with the developer and is responsible for ensuring that she/he adheres to all the conditions of the EMPr. The contractor must thoroughly familiarise him/herself with the EMP requirements before coming onto site and must request clarification on any aspect of these documents, should they be unclear. The contractor must ensure that he/she has provided sufficient budget for complying with all EMPr conditions at the tender stage. The contractor must comply with all orders (whether verbal or written) given by the ECO, project manager or site engineer in terms of the EMPr.

1.5.3 Environmental Control Officer (ECO)

Prior to the commencement of construction, a suitably qualified and experienced Environmental Control Officer (ECO) shall be appointed by the proponent to ensure that the mitigation rehabilitation measures and recommendations referred to in the Environmental Authorisation are implemented and

to ensure compliance with the provisions of the EMPr.

Roles and responsibilities

The role of the ECO is to oversee and monitor compliance with and implementation of the construction phase EMPr, which includes compliance with the relevant conditions contained in the

Environmental Authorisation. The ECO is responsible for:

- i) Liaison with the Client, engineer and Environmental Authorities;
- ii) Monitoring of all of the Contractor's activities for compliance with the various environmental requirements contained in this Specification;
- iii) Monitoring of compliance with the Environmental Authorisation issued by GDARD as well as other relevant environmental legislation;
- iv) Reviewing of the Contractor's environmental Method Statements;
- v) Ensuring that the requisite remedial action is implemented in the event of noncompliance;
- vi) Ensuring the proactive and effective implementation and management of environmental protection measures;
- vii) Ensuring that a register of public complaints is maintained by the Contractor and that any and all public comments or issues are appropriately reported and addressed;
- viii) Routine recording and reporting of environmental activities on a weekly and monthly basis;
- ix) Recording and reporting of environmental incidents;

Site visits and reporting:

The ECO shall visit the site a minimum of once every two weeks. More frequent visits may be required if the situation requires it.

Monthly compliance reports shall be submitted to the engineer and the proponent and distributed as desired. The compliance report shall speak to the requirements of the EMPr and the project specifications as well as other issues of compliance in terms of the Environmental Authorisation.

Please see a more detailed discussion under item 3.3.9. underneath i.e. *MONITORING, RECORD KEEPING AND REPORTING*.

2 PLANNING AND DESIGN

This section has been divided into subsections which outline how environmental considerations have informed and been incorporated into the planning and design phases of the proposed development. Detailed design is usually undertaken as part of the pre-construction phase as it is a costly undertaking which is generally only costed for once all required authorisations have been obtained. Thus, the planning and design phases discussed are limited to those associated with the pre-authorisation phases.

2.1 ASSESSMENT OF ALTERNATIVES & PREFERRED PROPOSAL

The Basic Assessment Process for the proposed project forms an integral component of the planning and design phase for the PROPOSED RESIDENCES to be situated on Portion 350 of the FARM THE WILLOWS 340-JR (City of Tshwane Metropolitan Municipality, Gauteng) with related Civil services.

Two residences are proposed to be constructed on Portion 350 of the FARM THE WILLOWS 340-JR (City of Tshwane Metropolitan Municipality, Gauteng) which will consist of the following i.e:

- Size of site = 1,0736.46ha (10736,46m²).
- Size of Proposed development (i.e. activity) footprint:
 - Buildings + Driveways + Paving (hard surfaces) = 1134.49 m²
 - Local Indigenous Landscaping area = 4392.51m².
 - TOTAL PROPOSED DEVELOPMENT FOOTPRINT = ± 5527 m².
- The remainder of the site which will not be developed but remain 'as is' since it falls within the designated 'conservation area' i.e the '*Bronberg Conservation Area*', of the City of Tshwane Metropolitan Municipality = 5209.46 m².
- Date of Ownership of site: December 2017.

The two proposed residences are proposed to be constructed outside of the designated 'conservation area' i.e the '*Bronberg Conservation Area*', of the City of Tshwane Metropolitan Municipality – and are as follows i.e:

- predominantly (i.e. the largest portion) the main residence on a portion of the northwestern portion of the site;
 - and,
- the second dwelling on the central-southern portion of the site.

2.2 LAYOUT & DESIGN PROPOSAL

The proposed activity involves the following i.e: the description of the scope of the PROPOSED RESIDENCES to be situated on Portion 350 of the FARM THE WILLOWS 340-JR (City of Tshwane Metropolitan Municipality, Gauteng) project is summarised as follows i.e:

2.2.1 LOCALITY

The site is situated in the eastern part of the City of Tshwane Metropolitan Municipal area of jurisdiction.

The application site is situated at an unnamed road (i.e. not as yet named by the Local Municipality since it's a private road in the current WAPADRAND COUNTRY ESTATE), which runs parallel to Solomon Mahlangu Drive, The Willows in Pretoria - and is currently described as i.e. Portion 350 of the FARM THE WILLOWS 340-JR.

This property obtains access via a right of way servitude which connects with Koedoeberg Road. From there on the property is very easily accessible from main routes such Solomon Mahlangu and Lynwood Road.

The Grove Mall is approximately 4km from the application site and Atterbury Value Mart Shopping Centre is about 3km from the application site. Other sites, such as Makro, Hazeldean square, Six Fountains Lifestyle Centre and Atterbury Pick & Pay are all located in a radius of 4 km from the application site.

Schools such as Tygerpoort Primary School, Tyger Valley College, Hoërskool Garsfontein, Doxa Deo College and some crèches are all located within 5 km of the property.

PLEASE SEE LOCALITY PLANS, SITE PLANS & FACILITY ILLUSTRATIONS attached in APPENDIX 1 underneath.

2.2.2 PROPOSED DEVELOPMENT:

Two residences are proposed to be constructed on Portion 349 of the FARM THE WILLOWS 340-JR (City of Tshwane Metropolitan Municipality, Gauteng) which will consist of the following i.e:

- Size of site = 1,0736.46ha (10736,46m²).
- Size of Proposed development (i.e. activity) footprint:
 - Buildings + Driveways + Paving (hard surfaces) = 1134.49 m²
 - Local Indigenous Landscaping area = 4392.51m².
 - TOTAL PROPOSED DEVELOPMENT FOOTPRINT = ± 5527 m².
- The remainder of the site which will not be developed but remain 'as is' since it falls within the designated 'conservation area' i.e the '*Bronberg Conservation Area*', of the City of Tshwane Metropolitan Municipality = 5209.46 m².
- Date of Ownership of site: December 2017.

The two proposed residences are proposed to be constructed outside of the designated 'conservation area' i.e the '*Bronberg Conservation Area*', of the City of Tshwane Metropolitan Municipality – and are as follows i.e:

- predominantly (i.e. the largest portion) the main residence on a portion of the northwestern portion of the site;
 - and,
- the second dwelling on the central-southern portion of the site.

PLEASE SEE DETAILED ARCHITECT'S PROPOSED FACILITY ILLUSTRATION in APPENDIX 1.

2.2.3 ZONING, LAND USE & SURROUNDING LAND USES

The application site is zoned "Agricultural" in terms of the Tshwane Town-planning Scheme, 2008. The purposes for which buildings may be erected and used are for agriculture, farm stall and one dwelling house. In terms of the current zoning a second dwelling house may be applied for in terms of Clause 14(10) of the Tshwane Town-planning Scheme, 2008. Such an application i.e. for a second dwelling house, was submitted and approved by '*CITY OF TSHWANE: Economic Development and Spatial Planning*' [i.e. dated: 6 February 2019 / Ref#: CPD 340-JR/0668/351 (Item no. 20709)]. A copy of the approval can be found in APPENDIX I of the BAR.

Land Use

The application site was still vacant by the date on which this application was launched and submitted to the City of Tshwane Metropolitan Municipality.

Accessibility

The application site currently obtains safe and direct access via a right of way servitude adjoining Koedoeberg Road, as well as from Wapadransdorp via Briekslinger Place. Access to the site is thus possible from two directions.

The property is centrally located and easily accessible from the major routes within the area,

including the provincial roads. Land within this area that can be developed for residential purposes with good accessibility may be considered a scarce resource and it is therefore important to determine the development potential of land within the area and to apply for land use rights in accordance with the development potential.

New Road Networks

According to our knowledge and information available, will the subject property not be influenced or affected by any new proposed road network in the area.

The property lies within an existing township, which has already been developed. Thus, it is highly unlikely that major road networks were planned over the erf, if the township has already been developed.

2.2.4 CIVIL INFRASTRUCTURE ANALYSIS

Engineering Services

The subject property is situated adjacent to already established townships in Pretoria i.e. Faerie Glen and Wapadrand, which obtain their services, such as:- roads, stormwater, water, electricity and sewerage from the City of Tshwane Metropolitan Municipality. The property under application has been serviced with water, sewer and electrical engineering services for the development of one dwelling house. Should the services require to be upgraded the necessary design will be done by the consultant's engineers. Services to the proposed development will thus also be obtained from the City of Tshwane Metropolitan Municipality.

2.3 SPECIALIST STUDIES

1. Specialist studies were conducted for this proposed development i.e. i. 'An assessment of vegetation, flora, vertebrate fauna and wetlands on Erf 350 of the Farm The Willows 340 JR, City of Tshwane, Gauteng. By G.J. Bredenkamp D.Sc. Pr.Sci.Nat. J.P.C. van Wyk M.Sc. Pr.Sci.Nat. C.E. Venter M.Sc. Pr.Sci.Nat. Commissioned by Pierre Joubert Landscape Architect and Environmental Planner (EcoAgent CC PO Box 25533 Monument Park 0181. Tel 012 4602525. Cell 082 5767046. March 2021).'; ii. 'A PHASE 1 HERITAGE IMPACT ASSESSMENT & REPORT FOR RESIDENTIAL DEVELOPMENT ON PORTION 350 OF THE FARM THE WILLOWS 350JR TSHWANE METROPOLITAN AREA, GAUTENG. For: Pierre Joubert Professional Landscape Architect & Environmental Planner [15 Marikana Street, WIERDAPARK, CENTURION, 0157]. REPORT: APAC021/71. by: APAC – APELSER ARCHAEOLOGICAL CONSULTING (Accredited member of ASAPA) , September 2021 .Member: AJ Pelsers BA (UNISA), BA (Hons) (Archaeology), MA (Archaeology) [WITS]. [P.O.BOX 73703 LYNNWOOD RIDGE0040 Tel: 083 459 3091 Fax: 086 695 7247 Email: apac.heritage@gmail.com Comprehensive and Professional Solutions for all Heritage Related Matters. CK 2006/014630/23 VAT NO.: 4360226270.
2. 'Paleontological Impact Assessment: Phase 1: Field Study of Portion 350 of the Farm The Willows 340-JR, City of Tshwane – Gauteng. By Dr. Fourie, H. Dr heidicindy@yahoo.com 012 322 7632/079 940 6048. Commissioned by: A. Pelsers Archaeological Consulting cc. 833B St Bernard Street, Garstfontein, 0081. 083 459 3091 Ref: Pending. 2021/08/30].
 - Biodiversity Assessment – as the site falls within a CRITICAL BIODIVERSITY AREA, a Biodiversity specialist study was conducted to addresses the impacts of the proposed activity upon the biodiversity related features/aspects (i.e. vegetation, mammals, avifauna, herpetofauna & wetland/watercourse) on the site and recommends mitigation measures.

- Heritage (i.e. Archaeological & Paleontological):

There are possible heritage aspects on site that are significant or worthy of conservation. However, the site is also larger than 5000m² it could require that SAHRA provide comments in terms of Section 38 of the National Heritage Resources Act, 1999 (Act No 25 of 1999).

2.4 PUBLIC PARTICIPATION PROCESS:

An EIA APPLICATION Public Participation Process is in the process of being conducted, in which the DRAFT BASIC ASSESSMENT REPORT (BAR) is made available for a period of 30 days i.e. from the 5th of October 2021 to the 5th of November 2021, to all potential interested and affected parties

i.e. placement of a notice on site; placement of a notice in the newspaper i.e. 'PRETORIA REKORD – EAST' (5 October 2021); notices to all adjacent landowners & potential stakeholders; GDARD; Environmental Section of the CITY of Tshwane Metropolitan Municipality and the Ward Councillor for that area. Written comment will be received and attended to in a Final Draft Basic Assessment Report regarding the PROPOSED RESIDENCES to be situated on Portion 350 of the FARM THE WILLOWS 340-JR (City of Tshwane Metropolitan Municipality, Gauteng). with associated Civil Services infrastructure, which is being undertaken in accordance with the National Environmental Management Amendment Act (as amended) ("NEMA") (Act 107 of 1998) Amendment of the Environmental Impact Assessment Regulations 2014, GNR: 324-327, 7 April 2017.

2.4 IMPACT MANAGEMENT, MITIGATION & MONITORING MEASURES:

PROPOSAL PREFERRED LAYOUT PLAN: (Table 2)

PROPOSED RESIDENCES to be situated on Portion 350 of the FARM THE WILLOWS 340-JR (City of Tshwane Metropolitan Municipality, Gauteng) - with associated Civil Services infrastructure

POTENTIAL IMPACTS on the TERRESTRIAL VEGETATION & FLORA BIODIVERSITY:

[Taken from i.e. quoted directly, from the specialist reports contained in APPENDIX G – '1. (i.e. 'An assessment of vegetation, flora, vertebrate fauna and wetlands on Erf 350 of the Farm The Willows 340 JR, City of Tshwane, Gauteng. By G.J. Bredenkamp D.Sc. Pr.Sci.Nat. J.P.C. van Wyk M.Sc. Pr.Sci.Nat. C.E. Venter M.Sc. Pr.Sci.Nat. Commissioned by Pierre Joubert Landscape Architect and Environmental Planner [EcoAgent CC PO Box 25533 Monument Park 0181. Tel 012 4602525. Cell 082 5767046. March 2021)].'

1. Potential Direct & Indirect Impacts on natural terrestrial vegetation.

Nature: Impact of the Preferred Lay-Out development on plant communities with Medium-Low or Low ecological sensitivity - loss of indigenous vegetation due to clearing for construction of two residences.

The relevant area is 0,45 ha in size. Only the footprint area for the development of two residences will be cleared of vegetation. The rest of the area will remain as natural as possible, with the development of an indigenous garden with special measures to enhance habitat for Juliana's Golden Mole. Due to the small area to be cleared, minimal loss of indigenous plant species is expected, while low disturbance of plant populations and the limited fragmentation of the already disturbed plant community will occur. The removal of vegetation will expose soil, with minimal risk of erosion during construction period.

NOTE: The Impact Assessment is restricted to the plant communities with Medium-Low or Low ecological sensitivity. The ecological sensitivity of the Historically Disturbed Plains Bushveld and the Recently Cleared Areas is **Medium-Low** or **Low**. This is mainly due to the transformed, degraded and disturbed nature of these plant communities, they have medium species richness and do not contain any protected plant species. The proposed development is restricted to these two plant communities with Medium-Low or Low ecological sensitivity.

As the natural vegetation had already long ago been transformed the **significance of the impact** of the proposed development on this vegetation, with mitigation, is therefore considered to be **Minor** during construction and **Low** during operational phases. Removal and control of alien invasive plant species is very important. There is adequate space left for conservation of plains bushveld, albeit historically disturbed, and the development of an indigenous garden and implementation of the management plan for Juliana's Golden Mole are important measures to maintain biodiversity on the site. From vegetation and flora point of view, the proposed development on this area can be supported.

	Without mitigation		With mitigation	
PLANNING & DESIGN PHASE				
Probability	n.a.	0	n.a.	0
Duration	n.a.	0	n.a.	0
Extent	n.a.	0	n.a.	0
Magnitude	n.a.	0	n.a.	0
Significance	n.a.	0	n.a.	0
Status (positive or negative)	n.a.		n.a.	
CONSTRUCTION PHASE				

Probability	Definite	5	Definite	5
Duration	Short-term	1	Short term	1
Extent	Limited to construction site	1	Limited to construction site	1
Magnitude	Minor	2	Small	1
Significance	Minor	20	Minor	15
Status (positive or negative)	Negative		Negative	
OPERATIONAL PHASE				
Probability	Definite	5	Definite	5
Duration	Permanent	5	Permanent	5
Extent	Local	1	Local	1
Magnitude	Major	5	Minor	2
Significance	Moderate	55	Moderate	40
Status (positive or negative)	Negative		Negative	
DECOMMISSIONING & CLOSURE PHASE				
Probability	n.a.		n.a.	
Duration	n.a.		n.a.	
Extent	n.a.		n.a.	
Magnitude	n.a.		n.a.	
Significance	n.a.		n.a.	
Status (positive or negative)	n.a.		n.a.	
Reversibility	Low		Moderate	
Irreplaceable loss of resources?	Low		Low	
Can impacts be mitigated?	Yes			
Mitigation:				
<ul style="list-style-type: none"> • The clearing of vegetation must be kept to a minimum and remain within the footprint development – leave the rest of the area with natural vegetation intact. • Leave all trees but remove alien invasive species wherever possible. • Construction must be completed as quickly as possible. • Disturbed open areas must be rehabilitated immediately after construction has been completed in that area by developing an indigenous garden by planting appropriate indigenous tree, grass and forb species. • During the construction phase workers must be limited to areas under construction and access to the planned open areas must be strictly controlled. • Rehabilitated areas must be monitored to ensure the establishment of re-vegetated areas. • Plant only indigenous trees – no alien species. • Adhere to the proposed management plan for Juliana's Golden Mole. 				
Cumulative impacts: Not Expected to reduce the functional ecosystems in the area.				
Residual Risks: Little anticipated as it is expected that the mitigation measures will be implemented correctly.				
2. Potential Direct & Indirect Impacts on natural terrestrial vegetation.				

Nature: Impact of the Preferred Lay-Out development on plant communities with Medium-Low or Low ecological sensitivity - Increase of alien invasive plant species on cleared sites.

Alien invasive plant species and weeds may encroach into any disturbed areas particularly areas cleared for the proposed development. Large parts of the proposed site already have various woody alien and invasive plant species present. These must be removed and an indigenous garden developed.

NOTE: The Impact Assessment is restricted to the plant communities with Medium-Low or Low ecological sensitivity. The ecological sensitivity of the Historically Disturbed Plains Bushveld and the Recently Cleared Areas is **Medium-Low** or **Low**. This is mainly due to the transformed, degraded and disturbed nature of these plant communities, they have medium species richness and do not contain any protected plant species. The proposed development will touch a negligible small part of the Disturbed Tall Treeveld on the Plains (Medium ecological sensitivity).

As the natural vegetation had already long ago been transformed the **significance of the impact** of the proposed development on this vegetation, with mitigation, is therefore considered to be **Minor** during construction and **Low** during operational phases. Removal and control of alien invasive plant species is very important. There is adequate space left for conservation of plains bushveld, albeit historically disturbed, and the development of an indigenous garden and implementation of the management plan for Juliana's Golden Mole are important measures to maintain biodiversity on the site. From vegetation and flora point of view, the proposed development on this area can be supported.

	Without mitigation		With mitigation	
PLANNING & DESIGN PHASE				
Probability	n.a.	0	n.a.	0
Duration	n.a.	0	n.a.	0
Extent	n.a.	0	n.a.	0
Magnitude	n.a.	0	n.a.	0
Significance	n.a.	0	n.a.	0
Status (positive or negative)	n.a.		n.a.	
CONSTRUCTION PHASE				
Probability	Improbable	2	Very improbable	1
Duration	Short-term	1	Short term	1
Extent	Limited to construction site	1	Limited to construction site	1
Magnitude	Moderate	5	Minor	2
Significance	Minor	14	Minor	4
Status (positive or negative)	Negative		Positive	
OPERATIONAL PHASE				
Probability	Improbable	2	Very improbable	1
Duration	Permanent	5	Permanent	5
Extent	Limited to site	1	Limited to site	1
Magnitude	Low	2	Low	1
Significance	Minor	16	Minor	7
Status (positive or negative)	Negative		Positive	
DECOMMISSIONING & CLOSURE PHASE				
Probability	n.a.		n.a.	
Duration	n.a.		n.a.	
Extent	n.a.		n.a.	
Magnitude	n.a.		n.a.	
Significance	n.a.		n.a.	
Status (positive or negative)	n.a.		n.a.	
Reversibility	Moderate		High	
Irreplaceable loss of resources?	Low		Low	
Can impacts be mitigated?	Yes			

Mitigation:

- An alien invasive management programme must be incorporated into the Environmental Management Programme.
- Ongoing alien plant control must be undertaken.
- Areas which have been disturbed will be quickly colonised by invasive alien species. An ongoing management plan must be implemented for the clearing/eradication of alien species.
- Monitor all sites disturbed by construction activities for colonisation by exotics or invasive plants and control these as they emerge.
- Avoid planting of exotic plant species, use indigenous species.
- Develop an indigenous garden.
- Adhere to the proposed management plan for Juliana's Golden Mole.

Cumulative impacts: Minor, should mitigation measure not be implemented. Alien invader plant species pose an ecological threat as they alter habitat structure; lower biodiversity, change ecosystem services and processes e.g. change nutrient cycling and productivity, and modify food webs.

Residual Risks: None anticipated provided that the mitigation measures are implemented correctly, and rehabilitation of the site is undertaken.

POTENTIAL IMPACTS on the MAMMALS & MAMMALS HABITAT:

[Taken from i.e. quoted directly, from the specialist reports contained in APPENDIX G – '1. (i.e. 'An assessment of vegetation, flora, vertebrate fauna and wetlands on Erf 350 of the Farm The Willows 340 JR, City of Tshwane, Gauteng. By G.J. Bredenkamp D.Sc. Pr.Sci.Nat. J.P.C. van Wyk M.Sc. Pr.Sci.Nat. C.E. Venter M.Sc. Pr.Sci.Nat. Commissioned by Pierre Joubert Landscape Architect and Environmental Planner [EcoAgent CC PO Box 25533 Monument Park 0181. Tel 012 4602525. Cell 082 5767046. March 2021]).'

1. Potential Direct & Indirect Impacts on MAMMALS & MAMMALS HABITAT.

Nature: Direct Impacts of the Preferred Lay-Out development on mammal communities and loss of mammal habitat. Only the footprint area for the development of two residences will be cleared of vegetation. The rest of the area will remain as natural as possible, with the development of an indigenous garden with special measures to enhance habitat for Juliana's Golden Mole. Due to the small area to be cleared, minimal loss of indigenous plant species is expected, while low disturbance of plant populations and the limited fragmentation of the already disturbed plant community will occur. The footprint for the proposed residential development will result in clearing most of the vegetation area. After clearing the vegetation, construction will commence. Construction activities may result in disturbance of mammal individuals or populations.

NOTE: The development according to the **Preferred Lay-Out** plan will be located on the Recently Disturbed Area with Low ecological sensitivity and the Historically Disturbed Plains Bushveld area with Medium-Low ecological sensitivity. The proposed development will touch a negligible small part of the Disturbed Tall Treeveld on the Plains (Medium ecological sensitivity). Areas within the Historically Disturbed) Plains Bushveld vegetation and the entire area of the Dense Treeveld of the Heritage site and Disturbed Tall Treeveld of the Plains will remain as natural veld. An indigenous garden is planned for the immediate surroundings of the residences. The Preferred Lay-Out development plan implies that a much larger area of natural vegetation will remain intact and a much larger area can be developed into a indigenous garden to the benefit of Juliana's Golden Mole. It is therefore envisaged that the impact of the Preferred Lay-Out development will be far less significant on the mammals, particularly the Juliana's Golden Mole, than the Alternative Lay-Out development, particularly should the conservation management plan be implemented.

'Juliana's golden mole subsurface activities were recorded at a few localities on site. The golden mole subsurface activities were found around a diversity of habitat types on the study site and buffer areas. The golden mole occurs on the site in both natural and in unnatural urban settings. Part of the study site includes the Bronberg Conservation Area where no development may occur, and signs of the Juliana's golden mole activity have been recorded. These golden mole individuals in the Bronberg Conservation Area would not be affected by the development since they occur outside the intended footprint of the development. The area where the intended development will take place has been altered by invasive plant species and except for a small area, no Juliana's golden mole subsurface activities were recorded. Near the white stinkwood trees at Erf 350, which is also a cultural heritage site, golden mole activities were observed at 25°46'51"S; 28°20'05"E. This area must be excluded from development. Golden moles are adapted to co-exist with human beings in rural settings on condition that the substrate consists of soft sand with no or little clay content and the soils kept permanently moist by regular irrigation. Implemented the suggested Ecological Management Plan (included in this report) will stabilize the population at higher numbers and ensure year-round optimized ecological conditions in a structured manner. Connectivity with adjoining properties is good. From a vertebrate perspective, there is no objection against the development as long as the development strictly adheres to the mitigation measures for the Juliana's Golden mole.'

	Without mitigation		With mitigation	
PLANNING & DESIGN PHASE				
Probability	n.a.	0	n.a.	0
Duration	n.a.	0	n.a.	0
Extent	n.a.	0	n.a.	0
Magnitude	n.a.	0	n.a.	0
Significance	n.a.	0	n.a.	0
Status (positive or negative)	n.a.		n.a.	
CONSTRUCTION PHASE				
Probability	Definite	5	Definite	5
Duration	Short term 1 year	1	Short term 1 year	1
Extent	Limited to construction site	1	Limited to construction site	1
Magnitude	Low	4	Minor	1
Significance	Low	30	Minor	15
Status (positive or negative)	Negative		Negative	
OPERATIONAL PHASE				
Probability	Definite	5	Definite	5
Duration	Permanent	5	Permanent	5
Extent	Limited to site	1	Limited to site	1
Magnitude	Moderate	5	Low	3

Significance	Moderate	55	Moderate	45
Status (positive or negative)	Negative		Negative/Positive	
DECOMMISSIONING & CLOSURE PHASE				
Probability	n.a.		n.a.	
Duration	n.a.		n.a.	
Extent	n.a.		n.a.	
Magnitude	n.a.		n.a.	
Significance	n.a.		n.a.	
Status (positive or negative)	n.a.		n.a.	
Reversibility	No		No	
Irreplaceable loss of resources?	No too small areas and natural mammal habitats are already disturbed for biodiversity or conservation.		No too small areas and natural mammal habitats are already disturbed for biodiversity or conservation.	
Can impacts be mitigated?	Yes, planting indigenous species in the gardens will enhance habitats for mammals and implementation of the management plan for Juliana's Golden Mole will improve mammal habitats in general			
Mitigation:				
<ul style="list-style-type: none"> • Should any South African Hedgehog or other mammal species be encountered or exposed during the construction phase, they should be removed and relocated to natural areas in the vicinity. The contractor must ensure that no indigenous mammal species are disturbed, trapped, hunted or killed during the construction phase. Conservation-orientated clauses should be built into contracts for construction personnel, complete with penalty clauses for non-compliance. • During the construction phase there may be increased surface runoff and a decreased water quality (with increased silt load and pollution). Completing construction during the winter months would mitigate this environmental impact. • The appropriate agency should implement an ongoing monitoring and eradication program for all invasive plant species growing on the site. • Any post-development re-vegetation or landscaping exercise should use species indigenous to South Africa. Plant species locally indigenous to the area are preferred. • Planting indigenous species in the gardens and development of an indigenous garden will enhance habitats for mammals. • Implementation of the management plan for Juliana's Golden Mole will improve mammal habitats in general and contribute to the conservation of these species. • Near the white stinkwood trees at Erf 350, which is also a cultural heritage site, golden mole activities were observed at 25°46'51"S; 28°20'05"E. This area must be excluded from development 				
Cumulative impacts: Limited, the adjacent areas are already used as residential areas.				
Residual Risks: None anticipated.				
POTENTIAL IMPACTS on the AVIFAUNA & AVIFAUNA HABITAT:				
[Taken from i.e. quoted directly, from the specialist reports contained in APPENDIX G – '1. (i.e. 'An assessment of vegetation, flora, vertebrate fauna and wetlands on Erf 350 of the Farm The Willows 340 JR, City of Tshwane, Gauteng. By G.J. Bredenkamp D.Sc. Pr.Sci.Nat. J.P.C. van Wyk M.Sc. Pr.Sci.Nat. C.E. Venter M.Sc. Pr.Sci.Nat. Commissioned by Pierre Joubert Landscape Architect and Environmental Planner [EcoAgent CC PO Box 25533 Monument Park 0181. Tel 012 4602525. Cell 082 5767046. March 2021)].'				
1. Potential Direct & Indirect Impacts on AVIFAUNA HABITAT.				
Nature: Construction of two residential houses and other buildings is likely to take place and may potentially incur the loss of habitat, but also potential creation of new habitats for certain species.				
NOTE: From a general avifaunal point of view, most of the terrestrial habitat types containing unspecialised and generalist bird species with widespread distribution ranges. The proposed development of the Preferred Lay-Out development plan can be supported.				
	Without mitigation		With mitigation	
PLANNING & DESIGN PHASE				
Probability	n.a.	0	n.a.	0

Duration	n.a.	0	n.a.	0
Extent	n.a.	0	n.a.	0
Magnitude	n.a.	0	n.a.	0
Significance	n.a.	0	n.a.	0
Status (positive or negative)	n.a.		n.a.	
CONSTRUCTION PHASE				
Probability	Definite	5	Probable	5
Duration	Short term 1 year	1	Short term 1 year	1
Extent	Limited to construction site	2	Limited to construction site	2
Magnitude	Minor	2	Small	1
Significance	Low	25	Minor	20
Status (positive or negative)	Negative		Negative	
OPERATIONAL PHASE				
Probability	n.a.	0	n.a.	0
Duration	n.a.	0	n.a.	0
Extent	n.a.	0	n.a.	0
Magnitude	n.a.	0	n.a.	0
Significance	N.a	0	n.a.	0
Status (positive or negative)	n.a.		n.a.	
DECOMMISSIONING & CLOSURE PHASE				
Probability	n.a.		n.a.	
Duration	n.a.		n.a.	
Extent	n.a.		n.a.	
Magnitude	n.a.		n.a.	
Significance	n.a.		n.a.	
Status (positive or negative)	n.a.		n.a.	
Reversibility	Low		Low	
Irreplaceable loss of resources?	No, area too small		No, area too small	
Can impacts be mitigated?	Yes, to some extent			
Mitigation:				
<ul style="list-style-type: none"> • The spatial extent of construction activities must be minimized, • The boundaries of the development footprint areas are to be clearly demarcated and it must be ensured that all activities remain within the demarcated footprint area. • Disturbance by residents of birds breeding and foraging in the area should be minimized and controlled. • Provide adequate briefing for site personnel and residents prior to construction. • Any bird nests that are found during the construction period must be reported to the Environmental Control Officer (ECO). 				
Cumulative impacts: Expected to be minimal on habitat with low avifaunal sensitivity. The habitat of low avifaunal sensitivity is already transformed and fragmented due to historic activities and the site is not a unique habitat within the landscape.				
Residual Risks: Low, if mitigation measures are implemented correctly and rehabilitation of the site is undertaken.				
2. Potential Direct & Indirect Impacts on AVIFAUNA.				

Nature: Impact on birds due to disturbance associated with construction activities and with increased human presence in the area.

The presence of vehicles and construction workers will cause disturbance to avifauna, with the movement and activities of personnel on site and the associated noise, pollution and litter all having a negative effect on birds. In addition, the presence of construction workers will increase the probability of activities such as illegal hunting of birds. The permanent presence of a much larger number of people than presently occur at the site will result in greater disturbance of birds that use the area for foraging and breeding.

NOTE: From a general avifaunal point of view, most of the terrestrial habitat types containing unspecialised and generalist bird species with widespread distribution ranges. The proposed development of the Preferred Lay-Out development plan can be supported.

	Without mitigation		With mitigation	
PLANNING & DESIGN PHASE				
Probability	n.a.	0	n.a.	0
Duration	n.a.	0	n.a.	0
Extent	n.a.	0	n.a.	0
Magnitude	n.a.	0	n.a.	0
Significance	n.a.	0	n.a.	0
Status (positive or negative)	n.a.		n.a.	
CONSTRUCTION PHASE				
Probability	Definite	5	Definite	5
Duration	Short term 1 year	1	Short term 1 year	1
Extent	Limited to construction site	2	Limited to construction site	2
Magnitude	Low	4	Minor	2
Significance	Low	35	Low	25
Status (positive or negative)	Negative		Negative	
OPERATIONAL PHASE				
Probability	Definite	5	Definite	5
Duration	Permanent	5	Permanent	5
Extent	Limited to local area	2	Limited to local area	2
Magnitude	Low	4	Minor	2
Significance	Moderate	55	Moderate	45
Status (positive or negative)	Negative		Negative	
DECOMMISSIONING & CLOSURE PHASE				
Probability	n.a.		n.a.	
Duration	n.a.		n.a.	
Extent	n.a.		n.a.	
Magnitude	n.a.		n.a.	
Significance	n.a.		n.a.	
Status (positive or negative)	n.a.		n.a.	
Reversibility	Low		Low	
Irreplaceable loss of resources?	No, area too small		No, area too small	
Can impacts be mitigated?	Yes.			

Mitigation:

- Movement of construction vehicles and workers beyond the boundary of the site must be minimized. In addition, workers must be instructed to minimize disturbance of birds at all times, and steps must be taken to ensure that no illegal hunting occurs.
- The boundaries of the development footprint areas are to be clearly demarcated and it must be ensured that all activities remain within the demarcated footprint area.
- Disturbance by residents of birds breeding and foraging in the area should be minimized and controlled.
- Provide adequate briefing for site personnel and residents prior to construction.
- Any bird nests that are found during the construction period must be reported to the Environmental Control Officer (ECO).

Cumulative impacts: Expected to be minimal. The habitat is however already largely transformed and fragmented due to residential activities in the vicinity of the site. The site is not a unique habitat within the landscape. It is not envisaged that any Red Data species will be displaced by the habitat transformation that will take place as a result of the construction and operation of the proposed development. Birds are very mobile and may migrate to adjacent suitable habitat. It should be noticed that the newly created houses and indigenous garden forms habitat for specific bird species.

Residual Risks: None anticipated provided that the mitigation measures are implemented correctly, and rehabilitation of the site is undertaken.

3. Potential Direct & Indirect Impacts on AVIFAUNA.

Nature: Impact on birds due to Pollution associated with construction or residential activities. Pollution associated with construction activities and residents (e.g., fuel spills, use of cleaning chemicals) could have negative impacts on avifauna.

NOTE: From a general avifaunal point of view, most of the terrestrial habitat types containing unspecialised and generalist bird species with widespread distribution ranges. The proposed development of the Preferred Lay-Out development plan can be supported.

	Without mitigation		With mitigation	
PLANNING & DESIGN PHASE				
Probability	n.a.	0	n.a.	0
Duration	n.a.	0	n.a.	0
Extent	n.a.	0	n.a.	0
Magnitude	n.a.	0	n.a.	0
Significance	n.a.	0	n.a.	0
Status (positive or negative)	n.a.		n.a.	
CONSTRUCTION PHASE				
Probability	Improbable	2	Very improbable	1
Duration	Short term 1 year	1	Short term 1 year	1
Extent	Limited to construction site	2	Limited to construction site	2
Magnitude	Low	4	Minor	2
Significance	Low	12	Minor	4
Status (positive or negative)	Negative		Negative	
OPERATIONAL PHASE				
Probability	Improbable	2	Very improbable	1
Duration	Permanent	5	Permanent	5
Extent	Limited to site	2	Limited to site	2
Magnitude	Low	4	Minor	2
Significance	Low	22	Minor	9
Status (positive or negative)	Negative		Negative	
DECOMMISSIONING & CLOSURE PHASE				
Probability	n.a.		n.a.	
Duration	n.a.		n.a.	
Extent	n.a.		n.a.	
Magnitude	n.a.		n.a.	
Significance	n.a.		n.a.	

Status (positive or negative)	n.a.	n.a.		
Reversibility	High	High		
Irreplaceable loss of resources?	Low	Low		
Can impacts be mitigated?	Yes.			
Mitigation:				
<ul style="list-style-type: none"> • Great care must be taken that no pollutants or other waste pollute the area or enter local water systems during the construction or operational phases. Measures to rapidly deal with spills of fuel, cleaning chemicals or any other potential pollutants must be put in place before construction commences. • Construction workers must be suitably trained to deal with any such spills. • Facilities to handle pollution and waste must be provided to residents. 				
Cumulative impacts: Expected to be minimal. The habitat is already transformed and fragmented due to the residential activities and the site is not a unique habitat within the landscape. It is not envisaged that any Red Data species will be displaced. Birds are very mobile and may migrate to adjacent suitable habitat. It should be noticed that the newly created town forms habitat for specific bird species.				
Residual Risks: None anticipated provided that the mitigation measures are implemented correctly, and rehabilitation of the site is undertaken.				
4. Potential Direct & Indirect Impacts on AVIFAUNA.				
Nature: Impact on birds due to Electrocutation and collision hazards. Electrical infrastructure such as distribution lines, as well as electric fences, pose a potential collision risk to flying birds, and a potential electrocution risk to perching birds. The magnitudes of these risks are much lower than the corresponding risks associated with large overhead transmission lines. Assuming that the electrical infrastructure comprising part of the proposed development is typical of housing developments, no specific mitigation measures are required.				
NOTE: From a general avifaunal point of view, most of the terrestrial habitat types containing unspecialised and generalist bird species with widespread distribution ranges. The proposed development of the Preferred Lay-Out development plan can be supported.				
	Without mitigation	With mitigation		
PLANNING & DESIGN PHASE				
Probability	n.a.	0	n.a.	0
Duration	n.a.	0	n.a.	0
Extent	n.a.	0	n.a.	0
Magnitude	n.a.	0	n.a.	0
Significance	n.a.	0	n.a.	0
Status (positive or negative)	n.a.		n.a.	
CONSTRUCTION PHASE				
Probability	Very Improbable	1	Very improbable	1
Duration	Short term 1 year	1	Short term 1 year	1
Extent	Limited to construction site	1	Limited to construction site	1
Magnitude	Low	4	Minor	2
Significance	Minor	6	Minor	4
Status (positive or negative)	Negative		Negative	
OPERATIONAL PHASE				
Probability	Improbable	2	Very improbable	1
Duration	Permanent	5	Permanent	5
Extent	Limited to site	1	Limited to site	1
Magnitude	Low	4	Minor	2
Significance	Minor	20	Minor	8
Status (positive or negative)	Negative		Negative	
DECOMMISSIONING & CLOSURE PHASE				
Probability	n.a.		n.a.	

Duration	n.a.		n.a.	
Extent	n.a.		n.a.	
Magnitude	n.a.		n.a.	
Significance	n.a.		n.a.	
Status (positive or negative)	n.a.		n.a.	
Reversibility	High		High	
Irreplaceable loss of resources?	Low		Low	
Can impacts be mitigated?	Yes.			
Mitigation:				
<ul style="list-style-type: none"> Normal safety measures for electrical installations as used by Eskom. 				
Cumulative impacts: Expected to be minimal. The habitat is already transformed and fragmented due to the residential activities and the site is not a unique habitat within the landscape. It is not envisaged that any Red Data species will be displaced. Birds are very mobile and may migrate to adjacent suitable habitat. It should be noticed that the newly created town forms habitat for specific bird species.				
Residual Risks: None anticipated.				
POTENTIAL IMPACTS on the HERPETOFAUNA & HERPETOFAUNA HABITAT:				
[Taken from i.e. quoted directly, from the specialist reports contained in APPENDIX G – '1. (i.e. 'An assessment of vegetation, flora, vertebrate fauna and wetlands on Erf 350 of the Farm The Willows 340 JR, City of Tshwane, Gauteng. By G.J. Bredenkamp D.Sc. Pr.Sci.Nat. J.P.C. van Wyk M.Sc. Pr.Sci.Nat. C.E. Venter M.Sc. Pr.Sci.Nat. Commissioned by Pierre Joubert Landscape Architect and Environmental Planner [EcoAgent CC PO Box 25533 Monument Park 0181. Tel 012 4602525. Cell 082 5767046. March 2021)].'				
1. Potential Direct & Indirect Impacts on HERPETOFAUNA & HERPETOFAUNA HABITAT.				
Nature: The current habitat is mostly disturbed terrestrial habitat The footprint for the proposed residential development will result in clearing most of the vegetation area. This will result in some loss of herpetofaunal habitat. After clearing the vegetation, construction will commence.				
NOTE: From a herpetofaunal point of view, the proposed development of the Preferred Lay-Out development plan can be supported.				
	Without mitigation		With mitigation	
PLANNING & DESIGN PHASE				
Probability	n.a.	0	n.a.	0
Duration	n.a.	0	n.a.	0
Extent	n.a.	0	n.a.	0
Magnitude	n.a.	0	n.a.	0
Significance	n.a.	0	n.a.	0
Status (positive or negative)	n.a.		n.a.	
CONSTRUCTION PHASE				
Probability	Definite	5	Probable	5
Duration	Short term 1 year	1	Short term 1 year	1
Extent	Limited to construction site	1	Limited to construction site	1
Magnitude	Minor	2	Small	1
Significance	Low	20	Minor	15
Status (positive or negative)	Negative		Negative	
OPERATIONAL PHASE				
Probability	Definite	5	Definitive	5
Duration	Permanent	5	Permanent	5
Extent	Site	1	Site	1
Magnitude	Moderate	5	Moderate	3
Significance	Moderate	55	Moderate	45
Status (positive or negative)	Negative		Negative/Postive	

DECOMMISSIONING & CLOSURE PHASE			
Probability	n.a.		n.a.
Duration	n.a.		n.a.
Extent	n.a.		n.a.
Magnitude	n.a.		n.a.
Significance	n.a.		n.a.
Status (positive or negative)	n.a.		n.a.
Reversibility	No		No
Irreplaceable loss of resources?	No too small areas and natural herpetofauna habitats are already disturbed for biodiversity or conservation.		No too small areas and natural herpetofauna habitats are already disturbed for biodiversity or conservation.
Can impacts be mitigated?	Yes, planting indigenous species in the gardens will enhance habitats for herpetofauna and implementation of the management plan for Juliana's Golden Mole will improve herpetofauna habitats in general		
Mitigation:			
Should any reptile or amphibia species be encountered or exposed during the construction phase, they should be removed and relocated to natural areas in the vicinity. The contractor must ensure that no indigenous herpetofauna species are disturbed, trapped, hunted or killed during the construction phase. Conservation-orientated clauses should be built into contracts for construction personnel, complete with penalty clauses for non-compliance.			
<ul style="list-style-type: none"> • During the construction phase there may be increased surface runoff and a decreased water quality (with increased silt load and pollution). Completing construction during the winter months would mitigate the environmental impact. • The appropriate agency should implement an ongoing monitoring and eradication program for all invasive plant species growing on the site. • Any post-development re-vegetation or landscaping exercise should use species indigenous to South Africa. Plant species locally indigenous to the area are preferred. 			
Cumulative impacts: Limited, the adjacent areas are already used as residential areas.			
Residual Risks: None anticipated.			

POTENTIAL IMPACTS on the HERITAGE ENVIRONMENT:

[Taken from i.e. quoted directly, from the specialist reports contained in APPENDIX G – 'A PHASE 1 HERITAGE IMPACT ASSESSMENT & REPORT FOR RESIDENTIAL DEVELOPMENT ON PORTION 350 OF THE FARM THE WILLOWS 350JR TSHWANE METROPOLITAN AREA, GAUTENG. For: Pierre Joubert Professional Landscape Architect & Environmental Planner [15 Marikana Street, WIERDAPARK, CENTURION, 0157]. REPORT: APAC021/71. by: APAC – APELSER ARCHAEOLOGICAL CONSULTING (Accredited member of ASAPA) , September 2021 .Member: AJ Pelser BA (UNISA), BA (Hons) (Archaeology), MA (Archaeology) [WITS]. [P.O.BOX 73703 LYNNWOOD RIDGE0040 Tel: 083 459 3091 Fax: 086 695 7247 Email: apac.heritage@gmail.com Comprehensive and Professional Solutions for all Heritage Related Matters. CK 2006/014630/23 VAT NO.: 4360226270.

1. Potential Direct & Indirect Heritage Impacts

In this section the impact of the proposed development on the sites will be assessed. From the overlay of the identified heritage sites over the proposed development footprints depicted, it is clear that the Late Iron Age sites may be impacted on by the proposed development. An archival and historical desktop study was therefore undertaken to provide a historic framework for the project area and surrounding landscape. This was augmented by a study of available maps and an assessment of previous archaeological and heritage studies completed for the area. The study area itself was assessed in the field by way of a walkthrough undertaken by one archaeologist (Anton Pelser). The fieldwork resulted in the identification of some Later Iron Age stone-walled sites (some which have been identified during earlier assessments) and associated cultural material including undecorated pottery and an upper grinder.

Table 3: Summarized List of Heritage Sites Identified during the Fieldwork

Site	Description	Significance	S	E	Mitigation
Site 1	LIA Stone Walling	Low to Medium	S25 46 50.00	E28 20 05.90	Mapping and Limited archaeological excavations should the sites be impacted by the proposed development actions
Site 2	LIA Stone Walling	Low to Medium	S25 46 50.90	E28 20 06.40	
Site 3	Upper Grinder	Low to Medium	S25 46 51.40	E28 20 05.80	

The impact of the proposed development on the located heritage sites was assessed, and it was established that the proposed development might impact on the Late Iron Age stone-walled sites located on the land parcel adjacent to the development site. Should these and other unknown related sites be impacted then the Impact will be Low to Medium. As a result, some mitigation measures will be required for these sites. This will include site clearance, mapping and drawing of the sites and features and archaeological excavations. A permit from SAHRA will be required for this.

Based on the fieldwork and desktop research it is however recommended that the proposed residential development on Portion 350 of The Willows 340JR be allowed to continue with the condition that the recommendations (i.e. mitigation measures underneath) are adhered to and included as part of the approvals to continue i.e. on the condition that the recommendations made in this report are adhered to, no heritage reasons can be given for the development not to continue.

Nature:

CONSTRUCTION PHASE:

- The construction phase may potentially result in the loss of cultural heritage resources and artifacts buried beneath the surface.
- In this section the impact of the proposed development on the sites will be assessed. From the overlay of the identified heritage sites over the proposed development footprint it is clear that the sites fall outside of the proposed development footprint, but that there is a possibility that these and related sites could potentially be impacted.

	Without mitigation	With mitigation	
PLANNING & DESIGN PHASE			
Probability	n.a.		n.a.
Duration	n.a.		n.a.
Extent	n.a.		n.a.
Magnitude	n.a.		n.a.
Significance	n.a.		n.a.
Status (positive or negative)	None		None
CONSTRUCTION PHASE			
Probability	Low	2	Low
Duration	Immediate	1	Immediate
Extent	Limited to Site	1	Limited to Site
Magnitude	Moderate/Medium	6	Moderate/Medium
Significance	Low	16	Low
Status (positive or negative)	Negative		Negative
OPERATIONAL PHASE			
Probability	n.a.		n.a.
Duration	n.a.		n.a.
Extent	n.a.		n.a.
Magnitude	n.a.		n.a.
Significance	n.a.		n.a.
Status (positive or negative)	n.a.		n.a.

DECOMMISSIONING & CLOSURE PHASE			
Probability	n.a.		n.a.
Duration	n.a.		n.a.
Extent	n.a.		n.a.
Magnitude	n.a.		n.a.
Significance	n.a.		n.a.
Status (positive or negative)	n.a.		n.a.
Reversibility	?		?
Irreplaceable loss of resources?	Low		Low
Can impacts be mitigated?	Yes		
Mitigation:			
The following mitigation measures are required to be implemented as part of the ENVIRONMENTAL MANAGEMENT PROGRAM (EMPr) i.e:			
1.that the area be cleared of vegetation under guidance from an archaeologist to determine to extent of the stonewalling in the area.			
2.that once this has been done that the stonewalling be mapped and drawn and that limited archaeological excavations be carried out in order to recover cultural material and to date the sites.			
3. A Phase 2 archaeological mitigation permit from SAHRA be obtained for this investigation.			
4. An archaeological watching brief must be implemented during the construction phase. This watching brief is aimed at monitoring the construction and excavation work for any subterranean archaeological deposits and features which may be exposed during these development activities. The subterranean nature of cultural heritage 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.			
5. Finally it should be noted that although all efforts are made to cover a total area during any assessment and therefore to identify all possible sites or features of cultural (archaeological and/or historical) heritage origin and significance, that there is always the possibility of something being missed. This will include low stone-packed or unmarked graves. This aspect should be kept in mind when development work commences and if any sites (including graves) are identified then an expert should be called in to investigate and recommend on the best way forward.			
Cumulative impacts: None.			
Residual Risks: None.			

POTENTIAL IMPACTS on the PALAEOLOGICAL ENVIRONMENT:

[A Paleontological Impact Assessment was conducted on the said site and the following was taken from the specialist report contained in APPENDIX Performed by Dr. H. Fourie i.e: '**Paleontological Impact Assessment: Phase 1: Field Study of Portion 350 of the Farm The Willows 340-JR, City of Tshwane – Gauteng.** By Dr. Fourie, H. Dr heidicindy@yahoo.com 012 322 7632/079 940 6048. Commissioned by: A. Pelsler Archaeological Consulting cc. 833B St Bernard Street, Garstfontein, 0081. 083 459 3091 Ref: Pending. 2021/08/30]

1. Potential Direct & Indirect Heritage Impacts

A field assessment study was undertaken to provide a heritage framework for the project area and surrounding landscape. This was augmented by a study of available historical topographical sheets and an assessment of previous heritage studies completed for the area. The field study revealed that the study area is present on the Silverton Formation. The study area was assessed in the field by way of intensive walkthroughs undertaken by one paleontologist (Heidi Fourie). The fieldwork resulted in the identification of several outcrops.

The impact of the proposed development on the located heritage sites was assessed, and it was established that the proposed development will have a Medium Impact Risk. As a result, mitigation measures may be required for the site.

The following general mitigation measures are required:

- Mitigation may be needed (Appendix 2) if fossils are found.
- No consultation with parties was necessary. The Environmental Control Officer must familiarise him- or herself with the formation present and its fossils and follow protocol.
- The development may go ahead, but the ECO must survey for fossils before and or after clearing, blasting, drilling or excavating.
- The EMP already covers the conservation of heritage and paleontological material that may be exposed during construction activities. For a chance fossil find, the protocol is to immediately cease all construction activities, construct a 30 m no-go barrier, and contact SAHRA for further investigation.

On the condition that the recommendations made in this report are adhered to, no heritage reasons can be given for the development not to continue.”

Nature:

CONSTRUCTION PHASE:

- The construction phase may potentially result in the loss of heritage resources buried beneath the surface.
- In this section the impact of the proposed development will be assessed.

	Without mitigation	With mitigation		
PLANNING & DESIGN PHASE				
Probability	n.a.		n.a.	
Duration	n.a.		n.a.	
Extent	n.a.		n.a.	
Magnitude	n.a.		n.a.	
Significance	n.a.		n.a.	
Status (positive or negative)	None	None		
CONSTRUCTION PHASE				
Probability	High	4	Low	2
Duration	Permanent	5	Short-term	2
Extent	Site	1	Site	1
Magnitude	Moderate	6	Low	4
Significance	Medium	48	Low	14
Status (positive or negative)	Negative	Negative		
OPERATIONAL PHASE				
Probability	n.a.		n.a.	
Duration	n.a.		n.a.	
Extent	n.a.		n.a.	
Magnitude	n.a.		n.a.	
Significance	n.a.		n.a.	
Status (positive or negative)	n.a.	n.a.		
DECOMMISSIONING & CLOSURE PHASE				
Probability	n.a.		n.a.	
Duration	n.a.		n.a.	
Extent	n.a.		n.a.	
Magnitude	n.a.		n.a.	
Significance	n.a.		n.a.	
Status (positive or negative)	n.a.	n.a.		
Reversibility	High	Very High		
Irreplaceable loss of resources?	Moderate	Low		
Can impacts be mitigated?	Yes			

Mitigation:

- If by chance fossil is uncovered during construction, SAHRA (South Africa Heritage Resource Agency) must be notified immediately.
- An Environmental Control Officer (ECO) must be appointed to oversee the implementation of the Environmental Management Programme (EMP) for the duration of the construction phase.

Cumulative impacts: None.

Residual Risks: None.

POTENTIAL IMPACTS on the SOCIO-ECONOMIC ASPECTS of the ENVIRONMENT:

[No specialists were appointed for the SOCIO-ECONOMIC ENVIRONMENTAL aspects].

1. Potential Direct & Indirect Impacts on the SOCIO-ECONOMIC ENVIRONMENT

Nature:

CONSTRUCTION PHASE IMPACTS:

- Job Creation -
 - The construction of the proposed development may create approximately 15-20 employment opportunities during the construction phase.

OPERATIONAL PHASE IMPACTS:

- Job Creation
 - Negligent increase in jobs as a result of the proposed development by creating and sustaining residential-oriented new job opportunities i.e. approximately 2 permanent local jobs stand to be created, and then sustained annually.

	Without mitigation		With mitigation	
PLANNING & DESIGN PHASE				
Probability	n.a.		n.a.	
Duration	n.a.		n.a.	
Extent	n.a.		n.a.	
Magnitude	n.a.		n.a.	
Significance	n.a.		n.a.	
Status (positive or negative)	n.a.		n.a.	
CONSTRUCTION PHASE				
Probability	Definite	5	Definite	5
Duration	Very Short-term	1	Very Short-term	1
Extent	Local	2	Local	2
Magnitude	Very Low	1	Very Low	1
Significance	Very Low	20	Very Low	20
Status (positive or negative)	Positive		Positive	
OPERATIONAL PHASE				
Probability	High	4	High	4
Duration	Long term	4	Long term	4
Extent	Site	1	Site	1
Magnitude	Very low	1	Very low	1
Significance	Low	24	Low	24
Status (positive or negative)	Positive		Positive	
DECOMMISSIONING & CLOSURE PHASE				
Probability	n.a.		n.a.	
Duration	n.a.		n.a.	
Extent	n.a.		n.a.	
Magnitude	n.a.		n.a.	
Significance	n.a.		n.a.	
Status (positive or negative)	n.a.		n.a.	

Reversibility	N.a.	N.a.		
Irreplaceable loss of resources?	No	No		
Can impacts be mitigated?	N.a.			
Mitigation:				
<ul style="list-style-type: none"> No mitigation measures are proposed, since there are no negative impacts foreseen, except if the proposed development would not proceed which will be minor in nature. Prerequisites that need to be considered i.e. in order for surrounding areas to capitalise optimally on the development there are certain aspects which will have certain minor positive implications on the surrounding areas: <ul style="list-style-type: none"> Local labour should be employed as far as possible during both construction and operations of the proposed development. 				
Cumulative impacts: An appropriate development, which is also compatible with its environment (i.e. residential) and which is also in line with legislation, policies, guidelines etc – is always an asset to the local economy in various ways and also creates the positive image of progress, wealth, safety, security and prosperity which in turn could possibly be a 'drawing card' for further development in the same area...albeit in a minor way.				
Residual Risks: None anticipated.				
2. Potential Direct & Indirect Impacts on the SOCIO-ECONOMIC ENVIRONMENT				
Nature:				
<u>OPERATIONAL PHASE IMPACTS:</u>				
<ul style="list-style-type: none"> Rates & Tax Base Expansion <ul style="list-style-type: none"> The development would facilitate real estate investment, job creation and economic growth, which, in turn will contribute to the creation of productive, rateable assets (i.e. residences) in a minor way. 				
	Without mitigation	With mitigation		
PLANNING & DESIGN PHASE				
Probability	n.a.	n.a.		
Duration	n.a.	n.a.		
Extent	n.a.	n.a.		
Magnitude	n.a.	n.a.		
Significance	n.a.	n.a.		
Status (positive or negative)	n.a.	n.a.		
CONSTRUCTION PHASE				
Probability	n.a.	n.a.		
Duration	n.a.	n.a.		
Extent	n.a.	n.a.		
Magnitude	n.a.	n.a.		
Significance	n.a.	n.a.		
Status (positive or negative)	n.a.	n.a.		
OPERATIONAL PHASE				
Probability	High	4	High	4
Duration	Long term	4	Long term	4
Extent	Site	1	Site	1
Magnitude	Minor	1	Minor	1
Significance	Low	24	Low	24
Status (positive or negative)	Positive		Positive	
DECOMMISSIONING & CLOSURE PHASE				
Probability	n.a.		n.a.	
Duration	n.a.		n.a.	
Extent	n.a.		n.a.	
Magnitude	n.a.		n.a.	
Significance	n.a.		n.a.	

Status (positive or negative)	n.a.	n.a.
Reversibility	High	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	N.a.	
Mitigation and/or Recommendations:		
<ul style="list-style-type: none"> No mitigation measures are proposed, since there are no negative impacts foreseen, except if the proposed development would not proceed which will be minor in nature. Prerequisites that need to be considered i.e. in order for surrounding areas to capitalise optimally on the development there are certain aspects which will have certain minor positive implications on the surrounding areas: <ul style="list-style-type: none"> Local labour should be employed as far as possible during both construction and operations of the proposed development. 		
Cumulative impacts: An appropriate development, which is also compatible with its environment (i.e. residential) and which is also in line with legislation, policies, guidelines etc – is always an asset to the local economy in various ways and also creates the positive image of progress, wealth, safety, security and prosperity which in turn could possibly be a 'drawing card' for further development in the same area...albeit in a minor way.		
Residual Risks: None anticipated.		

POTENTIAL IMPACTS on the VISUAL & AESTHETIC ENVIRONMENT:

1. Potential Direct & Indirect Impacts on the VISUAL & AESTHETIC ENVIRONMENT

The site without the proposed development:

'Genius Loci': **The spirit, or sense, of place is that quality imparted by the aspects of scale, colour, texture, landform, enclosure, and in particular, the land use. According to K. Lynch (1992) "it is the extent to which a person can recognise or recall a place as being distinct from other places as having a vivid, or unique, or at least a particular, character of its own."**

The spirit of place of this site is defined especially by the following aspects i.e: 'Portion 350 of the FARM THE WILLOWS lies within the 'Wapadrand Country Estates' and is one of five Erven i.e. 348-352 The Willows 340 JR. The Erven, which are located on the northern side of Solomon Mahlangu Drive (M10) about 900 m west of the Lynwood Road intersection in Pretoria.

The site includes steep south to south-east facing slopes of the Bronberg ridge and a plain that slopes gently towards the south-east.

In a broader landuse context the site is situated within upmarket residential areas which replaced the former farms and agricultural holdings. These developments placed pressure on the endangered ecosystems of the Bronberg mountain range with its unique red data flora and fauna species, though the Bronberg Conservation Area and Fairy Glen Nature Reserve offer some protection of the ridge and its biodiversity.

The historical Google Earth images provide an indication of what the vegetation cover was and how it changed over the last 17 years i.e:

- By 2004 the central to southern areas of Erven 348 – 350 were already **quite disturbed**, also, but less so, on Erf 351, while the south-eastern part of Erf 352 was already developed.
- In September 2007 and 2009 and even more so in 2011, **considerable disturbance** was evident over the southern halves of **all five** Erven (348-352). The bush along the drainage line in the south-western corner of Erf 348 and also on the rocky outcrop in the southern part of Erf 351 were clearly present. The central part of Erf 348 was cleared and terraces made and irrigated for agricultural purposes.
- From the images of May 2015 to August 2016 a (slight) recovery of woody vegetation on the plains can be seen, probably dominated by **pioneer species** such as *Vachellia karroo* and **alien invasive** species such as *Melia azedarach* and *Lantana camara*, currently still prominent in the area. This invasion of alien species is of particular interest for Erven 350 and 351, as this also involves a heritage site.
- More recently from September 2019 to November 2020 the southern disturbed areas have been covered densely by lush weedy species, particularly *Bidens pilosa*, as observed during the current survey.
- Limited parts of these **disturbed** areas, particularly Erven 349 and 350, have been cleared as can be seen on November 2020 Google Earth image.

The above historical changes in vegetation is considered to explain its current appearance and condition. The site is situated within the Andesite Mountain Bushveld (SVcb11) vegetation type (Mucina & Rutherford 2012). The protected Fairy Glen Nature Reserve is located 3.5 km (as the bird lies) west of the Wapadrand Country Estates. The northern half of the Estate is located within the Bronberg Conservation Area. The current vegetation on the hillslope is primary indigenous mountain bushveld, though it is severely encroached by particularly Category 1b Alien and Invasive plant species *Lantana camara* while some individuals of other Alien Invasive plant species are also present. Individuals of *Pittosporum viridiflorum* (Cheesewood) were found high up on the south-east facing hillslope close to the northern boundary fence. The trees were in good condition. Provincially protected plant species that were found on the hillslope are *Aloe pretoriensis*, *Scadoxys puniceus* and *Haemanthus humilis* subsp. *hirsutus*. As no development will occur on the hillslope, all plant species that may occur here will be safe and protected. The western part of the Bronberg Ridge runs east-west up to Solomon Mahlangu Drive, but east of Solomon Mahlangu Drive, the Ridge is orientated northwest-southeast. At Solomon Mahlangu Drive there is a shallow valley or plain between the western and eastern parts of the Ridge. The large double-carriage Solomon Mahlangu Drive transects the ridge area through this plain. The proclaimed Wapadrand Country Estates, consisting of five Erven, is located directly on Solomon Mahlangu Drive. The adjacent residential areas are well developed. Erf 350 stretches from Solomon Mahlangu Drive north-westwards over the plains area and up the south-facing slope to the top of the Bronberg Ridge. The northern half of the Erf is located within the Bronberg Conservation Area and is excluded from any development. The ecological sensitivity of the four pant communities that were identified and mapped on the mountain slopes is High, and these areas are excluded from any development. The planned development is restricted to the Historically Disturbed Plains Bushveld below the Bronberg Conservation Area line.

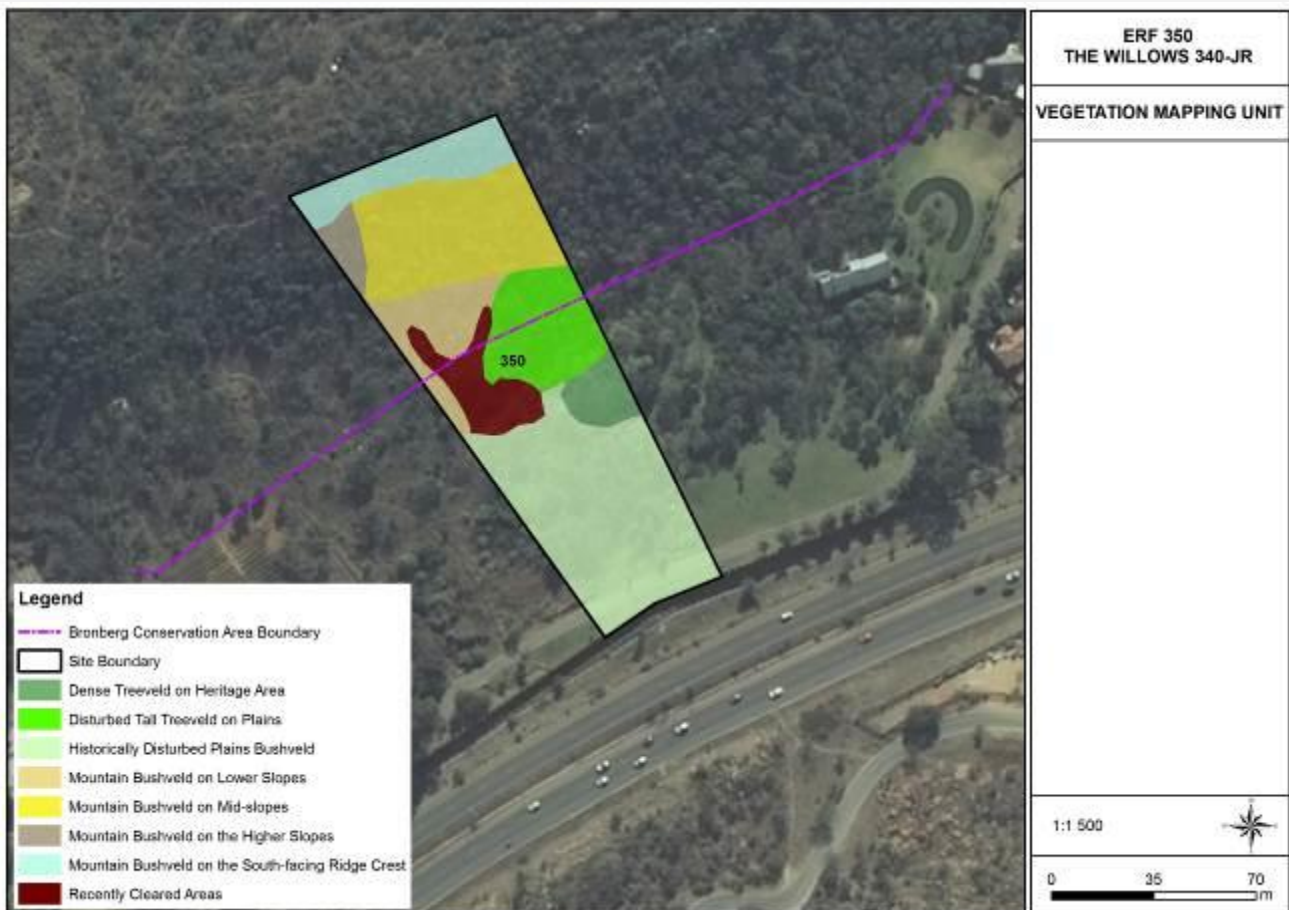


Figure 1: A vegetation map of Erf 350 indicating the eight plant communities.

Eight plant communities were identified and mapped which predominantly determines the visual character & senses of place, which are:

1) Mountain Bushveld on South-facing Ridge Crests: **The Mountain Bushveld on South-facing Ridge Crests plant community is restricted to the narrow strip of ridge crest that occurs within the property and stretches up to the northern boundary fence. The ridge is part of the Critically Endangered Bronberg Mountain Bushveld and is located within the Bronberg Conservation Area. This area is excluded from any development. The vegetation is dense bush on an area with large rocks and boulders. Indigenous woody species are dominant, though the alien invasive bush *Lantana camara* is present. Conspicuous trees in the ridge crest include *Protea caffra* & *Calodendron capensis*. Grasses and forbs are sparse or even absent. This area is excluded from any development.**

2) Mountain Bushveld on Higher Slopes: **The Mountain Bushveld on Higher Slopes plant community occurs on the ridge slopes just below the crest. The entire ridge is part of the Critically Endangered Bronberg Mountain Bushveld & is located within the Bronberg Conservation Area. The vegetation is extremely dense bush on an area with large rocks/boulders. Many indigenous woody species are present, though the vegetation is severely encroached by alien invasive bush *Lantana camara*, making access for detailed surveys almost impossible. The dense *Lantana camara* encroachment caused damage to the indigenous vegetation, several individuals of the protected *Aloe pretoriensis* were killed. Grasses and forbs are sparse or even absent. This area is excluded from any development since it's part of the Bronberg Conservation Area.**

3) Mountain Bushveld on Mid-Slopes.

The Mountain Bushveld on the Mid-Slopes plant community is located below the ridge crest in the far northern part of the site and stretches down to the Lower Slopes or the Disturbed Tall Treeveld on the Plain below. The slopes are part of the Critically Endangered Bronberg Mountain Bushveld and is located within the Bronberg Conservation Area. This area is excluded from any development. The vegetation is extremely dense bush on. Many indigenous woody species are present, though the vegetation is encroached by the alien invasive bush *Lantana camara*, making access for detailed surveys almost impossible. This is not critical, as this area is excluded from any development. The dense *Lantana camara* encroachment caused damage to the indigenous vegetation, several individuals of the protected *Aloe pretoriensis* were killed. Grasses and forbs are sparse or even absent

4) Mountain Bushveld on Lower Slopes: **The Mountain Bushveld on Lower Slopes plant community is located lower down the slope, below the Bushveld on the Steep Upper Slopes. This part of the ridge is still part of the Critically Endangered Bronberg Mountain Bushveld and is located within the Bronberg Conservation Area. This area is also excluded from any further development. The vegetation is still dense bush. Indigenous woody species are present, though the vegetation is also encroached by the alien invasive bush *Lantana camara* and several other alien and invasive species. Grass-dominated patches occur scattered about. In general, the area is regarded as somewhat disturbed. As this area is part of the Bronberg Conservation Area, no development may occur here.**

5) **Disturbed Tall Treeveld on Plains**

The plains bushveld on Erf 350 occurs on the relatively flat areas north of the Heritage Site in the central part of the site. This is a dense woodland with tall trees, few shrub plants and a sparse herbaceous layer. Several indigenous trees are conspicuous in this plant community, particularly *Senegalia caffra*, *Vachellia karroo* and *Celtis africana*.

6) Dense Treeveld on Heritage Area

This is a small patch of dense treeveld on an area with scattered rocks. This area seems to be a relic of an old Heritage site. This patch of vegetation extends to Erf 351, where it is more prominent. The vegetation is dominated by dense, tall trees, mainly the indigenous *Celtis africana* and the alien invasive *Melia azedarach*. An herbaceous layer is almost absent

7) **Historically Disturbed Plains Bushveld:** The vegetation on the plain located on the southern part of the site was disturbed and cleared since 2007. Since 2015 there was an increase in woody vegetation, but particularly alien species such as *Lantana camara* and *Melia azedarach* increased. Recently some areas have been cleared, particularly of alien woody species. Weeds, mostly *Bidens pilosa* is now very prominent. Little of the original grassy vegetation remained. Several indigenous trees were left and are still present in this plant community, particularly *Senegalia caffra*, *Vachellia karroo* and *Celtis africana*. Storage facilities were constructed on the eastern boundary of the site. The herbaceous layer is dominated by the weed *Bidens pilosa*. A limited part of the area is earmarked for the development of residences and was recently cleared.

8) **Recently Cleared Areas on Plains: Vegetation was cleared, and some levelling was done on an area within the Historically Disturbed Plains Bushveld area. Weeds occur in patches on the cleared area. This cleared area is 0.08 ha (800 m²) in size. The cleared area is principally located on an area that was historically quite disturbed, where the ecological sensitivity is Medium-Low. It is suggested that this area can be considered as suitable for development, without damage to the more sensitive mountain bushveld vegetation.**

These qualities impart a somewhat unique bushveld scenic 'Genius Loci' and thereby also presents a very pleasing setting within which especially the proposed residences to the BRONBERG CONSERVATION AREA come to it's fullest potential, should the Architect, Landscape Architect and Building construction professionals implement the proposed development in sympathy with nature i.e. in an ecological sensitive way which places the biodiversity's influence and preservation as it's foremost inspiration an priority.

The internal views of the BRONBERG BUSHVELD RIDGE CONSERVATION AREA from everywhere on site also enhance the aesthetic appeal due to the affinity people have with ridges and natural veldt.

Nature:

PLANNING & DESIGN PHASE:

The visual and aesthetical environment impact caused by the potential lack of adequate (i.e. sensitive, appropriate, in-context with the local surroundings and visual qualities of the site and other related visual aspects) sub-urban planning/design, architectural design and landscape architectural design of facilities and site – and, the full implementation of the proposed mitigation measures especially that of the BIODIVERSITY specialists. The applicant has appointed such specialists (i.e. architect & landscape architect &

biodiversity) as indicated above and therefore employed sufficient measures (mitigation) i.e. as far as possible, to make the proposed development an attractive and visually uplifting improvement on the site and aesthetically appealing towards the directly adjacent township and natural (i.e. BRONBERG CONSERVATION AREA) environment.

CONSTRUCTION PHASE:

Visual and aesthetical environment impact caused by construction related activities such as, stockpile material, trucks, construction offices, hoarding and excavation machinery, clearance of vegetation, excavation and storage of construction materials and equipment. This impact will be temporary in nature, limited to the construction phase.

OPERATIONAL PHASE:

The presence of the proposed residential facilities, in the midst of a well-established residential area (i.e. Wapadrand in PRETORIA) with (i.e. in general):- i. a visually uplifting natural 'green' backdrop of the BRONBERG CONSERVATION AREA (i.e. perceived from certain selected viewpoints in the area) – and, ii. a predominantly extensive medium to high-end upmarket residential area with also a variety of mixed uses, facilities, activities and elements which creates in general (i.e. perceived from various viewpoints in the area) a diversified visual landscape (i.e. relatively high visual variance). This variance ranges from a relative visually and aesthetically pleasing 'coherence' and 'sense of place' to a relative 'confusion' of disconnectedness (i.e. not integrated in a sensitive cohesive way visually and aesthetically with a lack of a 'sense of place') with no predominant visual 'theme' or specific architectural and/or landscape architectural style or character which unifies the visual 'landscape' as a whole. The proposed development will have a minor positive visual impact on (i.e. towards) it's surrounding area, particularly for the directly adjacent land occupiers and users due to it's relatively secluded locality in the 'visual landscape'. The minor positive visual enhancement would be applicable only if the applicant will develop the proposed facilities in a visual sensitive way which responds positively to its natural (i.e. BRONBERG CONSERVATION AREA) and surrounding built-up environment and landscapes the site with locally indigenous vegetation and maintains it (i.e. facilities and landscape) in a good condition. The applicant has appointed such specialists as indicated above (i.e. architect & landscape architect) and therefore employed sufficient measures i.e. as far as possible, to make the proposed development an attractive and visually uplifting improvement on the site and aesthetically appealing towards the directly adjacent township environment.

DECOMMISSIONING & CLOSURE PHASE:

- Trucks used for decommissioning activities, rubble and stockpiles may cause a visual impact.

	Without mitigation		With mitigation	
PLANNING & DESIGN PHASE				
Probability	Low	2	High	4
Duration	Long-term	4	Long-term	4
Extent	Local	2	Local	2
Magnitude	Minor	1	Minor	2
Significance	Low	14	Medium	32
Status (positive or negative)	Negative		Positive	
CONSTRUCTION PHASE				
Probability	Definite	5	Low	2
Duration	Immediate	1	Immediate	1
Extent	Local	2	Site	1
Magnitude	Low	2	Low	1
Significance	Low	25	Low	6
Status (positive or negative)	Negative		Negative	
OPERATIONAL PHASE				
Probability	Low	2	High	4
Duration	Long-term	4	Long-term	4
Extent	Local	2	Local	2
Magnitude	Minor	1	Minor	2
Significance	Low	14	Medium	32
Status (positive or negative)	Negative		Positive	
DECOMMISSIONING & CLOSURE PHASE				
Probability	Improbable	1	Improbable	1
Duration	Immediate	1	Immediate	1
Extent	Local	2	Local	2
Magnitude	High	8	Medium	6
Significance	Low	11	Low	9

Status (positive or negative)	Negative	Negative
Reversibility	Medium	Medium
Irreplaceable loss of resources?	No.	No.
Can impacts be mitigated?	Yes	
<p>Mitigation:</p> <p>PLANNING & DESIGN PHASE:</p> <ul style="list-style-type: none"> Planners, Architects & Landscape Architects and any other related professional, project managers and/or building contractor to plan, design and implement in the development proposal in such a sensitive manner which would be aesthetically pleasing and visually uplifting in it's current township setting e.g. sympathetic materials and colours with the surrounding environment; all yards and storage areas to be enclosed by masonry walls or screens which is screened by indigenous local biodiversity vegetation; external lighting should be confined to essential areas; lights should be low-level, where possible, and fitted with reflectors to avoid light spillage; lights and signage should be fixed to buildings or walls, where possible, to avoid unnecessary masts and visual clutter; other corporate or advertising signage and flags should be avoided or restricted etc. The visual and aesthetical environment impact caused by the potential lack of adequate (i.e. sensitive, appropriate, in-context with the local surroundings and visual qualities of the site and other related visual aspects) – urban planning/design, architectural, landscape architectural design of facilities and site – and, the full implementation of the proposed mitigation measures especially that of the BIODIVERSITY specialists. The applicant has appointed such specialists as indicated above and therefore employed sufficient measures (mitigation) i.e. as far as possible, to make the proposed development an attractive and visually uplifting improvement on the site and aesthetically appealing towards the directly adjacent township environment and natural (i.e. BRONBERG CONSERVATION AREA) environment. The relevant professionals i.e. Architect, Landscape Architect etc, should be appointed by the developer to implement the final construction and planting plans & drawings which at least complies with the above-mentioned mitigation measures. <p>CONSTRUCTION PHASE:</p> <ul style="list-style-type: none"> Limit dust and screen construction from viewers along adjacent road with strips of shade cloth; the construction site, material stores, stockpiles and lay-down area should be kept tidy; measures to control wastes and litter should be included in the contract specification documents; wind-blown dust from stockpiles and construction activities, should be controlled; an environmental management program (EMPr) should be prepared and an environmental control officer (ECO) employed for the duration of the construction. <p>OPERATIONAL PHASE:</p> <ul style="list-style-type: none"> Install landscaping and rehabilitation as soon as possible; Litter and waste should be effectively managed to avoid visual problems in the area; buildings and landscaping and rehabilitation should receive on-going maintenance to avoid visual decay; lights should be low-level, where possible, and fitted with reflectors to avoid light spillage; lights and signage should be fixed to buildings or walls, where possible, to avoid unnecessary masts and visual clutter. <p>DECOMMISSIONING & CLOSURE PHASE:</p> <ul style="list-style-type: none"> The decommissioning area must be fenced, and shade cloth attached, where necessary. At the end of the life of the project, structures no longer required must be demolished and removed from the site. Roads, parking and other paved areas no longer required must be broken up and the site re-instated or redeveloped. 		
<p>Cumulative impacts: An appropriate development aesthetically uplifting and visually pleasing to its current' environment and which is also in line with legislation, policies, guidelines etc – is always an asset to the local community in various ways and also creates the positive image of progress, wealth, safety, security and prosperity which in turn could possibly be a 'drawing card' for further development in the same area.</p>		
<p>Residual Risks: None anticipated.</p>		
<p>POTENTIAL IMPACTS of ACCESS ROADS on the ENVIRONMENT:</p>		
<p>1. Potential Direct & Indirect Impacts of ACCESS ROADS on the ENVIRONMENT</p>		

Nature:				
PLANNING & DESIGN PHASE:				
<ul style="list-style-type: none"> • ACCESS ROADS: <ul style="list-style-type: none"> ○ New access roads and haulage routes could impact on areas of sensitivity (fauna and flora, wetlands etc.). 				
CONSTRUCTION PHASE:				
<ul style="list-style-type: none"> • ACCESS ROADS: <ul style="list-style-type: none"> ○ New access roads and haulage routes could impact on areas of sensitivity (fauna and flora, wetlands and spruit etc.). 				
	Without mitigation		With mitigation	
PLANNING & DESIGN PHASE				
Probability	n.a.	n.a.	n.a.	n.a.
Duration	n.a.	n.a.	n.a.	n.a.
Extent	n.a.	n.a.	n.a.	n.a.
Magnitude	n.a.	n.a.	n.a.	n.a.
Significance	n.a.	n.a.	n.a.	n.a.
Status (positive or negative)	n.a.		n.a.	
CONSTRUCTION PHASE				
Probability	Medium	3	Improbable	1
Duration	Short term	2	Short term	2
Extent	Site	1	Site	1
Magnitude	Moderate	8	Low	2
Significance	Medium	33	Very low	5
Status (positive or negative)	Negative		Negative	
OPERATIONAL PHASE				
Probability	n.a.		n.a.	
Duration	n.a.		n.a.	
Extent	n.a.		n.a.	
Magnitude	n.a.		n.a.	
Significance	n.a.		n.a.	
Status (positive or negative)	n.a.		n.a.	
DECOMMISSIONING & CLOSURE PHASE				
Probability	n.a.		n.a.	
Duration	n.a.		n.a.	
Extent	n.a.		n.a.	
Magnitude	n.a.		n.a.	
Significance	n.a.		n.a.	
Status (positive or negative)	n.a.		n.a.	
Reversibility	Low		High	
Irreplaceable loss of resources?	Yes		No	
Can impacts be mitigated?	Yes			
Mitigation:				
PLANNING & DESIGN PHASE:				
<ul style="list-style-type: none"> • Temporary access and haulage routes must be designed prior to construction commencing to ensure that the most preferable access and haulage routes has been identified. Provision made for the erection of appropriate warning signs. • Road safety must be taken into account when planning access to the site. • Use should be made of existing roads as far as possible. 				
Cumulative impacts: None				
Residual Risks: None anticipated.				

POTENTIAL IMPACTS of EROSION & SOIL DISTURBANCE on the ENVIRONMENT:**1. Potential Direct & Indirect Impacts of EROSION & SOIL DISTURBANCE on the ENVIRONMENT****Nature:****CONSTRUCTION PHASE:**

- Erosion & Soil Disturbance:
 - Sources of water and soil pollution on construction sites include: diesel and oil; paint, solvents, cleaners and other harmful chemicals; and construction debris and dirt.
 - Spillages of oil, lubricants and fuel from construction vehicles, plant and machinery has the potential to contaminate the soil.
 - When portions of the site are cleared, combined with the failure to implement erosion control measures effectively, silt-bearing run-off and sedimentation pollution will result.
 - Ground disturbing activities such as blasting, and foundation construction can lead to increased erosion.
 - Stormwater runoff has the potential to erode the topsoil.
 - Soil compaction due to construction activities will reduce aeration, permeability, and water holding capacity of the soils and cause an increase in surface runoff, potentially causing increased sheet or gully erosion.

	Without mitigation		With mitigation	
PLANNING & DESIGN PHASE				
Probability	n.a.		n.a.	
Duration	n.a.		n.a.	
Extent	n.a.		n.a.	
Magnitude	n.a.		n.a.	
Significance	n.a.		n.a.	
Status (positive or negative)	n.a.		n.a.	
CONSTRUCTION PHASE				
Probability	High	4	Low	2
Duration	Short-term	2	Immediate	1
Extent	Site	1	Site	1
Magnitude	High	8	Low	4
Significance	Medium	44	Low	12
Status (positive or negative)	Negative		Negative	
OPERATIONAL PHASE				
Probability	n.a.		n.a.	
Duration	n.a.		n.a.	
Extent	n.a.		n.a.	
Magnitude	n.a.		n.a.	
Significance	n.a.		n.a.	
Status (positive or negative)	n.a.		n.a.	
DECOMMISSIONING & CLOSURE PHASE				
Probability	n.a.		n.a.	
Duration	n.a.		n.a.	
Extent	n.a.		n.a.	
Magnitude	n.a.		n.a.	
Significance	n.a.		n.a.	
Status (positive or negative)	n.a.		n.a.	
Reversibility	Low		High	
Irreplaceable loss of resources?	Yes		No	
Can impacts be mitigated?	Yes			

Mitigation:

CONSTRUCTION PHASE:

- Apply erosion controls (e.g., berms, sandbags and hessian sheets) to prevent/minimise soil erosion during construction activities.
- The topsoil layer of not less than 200mm (or as per geotechnical soil profiling result) must be removed and stockpiled in mounds no more than 2m in height in a designated area for use during progressive rehabilitation.
- Care must be taken to prevent the compaction of topsoil in any way, especially by trucks and other construction machinery.
- Apply a protective covering on disturbed soils with suitable vegetation after completion of construction activities.
- Save topsoil removed during construction and use it to reclaim disturbed areas upon completion of construction activities.
- Avoid creating excessive slopes during excavation.
- Implement a stormwater management plan to ensure compliance with regulations and prevent off-site migration of contaminated stormwater or increased soil erosion during the construction phase.
- Excavation (temporary) to comply with SANS 10400-G:2011 guidelines.

Cumulative impacts: None

Residual Risks: None anticipated.

POTENTIAL IMPACTS on AIR QUALITY of the ENVIRONMENT:

1. Potential Direct & Indirect Impacts on AIR QUALITY of the ENVIRONMENT

Nature:

CONSTRUCTION PHASE:

- Air quality impacts may arise during the construction phase as a result of dust generated by the exposure and disturbance of soil.
- Fugitive dust may become a nuisance for surrounding land users and occupiers.
- Further air quality impacts will arise as a result of the exhaust emissions from construction vehicles and plant.

DECOMMISSIONING & CLOSURE PHASE:

- There is potential for the air quality to be impacted through the decommissioning activities that may generate dust through excavation activities and disturbing the ground.
- Exhaust emissions produced by construction equipment will be dispersed and it is not anticipated that they will cause a nuisance to surrounding landowners.

	Without mitigation		With mitigation	
PLANNING & DESIGN PHASE				
Probability	n.a.		n.a.	
Duration	n.a.		n.a.	
Extent	n.a.		n.a.	
Magnitude	n.a.		n.a.	
Significance	n.a.		n.a.	
Status (positive or negative)	n.a.		n.a.	
CONSTRUCTION PHASE				
Probability	Low	3	Very Low	1
Duration	Short-term	2	Immediate	1
Extent	Site	1	Site	1
Magnitude	Low	2	Minor	1
Significance	Low	15	Minor	1
Status (positive or negative)	Negative		Negative	
OPERATIONAL PHASE				
Probability	n.a.		n.a.	
Duration	n.a.		n.a.	
Extent	n.a.		n.a.	
Magnitude	n.a.		n.a.	
Significance	n.a.		n.a.	
Status (positive or negative)	None		none	

DECOMMISSIONING & CLOSURE PHASE				
Probability	Low	3	Very low	1
Duration	Immediate	1	Immediate	1
Extent	Site	1	Site	1
Magnitude	Low	2	Minor	1
Significance	Low	12	Minor	1
Status (positive or negative)	Negative		Negative	
Reversibility	Medium		High	
Irreplaceable loss of resources?	No		No	
Can impacts be mitigated?	Yes			
Mitigation:				
<u>CONSTRUCTION PHASE:</u>				
<ul style="list-style-type: none"> Dust minimisation and control measures should be implemented on the construction site at regular intervals. This could include irrigation by water tankers. The frequency of implementation of dust suppression measures should be increased when it is expected that high wind conditions will develop. Vegetation clearing should only take place immediately prior to the commencement of construction activities in an area, in order to minimise the amount of exposed soil on the site. Stockpiles and spoil heaps must be covered with tarpaulins or straw to prevent fugitive dust. All construction vehicles must be appropriately maintained to minimise exhaust emissions. 				
<u>DECOMMISSIONING & CLOSURE PHASE:</u>				
<ul style="list-style-type: none"> Dust suppression methods, such as wetting or laying straw, should be applied where there are large tracks of exposed surfaces. Stockpiles and soil heaps must be covered with tarpaulins or straw to prevent fugitive dust. All construction vehicles must be appropriately maintained to minimise exhaust emissions. 				
Cumulative impacts: None				
Residual Risks: None anticipated.				
POTENTIAL IMPACTS of TRAFFIC on the ENVIRONMENT:				
1. Potential Direct & Indirect Impacts of TRAFFIC on the ENVIRONMENT				
Nature:				
<u>CONSTRUCTION PHASE:</u>				
<ul style="list-style-type: none"> Increased traffic volumes will be generated, including heavy vehicles delivering materials to the site. This could cause slight delays in existing traffic operations. The heavy vehicles may also cause damage to the public road. 				
<u>DECOMMISSIONING & CLOSURE PHASE:</u>				
<ul style="list-style-type: none"> Vehicle traffic around the site may increase during the decommissioning phase and impact the natural traffic flow around the site. 				
	Without mitigation		With mitigation	
PLANNING & DESIGN PHASE				
Probability	n.a.		n.a.	
Duration	n.a.		n.a.	
Extent	n.a.		n.a.	
Magnitude	n.a.		n.a.	
Significance	n.a.		n.a.	
Status (positive or negative)	n.a.		n.a.	
CONSTRUCTION PHASE				
Probability	Medium	3	Low	2
Duration	Short-term	2	Short-term	2

Extent	Local	2	Local	2
Magnitude	Moderate	6	Low	4
Significance	Medium	30	Low	16
Status (positive or negative)	Negative		Negative	
OPERATIONAL PHASE				
Probability	n.a.		n.a.	
Duration	n.a.		n.a.	
Extent	n.a.		n.a.	
Magnitude	n.a.		n.a.	
Significance	n.a.		n.a.	
Status (positive or negative)	Non		None	
DECOMMISSIONING & CLOSURE PHASE				
Probability	Low	3	Low	2
Duration	Immediate	1	Immediate	1
Extent	Local	2	Local	2
Magnitude	Moderate	6	Low	4
Significance	Low	27	Low	14
Status (positive or negative)	Negative		Negative	
Reversibility	Medium		High	
Irreplaceable loss of resources?	No		No	
Can impacts be mitigated?	Yes			
Mitigation:				
CONSTRUCTION & DECOMMISSIONING & CLOSURE PHASE:				
PHASE:				
<ul style="list-style-type: none"> The Contractor should ensure that traffic on the local roads is disrupted as little as possible which should include measures for the optimization of the amount of travel on the local roads, thereby reducing impacts. The delivery of construction equipment and material should be limited to hours outside peak traffic times (including weekends). Where obvious damage to the road infrastructure has occurred as a result of the project, repairs should be undertaken in accordance with the relevant authority's specifications and requirements. Co-ordination of movement of vehicles on and off site to reduce risks and prevent congestion on roads in the vicinity of the site. No vehicles or machinery should be serviced or refuelled onsite. Peak traffic hours should be avoided. Large vehicle turning must take place onsite and not in the adjacent roads. In cases where activities may obstruct traffic, local traffic officials must be contacted. 				
Cumulative impacts: None				
Residual Risks: None anticipated.				
POTENTIAL IMPACTS of WASTE GENERATION on the ENVIRONMENT:				
1. Potential Direct & Indirect Impacts of WASTE GENERATION on the ENVIRONMENT				
Nature:				
CONSTRUCTION & DECOMMISSIONING & CLOSURE PHASES:				
<ul style="list-style-type: none"> Waste generation during the construction & decommissioning/closure phases will have a negative impact on the environment, if not controlled adequately. Waste on site includes domestic waste, mixed concrete, paint cans and brushes, insulation material, building rubble and other construction waste. 				
	Without mitigation		With mitigation	
PLANNING & DESIGN PHASE				
Probability	n.a.		n.a.	
Duration	n.a.		n.a.	

Extent	n.a.		n.a.	
Magnitude	n.a.		n.a.	
Significance	n.a.		n.a.	
Status (positive or negative)	n.a.		n.a.	
CONSTRUCTION PHASE				
Probability	Moderate	4	Low	2
Duration	Short term	2	Short-term	2
Extent	Site	1	Site	1
Magnitude	Moderate	6	Low	4
Significance	Medium	36	Low	14
Status (positive or negative)	Negative		Negative	
OPERATIONAL PHASE				
Probability	n.a.		n.a.	
Duration	n.a.		n.a.	
Extent	n.a.		n.a.	
Magnitude	n.a.		n.a.	
Significance	n.a.		n.a.	
Status (positive or negative)	None		none	
DECOMMISSIONING & CLOSURE PHASE				
Probability	Low	3	Low	2
Duration	Immediate	1	Immediate	1
Extent	Local	2	Local	2
Magnitude	Moderate	6	Low	4
Significance	Low	27	Low	14
Status (positive or negative)	Negative		Negative	
Reversibility	Medium		High	
Irreplaceable loss of resources?	No		No	
Can impacts be mitigated?	Yes			
Mitigation:				
CONSTRUCTION PHASE:				
<ul style="list-style-type: none"> • General waste disposal bins will be made available for employees to use throughout the construction phase. • Where possible construction waste on site should be recycled or reused. • Waste will be temporarily stored on site (less than 90 days) before being disposed of appropriately. • General waste should be placed in a watertight container and disposed of on a regular basis. • Records of all waste being taken off site must be recorded and kept as evidence. • Evidence of correct disposal must be kept. • Construction rubble will be disposed of at an appropriate site. • Burning of waste material will not be permitted. • Hazardous materials will be generated if there are spillages during construction and maintenance periods. This waste should be cleaned up using absorbent material provided in spill kits on site and must be disposed of accordingly at a hazardous waste landfill. • Absorbent materials used to clean up spillages should be disposed of in a separate hazardous waste bin. • The storage area for hazardous material must be concreted, bunded, covered, labelled and well ventilated. • Provide employees with appropriate PPE for handling hazardous materials. • All hazardous waste will be disposed of in a registered hazardous waste disposal facility. 				
Cumulative impacts: None				
Residual Risks: None anticipated.				
POTENTIAL IMPACTS of NOISE on the ENVIRONMENT:				

1. Potential Direct & Indirect Impacts of NOISE on the ENVIRONMENT

Nature:

CONSTRUCTION PHASE:

- Noise impacts will arise as a result of the use of construction vehicles and machinery. These noise impacts may be a nuisance to surrounding land users and occupiers.
- It is anticipated that the construction activities will contribute to ambient noise levels during working hours.

DECOMMISSIONING & CLOSURE PHASE:

- Vehicles and other machinery required for decommissioning will increase the noise levels during working hours.
- Decommissioning activities which are likely to cause vibrations.
- Entry and use of construction vehicles as well as cranes on site.

	Without mitigation	With mitigation		
PLANNING & DESIGN PHASE				
Probability	n.a.		n.a.	
Duration	n.a.		n.a.	
Extent	n.a.		n.a.	
Magnitude	n.a.		n.a.	
Significance	n.a.		n.a.	
Status (positive or negative)	n.a.		n.a.	
CONSTRUCTION PHASE				
Probability	High	4	Low	2
Duration	Immediate	1	Immediate	1
Extent	Local	2	Local	2
Magnitude	Moderate	6	Low	3
Significance	Medium	36	Low	12
Status (positive or negative)	Negative		Negative	
OPERATIONAL PHASE				
Probability	n.a.		n.a.	
Duration	n.a.		n.a.	
Extent	n.a.		n.a.	
Magnitude	n.a.		n.a.	
Significance	n.a.		n.a.	
Status (positive or negative)	n.a.		n.a.	
DECOMMISSIONING & CLOSURE PHASE				
Probability	High	4	Low	2
Duration	Immediate	1	Immediate	1
Extent	Local	2	Site	1
Magnitude	Moderate	6	Low	3
Significance	Moderate	36	Low	10
Status (positive or negative)	Negative		Negative	
Reversibility	Medium		High	
Irreplaceable loss of resources?	No		No	
Can impacts be mitigated?	Yes			

Mitigation:**CONSTRUCTION PHASE:**

- Construction activities should be limited to normal working hours (08:00 – 17:00) and limited to weekdays.
- No work should occur on weekends or on public holidays.
- The contractor will adhere to local authority by-laws relating to noise control.
- Mechanical equipment with lower sound power levels must be selected to ensure that the permissible occupation noise-rating limit of 85 dBA is not exceeded.
- Equipment must be fitted with silencers as far as possible to reduce noise.
- All equipment to be adequately maintained and kept in good working order to reduce noise.
- Neighbouring landowners should be informed prior to the initiation of noisy activities e.g. high intensity drilling. A grievance procedure will be established whereby noise complaints can be received, recorded and responded to appropriately.
- All construction workers and personnel must wear hearing protection during working hours.
- Noise levels must comply with the SANS 100103 – 0994 (recommended noise levels).

DECOMMISSIONING & CLOSURE PHASE:

- The contractor will adhere to local authority by-laws relating to noise control.
- Decommissioning activities will be restricted to regular working hours, i.e. Monday to Friday (08:00 – 17:00).
- Mechanical equipment with lower sound power levels will be selected to ensure that the permissible occupation noise-rating limit of 85 dBA is not exceeded.
- Equipment will be fitted with silencers as far as possible to reduce noise.

Cumulative impacts: None**Residual Risks:** None anticipated.**POTENTIAL IMPACTS of HEALTH & SAFETY on the ENVIRONMENT:****1. Potential Direct & Indirect Impacts of HEALTH & SAFETY on the ENVIRONMENT****Nature:****CONSTRUCTION PHASE:**

- Potential human health and safety impacts during the operations and maintenance phase would include:
 - Exposures to hazardous materials such as petroleum, oils, lubricants, and herbicides can cause serious health problems.
 - The risk of serious injuries or accidents associated with maintenance of infrastructure.
- Adverse impacts could also occur from the risk of fires caused by development activities.

DECOMMISSIONING & CLOSURE PHASE:

- During the decommissioning phase, open excavations, vehicle movement and other construction activities may pose a health and safety hazard to workers.
- Storage, handling and transport of fuel are potentially dangerous to humans and properties due to the risk of fire and explosions.

	Without mitigation		With mitigation	
PLANNING & DESIGN PHASE				
Probability	n.a.		n.a.	
Duration	n.a.		n.a.	
Extent	n.a.		n.a.	
Magnitude	n.a.		n.a.	
Significance	n.a.		n.a.	
Status (positive or negative)	n.a.		n.a.	
CONSTRUCTION PHASE				
Probability	Moderate	3	Low	2
Duration	Immediate	1	Immediate	1
Extent	Site	1	Site	1
Magnitude	Moderate	6	Low	3
Significance	Low	24	Low	10
Status (positive or negative)	Negative		Negative	

OPERATIONAL PHASE				
Probability	n.a.		n.a.	
Duration	n.a.		n.a.	
Extent	n.a.		n.a.	
Magnitude	n.a.		n.a.	
Significance	n.a.		n.a.	
Status (positive or negative)	n.a.		n.a.	
DECOMMISSIONING & CLOSURE PHASE				
Probability	Medium	3	Low	2
Duration	Immediate	1	Immediate	1
Extent	Site	1	Site	1
Magnitude	Moderate	6	Low	3
Significance	Low	24	Low	10
Status (positive or negative)	Negative		Negative	
Reversibility	Medium		High	
Irreplaceable loss of resources?	No		No	
Can impacts be mitigated?	Yes			
Mitigation:				
<u>CONSTRUCTION PHASE:</u>				
<ul style="list-style-type: none"> The construction site must be fenced off to prohibit unauthorised access and site access must be strictly controlled. All employees, contractors and sub- contractors to wear appropriate PPE. Open excavations must be clearly marked. Appropriate health and safety signage must be displayed on site. Safety Audits must be conducted on a monthly basis and submitted to the relevant departments. 				
<u>DECOMMISSIONING & CLOSURE PHASE:</u>				
<ul style="list-style-type: none"> The construction site must be fenced off to prohibit unauthorised access and site access must be strictly controlled. All employees, contractors and sub- contractors to wear appropriate PPE. Open excavations must be clearly marked. All employees, contractors and sub- contractors must comply with the relevant Health and Safety Policy. Fire safety should be considered, and all vehicles should have fire extinguisher. Employees should be trained on fire safety. Local emergency fire brigade number should be known to everybody. Appropriate health and safety signage must be displayed on site. 				
Cumulative impacts: None				
Residual Risks: None anticipated.				

2.6 SUMMARY OF FINDINGS & ENVIRONMENTAL IMPACT STATEMENT:

This Draft Basic Assessment Report (dBAR) for the proposed RESIDENCES to be situated on Portion 350 of the FARM THE WILLOWS 340-JR (City of Tshwane Metropolitan Municipality, Gauteng) with associated Civil Services infrastructure, has been undertaken in accordance with the National Environmental Management Amendment Act (as amended) ("NEMA") (Act 107 of 1998) Amendment of the Environmental Impact Assessment Regulations 2014, GNR: 324-327, 7 April 2017.

The PUBLIC PARTICIPATION PROCESS is currently being conducted, and the findings will be included in the FINAL BASIC ASSESSMENT REPORT – and, the following preliminary findings is herewith presented i.e:

The EIA process has so far succeeded in identifying the significant environmental issues and addressing them adequately. The process is currently and have engaged with stakeholders and the specialist's input has assisted in identifying and assessing the potential impacts.

This draft BAR provides an assessment of both the benefits and potential negative impacts anticipated as a result of the proposed RESIDENCES to be situated on Portion 350 of the FARM THE WILLOWS 340-JR (City of Tshwane Metropolitan Municipality, Gauteng) construction.

The EIA process has been adequately rigorous in identifying various issues especially related to the biophysical environment [i.e. FAUNA, FLORA & BIODIVERSITY (i.e. vegetation, mammals, avifauna, herpetofauna & wetland)], heritage (i.e. archaeological & paleontological environment), socio-economic, health & safety, traffic, air quality, noise and visual impacts with regard to the planning and design phase, the construction phase, operational phase as well as the decommissioning phase (i.e. in some instances).

The proposed project is likely to predominantly yield both i.e.:-

- Negative impacts i.e:
 - low to minor, improbable to definite, negative, short-term, negative construction & potential decommissioning/closure related impacts (i.e. noise, air quality, erosion/soil disturbance, access roads, traffic, waste, visual, health & safety)

- and,

- Positive impacts i.e:
 - two - minor, improbable, short term to permanent positive vegetation impacts during construction & operational phases - if the recommended mitigation measures were implemented;
 - one – moderate, definite, permanent positive mammal impact during the operational phase - if the recommended mitigation measures were implemented;
 - three - low, definite, short to long-term, positive socio-economic impacts during construction & operational phases - if the recommended mitigation measures were implemented, – and,
 - two – moderate, definite, long-term positive visual impacts during planning/design & operational phases - if the recommended mitigation measures were implemented.

However, the positive vegetation, socio-economic & visual aspects outweigh the negative impacts.

The results of the specialist studies undertaken indicate that the proposed development would result in the following impacts subject to the implementation of their prescribed mitigation measures i.e:

1. FAUNA, FLORA & BIODIVERSITY (i.e. vegetation, mammals, avifauna, herpetofauna & wetland)] :-

- five (i.e. only definitely two, since three is only potential, since it could be positive if the recommended mitigation measures were implemented) - moderate, negative, definite/potential & permanent biophysical environment impacts during the operational phase [i.e. FAUNA – vegetation, watercourse/wetland, mammals, avifauna & herpetofauna] if the recommended mitigation measures were implemented. However, the professional specialist consultants [i.e. FAUNA, FLORA & BIODIVERSITY (i.e. vegetation, mammals, avifauna, herpetofauna & wetland)] also did not oppose the proposed development's approval subject to the implementation of their prescribed mitigation measures.

- but,

- predominantly - low to minor, improbable to definite, short-term to permanent, negative impacts on the biophysical environment (i.e. vegetation, mammals, avifauna, herpetofauna & wetland) during the construction & operational phase if the recommended mitigation measures were implemented. However, the professional specialist consultants [i.e. FAUNA, FLORA & BIODIVERSITY (i.e. vegetation, mammals, avifauna, herpetofauna & wetland)] also did not oppose the proposed development's approval subject to the implementation of their prescribed mitigation measures.

2. HERITAGE:

i. Archaeological: -

low, low probability, negative, short-term, negative construction related impacts.

ii. Paleontological: -

low, low probability, negative, short-term, negative construction related impacts.

The environmental practitioner is satisfied that an adequate understanding is achieved of the nature and extent of the issues and how to mitigate the negative impacts and enhance potential benefits.

The above-mentioned must be considered by the Department in its evaluation of the environmental authorisation application.

2.7 RECOMMENDATION:

PIERRE JOUBERT LANDSCAPE ARCHITECT, in his professional capacity as experienced and qualified environmental consultant believe that the proposed project be issued a positive environmental authorization.

However, this authorization must be accompanied with the following requirements:

- Appointment of an Environmental Control Officer (ECO) to oversee Full Compliance with the Environmental Management Program (EMPr in APPENDIX H of the BAR).
- Bi-monthly site audits to ensure compliance and to advise on any mitigation measures necessary to negate any environmental degradation.
- The ECO must compile monthly ECO Audit Reports on the state of the environment and areas of compliance and non-compliance with the EMPr. These reports must be made available to GDARD.
- Full implementation of ALL recommendation/guidelines defined in the Specialist Reports (attached in APPENDIX G of the BAR).

2.8 PHOTOGRAPHS OF THE SITE:

Figure 2: Photographic locality positions on site.



Figure 3: Photographic position 1 (Pp1) looking North to north-east.



Figure 4: Photographic position 1 (Pp1) looking North-west.

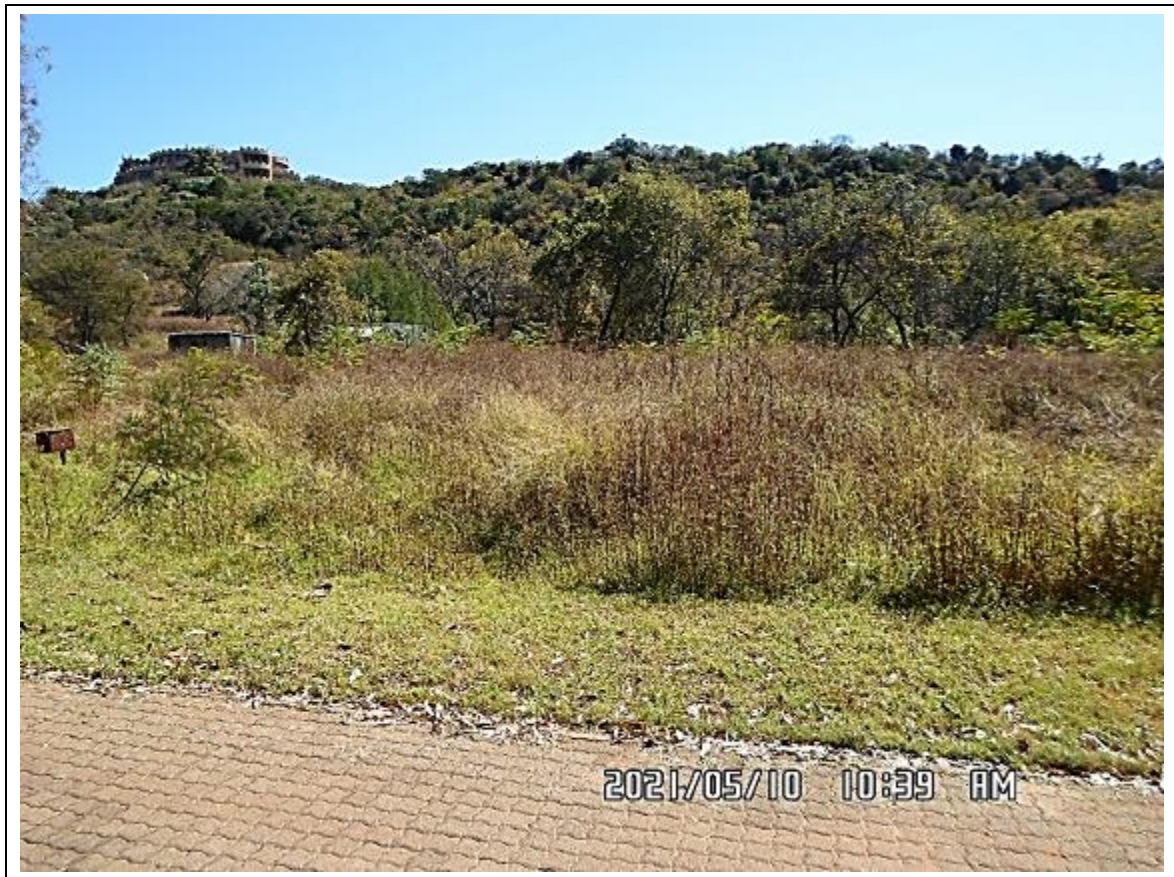


Figure 5: Photographic position 2 (Pp2) looking north to north-west.



Figure 6: Photographic position 2 (Pp2) looking north-east.



Figure 7: Photographic position 2 (Pp2) looking east.



Figure 8: Photographic position 2 (Pp2) looking south-east.



Figure 9: Photographic position 2 (Pp2) looking south.



Figure 10: Photographic position 3 (Pp3) looking west to south-west.



Figure 11: Photographic position 3 (Pp3) looking North-west.



2.9 PLANNING & DESIGN

The design for the proposed development responds to the identified environmental constraints and opportunities. This is achieved via the following mechanisms:

- 1) Consider design level mitigation measures recommended especially with respect to impact on natural resources i.e. especially regarding the constraints imposed by the biodiversity aspects & Bronberg conservation area – and, opportunity offered especially by landscaping & maintaining in a good condition with/the local indigenous vegetation.
- 2) Balance technical and financial considerations against environmental constraints and opportunities in finalising the design of key elements.

The EIA process has identified the significant environmental issues and addressed them, and the Public Participation Process is in the process of being conducted. The process engages with stakeholders and the specialist input has assisted in identifying and assessing the potential impacts.

The implementation of the above mitigation measures aims to ensure that the design meets the objectives and does not degrade the environment and that the design and layout respond to the mitigation measures and recommendations in the BAR and conditions of the Environmental Authorisation.

SECTION 2: PLANNING & DESIGN PHASE PROJECT SPECIFICATIONS EMPr TABLE (Table 4)

IMPACTS/ISSUES	ACTION / MITIGATION	RESPONSIBILITY	FREQUENCY										
1. Documentation	Contract documents to include EMPr as part thereof i.e. the final EMPr must be made binding to the main contractors as well as individual contractors and should be included in documentation for the construction contract. The contractors must also ensure that the construction crew is aware of the requirements set out in the EMPr for this development prior to commencing activities on site.	Developer and consultants	Prior to construction starting.										
2. Liaison with Authorities	Liaison with the City of Tshwane Metropolitan Municipality.	Developer, ECO, Contractor	Once off										
3. EMPr Specifications, Legislation, Guidelines, Regulations, Codes of Practice, Standards, By-laws, Policies etc.	<p>All National, Provincial and Local laws and regulations and relevant guidelines & International Standards need to be adhered to.</p> <p>Obligations imposed by the EMPr are legally binding in terms of environmental statutory legislation (i.e. the National Environmental Management Act (#107 of 1998) and in terms of amendments to the Particular Conditions of Contract that pertain to this project.</p> <p>The requirements of this EMPr do not release the Developer from the requirements of any legislation that may be applicable to the project. A list of Legislation applicable to the project (although not limited to those listed) has been provided below for guidance and does not substitute any regulatory requirements and should where applicable, be read and applied in conjunction with all relevant laws, by-laws, regulations and compulsory specifications including the following:</p> <table border="1" data-bbox="479 863 1507 1377"> <thead> <tr> <th data-bbox="479 863 1507 895">NATIONAL LEGISLATION:</th> </tr> </thead> <tbody> <tr> <td data-bbox="479 895 1507 935"><i>Conservation of Agriculture Resources Act, 1983 (Act 43 of 1983).</i></td> </tr> <tr> <td data-bbox="479 935 1507 975"><i>Disaster Management Act, 2002. Government gazette 43096, March 2020.</i></td> </tr> <tr> <td data-bbox="479 975 1507 1062"><i>DEAT (2005) Guideline 3: General Guide to the Environmental Impact Assessment Regulations, 2005, Integrated Environmental Management Guideline Series, Department of Environmental Affairs and Tourism (DEAT), Pretoria.</i></td> </tr> <tr> <td data-bbox="479 1062 1507 1150"><i>DEAT (2005) Guideline 4: Public Participation, in Support of the EIA Regulations, 2005, Integrated Environmental Management Guideline Series, Department of Environmental Affairs and Tourism (DEAT), Pretoria.</i></td> </tr> <tr> <td data-bbox="479 1150 1507 1238"><i>DEAT (2006) Guideline 5: Assessment of Alternatives and Impacts in support of the Environmental Impact Assessment Regulations, 2006. Integrated Environmental Management Guideline Series, Department of Environmental Affairs and Tourism (DEAT), Pretoria.</i></td> </tr> <tr> <td data-bbox="479 1238 1507 1278"><i>Environment Conservation Act. 1989 (Act no.73 of 1989).</i></td> </tr> <tr> <td data-bbox="479 1278 1507 1318"><i>Hazardous Substance Act. 1973 (15 of 1973).</i></td> </tr> <tr> <td data-bbox="479 1318 1507 1358"><i>National Building Regulations and Building Standards Act (Act 103 of 1977).</i></td> </tr> <tr> <td data-bbox="479 1358 1507 1377"><i>National Development Plan.</i></td> </tr> </tbody> </table>	NATIONAL LEGISLATION:	<i>Conservation of Agriculture Resources Act, 1983 (Act 43 of 1983).</i>	<i>Disaster Management Act, 2002. Government gazette 43096, March 2020.</i>	<i>DEAT (2005) Guideline 3: General Guide to the Environmental Impact Assessment Regulations, 2005, Integrated Environmental Management Guideline Series, Department of Environmental Affairs and Tourism (DEAT), Pretoria.</i>	<i>DEAT (2005) Guideline 4: Public Participation, in Support of the EIA Regulations, 2005, Integrated Environmental Management Guideline Series, Department of Environmental Affairs and Tourism (DEAT), Pretoria.</i>	<i>DEAT (2006) Guideline 5: Assessment of Alternatives and Impacts in support of the Environmental Impact Assessment Regulations, 2006. Integrated Environmental Management Guideline Series, Department of Environmental Affairs and Tourism (DEAT), Pretoria.</i>	<i>Environment Conservation Act. 1989 (Act no.73 of 1989).</i>	<i>Hazardous Substance Act. 1973 (15 of 1973).</i>	<i>National Building Regulations and Building Standards Act (Act 103 of 1977).</i>	<i>National Development Plan.</i>	Developer, ECO, Contractor	Prior to construction starting & continuous.
NATIONAL LEGISLATION:													
<i>Conservation of Agriculture Resources Act, 1983 (Act 43 of 1983).</i>													
<i>Disaster Management Act, 2002. Government gazette 43096, March 2020.</i>													
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<i>National Development Plan.</i>													

National Environmental Management Act, 1998 (Act No. 107 of 1998 as amended).
National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004).
SECTION 24G OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT (NO 107 OF 1998) – Consequences of unlawful commencement of activity.
National Heritage Resources Act 25 of 1999.
National Water Act (NWA), Act 36 of 1998].
National Web based Environmental Screening Tool.
NEMA (Act 107 of 1998) Amendment of the Environmental Impact Assessment Regulations 2014, 7 April 2017: GN326, published in Government Gazette 38282 on 7 April 2017.
Noise Control Regulations.
Noise Regulations promulgated in terms of the Environment Conservation Act 73 of 1989.
Occupational Health and Safety Act, 1993 (Act No 85 of 1993).
Red List Plant Species Guideline, 2006.
The Constitution of South Africa (Act 108 of 1996).
Sustainable Development Guideline, April 2017.
The Road Traffic Act of 1996.
Spatial Planning & Land Use Management Act, 16 of 2013 (SPLUMA).
PROVINCIAL GUIDELINES:
Gauteng Conservation Plan 3.3 Terrestrial CBA's 2011
Gauteng Environmental Management Framework, THE DEVELOPMENT OF THE PROVINCIAL ENVIRONMENTAL MANAGEMENT FRAMEWORK (GPEMF) FOR GAUTENG - Draft Environmental Management Framework Report August 2014 - Produced by the Environomics Project Team, including: Environomics MetroGis EnviroGIS David Hoare Consulting NRM Consulting.
Gauteng Urban Edge, 2010
Gauteng Noise Control Regulations, 1999
GDARD Draft Ridges Policy, 2001 (updated 2006)
GDARD's Gauteng Environmental Management Framework
The GAUTENG Transport Infrastructure Act, 2001.
Local Authority Notices
City of Tshwane Integrated Development Plan
City of Tshwane Noise Management Policy
THE METROPOLITAN SPATIAL DEVELOPMENT FRAMEWORK (MSDF) 2012 & The Tshwane Spatial Development Framework for Region 6
The City of Tshwane Metropolitan Municipality Clause 14(10) of the Tshwane Town-Planning Scheme, 2008 for permission for a second dwelling house (Revised 2014).
Tshwane Open Space Framework (TOSF) 2005.
Bioregional Plan for the City of Tshwane.(2016).

<p>4. Site Preparation <i>Sound environmental principles need to be adopted in the preparation of the site.</i></p>	i. The development footprint must be clearly marked prior to construction activities in order to ensure that the construction site and any construction activities do not encroach on surrounding operations.	Contractor	Once-off
	ii. Do not use the site for any other purpose other than for the proper carrying out of the Works under the Contract.	Contractor	Once-off
	iii. Marking for surveying and other purposes must be done using pegs, beacons or rope and droppers i.e. Corner pegs and servitudes to be clearly demarcated.	Contractor	Continuous
	iv. Utilise the method of de-bushing most appropriate for the environment and species in question. Favour mechanical rather than chemical methods wherever possible.	Contractor	Continuous
	v. No vegetation on neighbouring properties may be damaged or utilized	Contractor	Once-off
	vi. Exotic flora to be removed from the site; a weed control program implemented and spread of exotic species to be controlled.	Contractor/ECO	Once-off
	vii. Before any construction, borrowing and/or quarrying, the entire available topsoil layer has to be stripped. Ensure that it is stockpiled separately from subsoil and rocky material.	Contractor/ECO	Continuous
	viii. In the absence of a recognisable topsoil layer, strip the upper most 300mm of soil.	Contractor/ECO	Continuous
	ix. Co-ordinate excavation to limit unnecessarily prolonged exposure of stripped areas and stockpiles. Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction / earthworks in that area. All vegetation to be retained to be clearly marked.	Contractor/ECO	Once-off
	x. Strip and stockpile herbaceous vegetation, overlying grass and other fine organic matter along with the topsoil.	Contractor	Once-off
	xi. Do not strip topsoil when it is wet.	Contractor	Once-off
	xii. Store stripped topsoil in an approved location and in an approved manner for later re-use in the rehabilitation process.	Contractor	Once-off
	xiii. Check site conditions and contract document prior to commencement of construction.	Contractor	Once-off
	xiv. Specialist to be appointed to execute – if required e.g. Historical/archaeological	Developer	Once-off
	xv. Finalise appointment of ECO.	Developer	Once-off
	xvi. Developer to take responsibility to implement EMPr and to appoint ECO.	Developer	Once-off
	xvii. Reasonable hours to be defined, 7h00-18h00 week, 8h00-14h00 Saturday.	Developer	Once-off
	xviii. Familiarise with necessity and benefit of Environmental awareness.	Developer	Continuous

<p>5. Construction site <i>Careful planning of the Construction site can ensure that time and costs associated with environmental management and rehabilitation are reduced.</i></p>	<p>1. Structures and accommodation</p> <p>i. Erect all temporary buildings and structures, including offices, workshops, and stores, within predetermined zones as per the approved site plan.</p>	Contractor	Initial set-up (Is)
	<p>ii. Ensure that essential services (including sanitation and drinking water facilities) are provided for all contract staff.</p>	Contractor	Initial set-up
	<p>iii. Maintain essential services in a functional state. These may not be overloaded. Defects and inadequacies must be rectified immediately.</p>	Contractor Project manager	Initial set-up Continuous
	<p>iv. The Contractor must attend to drainage of the camp site to avoid standing water and / or sheet erosion.</p>	Contractor/ Project manager	Initial set-up
	<p>2. Storage areas</p> <p>i. A suitable and safe area for storage of the construction material is to be provided.</p>	Contractor	Initial set-up
	<p>ii. Storage areas must be designated, demarcated and fenced if necessary.</p>	Contractor/Project mnger	In stp/Cntns
	<p>iii. Storage areas should be secure so as to minimise the risk of crime. They should also be safe from access by children/ animals etc.</p>	Contractor	Continuous
	<p>iv. Hazardous materials such as fuel, oil, paint, herbicide and insecticides shall be stored in bermed areas or under lock and key, as appropriate, in well ventilated areas.</p>	Contractor/ Project manager	Initial set-up
	<p>v. Definitions of hazardous substances / materials are those that are potentially: poisonous, flammable, carcinogenic or toxic.</p>	Contractor	Initial set-up & Continuous
	<p>vi. Material Safety Data Sheets (MSDSs) shall be readily available on site for all chemicals and hazardous substances to be used on site. Where possible and available, MSDSs should additionally include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases or escapes.</p>	Contractor	Continuous
	<p>vii. Fire prevention facilities must be present at all storage facilities.</p>	Contractor/Project manager	Continuous
	<p>viii. Sufficient care must be taken when handling these materials to prevent pollution.</p>	Contractor	Continuous
	<p>3. Roads and Access</p> <p>i. Choice of access routes should take into account minimum disturbance to public and neighbours in close proximity to the site.</p>	Contractor	Continuous
<p>ii. Wherever possible existing roads should be used to avoid the disturbance of other areas.</p>	Contractor	Initial set-up	
<p>iii. Runoff from roads must be managed to avoid erosion and pollution problems.</p>	Contractor	Continuous	

<p>6. VISUAL IMPACT:</p> <p>The construction phase (site offices, temporary fencing, storage of building material, excavations etc) will have a direct visual impact.</p> <p>'Genius Loci</p> <p>The spirit, or sense, of place is that quality imparted by the aspects of scale, colour, texture, landform, enclosure, and in particular, the land use. According to K. Lynch (1992) <i>"it is the extent to which a person can recognise or recall a place as being distinct from other places as having a vivid, or unique, or at least a particular, character of its own."</i></p> <p><u>The site without the proposed development:</u></p> <p>The spirit of place of this site is defined especially by the following aspects i.e: 'Portion 350 of the FARM THE WILLOWS lies within the 'Wapadrand Country Estates' and is one of five Erven i.e. 348-352 The Willows 340 JR. The Erven, which are located on the northern side of Solomon Mahlangu Drive (M10) about 900 m west of the Lynwood Road intersection in Pretoria.</p>	<p>Effective mitigation is not always possible in the short term when construction takes place e.g. screening of construction site with shade netting & keeping building site clean & neat. Please refer to the Construction EMP underneath.</p> <p>Planners, Architects & Landscape Architects and any other related professional, project managers and/or building contractor to plan, design and implement in the development proposal in such a sensitive manner which would be aesthetically pleasing and visually uplifting in it's current township setting e.g. sympathetic materials and colours with the surrounding environment; all yards and storage areas to be enclosed by masonry walls or screens which is screened by indigenous local biodiversity vegetation; external lighting should be confined to essential areas; lights should be low-level, where possible, and fitted with reflectors to avoid light spillage; lights and signage should be fixed to buildings or walls, where possible, to avoid unnecessary masts and visual clutter; other corporate or advertising signage and flags should be avoided or restricted etc. The visual and aesthetical environment impact caused by the potential lack of adequate (i.e. sensitive, appropriate, in-context with the local surroundings and visual qualities of the site and other related visual aspects) – urban planning/design, architectural, landscape architectural design of facilities and site – and, the full implementation of the proposed mitigation measures especially that of the BIODIVERSITY specialists. The applicant has appointed such specialists as indicated above and therefore employed sufficient measures (mitigation) i.e. as far as possible, to make the proposed development an attractive and visually uplifting improvement on the site and aesthetically appealing towards the directly adjacent township environment and natural (i.e. <i>BRONBERG CONSERVATION AREA</i>) environment.</p>	<p>Developer, Contractor</p>	<p>Planning & Initial set-up (Is)</p>
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The site includes steep south to south-east facing slopes of the Bronberg ridge and a plain that slopes gently towards the south-east.

In a broader landuse context the site is situated within upmarket residential areas which replaced the former farms and agricultural holdings. These developments placed pressure on the endangered ecosystems of the Bronberg mountain range with its unique red data flora and fauna species, though the Bronberg Conservation Area and Fairy Glen Nature Reserve offer some protection of the ridge and its biodiversity.

The historical Google Earth images provide an indication of what the vegetation cover was and how it changed over the last 17 years i.e:



Figure 12: A vegetation map of Erf 350 indicating the eight vegetation communities.

- By 2004 the central to southern areas of Erven 348 – 350 were already **quite disturbed**, also, but less so, on Erf 351, while the south-eastern part of Erf 352 was already developed.
- In September 2007 and 2009 and even more so in 2011, **considerable disturbance** was evident over the southern halves of **all five** Erven (348-352). The bush along the drainage line in the south-western corner of Erf 348 and also on the rocky outcrop in the southern part of Erf 351 were clearly present. The central part of Erf 348 was cleared and terraces made and irrigated for agricultural purposes.
- From the images of May 2015 to August 2016 a (slight) recovery of woody vegetation on the plains can be seen, probably dominated by **pioneer species** such as *Vachellia karroo* and **alien invasive** species such as *Melia azedarach* and *Lantana camara*, currently still prominent in the area. This invasion of alien species is of particular interest for Erven 350 and 351, as this also involves a heritage site.



Figure: 13 The dense bush of the Mountain Bushveld on Higher Slopes in the background. The dense bush in the foreground is representative of the Mountain Bushveld on Lower Slopes.

- More recently from September 2019 to November 2020 the southern disturbed areas have been covered densely by lush weedy species, particularly *Bidens pilosa*, as observed during the current survey.
- Limited parts of these **disturbed** areas, particularly Erven 349 and 350, have been cleared as can be seen on November 2020 Google Earth image.

The above historical changes in vegetation is considered to explain its current appearance and condition. The site is situated within the Andesite Mountain Bushveld (SVcb11) vegetation type (Mucina & Rutherford 2012). The protected Fairy Glen Nature Reserve is located 3.5 km (as the bird lies) west of the Wapadrand Country Estates. The northern half of the Estate is located within the Bronberg Conservation Area. The current vegetation on the hillslope is primary indigenous mountain bushveld, though it is severely encroached by particularly Category 1b Alien and Invasive plant species *Lantana camara* while some individuals of other Alien Invasive plant species are



Figure.14: Mountain Bushveld on the Lower Slopes.

also present. Individuals of *Pittosporum viridiflorum* (Cheesewood) were found high up on the south-east facing hillslope close to the northern boundary fence. The trees were in good condition. Provincially protected plant species that were found on the hillslope are *Aloe pretoriensis*, *Scadoxys puniceus* and *Haemanthus humilis* subsp *hirsutus*. As no development will occur on the hillslope, all plant species that may occur here will be safe and protected. The western part of the Bronberg Ridge runs east-west up to Solomon Mahlangu Drive, but east of Solomon Mahlangu Drive, the Ridge is orientated northwest-southeast. At Solomon Mahlangu Drive there is a shallow valley or plain between the western and eastern parts of the Ridge. The large double-carriage Solomon Mahlangu Drive transects the ridge area through this plain. The proclaimed Wapadrand Country Estates, consisting of five Erven, is located directly on Solomon Mahlangu Drive.. The adjacent residential areas are well developed. Erf 349 stretches from Solomon Mahlangu Drive



Figure15: Disturbed Plains Bushveld.

north-westwards over the plains area and up the south-facing slope to the top of the Bronberg Ridge. The northern half of the Erf is located within the Bronberg Conservation Area and is excluded from any development.. The ecological sensitivity of the three pant communities that were identified and mapped on the mountain slopes is High, and these areas are excluded from any development. The planned development is restricted to the Historically Disturbed Plains Bushveld below the Bronberg Conservation Area line.

Eight plant communities were identified and mapped which predominantly determines the visual character & senses of place, which are:

1) Mountain Bushveld on South-facing Ridge Crests: **The Mountain Bushveld on South-facing Ridge Crests plant community is restricted to the narrow strip of ridge crest that occurs within the property and stretches up to the northern boundary fence. The ridge is part of the Critically Endangered Bronberg Mountain Bushveld and is**



Figure 16: Recently Cleared Area on the Historically Disturbed Plains Bushveld.

located within the Bronberg Conservation Area. This area is excluded from any development. The vegetation is dense bush on an area with large rocks and boulders. Indigenous woody species are dominant, though the alien invasive bush *Lantana camara* is present. Conspicuous trees in the ridge crest include *Protea caffra* & *Calodendron capensis*. Grasses and forbs are sparse or even absent. This area is excluded from any development.

2) Mountain Bushveld on Higher Slopes: The Mountain Bushveld on Higher Slopes plant community occurs on the ridge slopes just below the crest. The entire ridge is part of the Critically Endangered Bronberg Mountain Bushveld & is located within the Bronberg Conservation Area. The vegetation is extremely dense bush on an area with large rocks/boulders. Many indigenous woody species are present, though the vegetation is severely encroached by alien invasive bush *Lantana camara*, making access for detailed surveys almost impossible.



Figure 17: Dense Tree veld on the Heritage Area in the background.

The dense *Lantana camara* encroachment caused damage to the indigenous vegetation, several individuals of the protected *Aloe pretoriensis* were killed. Grasses and forbs are sparse or even absent. This area is excluded from any development since it's part of the Bronberg Conservation Area.

3) Mountain Bushveld on Mid-Slopes.

The Mountain Bushveld on the Mid-Slopes plant community is located below the ridge crest in the far northern part of the site and stretches down to the Lower Slopes or the Disturbed Tall Treeveld on the Plain below. The slopes are part of the Critically Endangered Bronberg Mountain Bushveld and is located within the Bronberg Conservation Area. This area is excluded from any development. The vegetation is extremely dense bush on. Many indigenous woody species are present, though the vegetation is encroached by the alien invasive bush *Lantana camara*, making access for detailed surveys almost impossible. This is

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not critical, as this area is excluded from any development. The dense *Lantana camara* encroachment caused damage to the indigenous vegetation, several individuals of the protected *Aloe pretoriensis* were killed. Grasses and forbs are sparse or even absent

4) Mountain Bushveld on Lower Slopes: The Mountain Bushveld on Lower Slopes plant community is located lower down the slope, below the Bushveld on the Steep Upper Slopes. This part of the ridge is still part of the Critically Endangered Bronberg Mountain Bushveld and is located within the Bronberg Conservation Area. This area is also excluded from any further development. The vegetation is still dense bush. Indigenous woody species are present, though the vegetation is also encroached by the alien invasive bush *Lantana camara* and several other alien and invasive species. Grass-dominated patches occur scattered about. In general, the area is regarded as somewhat disturbed.

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As this area is part of the Bronberg Conservation Area, no development may occur here.

5) Disturbed Tall Treeveld on Plains The plains bushveld on Erf 350 occurs on the relatively flat areas north of the Heritage Site in the central part of the site. This is a dense woodland with tall trees, few shrub plants and a sparse herbaceous layer. Several indigenous trees are conspicuous in this plant community, particularly *Senegalia caffra*, *Vachellia karroo* and *Celtis africana*. **6) Dense Treeveld on Heritage Area** This is a small patch of dense treeveld on an area with scattered rocks. This area seems to be a relic of an old Heritage site. This patch of vegetation extends to Erf 351, where it is more prominent. The vegetation is dominated by dense, tall trees, mainly the indigenous *Celtis africana* and the alien invasive *Meliaazedarach*. An herbaceous layer is almost absent. **7) Historically Disturbed Plains Bushveld:** The vegetation on the plain located on the southern part of the site was disturbed and cleared since 2007. Since 2015 there was an increase in

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woody vegetation, but particularly alien species such as *Lantana camara* and *Melia azedarach* increased. Recently some areas have been cleared, particularly of alien woody species. Weeds, mostly *Bidens pilosa* is now very prominent. Little of the original grassy vegetation remained. Several indigenous trees were left and are still present in this plant community, particularly *Senegalia caffra*, *Vachellia karroo* and *Celtis africana*. Storage facilities were constructed on the eastern boundary of the site. The herbaceous layer is dominated by the weed *Bidens pilosa*. A limited part of the area is earmarked for the development of residences and was recently cleared. 8) Recently Cleared Areas on Plains: **Vegetation was cleared, and some levelling was done on an area within the Historically Disturbed Plains Bushveld area. Weeds occur in patches on the cleared area. This cleared area is 0.08 ha (800 m²) in size. The cleared area is principally located on an area that was historically quite disturbed, where the ecological sensitivity is**

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Medium-Low. It is suggested that this area can be considered as suitable for development, without damage to the more sensitive mountain bushveld vegetation.

These qualities impart a somewhat unique bushveld scenic character and thereby also presents a very pleasing setting within which especially the proposed residences to the BRONBERG CONSERVATION AREA come to it's fullest potential, should the Architect, Landscape Architect and Building construction professionals implement the proposed development in sympathy with nature i.e. in an ecological sensitive way which places the biodiversity's influence and preservation as it's foremost inspiration an priority.

The internal views of the BRONBERG BUSHVELD RIDGE CONVSERVATION AREA from everywhere on site also enhance the aesthetic appeal due to the affinity people have with ridges and natural veldt.

The site with the Proposed Development:

- The presence of the

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<p>proposed residential facilities, in the midst of a well-established residential area (i.e. Wapadrand in PRETORIA) with (i.e. in general):- i. e. visually uplifting natural 'green' backdrop of the <i>BRONBERG CONSERVATION AREA</i> (i.e. perceived from certain selected viewpoints in the area) – and, ii. a predominantly extensive medium to high-end upmarket residential area with also a variety of mixed uses, facilities, activities and elements which creates in general (i.e. perceived from various viewpoints in the area) a diversified visual landscape (i.e. relatively high visual variance). This variance ranges from a relative visually and aesthetically pleasing 'coherence' and 'sense of place' to a relative 'confusion' of disconnectedness (i.e. not integrated in a sensitive cohesive way visually and aesthetically with a lack of a 'sense of place') with no predominant visual 'theme' or specific architectural and/or landscape architectural style or character which unifies the visual 'landscape' as a whole.</p>			
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<p>The proposed development will have a minor positive visual impact on (i.e. towards) it's surrounding area, particularly for the directly adjacent land occupiers and users due to it's relatively secluded locality in the 'visual landscape'. The minor positive visual enhancement would be applicable only if the applicant will develop the proposed facilities in a visual sensitive way which responds positively to its natural (i.e. <i>BRONBERG CONSERVATION AREA</i>) and surrounding built-up environment and landscapes the site with locally indigenous vegetation and maintains it (i.e. facilities and landscape) in a good condition. The applicant has appointed such specialists as indicated above (i.e. architect & landscape architect) and therefore employed sufficient measures i.e. as far as possible, to make the proposed development an attractive and visually uplifting improvement on the site and aesthetically appealing towards the directly adjacent township environment.</p>			
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<p>7. VISUAL IMPACT: Impact on Sense of Place: i.e. Planning/design phase could potentially ignore importance of quality of visual / aesthetical appeal/relevance in context of environment e.g. contextual appeal of proposed buildings, structures & landscape.</p>	<p>1. the longer term visual impact of the proposed development could only be mitigated effectively and could become a positive Visual asset to its environment subject to the appointment of a professional Architect and Landscape Architect - and compliance to all of their planning, design and construction recommendations and plans - who should take into consideration all aspects of design and layout in it's current and futuristic context i.e. biophysical, ecological, visual, cultural etc.</p>	<p>Developer and consultants</p>	<p>Prior to construction</p>
<p>8. ACCESS ROADS: New access roads and haulage routes could impact on areas of sensitivity (fauna and flora etc.).</p>	<p>1. Temporary access and haulage routes must be designed prior to construction commencing to ensure that the most preferable access and haulage routes has been identified. Provision made for the erection of appropriate warning signs. 2. Road safety must be taken into account when planning access to the site. 3. Use should be made of existing roads as far as possible. 4. Strict adherence to EMPr.</p>	<p>Developer and consultants</p>	<p>Prior to construction</p>

3 CONSTRUCTION PHASE EMPr

3.1 OBJECTIVES OF THE CEMPr

The aim of a CEMPr is to facilitate appropriate environmental input during the construction phase of a project and it aims to address mitigation measures pertaining to the construction phase as identified during the course of the Basic Assessment. To achieve this, the CEMPr must specify the limitations the contractor must abide by during construction, detail the issues that he should take cognisance of and indicate specific actions he must and must not undertake so as to ensure that the environment is not unnecessarily damaged. The CEMPr thus specifies the framework within which the contractor must carry out his operations.

In addition, the CEMPr provides a clear indication of the environmental management requirements of each of the role players involved during the construction phase of the development. Guidance for the implementation of the CEMPr is provided including guidance regarding method statements which are required to be implemented to achieve compliance with the Environmental Specifications. Corrective actions and/or penalties in the event of non-compliance with the CEMPr are also defined.

3.2 COMPONENTS OF THE CEMPr

The CEMPr consists of the following components:

1. Implementation of the CEMPr: Roles and responsibilities, organisational and communications structures.
2. Environmental Specifications: Detailed environmental requirements and standards for the construction phase.

3.3 IMPLEMENTATION OF THE CEMPr

3.3.1 INTRODUCTION

This document describes mitigation measures in detail, and is partly prescriptive, identifying specific people or organisations to undertake specific tasks, in order to ensure that impacts on the environment are minimised during the construction phase of this project. The CEMPr is applicable to all works comprising the PROPOSED RESIDENCES to be situated on Portion 350 of the FARM THE WILLOWS 340-JR (City of Tshwane Metropolitan Municipality, Gauteng) with related civil services infrastructure.

This includes works outside of the site boundaries that form part of the project works. It is an open-ended document implying that information gained during construction activities and/or monitoring of procedures on site could lead to changes in the CEMPr.

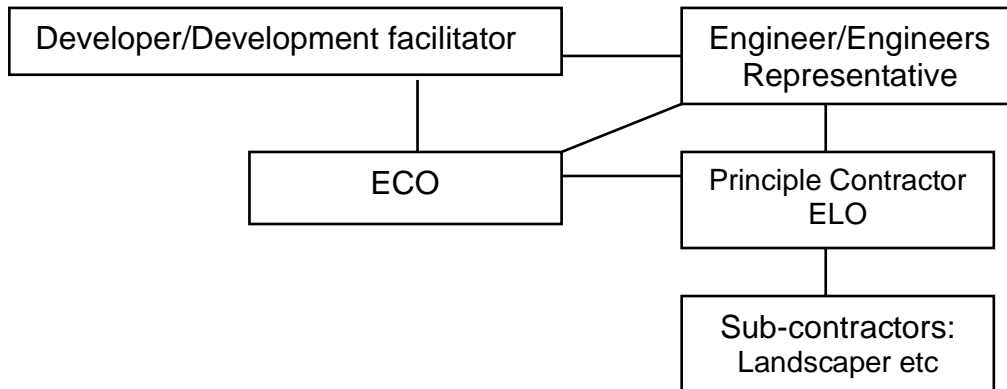
The appointed ECO (Environmental Control Officer) will monitor compliance with the CEMPr and other Conditions of Approval as they relate to environmental matters. This CEMPr gives direction and guidance to all responsible parties. The responsible parties are expected to co-operate closely to minimise or avoid unnecessary environmental impacts.

Non-compliance penalties and/or corrective actions are described in this CEMPr and are thus to be included into the official contract documentation. The Contractor is obliged to inform the ECO immediately of events that may cause serious environmental damage or breach the requirements of the CEMPr. The ECO in turn will immediately inform the Engineer and Developer and, if necessary, the Local Authority, of such events.

3.3.2 ROLES AND RESPONSIBILITIES

The key role-players during the construction phase of the development, for the purposes of environmental management on site include, but are not limited to: the Developer, the Engineer, the main Contractors (An Environmental Liaison Officer should be appointed by the main contractor and should represent the contractor & contact directly with ECO. Direct contractor appointments includes: civil works contractor, building contractor, Landscape Contractor etc.) and the Environmental Control Officer (ECO). There may also be representatives of the relevant Authority/ies if required.

Details of the responsibilities of each of the key role-players have been provided underneath. Lines of communication and reporting between the various parties are illustrated below.



3.3.2.1 The Developer

The Developer refers to the relevant current owner and/or the future owner to which the current owner of the PROPOSED RESIDENCES to be situated on Portion 350 of the FARM THE WILLOWS 340-JR (City of Tshwane Metropolitan Municipality, Gauteng) with related civil services infrastructure will legally sell (i.e. transfer ownership) or rental of the said property too and its appointed facilitators, to whom permission has been granted to proceed with the development, and who is thus ultimately responsible for compliance with all conditions of approval of the development or any aspect thereof by any authority.

With respect to the construction phase of the Development, the Developer is to:

- ensure that all relevant approvals and permits have been obtained prior to the start of construction activities on site;
- ensure that GDARD have been notified of the date on which construction activities will be starting, prior to commencement of the activity;
- ensure that construction activities start prior to the expiration date of the Record of Decision issued by GDARD, failing which the approval of the development by this department will lapse;
- appoint a suitably qualified or experienced Environmental Control Officer prior to the start of construction activities on site, and for the duration of the construction phase.

3.3.2.2 The Engineer

For the purposes of this document “The Engineer” refers to the engineer for the development, or any other person authorised by the Developer, to be responsible for the technical and contractual implementation of the works to be undertaken.

The responsibilities of the Engineer are to:

- ensure that the requirements as set out in this CEMPr and by the relevant Authorities are adhered to and implemented;
- assist the ECO in ensuring that the conditions of the CEMPr are being adhered to and promptly issuing instructions requested by the ECO, to the Contractor. All site instructions relating to environmental matters issued by the Engineer are to be copied to the ECO;
- assist the ECO in making decisions and finding solutions to environmental problems that may arise during the construction phase;
- reviewing and approving construction method statements with input from the ECO;
- ordering the removal of person(s) and/or equipment not complying with the specifications (as required by the ECO or otherwise);
- issuing of penalties and/or corrective actions for transgressions of Environmental Specifications;
- providing input into the ECO's ongoing internal review of the EMPr.

3.3.2.3 The Contractor

For the purposes of this document “The Contractor” refers to any directly appointed (by the Developer) company or individual undertaking the implementation of the works.

The Contractor (i.e. the ELO taking on the responsibilities & executing them) is to:

- ensure implementation of all applicable Environmental Specifications, including all additional requirements related with approved method statements, during all works on site, failing which penalties and/or corrective actions, as outlined in the Environmental Specifications may be imposed by the ECO via the Engineer;
- ensure that all of its sub-contractors', employees, suppliers, agents or servants etc. are fully aware of the environmental requirements detailed in the Environmental Specifications;
- liaise closely with the Engineer and the ECO and ensure that the works on site are conducted in an environmentally sensitive manner;
- inform the Engineer as well as the ECO should environmental issues on site go wrong, e.g. dumping, pollution, littering and damage to vegetation;
- carry out instructions issued by the Engineer, on request of the ECO, required to fulfil his/her compliance with the CEMPr.

3.3.2.4 Environmental Control Officer

During the construction phase of the project, the ECO is to:

- ensure that the Contractor has a copy of the CEMPr and all agreed method statements;
- undertake weekly site inspections (frequency may change as required) to audit compliance of all parties with the requirements of the CEMPr;
- advise/recommend on actions or issues impacting on the environment to the Engineer, who shall issue any required Site Instructions to the Contractor;
- to environmentally educate and raise the awareness of the Contractor and his staff as to the sensitivity of the Site and to facilitate the spread of the correct attitude during works on Site;
- reviewing and approving construction and/or landscaping method statements together with the Engineer and/or Landscape Architect;
- assisting the Contractor in finding environmentally responsible solutions to problems;
- recommend to the Engineer the issuing of a penalty for any environmental damage caused on site, or non-compliance with the Environmental Specifications;
- recommend to the Engineer the removal of person(s) and/or equipment not complying with the Specifications;

- act as the contact person between the Developer, GDARD and the public with regard to environmental matters;
- keeping a register of complaints and recording and dealing with any community comments or issues, having reported these first to the Engineer;
- undertake photographic monitoring of the construction site (if required);
- keep records of all activities/ incidents on Site in a Site Diary concerning the environment (if required);
- completing temporary and permanent site closure checklists (if required);
- to take immediate action on Site to stop works where significant and irreparable damage is being inflicted on the environment, and to inform the Engineer immediately of the occurrence and action taken;
- undertaking a continual internal review of the EMPr and making recommendations to the Engineer and Developer.

The ECO has the authority to recommend to the engineer and the local authority that works be stopped, if in his/her opinion serious harm to, or impact on, the environment is imminent, is likely to occur or has occurred and such actual or potential harm or impact is in contravention of this CEMPr, and which is, or may be, caused by construction, or related works.

Upon failure by the Contractor or contractor's employee to show adequate consideration to the environmental aspects of this contract, the ECO may recommend to the Engineer and the project management team to have the Contractor's representative or any employee(s) removed from the site or work suspended until the matter is remedied. No extension of time will be considered in the case of such suspensions and all costs will be borne by the Contractor.

The ECO shall keep a site diary in which events and concerns of environmental significance are to be recorded. The ECO will compile a monthly report of such events, concerns and general compliance of the Contractor with the CEMPr (if required). This report will be submitted to the Engineer. The ECO is also required to attend regular site meetings of the project management team to report on environmental issues and minute requirements.

The ECO will be responsible for the compilation of a final closure checklist for the project, completed when all works related to the project have been completed and the site has been cleared of all construction related debris, materials or equipment not forming part of the permanent works.

3.3.3 COMMUNICATION STRUCTURES ON SITE

3.3.3.1 Site Meetings

The ECO is required to attend regular site meetings (no more than once every 2 weeks and no less than once a month) of the project management team to facilitate the transfer of information and to update all parties on the environmental compliance of the project as a whole and minute requirements.

The ECO will present a summary report outlining the main construction activities that relate to the environment, at this meeting (if required – to be arranged with Engineer and Contractor on a monthly basis).

The minutes of these meetings will form part of the CEMPr records. These minutes will reflect environmental queries, agreed actions and dates of eventual compliance by the Contractor.

The following people should attend these meetings:

- Developer's Representative;

- Engineer;
- Architect,
- Landscape Architect (when applicable);
- The ECO;
- Contractor(s) representative (ELO).

3.3.3.2 Environmental Education Programme

The Contractor (ELO) in consultation with the ECO shall arrange for a presentation to site staff to familiarise them with the environmental aspects of the CEMPr within seven days from the Commencement Date. This presentation should take cognizance of the level of education, designation and language preferences of the staff. General site staff would commonly receive a basic environmental awareness course highlighting general environmental “do’s and don’ts” and how they relate to the site. Management on site e.g. site agents and foremen, who require more detailed knowledge about the environmental sensitivities on site and the contents and application of the CEMPr document itself, will benefit from a separate presentation dealing with these issues.

3.3.3.3. Method Statements

The Contractor (ELO) shall provide Method Statements for approval by the ECO and the Engineer prior to work commencing on aspects of the project deemed or identified to be of greater risk to the environment and/or which may not be covered in sufficient detail in the CEMP, when called upon to do so by the Engineer or ECO.

A Method Statement is a “live document” in that modifications are negotiated between the Contractor and the ECO/project management team, as circumstances unfolds. All Method Statements will form part of the CEMPr documentation and are subject to all terms and conditions contained within the CEMPr.

Note that a Method Statement is a ‘starting point’ for understanding the nature of the intended actions to be carried out and allows for all parties to review and understand the procedures to be followed in order to minimise risk of harm to the environment.

Changes to, and adaptations of, Method Statements can be implemented with the prior consent of all parties.

A Method Statement describes the scope of the intended work in a step-by-step description in order for the ECO and the Engineer to understand the Contractors intentions. This will enable them to assist in devising any mitigation measures, which would minimize environmental impact during these tasks. For each instance where it is requested that the Contractor submit a Method Statement to the satisfaction of the Engineer and ECO, the format should clearly indicate the following:

- What - a brief description of the work to be undertaken;
- How - a detailed description of the process of work, methods and materials;
- Where - a description/sketch map of the locality of work (if applicable); and
- When - the sequencing of actions with due commencement dates and completion date estimates.
- Who – The person responsible for undertaking the works described in the Method Statement;
- Why – a description of why the activity is required.

All Method Statements are to be to the satisfaction of the ECO, Engineer and, where practical and deemed necessary, should be endorsed as being acceptable by the environmental representative of the Relevant Authority.

A list of some of the Method Statements that the Contractor may need to submit during the course of the construction contract has been provided in Section 3, along with an

indication of those which the ECO may require the Contractor to provide prior to the start of works on site (see **Appendix 2** for a Method Statement Template).

3.3.4. ECO Diary Entries

The ECO will maintain a site diary that relates to environmental issues as they occur on site for record keeping purposes (if required). Comments from this diary will form part of reports presented at site meetings by the ECO.

3.3.3.5 Site Memo Entries

Site memo's, stipulating recommended actions required to improve compliance with the CEMPr by the contractor, will be issued by the ECO to the Engineer, who in turn will ensure that the Contractor is informed of the said instruction.

Comments made by the ECO in the Site Memo book are advisory and all Site Instructions required may only be issued by the Engineer. Site Memo's will also be used for the issuing of stop work orders for the purposes of immediately halting any particular activity(ies) of the Contractor deemed to pose immediate and serious risk of unnecessary damage to the environment.

3.3.4 LEGISLATIVE FRAMEWORK, GUIDELINES & INTERNATIONAL STANDARDS

Obligations imposed by the EMPr are legally binding in terms of environmental statutory legislation (i.e. the National Environmental Management Act (#107 of 1998) and in terms of amendments to the Particular Conditions of Contract that pertain to this project.

The requirements of this EMPr do not release the Developer from the requirements of any legislation that may be applicable to the project. A list of Legislation applicable to the project (although not limited to those listed) has been provided below for guidance, but is not exhaustive since the onus lies with the developer to comply to all legislation i.e:

- *National Environmental Management Act (#107 of 1998);*
- *National Environmental Management Biodiversity (Act 10 of 2004);*
- *National Heritage Resources Act (#25 of 1999);*
- *National Water Act (#36 of 1998);*
- *Occupational Health and Safety Act (#85 of 1993);*
- *Hazardous Substances Act (#63 of 1977);*
- *National Health Act (Act 62 of 2003);*
- *National Environmental Management Biodiversity (Act 10 of 2004);*
- *National Heritage Resources Act (#25 of 1999);*
- *National Water Act (#36 of 1998);*
- SANS 10131:2004 (i.e. *Editon 1 ISBN 0-626-15187-2 SOUTH AFRICAN NATIONAL STANDARD Above-ground storage tanks for petroleum products Published by Standards South Africa 1 dr lategan road groenkloof private bag x191 pretoria 0001. Tel: 012 428 7911 fax: 012 344 1568 international code + 27 12 www.stansa.co.za © Standards South Africa 2004).*

3.3.5 DISPUTE RESOLUTION

Any disputes or disagreements between role players on Site (with regard to environmental management) will be referred to the Engineer.

Where a dispute then still persists this shall be referred for arbitration to a panel of persons made up of one specialist environmental consultant, one qualified engineer, one official of the local authority and one legal practitioner of no less than 4 years' experience in environmental issues whose decision by simple majority will be final and binding on the parties. This arbitration will be informal ("the informal arbitration") and will be finalised within a period of 48 hours from the date of the ruling of the ECO, the purpose being to

ensure that disagreements are rapidly resolved and thereby to limit any prejudice to the contractor or the other parties to this agreement in the construction process. In the event of a deadlock in the aforesaid panel, the legal practitioner forming part of the panel will have a casting vote.

3.3.6 COMMUNITY RELATIONS

The Developers shall be responsible for responding to third party or public queries and/or complaints relating to operations. In addition, the Developers shall be responsible for dissemination of information to the community and the media (press releases, notice boards, etc) if required.

The Contractor shall notify the ECO and the Engineer of any complaints lodged. The Contractor shall be responsible for maintaining a Complaints Register to record complaints received and action taken. This register will be made available to the ECO, the Engineer and the relevant Authority.

3.3.7 SOCIAL RESPONSIBILITIES

The Developer and Contractors shall encourage and implement wherever possible the procurement of locally based labour, skills and materials.

3.3.8 RECYCLING

Wherever possible, materials used or generated by construction shall be recycled. Containers for glass, paper and metals shall be provided separate to general waste bins. Office and camp areas are particularly suited to this form of recycling process. Where possible and practical, such as at stores and offices, waste shall be sorted for recycling purposes. Recycling protocols shall sort materials into the following categories:

- Paper / cardboard
- Aluminium
- Metals (other than aluminium)
- Organic waste
- Glass

3.3.9 MONITORING, RECORD KEEPING AND REPORTING

Environmental Auditing

In accordance with the requirements of the Environmental Impact Assessment Regulations, 2014 (GN No R 982 of 4 December 2014), the holder of the Environmental Authorisation (i.e. the Applicant) must, for the period that the Environmental Authorisation is valid, appoint a suitably qualified independent person to conduct an environmental audit to audit compliance with the conditions of the Environmental Authorisation and the EMPr.

The Applicant is responsible for appointing, managing and remunerating the appointed auditor. The auditor may be the appointed Environmental Control Officer (ECO), provided the ECO is sufficiently qualified and experienced to fulfil the auditing requirements specified below.

The appointed auditor must undertake regular environmental audits according to the frequency specified in the Environmental Authorisation. Following each audit, the environmental auditor must submit an audit report to the Competent Authority (in this instance GDARD).

- Environmental auditing and environmental audit reports must adhere to the requirements of the 2014 Environmental Impact Assessment Regulations, in particular Section 34

(Auditing of Compliance with Environmental Authorisation, Environmental Management Programme) and Appendix 7 (Objective and Content of Environmental Audit Report)

- The audit report must provide verifiable findings on the level of compliance with the provisions/ conditions of the Environmental Authorisation and the EMPr, and must also comment on the ability of the measures contained in this EMPr to sufficiently avoid, manage and mitigate environmental impacts.
- Where the findings of the audit report indicate that the impact management measures stated in the EMPr are insufficient to adequately address environmental impacts, recommendations as to how the EMPr must be amended so as to address the identified shortcomings must be made and submitted to the competent authority together with the audit report.

Construction phase monitoring, reporting and record keeping

The appointed Environmental Control Officer (ECO) is responsible for monitoring the site at regular intervals during the construction phase, in order to ensure that the provisions of this EMPr and the Environmental Authorisation are adhered to and that sound environmental management is ensuing on site.

The ECO must compile a monthly 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, and to the Competent Authority if so requested by that authority. The ECO inspection reports must include both photographic and written records.

ECO Inspections - Photographic Records

The condition of the surrounding natural environment must be monitored regularly in order to ensure that construction and management activities are not impacting negatively on the condition of the landscape and any sensitive ecosystems. The most effective way to achieve this is by means of a detailed photographic record. In this way, a record of any shift in ecosystem condition can be maintained and potential impacts be detected at an early stage. It is thus recommended that fixed-point photo-monitoring sites could be set up, and photographs should be taken at these sites during each ECO inspection. Where necessary, the entire working area should be well documented and photographed.

ECO Inspections - Written Records

The following record-keeping during the pre-construction, construction and rehabilitation phases of the development is recommended:

- The ECO should complete an ECO Checklist after each ECO site visit.
- The ECO must compile an ECO monitoring report and submit this to the Applicant, the Contractor and the Competent Authority (the latter only if required by the Competent Authority). The monthly reports must be a summary of the ECO inspections from the preceding month and must highlight the key concerns/ issues on site, instances of noncompliance with the EA and EMPr, all instructions issued to the contractor, actions taken and aspects that still require attention.
- All ECO reports and ECO instructions must be retained on file at least for the duration of the construction period (retaining reports for a period of at least 5 years is recommended, in the event that the Competent Authority should request information).
- A record (minutes) of construction site meetings, liaison site meetings between the ECO and resident engineer or contractor, monitoring reports, ECO instructions and ECO observations should be clearly documented and filed on a master file off-site for safe keeping.

- It is recommended that a site register (incident register) should be kept on site at the site office for the recording of any environmental incidents (e.g. fires, spills etc.), observations which are contrary to the stipulations within the EMPr and any other contravention deemed necessary for the attention of the resident engineer. Actions taken to remedy the incidents should also be recorded.
- A complaints register should be kept on site in which complaints by any member of the public should be logged.
- The ECO must compile a final post-construction audit report, within 6 months of completion of each construction phase. The audit report should detail the rehabilitation measures undertaken, describe all major incidents or issues of non-compliance and any issues or aspects that require attention or follow-up.

Construction Phase Record Keeping

A copy of the approved EMPr, the Environmental Authorisation, Water Use Authorisation and any relevant construction method statements must be kept on site at all times during pre-construction, construction and rehabilitation activities.

The ECO Reports must be retained by the Applicant for a period of at least 5 years, and must be provided to the Competent Authority upon request.

**Recycling ensures that we do not waste valuable resources.
Recycling can also create employment opportunities.**

3.4 ENVIRONMENTAL SPECIFICATION

3.4.1 SCOPE

This Specification covers the requirements for controlling the impact on the environment of construction activities.

3.4.2 APPLICATION

This Specification contains clauses that are generally applicable to the undertaking of civil engineering works in areas where it is necessary to impose pro-active controls on the extent to which the construction activities impact on the environment. The roles and responsibilities in terms of the application and implementation of this Specification have been outlined in Section 2 above.

3.4.3 METHOD STATEMENTS

Any Method Statement required by the Engineer or the Environmental Specification shall be produced within such reasonable time as the Engineer shall specify or as required by the Specification. The Contractor shall not commence the activity until the Method Statement has been approved and shall, except in the case of emergency activities, allow a period of two weeks for approval of the Method Statement by the Engineer. Such approval shall not unreasonably be withheld.

The Engineer may request a Method Statement for any activity he believes may impact on the environment. The Engineer may also require changes to a Method Statement if the proposal does not comply with the Specification or if, in the reasonable opinion of the Engineer, the proposal may result in, or carries a greater than reasonable risk of, damage to the environment in excess of that permitted by the Specifications.

Approved Method Statements shall be readily available on the site and shall be communicated to all relevant personnel. The Contractor shall carry out the Works in accordance with the approved Method Statement. Approval of the Method Statement shall not absolve the Contractor from any of his obligations or responsibilities in terms of the Contract.

The following Method Statements shall be provided by the Contractor and submitted to the ECO at least 7 working days before site establishment:

3.4.3.1 Site camp and site division (Clause 3.4.4.1 and 3.4.4.2)

The location, layout and method of establishment of the construction camp (including all buildings, offices, lay down yards, vehicle wash areas, fuel storage areas, batching areas and other infrastructure required for the running of the project)

3.4.3.2 Vegetation clearing (Clause 3.4.4.3a)

Method of vegetation clearing during site establishment and disposal procedure for cleared material.

3.4.3.3 Access/haul routes (Clause 3.4.4)

Details, including a drawing, showing where and how the access points and routes will be located and managed, including traffic safety measures.

3.4.3.4 Fuel storage and use (Clause 3.4.5.2)

The design, location and construction of the fuel storage area, service areas as well as for the filling and dispensing from storage tanks and management of drip trays.

3.4.3.5 Solid waste management (Clause 3.4.5.3)

Expected solid waste types, quantities, methods and frequency of collection and disposal as well as location of disposal sites. Include details of the proposed recycling program.

3.4.3.6 Contaminated water (Clause 3.4.5.7)

Methods of minimizing, controlling, collecting and disposing of contaminated water.

3.4.3.7 Hazardous substances (Clause 3.4.5.8)

Details of any hazardous substances / materials to be used, together with the transport, storage, handling and disposal procedures for the substances.

3.4.3.8 Cement and concrete batching (Clause 3.4.5.18)

Cement powder has a high pH. Spillage of dry cement powder and concrete slurry will affect both soil and water pH adversely. Careless handling of cement products resulting in spillage can have detrimental effects on the surrounding environment.

The permitted location of the batching plant (including the location of cement stores and sand and aggregate stockpiles) shall be indicated on the Site layout plan and approved by the ECO. A Method Statement indicating the layout and preparation of this facility is required in this regard.

3.4.3.9 Emergency procedures (Clause 3.4.5.19)

The Contractor shall submit Method Statements covering the procedures for the following emergencies:

a) Fire

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

b) Accidental leaks and spillages

The Contractor shall ensure that his employees are aware of the procedure to be followed for dealing with spills and leaks, which shall include notifying the Engineer and the relevant authorities. The Contractor shall ensure that the necessary materials and equipment for dealing with spills and leaks is available on Site at all times. Treatment and remediation of the spill areas shall be undertaken to the reasonable satisfaction of the Engineer.

In the event of a hydrocarbon spill, the source of the spillage shall be isolated, and the spillage contained. The area shall be cordoned off and secured.

Emergency procedures for fire and accidental leaks and spillages of hazardous substances (including fuel and oil) should include details of risk reduction measures to be implemented including firefighting equipment, fire prevention procedures and spill

kits (materials and compounds used to reduce the extent of spills and to breakdown or encapsulate hydrocarbons).

Other Method Statements required by the Engineer and ECO during the course of construction are to be provided by the Contractor a minimum of 14 working days prior to commencement of the works or activities to which they apply (these activities may not commence on site before these Method Statements have been approved except in the case of emergency activities).

3.4.3.10 Drilling and Blasting (Clause 3.4.5.32)

The Contractor shall submit Method Statements covering the procedures, materials, safety precautions, programme and any other relevant information required by Law, the Engineer, ECO, GDARD and/or any other Authority for Drilling and Blasting.

3.4.3.11 Safety

The Contractor shall at all times observe proper and adequate safety precautions on the Site. Telephone numbers of emergency services, including the local firefighting service, shall be posted conspicuously in the Contractor's office near the telephone.

No unauthorised firearms are permitted on Site.

The Occupational Health and Safety Act (Act 85 of 1993) and in particular the requirements of the Construction Regulations issued in July 2003, must be complied with.

3.4.3.12 Security

With the possible exception of any security staff who may be required to stay overnight at the Contractor's Camp, no personnel will be permitted to live on site. Security staff must be provided with heating and cooking facilities (in order that they do not need to light fires) access to toilet facilities and communication equipment.

Any security lighting at the Contractor's Camp is to be placed in such a way as to not cause a nuisance to residents of the area and traffic on adjacent roads.

3.4.3.13 Community relations

The Contractor shall erect and maintain information boards in the position, quantity, design and dimensions specified. Such boards shall include contact details for complaints by members of the public in accordance with details provided by the Engineer. The Contractor shall keep a "Complaints Register" on Site. The Register shall contain all contact details of the person who made the complaint, and information regarding the complaint itself.

3.4.4 SITE ESTABLISHMENT

3.4.4.1 Site division

The Contractor shall restrict all his activities, materials, equipment and personnel to within the area specified.

A Method Statement detailing the layout and method of establishment of the construction camp (including all buildings, hostels, offices, lay down yards, vehicle wash areas, fuel storage areas, batching areas and other infrastructure required for the running of the project) shall be submitted.

3.4.4.2 Site demarcation

The Contractor shall erect and maintain permanent and/ or temporary fences of the type and in the locations directed by the Engineer. Such fences shall, if so specified, be erected before undertaking designated activities.

NOTE: Special care should be taken to erect and maintain a fence with adequate signage to prevent and inform all construction workers of not entering the 'NO-GO' area as clearly indicated on the PLAN in APPENDIX 1 attached to this report i.e. *Figure 4: SITE LAYOUT PLAN with SENSITIVITY MAP 'NO-GO' AREA of the PROPOSED RESIDENCE on Portion 350 of the FARM THE WILLOWS 340-JR (City of Tshwane Metropolitan Municipality, Gauteng).*

3.4.4.3 Construction areas

The minimum practical area outside of the Building Zone within which construction activity can take place must be identified and marked. This is called the construction space and must be clearly marked for each site, or wherever infrastructure construction activity is to take place, (i.e. the road reserves.) This will include the area of the actual structure - the 'building footprint,' and the 'building zone,' the area within which proposed residences (houses) and infrastructure may be built.

The 'construction space' is a clearly defined area within which all construction activity, scaffolding, storage of building materials etc. is to be confined.

This area will be smaller than the site size, i.e. the whole site is not allowed to be used as a working area.

These 'construction spaces' are to be determined on the site by the Engineer, the ECO in conjunction with the landscape rehabilitation contractor or specialist. The 'construction space' (i.e. its size and shape) will be informed by the slope of the erf and the position and shape of the proposed building.

All areas outside the 'construction space' are to be cordoned off by danger tape wrapped around at least one strand of galvanized wire and construction crews are to be forbidden access to these areas.

The contractor must store any building rubble in a suitable area designated by the site agent and should ideally be removed from site on a weekly basis, if such waste material is not to be used as fill.

No reshaping of the land outside the 'construction space' is allowed.

The above applies to all POS areas as well where the natural existing shape of the landscape is to be preserved.

The ECO, Engineer & contractor must ensure that green areas are off limits to construction crews, vehicles and earth moving machinery.

Where excavation or construction work for the infrastructure temporarily requires extra room, the need is to be discussed with the Engineer and ECO and an agreed area marked off for use.

All open excavations must be protected with danger tape or fencing where construction staff or the public may have access to such areas.

3.4.4.4 Site Clearance

a) Vegetation

A landscape rehabilitation plan and/or specification should be drawn up and/or compiled by a Landscape Professional (e.g. Landscape Architect or Landscape Technician) and/or

Landscape Contractor that specializes in rehabilitation work prior to any construction work. - should it be required. This Landscape Rehabilitation Plan and/or Specification should be compliant to / adhere to any further recommendations, mitigation measures and/or recommendations of the Landscape Architect for this proposed development - should it be required. This landscape rehabilitation plan and/or specification should be obtained from the Developer prior to construction and strictly adhered to throughout the construction phases - should it be required.

b) Topsoil

Topsoil / top material shall be removed from all areas cleared of vegetation and retained for future landscaping use, where feasible. Top material should exclude litter, building rubble, alien plant material or any other waste.

Topsoil shall be stored in areas demarcated by the ECO and Engineer and in piles not higher than 2 m. The stockpiles shall not be compacted or disturbed and shall be domed at the top to promote runoff. Should significant erosion (e.g. through rain or wind) of the stockpiled material occur, the stockpiles should be covered with shade cloth or Geotech fabrics or similarly suitable material to prevent such erosion e.g. mulched indigenous waste plant material.

3.4.4.5 Access routes/ haul roads

The Contractor shall control the movement of all vehicles and plant including that of his suppliers so that they remain on designated routes, are distributed so as not to cause an undue concentration of traffic and that all relevant laws are complied with. In addition, such vehicles and plant shall be so routed and operated as to minimise disruption to regular users of the routes not on the Site. On gravel or earth roads on Site and within 500m of the Site, the vehicles of the Contractor and his suppliers shall not exceed a speed of 45 km/h.

3.4.5 GENERAL REQUIREMENTS

3.4.5.1 Materials handling, use and storage

The Contractor shall ensure that any delivery drivers are informed of all procedures and restrictions (including "no go" areas) required to comply with the Specifications. The Contractor shall ensure that these delivery drivers are supervised during off loading, by someone with an adequate understanding of the requirements of the Specifications.

Materials shall be appropriately secured to ensure safe passage between destinations. Loads including, but not limited to sand, stone chip, fine vegetation, refuse, paper and cement, shall have appropriate cover to prevent them spilling from the vehicle during transit. The Contractor shall be responsible for any clean-up resulting from the failure by his employees or suppliers to properly secure transported materials.

All manufactured and/ or imported material shall be stored within the Contractor's camp. All lay down areas outside of the construction camp shall be subject to the Engineer's approval.

3.4.5.2 Fuel (petrol and diesel) and oil

All fuel is to be stored within a demarcated area in the Contractor's Camp. No refueling of vehicles or machinery is to take place outside of this demarcated area unless authorised

by the Engineer. The Engineer shall be advised of the area that the Contractor intends using for the storage of fuel.

The Contractor shall ensure that all liquid fuels (petrol and diesel) are stored in tanks with lids, which are kept firmly shut. Only empty and externally clean tanks may be stored on the bare ground. All empty and externally dirty tanks shall be sealed and stored on an area where the ground has been protected.

Tanks containing fuels shall be situated on a smooth impermeable surface (plastic or concrete) base with a bund (if plastic it must have sand on top to prevent perishing) to contain any possible spills and prevent infiltration of fuel into the ground. The impermeable lining shall extend to the crest of the bund and the volume inside the bund shall be 110% x the total capacity of all the storage tanks.

The floor of the bund shall be sloped towards an oil trap or sump to enable any spilled fuel to be removed. An *Enretech* or similar hydrocarbon absorption/remediation product approved by the ECO shall be installed in the sump to reduce the risk of pollution. Bulk fuel storage and bunded areas shall have overhead cover to prevent rain from entering the bunded area.

The Contractor shall keep fuel under lock and key at all times.

If fuel is dispensed from 200 litre drums, the proper dispensing equipment shall be used, and the drum shall not be tipped in order to dispense fuel. The dispensing mechanism of the fuel storage tank shall be stored in a waterproof container when not in use.

During fuel tanker delivery, the tanker driver must be present at all times during offloading of product. An emergency cut off switch must be installed to immediately stop fuel delivery should an accident occur. An anti-flash nozzle must be installed at the end of the vent pipe with a fuel dispenser equipped with an automatic cut off switch to prevent fuel tank overfills.

Vehicles using the temporary fuel storage tanker must be located on a concrete hard standing area for fuel containment.

No smoking shall be allowed in the vicinity of the stores. Symbolic safety signs depicting "No Smoking", "No Naked Lights" and "Danger" are to be provided and are to conform to the requirement of SABS 1186. The volume capacity of the tank shall be displayed. The product contained within the tank shall be clearly identified; using the emergency information system detailed in SABS 0232 part 1. Any electrical or petrol-driven pump shall be equipped and positioned, so as not to cause any danger of ignition of the product.

Areas for storage of fuels and other flammable materials shall comply with standard fire safety regulations and may require the approval of the Municipal Fire Prevention Officer.

The Contractor shall ensure that there is adequate fire-fighting equipment at the fuel stores.

Where reasonably practical, plant shall be refueled at a designated re-fuelling area or at the workshop as applicable. If it is not reasonably practical, then the surface under the temporary refueling area shall be protected against pollution to the reasonable satisfaction of the Engineer prior to any refueling activities. The Contractor shall ensure that there is always a supply of appropriate material readily available to absorb/ breakdown and where possible be designed to encapsulate minor hydrocarbon spillage. The quantity of such materials shall be able to handle a minimum of 200l of hydrocarbon liquid spill. This material must be approved by the Engineer prior to any refueling or maintenance activities.

3.4.5.3 Solid waste management

For the purposes of these Environmental Specifications, solid waste includes all debris and waste (e.g. litter, food waste, cable pieces, vegetation and tree stumps, building rubble, etc), including hazardous waste (e.g. oils).

The Contractor shall be responsible for the establishment of a waste control system that is acceptable to the Engineer and ECO, and a method statement is required in this regard. NO REFUSE OR WASTE MATERIAL WILL BE DISPOSED OF BY BURYING.

a) Refuse Control

The Contractor shall provide labourers to clean up the Contractor's camp and working areas at least once a week.

Litter and waste materials (excluding rubble and hazardous waste materials) shall be disposed of into scavenger- and weather-proof bins. The Contractor shall provide sufficient bins with lids on Site to store the waste produced on a daily basis. Bins shall not be allowed to become overfull and shall be emptied a minimum of once daily. The waste may be temporarily stored on Site in a central waste area that is weatherproof and scavenger-proof, and which the Engineer has approved. The Contractor shall then remove the refuse collected from the working areas, from Site at least once a week. Refuse must be disposed of at a site approved by the Engineer and Local Authority.

The Contractor shall ensure that waste and surplus food, food packaging and organic waste are not deposited by employees anywhere on the site except in refuse bins.

b) Empty Cement Bags

Empty cement bags must be collected from the construction area by the end of every day and before rain events and shall be stored in bins that are either placed under cover or have been fitted with lids. This prevents the bags getting wet and the cement powder leaching into the environment.

c) Hazardous Waste

Petroleum, chemical, harmful and hazardous waste is to be stored in an enclosed and bunded area. The location of these sites is to be approved by the Engineer and the ECO. This waste shall be disposed of at a hazardous waste disposal site as approved by the Local Authority. The Contractor shall submit copies of receipts from such waste disposal sites to the Engineer and ECO as proof of proper disposal. Storage and disposal etc is also controlled through other relevant legislation which must be complied with e.g. Occupational Health & Safety Act.

d) Builders rubble

The Contractor shall provide labourers to clean up the Contractor's camp and working areas of rubble generated in the course of construction work at least once a week.

Rubble shall be temporarily stockpiled in a waste skip or a central stockpile and shall be removed from site to an approved landfill site as soon as it constitutes a practical load for removal and before temporary closure of the site. No plastics, shrink wrap, paint buckets or any other debris that does not constitute clean building rubble, shall be stored at such stockpile sites.

3.4.5.4 Ablution facilities

Washing, whether of the person or of personal effects and acts of excretion and urination are strictly prohibited other than at the facilities provided.

Latrine and ablution facilities and first-aid services shall comply with the regulations of the local authority concerned and shall be maintained in a clean and sanitary condition to the satisfaction of the Engineer.

The Contractor shall provide suitable sanitary arrangements at the Contractor's Camp and approved points around the designated work area to allow easy access to all employees on site. No staff is permitted to commence with work on a site without suitable toilet facilities available for them. Sanitary facilities shall be located within 100 m from any point of work, but not closer than 50 m to any water body. One chemical toilet is to be provided on site for every 15-contract personnel at each working area. These toilets must have doors and locks and shall be secured to prevent them blowing over. Toilet paper shall be provided.

The Contractor shall ensure that suitable sanitation facilities are provided for or by all his sub-contractors on site.

Toilets are to be emptied prior to builders' holidays. The contractor shall ensure that no spillage occurs when the toilets are cleaned or emptied and that the contents are removed from site. Discharge of waste from toilets into the environment and burial of waste is strictly prohibited.

The Contractor shall keep the toilets in a clean, neat and hygienic condition. If the Contractor fails to provide and/or maintain all site sanitation facilities in a clean and hygienic condition, the Engineer may order the Contractor to suspend any or all work on the site until these requirements are met. No payment shall be made for any delays or disruption of the Works caused thereby nor shall extensions of time be granted for such delays.

3.4.5.5 Eating areas

The Contractor shall designate eating areas to the approval of the Engineer which shall be clearly demarcated. Sufficient bins, as specified shall be present in this area. Any cooking on Site shall be done on well-maintained gas cookers with fire extinguishers present.

3.4.5.6 Drinking water

The Contractor shall ensure that drinking water is available for all staff on site. If no potable water source is available on site, then the Contractor shall import drinking water to the site.

3.4.5.7 Contaminated water

Potential pollutants of any kind and in any form shall be kept, stored, and used in such a manner that any escape can be contained and the water table not endangered. Water containing such pollutants as cements, concrete, lime, chemicals, fuels and hydrocarbons shall be contained and discharged into an impermeable storage facility for removal from the site or for recycling. This particularly applies to water emanating from concrete batching plants and concrete swills, and to runoff from fuel depots/workshops/truck washing areas.

Wash down areas shall be placed and constructed in such a manner so as to ensure that the surrounding areas are not polluted. The Contractor shall notify the Engineer immediately of any pollution incidents on Site.

A Method Statement shall be required for all wash areas where hydrocarbon and hazardous materials, and pollutants are expected to be used. This includes, but is not limited to, vehicle washing, workshop wash bays and paint equipment cleaning. Wash areas for domestic use shall ensure that the disposal of contaminated "grey" water is sanctioned by the Engineer.

3.4.5.8 Hazardous substances

Hazardous chemical substances (as defined in the Regulations for Hazardous Chemical Substances) used during construction shall be stored in secondary containers. The relevant Material Safety Data Sheets (MSDS) shall be available on Site. Procedures detailed in the MSDS's shall be followed in the event of an emergency situation.

If potentially hazardous substances are to be stored on site, the Contractor shall provide a Method Statement detailing the substances/ materials to be used, together with the storage, handling and disposal procedures of the materials.

No paint products and chemical additives and cleaners such as thinners and turpentine may be disposed of on Site. Brush / roller wash facilities shall be established to the satisfaction of the Engineer. A Method Statement, approved by the Engineer, is required.

3.4.5.9 Site structures

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

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

3.4.5.10 Lights

The Contractor shall ensure that any lighting installed on the site for his activities does not interfere with road traffic or cause a reasonably avoidable disturbance to the surrounding community or other users of the area.

3.4.5.11 Workshop, equipment maintenance and storage

Where practical, all maintenance of plant on Site shall be performed in the workshop. If it is necessary to do maintenance outside of the workshop area, the Contractor shall obtain the approval of the Engineer prior to commencing activities.

The Contractor shall ensure that in his workshop and other plant maintenance facilities, including those areas where, after obtaining the Engineer's approval, the Contractor carries out emergency plant maintenance, there is no contamination of the soil or vegetation. The workshop shall have a smooth impermeable floor either constructed of concrete or thick plastic covered with sufficient sand to protect the plastic from damage. The floor shall be bunded and sloped towards an oil trap or sump to contain any spillages of substances (e.g. oil). A Method Statement detailing the design and construction of the workshop must be submitted.

When servicing equipment, drip trays shall be used to collect the waste oil and other lubricants. Drip trays shall also be provided in construction areas for stationary plant (such as compressors) and for "parked" plant (such as scrapers, loaders, vehicles).

All vehicles and equipment shall be kept in good working order and serviced regularly. Leaking equipment shall be repaired immediately or removed from the Site.

The washing of equipment shall be restricted to urgent or preventative maintenance requirements only. All washing shall be undertaken in the workshop or maintenance areas, and these areas must be equipped with a suitable impermeable floor and sump/oil trap. The use of detergents for washing shall be restricted to low phosphate and nitrate containing and low sudsing-type detergents.

3.4.5.12 Noise

The Contractor shall limit noise levels (e.g. install and maintain silencers on machinery). When working in built-up areas, or any areas within audible distance of residents whether in urban, peri-urban or rural areas, the Contractor shall provide and use suitable and effective silencing devices for pneumatic tools and other plant that would otherwise cause a noise level exceeding 85 dB(A) during excavations and other work.

Appropriate directional and intensity settings are to be maintained on all hooters and sirens.

No amplified music shall be allowed on Site. The use of radios, tape recorders, compact disc players, television sets etc shall not be permitted unless the volume is kept sufficiently low as to avoid any intrusion on members of the public within range. The Contractor shall not use sound amplification equipment on Site unless in emergency situations.

The Contractor's attention is drawn to the Noise Regulations as promulgated in terms of the Environment Conservation Act and relevant Local Authority bylaws.

3.4.5.13 Environmental awareness training

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

Contractor general site staff are to attend an initial presentation of approximately 45 minutes, and approximately half an hour a month thereafter for the duration of the contract shall be allowed for employees to attend any follow-up lectures, should such follow-up lectures be deemed necessary by the ECO. In addition, all new staff and sub-contractors employees that spend more than 1 day a week or four days in a month to attend the environmental education program within 1 (one) week of commencement of work on site. The Contractor shall supply the ECO with a monthly report indicating the number of employees that will be present on site during the following month and any changes in this number that may occur during the month.

No more than 30 people shall attend each course and the cost, venue and logistics for this/ these course/s shall be for the Developer's responsibility. The ECO shall keep a register of all personnel attending the Environmental Education Program.

Notwithstanding the specific provisions of this clause it is incumbent upon the Contractor to convey the sentiments of the EMP to all personnel involved with the works.

a) Training course for management and foremen

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

b) Training course for site staff and labour

The environmental awareness training course for site staff and labour shall be presented by the Engineer or ECO. The course will be approximately 45 minutes long. The course shall be run not more than 7 days after commencement of work on site with sufficient

sessions to accommodate all available personnel. Subsequent courses shall be held as and when required

3.4.5.14 Contractor's Environmental Officer

The Contractor shall appoint an Environmental Officer who shall be responsible for undertaking a daily site inspection to monitor compliance with this Specification. The Contractor shall submit the name of the Contractor's Environmental Officer to the Engineer for his approval seven days prior to the date of the environmental awareness training course.

3.4.5.15 "No go" areas

If "no-go areas" are defined, the Contractor shall ensure that, insofar as he has the authority, no person, machinery, equipment or material enters the "no go" areas at any time. **NOTE:** Special care should be taken to erect and maintain a fence with adequate signage to prevent and inform all construction workers of not entering the 'NO-GO' area as clearly indicated on the PLAN in APPENDIX 1 attached to this report i.e. *Figure 4: SITE LAYOUT PLAN with SENSITIVITY MAP 'NO-GO' AREA of the PROPOSED RESIDENCE on Portion 350 of the FARM THE WILLOWS 340-JR (City of Tshwane Metropolitan Municipality, Gauteng).*

3.4.5.16 Construction personnel information posters

The Contractor shall erect and maintain information posters for the information of his employees depicting actions to be taken to ensure compliance with aspects of the Specifications. Such posters shall be erected at the eating areas and any other locations specified by the Engineer.

3.4.5.17 Fire control

No fires may be lit on site. Any fires, which occur, shall be reported to the Engineer immediately. Smoking shall not be permitted in those areas where it is a fire hazard. Such areas shall include the workshop and fuel storage areas and any areas where the vegetation or other material is such as to make liable the rapid spread of an initial flame. In terms of the Atmospheric Pollution Prevention Act, burning is not permitted as a disposal method.

The Contractor shall appoint a Fire Officer who shall be responsible for ensuring immediate and appropriate actions in the event of a fire and shall ensure that employees are aware of the procedure to be followed. The Contractor shall forward the name of the Fire Officer to the Engineer for his approval seven days prior to the date of the environmental awareness training course.

The Contractor shall ensure that there is basic fire-fighting equipment available on site at all times.

3.4.5.18 Concrete and Cement Work

Cement powder has a high pH. Spillage of dry cement powder and concrete slurry will affect both soil and water pH adversely. Careless handling of cement products resulting in spillage can have detrimental effects on the surrounding environment.

The permitted location of the batching plant (including the location of cement stores and sand and aggregate stockpiles) shall be indicated on the Site layout plan and approved by

the ECO. A Method Statement indicating the layout and preparation of this facility is required in this regard.

Cement is to be stored in a secure weatherproof location to avoid contamination of the environment.

All runoff from batching areas shall be strictly controlled so that contaminated water does not enter stormwater, or groundwater. Dagma boards and mixing trays should be used at all mixing and supply points. Cleaning of equipment and flushing of mixers shall not result in pollution of the surrounding environment:

Suitable screening and containment shall be in place to prevent windblown contamination associated with bulk cement silos, loading and batching.

All visible remains of excess concrete shall be physically removed to an approved Municipal waste site on completion of the plaster or concrete pour section and disposed of. Used cement bags are to be stored in a wind and rainproof container for disposal. Used bags may not lie around on site nor may they be burnt on site.

3.4.5.19 Emergency response procedures and preparedness

The potential environmental risks that may arise as a result of construction activities, or during the maintenance of the structures must be identified, and appropriate emergency response procedures must be compiled for each emergency scenario i.e. the contractor shall develop environmental emergency response procedures to ensure that there will be an appropriate response to unexpected or accidental actions or incidents that will cause environmental impacts during the construction period.

The Contractor is responsible for identifying potential significant environmental risks that may arise as a result of pre-construction, construction and rehabilitation activities, and the contractor must formulate emergency response procedures for these potential incidents and shall submit Method Statements covering the procedures for any potential environmental emergencies of which the following activities may include, inter alia – but are not limited to :

- Accidental discharges to water and land;
- Accidental exposure of employees to hazardous substances;
- Accidental fires.
 - The Contractor shall advise the relevant authority of a fire as soon as one starts and shall not wait until he can no longer control it. The Contractor shall ensure that his employees are aware of the procedure to be followed in the event of a fire.
- Accidental leaks, spillage of hazardous substances;
 - The Contractor shall ensure that his employees are aware of the procedure to be followed for dealing with spills and leaks, which shall include notifying the Engineer and the relevant authorities.
 - The Contractor shall ensure that the necessary materials and equipment for dealing with spills and leaks is always available on site.
 - Treatment and remediation of the spill areas shall be undertaken to the reasonable satisfaction of the Engineer.
 - In the event of a hydrocarbon spill, the source of the spillage shall be isolated, and the spillage contained. The area shall be cordoned off and secured.
- Specific environmental and ecosystem effects from accidental releases or incident;
- Snake bites, scorpion stings, bee stings etc.

The contractor and sub-contractors shall comply with the emergency preparedness incident reporting requirements that must be developed prior to construction.

The ECO, the contractor and the Applicant are responsible for ensuring that all construction workers are aware of the emergency procedures and are properly trained on how to identify and respond to an emergency incident during construction.

General Emergency preparedness:

The following measures must be implemented, as appropriate, to ensure effective responses to emergencies:

- All workers on site during the construction and maintenance phase must be properly educated about possible emergency incidents that may arise, how to avoid such incidents and how to respond in the event of an incident. “Refresher” training sessions on emergency procedures must be held if needed.
- All workers must ideally be given basic fire-awareness training and advised on basic firefighting and safety techniques. Fire-fighting equipment must be available on-site during construction and maintenance activities.
- All workers must be trained on how to respond in the event of a spill of a hazardous substance (fuel, chemicals etc.), if hazardous substances are to be used on site.
- A spill kit for containing and/or neutralising spills of hazardous substances (e.g. hydrocarbons) must be available on site at all times, when hazardous substances are present.
- Any incidents of pollution or spillage of hazardous materials during construction must be reported to the ECO as soon as possible. The ECO must then (depending on the nature of the spill) notify the relevant authorities, if needed.

During the operational phase of the development, the Applicant is responsible for notifying the relevant authorities of any pollution incidents that arise as a result of maintenance activities.

- A first aid kit must be available on site at all times.
- Emergency contact numbers (including the fire department, police and ambulance) must be prominently displayed on site at all times and regularly updated.
- All emergency incidents must be recorded in a site incident log. The cause of the incident, the measures taken in response to the incident and the efficacy of those measures must also be recorded. This information must be used to inform future emergency preparedness planning, and to avoid prevent similar incidents from arising again.

3.4.5.20 Environmental Incident Management

The construction contractors will adhere to the hazard and incident reporting protocols to be developed by the contractor. A report must be completed for all incidents, and appropriate action taken where necessary to minimise any potential impacts. GDARD must be informed of any environmental incident, in accordance with legislative requirements, should this be necessitated by a major environmental incident.

PLEASE also refer to the following guidelines should you require assistance i.e:

- *‘Guidelines on the administration of incidents, As described in section 30 of the National Environmental Management Act, 107 of 1998.’ – by the Department of Environmental Affairs, 2019. Environment House, 437 Steve Biko Road, Arcadia, Pretoria 0002. Hotline: 0800 205 005. Website: www.environment.gov.za*

3.4.5.21 Safety

The Contractor shall at all times observe proper and adequate safety precautions on the Site. Telephone numbers of emergency services, including the local firefighting service, shall be posted conspicuously in the Contractor's office near the telephone.

No unauthorised firearms are permitted on Site.

The Occupational Health and Safety Act (Act 85 of 1993) and in particular the requirements of the Construction Regulations issued in July 2003, must be complied with.

3.4.5.22 Security

With the possible exception of any security staff who may be required to stay overnight at the Contractor's Camp, no personnel will be permitted to live on site. Security staff must be provided with heating and cooking facilities (in order that they do not need to light fires) access to toilet facilities and communication equipment.

Any security lighting at the Contractor's Camp is to be placed in such a way as to not cause a nuisance to residents of the area and traffic on adjacent roads.

3.4.5.23 Community relations

The Contractor shall erect and maintain information boards in the position, quantity, design and dimensions specified. Such boards shall include contact details for complaints by members of the public in accordance with details provided by the Engineer.

The Contractor shall keep a "Complaints Register" on Site. The Register shall contain all contact details of the person who made the complaint, and information regarding the complaint itself.

3.4.5.24 Protection of natural features

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

The Contractor shall not permit his employees to make use of any natural water sources (e.g. springs, streams, and open water bodies) for the purposes of swimming, personal washing and the washing of machinery or clothes.

3.4.5.25 Protection of flora and fauna

Except to the extent necessary for the carrying out of the Works, flora shall not be removed, damaged or disturbed nor shall any vegetation be planted.

Trapping, poisoning and/ or shooting of animals is strictly forbidden. No domestic pets or livestock are permitted on Site.

Where the use of herbicides, pesticides and other poisonous substances has been specified, the Contractor shall submit a Method Statement.

3.4.5.26 Erosion and sedimentation control

The Contractor shall take all reasonable measures to limit erosion and sedimentation due to the construction activities. Where erosion and/or sedimentation, whether on or off the Site, occurs despite the Contractor complying with the foregoing, rectification shall be carried out in accordance with details specified by the Engineer. Where erosion and/or

sedimentation occur due to the fault of the Contractor, rectification shall be carried out to the reasonable requirements of the Engineer.

The use of water on the site (especially at concrete batching plants and access road construction where large water bouwsers are used), must be carefully monitored to ensure that the start of erosion on steep slopes does not take hold. The soils of the site are highly erodible, initially starting with rill erosion, followed by donga erosion. Once some vegetation has been removed, wind erosion (blow-outs) quickly takes place which, together with water erosion (from construction activities or rainfall), exacerbates the whole erosion cycle.

3.4.5.27 Aesthetics

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

3.4.5.28 Pollution

The Contractor shall take all reasonable measures to minimize any dust nuisance, pollution of streams and inconvenience to or interference with the public (or others) as a result of the execution of the Works. A method statement may be required in this regard as determined by the Engineer and ECO.

3.4.5.29 Archaeology and Palaeontology

All artifacts over 50 years of age and all fossils are protected by law. Should anything of an archaeological nature be found on site by the Contractor (or any other party), e.g. stone hand tools, remnants of old structures not previously visible, old ceramic shards etc, work is to be stopped in the area immediately, and the ECO/Engineer notified. Failure to notify ECO of a find will result in a penalty.

The ECO will advise on demarcation of this area, and notify a relevant specialist to view material and ascertain whether further study of the area is required. .

Should a specialist confirm a genuine artifact and recommend further study of the area, work in the area of any artifact or fossil is to cease until further notice and the South African Heritage Resources Agency (SAHRA) is to be informed forthwith by the ECO. The contact details for the SAHRA are as follows:

SATELLITE OFFICE – GAUTENG, Satellite Office – Pretoria.

<u>Physical Address</u> South African Heritage Resources Agency Office 101, 1st Floor, Suncardia Mall, 541 Madiba Street, Pretoria.	<u>Postal address</u> P.O. Box 4637 CAPE TOWN 8000	<u>Tel. & Email Contact;</u> Tel: 012 320 8490 Fax: 012 320 8486 Email: info@sahra.org.za
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3.4.5.30 Working Hours

If works are to take place outside of normal working hours, the ECO and the Engineer are to be notified and disturbance to the surrounding residents or land users is to be prevented. The Engineer will, where required, in turn notify the Relevant Authority of work done outside of normal working hours i.e. from 08h00 to 17h00 only during the week and NOT during weekends and/or public holidays.

3.4.5.31 Excavation and Trenching

During excavation and trenching activities, care is to be taken to ensure that the stockpiling of top material is kept separate from sub-soils. Top material thus saved is to be replaced as top material and is to be the final layer when back-filling. The Contractor shall reinstate all working areas to the satisfaction of the Engineer.

Areas opened for trenching should be restricted to the minimum required to be worked in and closed up in a working day or as dictated by technical requirements such as length of pipe or cable, in order to prevent them from posing safety hazards to people, traffic and animals and to prevent rainwater erosion. Trenches shall be re-filled to the same level as (or slightly higher to allow for settlement) the surrounding land surface to minimise erosion. Excess soil shall be stockpiled in an appropriate manner.

In the event of material removed during trenching being excessive after backfilling or being unsuitable as overburden, the excess material must be removed from the construction site to a site agreed upon by the Engineer and, where applicable, the Local Authority

3.4.5.32 Temporary site closure

If the Site is closed for a period exceeding one week, a checklist procedure shall be carried out by the Contractor in consultation with the ECO.

Contractor's Safety Officers (in terms of the Occupational Health and Safety Act) are to check site and report to the Engineer regarding the following:

Fuels / flammables / hazardous materials stores:

- Ensure fuel stores as low in volume as possible;
- No leaks;
- Outlet secure / locked;
- Bund empty;
- Fire extinguisher serviced and accessible;
- Secure area from accidental damage e.g. vehicle collision;
- Emergency and Management telephone numbers to be available and displayed;
- Adequate ventilation.

Other:

- All trenches and manholes secured.
- Fencing and barriers in place per the Occupational Health and Safety Act (No. 85 of 1993).
- Notice boards applicable and secured.
- Security persons briefed and have facility for contact.
- Night hazards checked e.g. reflectors, lighting, and traffic signage.
- Fire hazards identified – local authority notified of any potential threats e.g. large brush stockpiles, fuels etc.
- Pipe stockpile wedged / secured.
- Scaffolds secure.
- Inspection schedule and log by security or contracts staff.

The ECO is to check and report to the Engineer:

- Wind and dust mitigation in place e.g. straw, brush packs, irrigation.
- Slopes and stockpiles at stable angle.
- Landscape areas watering schedules & supply secured.
- Fuels/hazardous substances stores secure.
- Cement and materials stores secured
- Toilets empty and secured
- Refuse bins empty and secured (lids)

- Bunding clean and treated e.g. Spill Sorb or Enretech #1 powder
- Drip trays empty & secure (where possible)
- Structures vulnerable to high winds secure.

The Contractor is to ensure that all temporary closure requirements are met before leaving the site.

3.4.5.33 Drilling and Blasting

Should blasting be required, it is the Contractors' sole responsibility to obtain a blasting permit and must abide by all the conditions of the Explosives Act and the Inspector of Explosives.

Blasting will only be permitted at such times as agreed with the PM and ECO, and in consultation with the Contractors. Blasting must preferably occur at the same time every day (i.e. between 10h00 and 15h00). During overcast/cloudy days, the ECO and/or Engineer will advise on whether or not blasting can take place.

Charge sizes will be set to ensure no damage to surrounding structures. The Contractors must ensure that ground monitoring equipment is available on the site at all times during blasting operations and must make provision for this in their budgets. Apart from legal requirements, record keeping when doing controlled blasting is of vital importance, since it is useful to have on record in the event of any claims arising.

The contractor is to schedule an approved written blasting programme with any relevant conditions in conjunction with and from GDARD and the Local Authority. This written blasting programme should be made available to the Developer, Engineer, ECO, GDARD and any other Authorities that may request it, and strictly adhered to. If amendments are required to be made to the blasting programme, it should be done in conjunction with and made available to the above-mentioned parties timeously.

A current and valid authorisation shall be obtained from the relevant authorities and copied to the Engineer prior to any blasting activity. A Method Statement shall be required for any blasting related activities. All Laws and Regulations applicable to blasting activities shall be adhered to at all times. A qualified and registered blaster shall supervise all blasting and rock splitting operations at all times.

1. The Contractor shall ensure that appropriate pre-blast monitoring records are in place (i.e. photographic and inspection records of structures in close proximity to the blast area). The Contractor shall allow for good quality vibration monitoring equipment and record keeping on Site at all times during blasting operations.
2. The Contractor shall ensure that emergency services are notified, in writing, a minimum of 24 hours prior to any blasting activities commencing on Site.
3. The Contractor shall take necessary precautions to prevent damage to special features and the general environment, which includes the removal of fly-rock. Environmental damage caused by blasting / drilling shall be repaired at the Contractors expense to the satisfaction of the Engineer.
4. The Contractor shall use blast mats for cover material during blasting – whenever and if required. PLEASE NOTE: Topsoil or any other material may not be used as blast cover!
5. All debris and loose rock is to be removed from the site by the contractor to an approved dumping site.

Appropriate blast shaping techniques shall be employed to aid in the landscaping of blast areas (if required), and a Method Statement to be approved by the Engineer, shall be required in this regard.

3.4.6 SPECIFIC REQUIREMENTS

3.4.6.1 Landscaping

The Engineer is to arrange (in conjunction with the main contractor) for all necessary and required equipment and mark out the exact location of the construction activities (prior to the commencement of any construction activities) in order to assist the Landscape Professional and/or Landscape Rehabilitation contractor in determining the exact extent of the landscaping work required, as well as provide ample opportunity to perform any search and rescue exercises of any plant material considered as rehabilitable and/or retainable – should it be required?

A landscape rehabilitation plan and/or specification should be drawn up and/or compiled by a Landscape Professional (e.g. Landscape Architect or Landscape Technician) and/or Landscape Contractor that specializes in rehabilitation work prior to any construction work. - should it be required. This Landscape Rehabilitation Plan and/or Specification should be compliant to / adhere to any further recommendations, mitigation measures and/or recommendations of the Landscape Architect for this proposed development - should it be required. This landscape rehabilitation plan and/or specification should be obtained from the Developer prior to construction and strictly adhered to throughout the construction phases - should it be required?

3.4.6.2 Rehabilitation

The main contractor should stockpile and reinstate topsoil according to the general requirements as specified above.

The Engineer is to arrange (in conjunction with the main contractor) for all necessary and required equipment and mark out the exact location of the construction activities (prior to the commencement of any construction activities) in order to assist the Landscape Rehabilitation contractor in the search and rescue exercises of retainable and/or rehabilitable vegetation - should it be required?

A landscape rehabilitation plan and/or specification should be drawn up and/or compiled by a Landscape Professional (e.g. Landscape Architect or Landscape Technician) and/or Landscape Contractor that specializes in rehabilitation work prior to any construction work. - should it be required. This Landscape Rehabilitation Plan and/or Specification should be compliant to / adhere to any further recommendations, mitigation measures and/or recommendations of the Landscape Architect for this proposed development - should it be required. This landscape rehabilitation plan and/or specification should be obtained from the Developer prior to construction and strictly adhered to throughout the construction phases - should it be required?

3.4.7 SITE CLEAN UP AND REHABILITATION

3.4.7.1 Site Clean Up

The Contractor shall ensure that all temporary structures, equipment, materials, waste and facilities used for construction purposes are removed upon completion of the project. The site cleanup shall be to the satisfaction of the Engineer and the ECO.

Ensuring that building material and rubble does not lay around in areas will help to restrict the spread of invasive alien Argentine ants.

3.4.7.2 Rehabilitation

Where appropriate, the contractor shall employ a suitably qualified person to rehabilitate areas damaged by construction activities during the course of the project. The Contractor shall be responsible for rehabilitating areas identified by the ECO and the Engineer. The

Contractor's procedure for rehabilitation shall be approved by the ECO and the Engineer and where required, the Local Authority environmental representative.

The rehabilitation programme, to be instituted by the contractor, must also entail the following general measures:

- backfilling of trenches with the required compaction to prevent the subsidence of filled material in the future (particularly after rains that result in natural compaction of unconsolidated horizons);
- small earth berms could be provided across the alignment of any pipelines on any possible slopes at pre-determined intervals to break the velocity of run-off and prevent run-off erosion from taking within the filled trenches;
- remove any excess fill material to appropriate dumping areas;
- a thin covering of the topsoil must be spread over the disturbed area along the alignment of the pipelines. The stockpiled brushwood and topsoil can be hand-placed over the disturbed area along the alignment of the pipelines. Any large shrubs removed can be placed over the disturbed area.

3.4.8 PENALTIES AND BONUSES

Where the Contractor inflicts damage upon the environment or fails to comply with any of the Environmental Specifications contained within this EMP, he shall be liable to pay a penalty for breach of the conditions of the Environmental Specifications which form part of the works contract.

The Contractor is deemed NOT to have complied with this Specification if:

- within the boundaries of the site, site extensions and haul/ access roads there is evidence of contravention of the Specification
- environmental damage ensues due to negligence
- the Contractor fails to comply with corrective or other instructions issued by the Engineer within a specific time
- the Contractor fails to respond adequately to complaints from the public

Penalties shall be issued per incident and per individual for the Contractor's responsibility. The amount of the penalty shall be determined by the Engineer, in consultation with the ECO. The Engineer shall inform the Contractor of the contravention and he shall notify the consulting quantity surveyor to deduct such a penalty from monies due under the Contract prior to the issuing of the monthly payment certificates.

Payment of any penalties in terms of the contract shall not absolve the offender from being liable from prosecution in terms of any law.

The following penalties (not an exclusive list) shall be issued in addition to any remedial costs incurred as a result of non-compliance with the Environmental Specification and shall be imposed by the Engineer on the Contractor for contraventions of the Environmental Specifications by individuals or operators employed by the Contractor and/or his Sub-contractors. Where there are ranges, the amount shall depend on the severity and extent of the damage done to the environment:

TABLE 5: PENALTIES

a.	An individual entering a "no-go" area by foot (without Engineer's/ ELO's / ECO's permission)	R100
b.	An individual failing to adhere to speed limit	R 100
c.	An individual driving a vehicle in a no-go area	R500 – 2000
d.	An individual driving any earthmoving plant in a no-go area	R500 – 5000
e.	A plant operator ignoring a verbal warning to have an oil leak from his machinery repaired	R 200
f.	An individual littering on site	R20
g.	An individual not making use of the ablution facilities	R50

h.	An individual making an illegal fire on site	R200 – 10 000
j.	An individual causing unnecessary damage to flora and fauna on site	R100 – 2000
j.	An individual/team wasting water	R100 - 2000
k.	An individual not reporting a suspected archaeological find to the ECO	R200 – 2000

For each subsequent similar offence committed by the same individual, the penalty shall be doubled in value to a maximum value of R10 000.

The following penalties are suggested for transgressions where damage has been done to the environment:

a.	Erosion	A penalty equivalent in value to the cost of rehabilitation plus 20%
b.	Oil spills	A penalty equivalent in value to the cost of cleanup operation plus 20%
c.	Damage to sensitive environments	A penalty equivalent in value to the cost of restoration plus 20%.
d.	Damage to archaeological finds	A penalty to a maximum of R 100 000 shall be paid for any damage to any archaeological sites/finds.
e.	Damage or Destruction to and Possible indigenous Fauna	A penalty to a maximum of R 100 000 shall be paid for any damage or destruction of any Marine Life.

All monies collected through penalties shall be held an environmental fund by the Developer and be accounted for. A summary page is to be included with the monthly payment certificates as a record of penalties issued to date. A portion of these funds may be used for token monetary bonuses to individual site staff members that have shown exceptional diligence in applying good environmental practice on the site. The remaining funds shall be allocated for the purposes of contributing to environmental education efforts in the local community e.g. for environmental books for the library, posters, excursions or trees for the local school or environmental resource material for the local public library. The Developer, in consultation with the ECO, Engineer and possibly the local Authority, will make a final decision regarding the precise allocation of all penalty funds.

3.4.9 TOLERANCES

Environmental management is concerned not only with the final results of the Contractor's operations to carry out the Works but also with the control of how those operations are carried out. Tolerance with respect to environmental matters applies not only to the finished product but also to the standard of the day-to-day operations required to complete the Works.

It is thus required that the Contractor shall comply with the environmental requirements on an ongoing basis and any failure on his part to do so will entitle the Engineer to certify the imposition of a fine subject to the details set out in the Environmental Specification.

3.4.10 TESTING

Void.

3.4.11 MEASUREMENT AND PAYMENT

3.4.11.1 Basic principles

Except as noted below and as Scheduled Items, no separate measurement and payment will be made to cover the costs of complying with the provisions of this Specification and such costs shall be deemed to be covered by the rates tendered for the items in the Schedule of Quantities completed by the Contractor when submitting his tender.

Some of the important cost items have been listed below to assist the contractor in making provision for implementation of the Specifications:

- a) Protection of stockpiles from blowing or washing away:** The spraying or covering of stockpiles, including the supply of the spray or cover material, as required.
- b) Storage of fuel and oils:** The supply, construction, installation, transport, upkeep and removal of all facilities required for storage and management of fuel and oils.
- c) Cement laden water management:** The supply, construction, installation, transport, upkeep and removal of all facilities required for the management of wastewater from concrete operations.
- d) Contaminated water management:** The supply, construction, installation, transport, upkeep and removal of all facilities required for managing contaminated water.
- e) Storm water and flood management:** The supply, construction, installation, transport, upkeep and removal of all facilities required for managing storm water run-off from the site and protection of works from flooding.
- f) Bunding and management of run-off from workshop areas and supply of drip trays for stationary and “parked” plant:** The supply, construction, installation, transport, upkeep and removal of all facilities required for bunding and managing the run-off from workshop areas as well as all drip trays required.
- g) Dust management:** The supply, application, transport, upkeep and removal of all materials required to ensure that dust is adequately controlled.
- h) Solid waste management:** The supply, application, transport, upkeep and removal of all materials required to ensure that solid waste is adequately controlled (including a recycling program).
- i) Fire Control:** The supply, transport, upkeep and removal of all material required for fire control.
- j) Eating areas:** The supply, construction, installation, transport, upkeep and removal at the end of the construction of all eating areas structures.
- k) Ablutions:** The supply, maintenance, regular emptying and removal of toilets.
- l) Site demarcation:** The supply, installation and removal at the end of the construction of all temporary fences.
- m) Tree protection:** The supply, installation and removal at the end of the construction of all tree protection fences.

3.4.11.2 Scheduled items

a) Provision of venue and staff attendance at the environmental awareness training course

The provision of a venue and attendance at the environmental training course will be measured as a lump sum. The sum shall cover all costs incurred by the Contractor in

providing the venue and facilities and in ensuring the attendance of all relevant employees and sub-contractors, at the training.

b) Method Statements: Additional Work

No separate measurement and payment will be made for the provision of Method Statements but, where the Engineer requires a change on the basis of his opinion that the proposal may result in, or carries a greater than warranted risk of damage to the environment in excess of that warranted by the Specifications, then any additional work required, provided it could not reasonably have been foreseen by an experienced contractor, shall be valued in accordance with GCC 90 Clause 40. A stated sum should be provided in the Schedule of Quantities to cover payment for such additional work.

SECTION 3: CONSTRUCTION PHASE SPECIFICATIONS EMPR TABLE (Table 5)

IMPACTS/ISSUES	ACTION / MITIGATION	RESPONSIBILITY	FREQUENCY
<p>1. Maintenance of Construction site</p> <p><i>Conscientious maintenance of the Construction site can ensure that time and costs associated with environmental management and rehabilitation are reduced.</i></p>	<p>1.1 Maintenance of Access</p> <p>i. Contractors should ensure that access roads are maintained in good condition by attending to potholes, corrugations and storm water damage as soon as these develop.</p>	Contractor	Weekly inspection
	<p>ii. If necessary, staff must be employed to clean surfaced roads adjacent to construction sites where materials have been spilt.</p>	Contractor	When necessary
	<p>1.2 Surfaces</p>		
	<p>i. The Contractor must monitor and manage drainage of the camp site to avoid standing water and soil erosion.</p>	Contractor	Continuous
	<p>ii. The construction site must be fenced off and demarcation of material lay down areas must precede all activities on site.</p>	Contractor	Initial set-up period
	<p>iii. Run-off from the camp site must not discharge into neighbouring properties or adjacent river(s) and/or irrigation canals and/or boreholes and/or wetlands.</p>	Contractor	Initial set-up period
	<p>iv. Cement mixing shall only occur in areas demarcated by the Engineer, in consultation with the ECO. Cleaning of cement mixing and handling equipment shall only be done using proper cleaning trays. All empty containers shall be removed from the site. Any spillage shall be reported to the ECO for cleanup instructions.</p>	Contractor	When necessary
	<p>1.3 Ablutions</p>		
	<p>i. An adequate number of portable/ chemical toilets shall be supplied (1 toilet per 15 users is the norm).</p>	Contractor	Initial set-up period
	<p>ii. The Contractor is to ensure that open areas or the surrounding bush are not being used as a toilet facility.</p>	Contractor	Weekly
	<p>iii. Regular inspections shall be carried out to ensure toilets are kept in a hygienic state.</p>	Contractor	Weekly
	<p>iv. Toilet paper shall be supplied to all toilets. Combine drinking water facilities with hand washing facilities near site toilets.</p>	Contractor	Monitor daily
	<p>v. Toilet facilities will be screened and put as far away from the neighbours and roads as possible.</p>	Contractor	Initial set-up period
<p>1.4 Camp/site Waste Disposal</p>			
<p>i. Refuse generated from the campsite, construction area, storage area or any other area shall be collected and placed in suitable covered refuse bins on a daily basis. A litter patrol around the construction camp is to take place every day to collect any litter that may have been strewn around.</p>	Contractor/ Project manager	Once-off, monitor daily	

	<p>ii. Bins and/or skips should be emptied regularly, and waste should be disposed of at a registered landfill site.</p> <p>iii. All refuse containers are to be covered at all times.</p> <p>iv. More Waste handling specifics:</p> <ul style="list-style-type: none"> • Where possible construction waste on site should be recycled or reused. • Waste will be temporarily stored on site (less than 90 days) before being disposed of appropriately. • General waste should be placed in a watertight container and disposed of on a regular basis. • Records of all waste being taken off site must be recorded and kept as evidence. • Evidence of correct disposal must be kept. • Construction rubble will be disposed of at an appropriate site. • Burning of waste material will not be permitted. • Hazardous materials will be generated if there are spillages during construction and maintenance periods. This waste should be cleaned up using absorbent material provided in spill kits on site, and must be disposed of accordingly at a hazardous waste landfill. • Absorbent materials used to clean up spillages should be disposed of in a separate hazardous waste bin. • The storage area for hazardous material must be concreted, bunded, covered, labeled and well ventilated. • Provide employees with appropriate PPE for handling hazardous materials. All hazardous waste will be disposed of in a registered hazardous waste disposal facility. <p>1.5 Provision of Water</p> <p>i. Sufficient potable water shall be provided for drinking, cooking and ablutions.</p> <p>ii. Water will not be abstracted from the boreholes without the appropriate permission.</p> <p>iii. Great care is to be taken that the water supply is not contaminated in any way.</p> <p>1.6 Provision of Food preparation and eating areas</p> <p>i. Provide a designated place for food storage, preparation and consumption. Food storage must be separate from waste storage areas.</p> <p>ii. Eating areas should be regularly serviced and cleaned to ensure the highest</p>	<p>Contractor/ Project manager Contractor</p> <p>Contractor</p> <p>Contractor Contractor</p> <p>Contractor</p> <p>Contractor</p>	<p>Weekly</p> <p>Daily</p> <p>Daily to weekly</p> <p>As required Initial set-up period Daily</p> <p>Initial set-up period Daily</p>
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	<p>possible standards of hygiene and cleanliness.</p> <p>iii. All litter throughout the site should be picked up and placed in the bins provided.</p> <p>iv. Open fires should not be allowed. Fires for cooking should be limited to fire places designed for the purpose. Gas is more preferable.</p> <p>1.7 Safety and Security</p> <p>i. Safety officer to be appointed and all safety precautions and legislation to be adhered to.</p> <p>1.8 Pollution</p> <p>i. Oil/petrol/diesel/cement spills to be contained, reported and to be cleaned up immediately.</p> <p>ii. Builder's rubble to be removed monthly from site.</p> <p>iii. No concrete to be dumped on site.</p> <p>1.9 Vehicles</p> <p>i. Fuelling and servicing of vehicles shall be done off –site. In the event of a breakdown immediate steps shall be taken to prevent any spillage. If spillage occurs, it shall be reported to the ELO immediately, and it shall be contained and cleaned up.</p>	<p>Contractor</p> <p>Contractor</p> <p>Contractor/ELO/ ECO</p> <p>Contractor</p> <p>Contractor Contractor</p> <p>Contractor</p>	<p>Daily</p> <p>Daily</p> <p>Initial set-up period</p> <p>As required</p> <p>Monthly Daily</p> <p>As required</p>
<p>2. Staff conduct</p>	<p>2.1 Environmental Education and Awareness</p> <p>i. Ensure that all site personnel have a basic level of environmental awareness training.</p> <p>ii. It is the Contractor's responsibility to provide the site foreman with no less that 1 hour's environmental training and to ensure that the foreman has sufficient understanding to pass this information onto the construction staff.</p> <p>iii. Translators are to be used where necessary.</p> <p>iv. The need for a "clean site" policy also needs to be explained to the construction workers.</p> <p>2.2 Worker conduct on site</p> <p>i. A general regard for the social and ecological well-being of the site and adjacent areas, is expected of the site staff.</p> <p>ii. Workers need to be made aware of the following general rules:</p> <p>a) No alcohol / drugs to be present on site.</p> <p>b) No firearms allowed on site or in vehicles transporting staff to / from site, (unless used by security personnel).</p> <p>c) Prevent excessive noise.</p> <p>d) Prevent unsocial behaviour.</p>	<p>Project manager / ECO</p> <p>Contractor</p> <p>Contractor</p> <p>Contractor</p> <p>Project manager /ECO</p> <p>Project manager</p>	<p>During staff induction & ongoing Prior to moving onsite</p> <p>Continuous Continuous</p> <p>During staff induction & ongoing During staff induction & monitored on an ongoing basis</p>

	<p>e) Bringing pets onto the site is forbidden. f) No harvesting of firewood from the site or from the areas adjacent to it. g) Construction staff are to make use of the facilities provided for them, as opposed to adhoc alternatives. (e.g.: fires for cooking; the use of surrounding bush as a toilet facility; are forbidden). h) Trespassing on private / commercial properties adjoining the site is forbidden i) Driving under the influence of alcohol is prohibited.</p> <p>2.3 Fauna and Flora i. Capture/snaring of fauna is strictly prohibited. ii. Anyone found doing the above-mentioned will be prosecuted or disciplined. iii. Faunal species found should be translocated. iv. No vegetation on neighbouring properties is to be used for firewood.</p>	<p>Contractor/ ECO Contractor ECO Contractor/ ECO</p>	<p>Continuous As necessary As necessary Continuous</p>
<p>3. Dust/Air pollution Main causes of air pollution are dust from vehicle movements and stockpiles, vehicle emissions and fires.</p>	<p>i. If necessary, the construction site shall be watered (or an appropriate alternative method used) to control possible dust fallout. ii. Vehicles travelling to and from the construction site must adhere to speed limits so as to avoid producing excessive dust. iii. Vehicles and machinery are to be kept in good working order and to meet manufacturer's specifications for safety, fuel consumption etc. iv. No fires are allowed on site unless first cleared with the ECO and Project Manager. v. Stockpiles may cause dust and so must be managed in accordance with the guidelines in <i>Section 4: Soil Erosion</i> underneath.</p>	<p>Contractor Contractor Contractor Contractor / ECO Contractor</p>	<p>Monitor daily Continuous Weekly As necessary Daily</p>
<p>4. Soil Erosion</p>	<p>4.1 Topsoil stripping and stockpiling i. Once an area has been cleared of vegetation, the top layer (nominally 150mm) of soil should be removed and stockpiled in a designated area. Topsoil is to be handled twice only – once to strip and stockpile, and once to replace and level. ii. Should there be a need to stockpile soil; those stockpiles must be covered in excessively windy conditions. iii. No stockpiles or construction materials may be stored or placed within any drainage line (including the river and irrigation canals) on site or in close proximity to storm water drains. iv. Position topsoil stockpiles on the higher side of a disturbed area. v. Ensure that all topsoil is stored in such a way and in such a place that it will not cause the damming up of water, erosion gullies, or wash away itself. vi. Do not stockpile topsoil in heaps exceeding 2m in height. vii. Protect topsoil stockpiles from erosion. viii. Remove exotic / invasive plants and broad leaf weeds that emerge on topsoil</p>	<p>Contractor Contractor Contractor Contractor Contractor Contractor Contractor Contractor Contractor</p>	<p>Once-off, monitor regularly As required Once-off, monitor regularly Once-off, monitor regularly Once-off, monitor regularly Continuous Continuous Continuous</p>

<p><i>Measures in this section are aimed at reducing the erosive potential of storm water.</i></p>	<p>iv. Line overflow and scour channels with stone pitching along their length and at their points of discharge to prevent soil erosion. The point of discharge must be at a point where there is dense natural grass cover. v. Ensure that channels do not discharge straight down the contours. These must be aligned at such an angle to the contours that they have the least possible gradient. vi. Locate any point of overland discharge at least 50m away from any rivers, streams and/or irrigation canals.</p>	<p>Contractor Contractor Contractor</p>	<p>Continuous When the need arises Whenever the need arises</p>
<p>6. Various other Construction-related Activities: (i.e. only those that are applicable &/or relevant)</p> <ul style="list-style-type: none"> - Foundations in clay area - Excavation/trenching in surface rock - Blasting - Geotechnical precautions - Access to the site - Increase in traffic - Delivery of materials - Storage of materials and goods - Historical/archaeological finds 	<p>Foundations and reinforcing according to geotechnical report; Soft rock excavations, jack hammering, pop blasting, drilling and maybe blasting.</p> <p>Community within a 2km radius must be notified prior to blasting. Requirements of the Explosives Act shall be adhered to. Blasting to be done at appropriate times to minimize disruption. Any damage resulting from blasting to be repaired at own cost.</p> <p>All precautions in geotechnical report to be adhered to (i.e. if applicable). Access from Provincial and/or Municipal Road at one dedicated point to be demarcated in consultation with ECO and/or traffic engineer (if required). Upgrading of intersections of proposed internal roads as well as Provincial and/or Municipal access roads where and if required. Controlled access to the site. Care to be taken not to clear areas of trees (for storage) which could be retained.</p> <p>Toxic/dangerous material to be stored separate from others, under lock and on impenetrable surface. Wet and dry materials to be stored separately. Dangerous and toxic materials, such as fuel/oil/paint and herbicides shall be stored under key in well-ventilated areas. Sufficient precautions shall be taken during handling to prevent any pollution. Any spillage shall be reported to the ECO for cleanup instructions.</p> <p>Any excavation/uncovering of human, historical, or archaeological nature shall be reported immediately and all work shall be stopped and reported to SAHRA (South African Heritage Resource Agency).</p>	<p>Contractor Contractor Contractor Contractor/ECO/ELO Developer/Contractor Contractor Contractor/ECO Contractor/ECO/ ELO</p>	<p>As required As required As required As required When the need arises When the need arises Daily As required When the need arises</p>

<p>- Materials and workmanship</p> <p>- Weather conditions</p> <p>- Records</p>	<p>All work to be done in accordance with national and local laws and regulations, and to proper workmanship and finishes. All work to be done in accordance with contract documents. All procedures, service connections, levies, tests, inspections, records, and payments in accordance with contract, legislation, NBR, NHBRC, SABS, supplier and manufacturer specifications and local regulations.</p> <p>All weather conditions shall be recorded – precipitation, temperature, wind etc.</p> <p>Daily records to be kept on site to conform to the EMPr. Records to be submitted to the relevant Provincial Government Authority monthly and/or as required.</p>	<p>Contractor</p> <p>ELO</p> <p>ELO/ECO</p>	<p>Daily</p> <p>Daily</p> <p>Daily</p>
<p>7. VISUAL IMPACTS</p>	<p>Limit dust and screen construction from viewers along adjacent road with strips of shade cloth; the construction site, material stores, stockpiles and lay-down area should be kept tidy; measures to control wastes and litter should be included in the contract specification documents; wind-blown dust from stockpiles and construction activities, should be controlled; an environmental management program (EMPr) should be prepared and an environmental control officer (ECO) employed for the duration of the construction.</p>	<p>Contractor/ECO/ELO</p>	<p>When the need arises</p>
<p>8. NOISE</p>	<ul style="list-style-type: none"> • Construction activities should be limited to normal working hours (08:00 – 17:00) and limited to weekdays. • No work should occur on weekends or on public holidays. • The contractor will adhere to local authority by-laws relating to noise control. • Mechanical equipment with lower sound power levels must be selected to ensure that the permissible occupation noise-rating limit of 85 dBA is not exceeded. • Equipment must be fitted with silencers as far as possible to reduce noise. • All equipment to be adequately maintained and kept in good working order to reduce noise. • Neighbouring landowners should be informed prior to the initiation of noisy activities e.g. high intensity drilling. A grievance procedure will be established whereby noise complaints can be received, recorded and responded to appropriately. • All construction workers and personnel must wear hearing protection during working hours. • Noise levels must comply with the SANS 100103 – 0994 (recommended noise levels). 	<p>Contractor/ECO/ELO</p>	<p>As required / Continuous</p>

<p>8. TERRESTRIAL VEGETATION & FLORA BIODIVERSITY:</p> <ul style="list-style-type: none"> Potential Direct & Indirect Impacts on natural terrestrial vegetation - loss of indigenous vegetation due to clearing for construction of two residences. 	<ul style="list-style-type: none"> The unauthorised trespassing of visitors and staff onto the adjacent properties should be prohibited and monitored closely – and, fencing around the proposed development should be well maintained to prevent persons trespassing onto the adjacent areas. The fences should be frequently checked to ensure that they are properly sealed off and inaccessible to people. Strict adherence to EMP. Consult and Implement the full relevant specialist report i.e: (i.e. ‘An assessment of vegetation, flora, vertebrate fauna and wetlands on Erf 350 of the Farm The Willows 340 JR, City of Tshwane, Gauteng. By G.J. Bredenkamp D.Sc. Pr.Sci.Nat. J.P.C. van Wyk M.Sc. Pr.Sci.Nat. C.E. Venter M.Sc. Pr.Sci.Nat. Commissioned by Pierre Joubert Landscape Architect and Environmental Planner [EcoAgent CC PO Box 25533 Monument Park 0181. Tel 012 4602525. Cell 082 5767046. March 2021]).’ - upon which the following mitigation measures applies i.e: <ul style="list-style-type: none"> The clearing of vegetation must be kept to a minimum and remain within the footprint development – leave the rest of the area with natural vegetation intact. Leave all trees but remove alien invasive species wherever possible. Construction must be completed as quickly as possible. Disturbed open areas must be rehabilitated immediately after construction has been completed in that area by developing an indigenous garden by planting appropriate indigenous tree, grass and forb species. During the construction phase workers must be limited to areas under construction and access to the planned open areas must be strictly controlled. Rehabilitated areas must be monitored to ensure the establishment of re-vegetated areas. Adhere to the proposed management plan for Juliana’s Golden Mole. Plant only indigenous trees – no alien species. An alien invasive management programme must be incorporated into the Environmental Management Programme. Ongoing alien plant control must be undertaken. Areas which have been disturbed will be quickly colonised by invasive alien species. An ongoing management plan must be implemented for the clearing/eradication of alien species. Monitor all sites disturbed by construction activities for colonisation by exotics or invasive plants and control these as they emerge. Avoid planting of exotic plant species, use indigenous species. Develop an indigenous garden. <p>NOTE: A registered ecologist and professional landscape architect with adequate experience should be appointed to assist with, plan, design and enforce, monitor and audit the planning, design, implementation and operational phases of the conservation of the sensitive ecological areas on site.</p>	<p>Consultants, contractor, ECO, ELO, project mgr</p>	<p>Initial set-up, Continuous, Monitor weekly</p>
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<p>9. MAMMALS & MAMMALS HABITAT: Direct Impacts of the Preferred Lay-Out development on mammal communities and loss of mammal habitat.</p> <p>The relevant area is 0,6 ha in size. Only the footprint area for the development of two residences will be cleared of vegetation. The rest of the area will remain as natural as possible, with the development of an indigenous garden with special measures to enhance habitat for Juliana's Golden Mole. Due to the small area to be cleared, minimal loss of indigenous plant species is expected, while low disturbance of plant populations and the limited fragmentation of the already disturbed plant community will occur. The footprint for the proposed residential development will result in clearing most of the vegetation area. After clearing the vegetation, construction will commence. Construction activities may result in disturbance of mammal individuals or populations.</p>	<ul style="list-style-type: none"> • The unauthorised trespassing of visitors and staff onto the adjacent properties should be prohibited and monitored closely – and, fencing around the proposed development should be well maintained to prevent persons trespassing onto the adjacent areas. The fences should be frequently checked to ensure that they are properly sealed off and inaccessible to people. Strict adherence to EMP. • Consult and Implement the full relevant specialist report i.e: (i.e. 'An assessment of vegetation, flora, vertebrate fauna and wetlands on Erf 350 of the Farm The Willows 340 JR, City of Tshwane, Gauteng. By G.J. Bredenkamp D.Sc. Pr.Sci.Nat. J.P.C. van Wyk M.Sc. Pr.Sci.Nat. C.E. Venter M.Sc. Pr.Sci.Nat. Commissioned by Pierre Joubert Landscape Architect and Environmental Planner [EcoAgent CC PO Box 25533 Monument Park 0181. Tel 012 4602525. Cell 082 5767046. March 2021]).' - upon which the following mitigation measures applies i.e: • Should any South African Hedgehog or other mammal species be encountered or exposed during the construction phase, they should be removed and relocated to natural areas in the vicinity. The contractor must ensure that no indigenous mammal species are disturbed, trapped, hunted or killed during the construction phase. Conservation-orientated clauses should be built into contracts for construction personnel, complete with penalty clauses for non-compliance. • During the construction phase there may be increased surface runoff and a decreased water quality (with increased silt load and pollution). Completing construction during the winter months would mitigate this environmental impact. • The appropriate agency should implement an ongoing monitoring and eradication program for all invasive plant species growing on the site. • Any post-development re-vegetation or landscaping exercise should use species indigenous to South Africa. Plant species locally indigenous to the area are preferred. • Implementation of the management plan for Juliana's Golden Mole will improve mammal habitats in general and contribute to the conservation of these species i.e: <p><u>The following steps are recommended before construction commences and also in order to maintain and increase the population numbers of Juliana's golden mole on the study site, it is suggested that:</u></p> <ul style="list-style-type: none"> • The footprint of the planned construction area be cleared of vegetation. • The storage area for building material etc. be cleared of vegetation, bar large indigenous trees. • No clearing of any vegetation outside the construction and storage area footprint. • Building materials are to be delivered and stored on only one of the cleared hard-surface areas on the site. • Random dumping of building waste cannot be tolerated. There must be a specified area for it 	<p>Consultants, contractor, ECO, ELO, project mgr</p>	<p>Initial set-up, Continuous, Monitor weekly</p>
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	<p>and must be removed from the site as soon as possible.</p> <ul style="list-style-type: none"> • No or limited access for workers to areas outside the above-mentioned footprint. • The areas where there will not be any development must be irrigated so that the soil remains moist, attracting more potential prey items to these areas. This will increase the probability that the Juliana's golden moles will migrate to these irrigated areas, away from the construction and storage areas. <p><u>Stabilising the Juliana's golden mole population is dealt with on a general and a specific level.</u></p> <p>General actions: It is suggested that:</p> <ul style="list-style-type: none"> • the garden area be developed shortly after the construction of the residences has been completed. • A well-manicured and maintained, mainly indigenous garden to reflect the upmarket ambience of the entire facility be developed. • It is therefore strongly advised that the flower beds are composted on a regular and ongoing basis, to enhance the occurrence of subterranean invertebrate instars serving as food source for the golden moles. Increasing the organic content of the soil to a depth of 15cm will furthermore serve to loosen its texture and hence enhance mole occupation. • In addition, it is also suggested that flower beds are seeded with earthworms from time to time. • Indigenous grasses be used amply in the beds. • Planting of members of the legume family (pea family, Fabaceae) to bind atmospheric nitrogen. • Leave large areas with natural vegetation or re-establish natural vegetation. • LM grass is preferred to Kikuyu grass for a lawn. • It is not anticipated that moderate use of inorganic fertilisers will have any effect on golden moles. • Irrigation is an important facet of maintaining the soft substrate. Regular irrigation is suggested throughout the year. • Use steppingstones rather than fully paved walkways to allow for mole tunnelling and dispersal. • Juliana's golden mole activity was also observed on the sidewalk area southeast of the service road and this area may not be used for a storage or dumping site. • That an Ecological Control Officer (ECO) be appointed as soon as operations commence. During the construction phase he/she is to monthly supervise the development and maintenance of the golden mole habitat, to monitor golden mole activities and dispersal, where necessary to interact with the construction site managers, has the right to amend the EMP in consultation with the developer, to monthly provide feedback to the developers who 		
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	<p>will copy that to the authorities, and to report non-compliance to GDARD.</p> <p>Specific actions:</p> <ul style="list-style-type: none"> • Near the white stinkwood trees, at the heritage site, golden mole activities occur at 25°46'51"S; 28°20'05"E. This area must be excluded from development. • This areas of golden mole activity together with a buffer zone of ten meters are to be demarcated in concurrence with the ECO, and this should be a no-entry area for all the construction workers. • As little as feasible paving must be laid and preferably no Kikuyu grass be planted. • The soil in the garden must be carefully loosened, composted and seeded with earthworms, and Canada Green or LM grass planted. • Irrigation to be installed and the site watered throughout the year. • It is possible that resident golden moles may be unearthed during preparation of the substrate. In such cases the specimens can be released anywhere where there are no plans to construct houses. • A temporary route to bypass the golden mole areas should be established to transport building material, avoid trampling and compaction of soil. • Upon completion of construction, this temporary route is to be loosened, composted and developed to be amenable for golden moles. <p>Construction phase:</p> <p>This is a critical phase. Since golden moles are completely blind, they rely on acute hearing and detection of tremors conveyed through the substrate to detect prey. Experience at other developments suggest that they respond neutrally to typical noise of construction processes. To ensure that conservation measures are maintained and amended as necessary, it is suggested that:</p> <ul style="list-style-type: none"> • An appropriate Management Authority should be identified (e.g. the owners) that is contractually bound to implement this Environmental Management Plan during the construction phase of the development. The Management Authority will keep a record of ECO monthly audits and upon request make these available to GDARD. • That the ECO monitors the construction site on a regular basis (at least monthly) and keeps a written Record of Decision (ROD). Particular attention should be paid to unforeseen artificial edge effects (e.g. water runoff from developed areas & application of chemicals). • That a copy of this EMP should be provided to the neighbouring landowners. • That the ECO interacts with the landscape architect / site manager in terms of enriching the substrate and the planting of vegetation on the site. • The contractor and all the construction personnel receive environmental training on the importance of the Juliana golden moles. • No dumping of construction materials, hazardous materials such as oil and diesel or domestic 		
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<p>10. AVIFAUNA & AVIFAUNA HABITAT: Construction of two residential houses and other buildings is likely to take place and may potentially incur the loss of habitat, but also potential creation of new habitats for certain species. Impact on birds due to disturbance associated with construction activities and with increased human presence in the area. The presence of vehicles and construction workers will cause disturbance to avifauna, with the movement and activities of personnel on site and the associated noise, pollution and litter all having a negative effect on birds. In addition, the presence of construction workers will increase the probability of activities such as illegal hunting of birds. The permanent presence of a much larger number of people than presently occur at the site will result in greater disturbance of birds that</p>	<p>waste is to be allowed within the site.</p> <ul style="list-style-type: none"> • The landscape planting plan must ensure that the trees / shrubs used in the gardens are indigenous. • The contractor is aware of the need for as little noise as possible on site. • The footprint of paving or other concrete structures around the houses must be kept to a minimum. • Wire fence (not concrete or brick wall) between the different erven is preferred to enable migration of golden moles between the properties. • Swimming pools must have a barrier to prevent Juliana golden moles from accidentally falling into pools. <ul style="list-style-type: none"> • The unauthorised trespassing of visitors and staff onto the adjacent properties should be prohibited and monitored closely – and, fencing around the proposed development should be well maintained to prevent persons trespassing onto the adjacent areas. The fences should be frequently checked to ensure that they are properly sealed off and inaccessible to people. Strict adherence to EMPr. • Consult and Implement the full relevant specialist report i.e: (i.e. 'An assessment of vegetation, flora, vertebrate fauna and wetlands on Erf 350 of the Farm The Willows 340 JR, City of Tshwane, Gauteng. By G.J. Bredenkamp D.Sc. Pr.Sci.Nat. J.P.C. van Wyk M.Sc. Pr.Sci.Nat. C.E. Venter M.Sc. Pr.Sci.Nat. Commissioned by Pierre Joubert Landscape Architect and Environmental Planner [EcoAgent CC PO Box 25533 Monument Park 0181. Tel 012 4602525. Cell 082 5767046. March 2021]).' - upon which the following mitigation measures applies i.e: <ul style="list-style-type: none"> ○ The spatial extent of construction activities must be minimized, ○ The boundaries of the development footprint areas are to be clearly demarcated and it must be ensured that all activities remain within the demarcated footprint area. ○ Disturbance by residents of birds breeding and foraging in the area should be minimized and controlled. ○ Provide adequate briefing for site personnel and residents prior to construction. ○ Any bird nests that are found during the construction period must be reported to the Environmental Control Officer (ECO). ○ Movement of construction vehicles and workers beyond the boundary of the site must be minimized. In addition, workers must be instructed to minimize disturbance of birds at all times, and steps must be taken to ensure that no illegal hunting occurs. ○ The boundaries of the development footprint areas are to be clearly demarcated and it must be ensured that all activities remain within the demarcated footprint area. ○ Great care must be taken that no pollutants or other waste pollute the area or enter 	<p>Consultants, contractor, ECO, ELO, project mgr</p>	<p>Initial set-up, Continuous, Monitor weekly</p>
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<p>use the area for foraging and breeding. Impact on birds due to Pollution associated with construction or residential activities. Pollution associated with construction activities and residents (e.g., fuel spills, use of cleaning chemicals) could have negative impacts on avifauna. Impact on birds due to Electrocutation and collision hazards. Electrical infrastructure such as distribution lines, as well as electric fences, pose a potential collision risk to flying birds, and a potential electrocution risk to perching birds. The magnitudes of these risks are much lower than the corresponding risks associated with large overhead transmission lines. Assuming that the electrical infrastructure comprising part of the proposed development is typical of housing developments, no specific mitigation measures are required.</p> <p>11. HERPETOFAUNA & HERPETOFAUNA HABITAT: The current habitat is mostly disturbed terrestrial habitat. The footprint for the proposed residential development will result in clearing most of the vegetation area. This will result in some loss of herpetofaunal habitat. After clearing the vegetation, construction will</p>	<p>local water systems during the construction or operational phases. Measures to rapidly deal with spills of fuel, cleaning chemicals or any other potential pollutants must be put in place before construction commences.</p> <ul style="list-style-type: none"> ○ Construction workers must be suitably trained to deal with any such spills. ○ Facilities to handle pollution and waste must be provided to residents. ○ Normal safety measures for electrical installations as used by Eskom. <ul style="list-style-type: none"> • The unauthorised trespassing of visitors and staff onto the adjacent properties should be prohibited and monitored closely – and, fencing around the proposed development should be well maintained to prevent persons trespassing onto the adjacent areas. The fences should be frequently checked to ensure that they are properly sealed off and inaccessible to people. Strict adherence to EMP. • Consult and Implement the full relevant specialist report i.e: (i.e. 'An assessment of vegetation, flora, vertebrate fauna and wetlands on Erf 350 of the Farm The Willows 340 JR, City of Tshwane, Gauteng. By G.J. Bredenkamp D.Sc. Pr.Sci.Nat. J.P.C. van Wyk M.Sc. Pr.Sci.Nat. C.E. Venter M.Sc. Pr.Sci.Nat. Commissioned by Pierre Joubert Landscape Architect and Environmental Planner [EcoAgent CC PO Box 25533 Monument Park 0181. Tel 	<p>Consultants, contractor, ECO, ELO, project mgr</p>	<p>Initial set-up, Continuous, Monitor weekly</p>
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<p>commence.</p> <p>12. HERITAGE (Archaeological): The construction phase may potentially result in the loss of cultural heritage resources and artifacts buried beneath the surface. In this section the impact of the proposed development on the sites will be assessed. From the overlay of the identified heritage sites over the proposed development footprint it is clear that the sites fall outside of the proposed development footprint, but that there is a possibility that these and related sites could potentially be impacted. From the overlay of the identified heritage sites over the proposed development footprints depicted, it is clear that the Late Iron Age sites may be impacted on by the proposed development. An archival and historical desktop study</p>	<p>012 4602525. Cell 082 5767046. March 2021)).' - upon which the following mitigation measures applies i.e:</p> <ul style="list-style-type: none"> ○ Should any reptile or amphibia species be encountered or exposed during the construction phase, they should be removed and relocated to natural areas in the vicinity. The contractor must ensure that no indigenous herpetofauna species are disturbed, trapped, hunted or killed during the construction phase. Conservation-orientated clauses should be built into contracts for construction personnel, complete with penalty clauses for non-compliance. ○ During the construction phase there may be increased surface runoff and a decreased water quality (with increased silt load and pollution). Completing construction during the winter months would mitigate the environmental impact. ○ The appropriate agency should implement an ongoing monitoring and eradication program for all invasive plant species growing on the site. ○ Any post-development re-vegetation or landscaping exercise should use species indigenous to South Africa. Plant species locally indigenous to the area are preferred. <ul style="list-style-type: none"> ● That the area be cleared of vegetation under guidance from an archaeologist to determine to extent of the stonewalling in the area. ● That once this has been done that the stonewalling be mapped and drawn and that limited archaeological excavations be carried out in order to recover cultural material and to date the sites. ● A Phase 2 archaeological mitigation permit from SAHRA be obtained for this investigation. ● An archaeological watching brief must be implemented during the construction phase. This watching brief is aimed at monitoring the construction and excavation work for any subterranean archaeological deposits and features which may be exposed during these development activities. The subterranean nature of cultural heritage 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 it should be noted that although all efforts are made to cover a total area during any assessment and therefore to identify all possible sites or features of cultural (archaeological and/or historical) heritage origin and significance, that there is always the possibility of something being missed. This will include low stone-packed or unmarked graves. This aspect should be kept in mind when development work commences and if any sites (including graves) are identified then an expert should be called in to investigate and recommend on the best way forward. 	<p>Consultants, contractor, ECO, ELO, project mgr</p>	<p>Initial set-up, Continuous, Monitor weekly</p>
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was therefore undertaken to provide a historic framework for the project area and surrounding landscape. This was augmented by a study of available maps and an assessment of previous archaeological and heritage studies completed for the area. The study area itself was assessed in the field by way of a walkthrough undertaken by one archaeologist (Anton Pelsler). The fieldwork resulted in the identification of some Later Iron Age stone-walled sites (some which have been identified during earlier assessments) and associated cultural material including undecorated pottery and an upper grinder.

13. HERITAGE (Paleontological):

The construction phase may potentially result in the loss of heritage resources buried beneath the surface.

A field assessment study was undertaken to provide a heritage framework for the project area and surrounding landscape. This was augmented by a study of available historical topographical sheets and an assessment of previous heritage studies completed for the area. The field study revealed that the study area is present on the Silverton Formation. The study area was assessed in the field by way of intensive walkthroughs undertaken

- If by chance fossil is uncovered during construction, the protocol is to immediately cease all construction activities, construct a 30 m no-go barrier and SAHRA (South Africa Heritage Resource Agency) must be notified immediately.
- An Environmental Control Officer (ECO) must be appointed to oversee the implementation of the Environmental Management Programme (EMPr) for the duration of the construction phase.
- The Environmental Control Officer must familiarise him- or herself with the formation present and its fossils and follow protocol. The ECO must survey for fossils before and or after clearing, blasting, drilling or excavating.
- A site visit is recommended after drilling, excavations and blasting and the keeping of a photographic record. A regular monitoring presence over the period during which excavations are made can be done during groundbreaking.
- The following mitigation may be needed (Appendix 2) if fossils are found i.e:
 - A Phase 2 Palaeontological Impact Assessment: Mitigation will include (SAHRA) -**
 1. Recommendations for the future of the site.
 2. Description and purpose of work done (including number of people and their

<p>by one paleontologist (Heidi Fourie). The fieldwork resulted in the identification of several outcrops. The impact of the proposed development on the located heritage sites was assessed, and it was established that the proposed development will have a Medium Impact Risk.</p>	<p>responsibilities).</p> <ol style="list-style-type: none"> 3. A written assessment of the work done, fossils excavated, not removed or collected and observed. 4. Conclusion reached regarding the fossil material. 5. A detailed site plan and map. 6. Possible declaration as a heritage site or Site Management Plan. 7. Stakeholders. 8. Detailed report including the Desktop and Phase 1 study information. 9. Annual interim or progress Phase 2 permit reports as well as the final report. 10. Methodology used. <p>Three types of permits are available; Mitigation, Destruction and Interpretation. The specialist will apply for the permit at the beginning of the process (SAHRA 2012). The Palaeontological Society of South Africa (PSSA) does not have guidelines on excavating or collecting, but the following is suggested:</p> <ol style="list-style-type: none"> 1. The developer needs to clearly stake or peg-out (survey) the areas affected by the mining (if applicable)/ construction/ development operations and dig representative trenches and if possible supply geological borehole data. 2. When clearing topsoil, subsoil or overburden and hard rock (outcrop) is found, the contractor / developer needs to stop all work. 3. A Palaeobotanist / palaeontologist (contact SAHRIS for list) must then inspect the affected areas and trenches for fossiliferous outcrops / layers. The contractor / developer may be asked to move structures, and put the development on hold. 4. If the palaeontologist / palaeobotanist is satisfied that no fossils will be destroyed or have removed the fossils, development and removing of the topsoil can continue. 5. After this process the same palaeontologist / palaeobotanist will have to inspect and offer advice through the Phase 2 Mitigation Process. Bedrock excavations for footings may expose, damage or destroy previously buried fossil material and must be inspected. 6. When permission for the development is granted, the next layer can be removed, if this is part of a fossiliferous layer, then with the removal of each layer of sediment, the palaeontologist / palaeobotanist must do an investigation (a minimum of once a week). 7. At this stage the palaeontologist / palaeobotanist in consultation with the developer / 		
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mining company must ensure that a further working protocol and schedule is in place. Onsite training should take place, followed by an annual visit by the palaeontologist / palaeobotanist.

Fossil excavation if necessary, during Phase 2:

1. Photography of fossil / fossil layer and surrounding strata.
2. Once a fossil has been identified as such, the task of extraction begins.
3. It usually entails the taking of a GPS reading and recording lithostratigraphic, biostratigraphic, date, collector and locality information.
4. Use Paraloid (B-72) as an adhesive and protective glue, parts of the fossil can be kept together (not necessarily applicable to plant fossils).
5. Slowly chipping away of matrix surrounding the fossil using a geological pick, brushes and chisels.
6. Once the full extent of the fossil / fossils is visible, it can be covered with a plaster jacket (not necessarily applicable to plant fossils).
7. Chipping away sides to loosen underside.
8. Splitting of the rock containing palaeobotanical material should reveal any fossils sandwiched between the layers.

SAHRA Documents:

Guidelines to Palaeontological Permitting Policy.

Minimum Standards: Palaeontological Component of Heritage Impact Assessment reports.

Guidelines for Field Reports.

Palaeotechnical Reports for all the Provinces.

Appendix 2: Table of Appendix 6 requirements.

Section in Report	Point in Act	Requirement
B	1(c)	Scope and purpose of report
B	1(d)	Duration, date and season
B	1(g)	Areas to be avoided
D	1(ai)	Specialist who prepared report
D	1(aii)	Expertise of the specialist
F Figure 3	1(h)	Map
B	1(ni)(niA)	Authorisation
B	1(nii)	Avoidance, management, mitigation and closure plan
G Table 1	1(cA)	Quality and age of base data
G Table 2	1(cB)	Existing and cumulative impacts

	D	1(f)	Details or activities of assessment		
	G	1(j)	Description of findings		
	H	1(e)	Description of methodology		
	H	1(i)	Assumptions		
	J	1(o)	Consultation		
	J	1(p)	Copies of comments during consultation		
	J	1(q)	Information requested by authority		
	Declaration	1(b)	Independent declaration		
	Appendix 2	1(k)	Mitigation included in EMPr		
	Appendix 2	1(l)	Conditions included in EMPr		
	Appendix 2	1(m)	Monitoring included in EMPr		
	D	2	Protocol or minimum standard		

4 OPERATIONAL FRAMEWORK EMPR

The potential positive and negative operational phase impacts identified and mitigation as part of the EIA include (i.e. as taken from the BAR) and are indicated underneath in TABLE 4. Also please refer to Section G of the BAR for further details on the impacts and assessment methodologies should it be required.

The information is summarised in tabular format illustrating the activity, aspect, impact, mitigation measure, performance indicators, resources, schedule and verification. These criteria are listed and explained below:

The following components are identified/ described in the following section which provides the Draft Operational EMPr which should be included in all contract documentation associated with the PROPOSED RESIDENCES to be situated on Portion 350 of the FARM THE WILLOWS 340-JR (City of Tshwane Metropolitan Municipality, Gauteng) with associated Civil Services infrastructure, and will accordingly be binding on the Contractor and Developer i.e:

- **Activity:** component/ activity of the project for which the impact has been identified;
- **Aspect:** the aspect of the above activity which will be impacted;
- **Impact:** the environmental impact identified and to be mitigated;
- **Mitigation measure:** measures identified for implementation in terms of environmental management to reduce, rectify or contain the identified environmental impact – mitigation is divided into the following:
 - **Objective:** desired outcome of mitigation measure,
 - **Mechanism:** method of achieving the objective;
- **Performance indicators:** outcomes that will indicate achievement of objective/s;
- **Responsibility:** party or parties identified for implementation of mitigation measure/s;
- **Resources:** available resources to aid implementation of mitigation;
- **Schedule:** timeframe in which identified impact and mitigation measure is anticipated to occur; and
- **Verification:** party or parties identified as responsible for review and assessment of final outcome.

Operational Phase Mitigation:

The following operational mitigation measures is applicable at all times in the operational phase regardless of any listed and/or unlisted criteria e.g. the activity, aspect, impact, mitigation measure, performance indicators, resources, schedule and verification i.e:-

Health and safety:

- All relevant Health and Safety legislation as required in South Africa should be strictly adhered to, including but not limited to the Occupational Health and Safety Act, 1993 (No. 85 of 1993);
- All necessary occupational certificates and inspections must be complied with to the approval of the City of Tshwane Metropolitan Municipality;
- The operational process must be compliant with all safety and health measures, listed in the EA.

Emergency plan & Incidents:

- An emergency response plan should be drawn up for the operational phase of the proposed development by the landowner (i.e. if required).
 - All pollution incidents must be reported and record(s) of environmental related incidents should be maintained and communicated to the landowner.
 - Training should be provided in the use of the appropriate fire-fighting equipment;
 - Ensure availability of fire extinguishers and firefighting technique (SABS 089-1-1987);
 - The landowner must co-operate closely with local fire authority to ensure that they know the layout of the site, what equipment and facilities are available, where they are located, and how they are used;
- and –
- Emergency/ contingency plans need to be put in place to ensure an understanding of the hazards and procedures required during an emergency situation.

PLEASE also refer to the following guidelines should you require assistance i.e:

- *'Guidelines on the administration of incidents, As described in section 30 of the National Environmental Management Act, 107 of 1998.'* – by the Department of Environmental Affairs, 2019. Environment House, 437 Steve Biko Road, Arcadia, Pretoria 0002. Hotline: 0800 205 005. Website: www.environment.gov.za

Effluent handling/ storm water management:

- Stormwater should be regularly tested (i.e. if required by the local authority) before entering the bulk stormwater lines, to ensure that the quality of stormwater out-flow complies to General Limit Values of the National Water Act (No. 36 of 1998) (NWA) as well as any Special Limit Values as possibly specified in the Bulk Services Agreement.

Waste and pollution management:

- An integrated waste management approach that is based on waste minimisation must be used and should incorporate reduction, recycling, re-use and disposal where EOH Coastal & Environmental Services 54 FERD appropriate (i.e. if required by the local authority).
- Any solid waste shall be disposed of at a landfill licensed in terms of section 20 (b) of the National Management Waste Act, 2008 (Act No. 59 of 2008) which is not the normal residential (i.e. household) waste stream removed by the municipality on a weekly basis.

This section contains the Operational Framework EMP table and it is important to note that this Framework Outlines the mitigation measures for the Operational Phase to be contained in the required authorisation of the proposed project and will be updated to include the conditions of authorisation that will be issued before any construction and/or operation of the development could occur:

SECTION 4: Operational Framework Environmental Management Programme Table (Table 6)

ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (Objective & Mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCE	SCHEDULE	VERIFICATION
All Activities & Facilities	Environmental management of the operational phase	Negative impacts on environment during operation	<p>Objective: To ensure that the operation of the activities and facilities does not result in avoidable impacts on the environment, and that any impacts that do occur are anticipated and managed.</p> <p>Mechanism: 1) Implement the operational phase management procedures outlined in the OEMP Framework. 2) Comply with all requirements of all permits, authorisations and/ or licenses received.</p>	Environmental impacts effectively monitored and managed during the operational phase with no residual impacts on the environment. Comprehensive record of compliance and remedial actions available to Owner and the authorities.	Owner	Environmental Management Procedure OEMP and the inspections of the consulting ecologist and landscape architect on a regular basis.	During operation	Owner and the authorities.
All Activities & Facilities	Site management ~ <i>Employment Impacts</i>	Impact of proposed job creation.	<p>Objective: To ensure employment opportunities are provided to locals.</p> <p>Mechanisms: 1) Provisions to provide jobs to local workers should be maximised. 2) Preferential procurement and hiring practices shall be implemented and monitored as part of Owner management activities.</p>	Employment provided to Locals i.e. where appropriate and possible.	Owner	OEMP	During operation	Owner and the authorities.
All Activities & Facilities	Site management ~ <i>Natural resources</i>	Negative impact on and/or loss of natural resources on site especially the: <i>Potential loss of: -</i>	<p>Objective: Avoid or minimise impact on natural resources on site – reduce significance</p> <p>Mechanisms: 1) Water used for drinking purposes, evaporative cooling and facilities washing purposes should be used sparingly and effectively i.e. high-pressure washing apparatus. 2) Water for washing purposes</p>	Environmental impacts effectively monitored and managed during the operational phase – Comprehensive record of water use and minimisation of waste.	Owner & environmental Professional e.g. ecologist and/or landscape architect.	OEMP	During Operation	Owner and the authorities.

		<p>1. TERRESTRIAL VEGETATION & FLORA BIODIVERSITY:</p>	<p>should be minimized and made environmentally non-hazardous i.e. friendly, through the use of appropriate biodegradable detergents and sanitizers with high-pressure nozzles to assist in cleaning.</p> <p>3) Dimmable energy-saving bulbs are being tried experimentally.</p> <p>4) Extra heating would only occur when needed in extreme winter conditions as well as cooling when needed in extreme summer conditions i.e. electricity should be used for heating & cooling purposes in a responsible way in only extreme circumstances.</p> <p>5) Alternative Energy systems should be explored and implemented e.g. Solar panels for electricity generation could be installed and used to reduce the reliance on electricity from ESKOM / Municipality.</p> <p>6) the proposed facilities should limit their activities strictly to the proposed new footprints. The unauthorised trespassing of visitors and staff onto the adjacent farmlands should be a concern and monitored closely.</p> <p>7) Consult and Implement the full Consult and Implement the full relevant specialist report i.e: (i.e. <i>'An assessment of vegetation, flora, vertebrate fauna and wetlands on Erf 350 of the Farm The Willows 340 JR, City of Tshwane, Gauteng. By G.J. Bredenkamp D.Sc. Pr.Sci.Nat. J.P.C. van Wyk M.Sc. Pr.Sci.Nat. C.E. Venter M.Sc. Pr.Sci.Nat. Commissioned by Pierre Joubert Landscape Architect and Environmental Planner [EcoAgent CC PO Box 25533 Monument</i></p>					
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			<p><i>Park 0181. Tel 012 4602525. Cell 082 5767046. March 2021J).</i></p> <ul style="list-style-type: none"> - upon which the following mitigation measures applies i.e: o The clearing of vegetation must be kept to a minimum and remain within the footprint development – leave the rest of the area with natural vegetation intact. o Leave all trees but remove alien invasive species wherever possible. o Disturbed open areas must be rehabilitated immediately after construction has been completed in that area by developing an indigenous garden by planting appropriate indigenous tree, grass and forb species. o Rehabilitated areas must be monitored to ensure the establishment of re-vegetated areas. o Adhere to the proposed management plan for Juliana’s Golden Mole. o Plant only indigenous trees – no alien species. o An alien invasive management programme must be incorporated into the Environmental Management Programme. o Ongoing alien plant control must be undertaken. o Areas which have been disturbed will be quickly colonised by invasive alien species. An ongoing management plan must be implemented for the clearing/eradication of 					
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		<p>2. MAMMALS & MAMMALS HABITAT:</p>	<p>alien species.</p> <ul style="list-style-type: none"> ○ Avoid planting of exotic plant species, use indigenous species. ○ Develop an indigenous garden. <p>NOTE: A registered ecologist and professional landscape architect with adequate experience should be appointed to assist with, plan, design and enforce, monitor and audit the planning, design, implementation and operational phases of the conservation of the sensitive ecological areas on site.</p> <ul style="list-style-type: none"> • The appropriate agency should implement an ongoing monitoring and eradication program for all invasive plant species growing on the site. • Any post-development re-vegetation or landscaping exercise should use species indigenous to South Africa. Plant species locally indigenous to the area are preferred. • Implementation of the management plan for Juliana's Golden Mole will improve mammal habitats in general and contribute to the conservation of these species i.e: <p><u>The following steps are recommended in order to maintain and increase the population numbers of Juliana's golden mole on the study site, it is suggested that:</u></p> <p>The areas where there will not be any development must be irrigated so that the soil remains moist, attracting more potential prey items to these areas. This will increase the probability that the</p>					
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			<p>Juliana's golden moles will migrate to these irrigated areas, away from the construction and storage areas.</p> <p><u>Stabilising the Juliana's golden mole population is dealt with on a general and a specific level.</u></p> <p>General actions: It is suggested that:</p> <ul style="list-style-type: none"> ○ the garden area be developed shortly after the construction of the residences has been completed. ○ A well-manicured and maintained, mainly indigenous garden to reflect the upmarket ambience of the entire facility be developed. ○ It is therefore strongly advised that the flower beds are composted on a regular and ongoing basis, to enhance the occurrence of subterranean invertebrate instars serving as food source for the golden moles. Increasing the organic content of the soil to a depth of 15cm will furthermore serve to loosen its texture and hence enhance mole occupation. ○ In addition, it is also suggested that flower beds are seeded with earthworms from time to time. ○ Indigenous grasses be used amply in the beds. ○ Planting of members of the legume family (pea family, Fabaceae) to bind atmospheric nitrogen. ○ Leave large areas with natural vegetation or re-establish natural vegetation. ○ LM grass is preferred to Kikuyu grass for a lawn. 					
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			<ul style="list-style-type: none"> ○ It is not anticipated that moderate use of inorganic fertilisers will have any effect on golden moles. ○ Irrigation is an important facet of maintaining the soft substrate. Regular irrigation is suggested throughout the year. ○ Use steppingstones rather than fully paved walkways to allow for mole tunnelling and dispersal. ○ Juliana's golden mole activity was also observed on the sidewalk area southeast of the service road and this area may not be used for a storage or dumping site. ○ That an Ecological Control Officer (ECO) be appointed as soon as operations commence. <p>Specific actions: As little as feasible paving must be laid and preferably no Kikuyu grass be planted. The soil in the garden must be carefully loosened, composted and seeded with earthworms, and Canada Green or LM grass planted. Irrigation to be installed and the site watered throughout the year. It is possible that resident golden moles may be unearthed during preparation of the substrate. In such cases the specimens can be released anywhere where there are no plans to construct houses.</p> <p>Operational phase: During this phase the homeowners should continuously be aware of the presence of the Juliana golden mole and take care to implement management action that will promote the golden moles existence. Monitoring of the study area for the</p>					
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			<p>continued existence of the golden mole would be important to determine the effect on the golden mole of the construction and later the occupation of the residences. The following is suggested:</p> <ul style="list-style-type: none"> ○ At the onset of the operational phase, the plains area of the site should be planned and developed as an indigenous garden to augment the atmosphere of the Wapadrand Country Estates and also enhance suitable habitat for Juliana's Golden Mole. ○ The ECO to cooperate with the landscape planner to select plants amenable to golden mole habitat prerequisites. ○ The remaining plains area should remain in a natural state, with measures to control all alien and invasive plant species. ○ Employees should be familiarised with the conservation measures implemented and their responsibility in this regard. ○ The ECO must interact with the gardener to ensure optimal development and maintenance of the study site. Suitable training in this regard is necessary. ○ The garden beds must be kept well-composted and moist by irrigation. ○ All garden areas must be inspected regularly to ensure that the soil is not compacted. Measures implemented to carefully loosen the soil ensuring that mole individuals are not killed accidentally. ○ The swimming pools must be regularly inspected to ensure rescuing of golden moles that accidentally fell into the pool. ○ Planting indigenous species in the gardens and development of an indigenous garden will enhance habitats for mammals. 					
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		<p>3. AVIFAUNA & AVIFAUNA HABITAT:</p>	<p>Consult and Implement the full relevant specialist report i.e: (i.e. 'An assessment of vegetation, flora, vertebrate fauna and wetlands on Erf 350 of the Farm The Willows 340 JR, City of Tshwane, Gauteng. By G.J. Bredenkamp D.Sc. Pr.Sci.Nat. J.P.C. van Wyk M.Sc. Pr.Sci.Nat. C.E. Venter M.Sc. Pr.Sci.Nat. Commissioned by Pierre Joubert Landscape Architect and Environmental Planner [EcoAgent CC PO Box 25533 Monument Park 0181. Tel 012 4602525. Cell 082 5767046. March 2021]).' - upon which the following mitigation measures applies i.e:</p> <ul style="list-style-type: none"> ○ Disturbance by residents of birds breeding and foraging in the area should be minimized and controlled. ○ Great care must be taken that no pollutants or other waste pollute the area or enter local water systems. Measures to rapidly deal with spills of fuel, cleaning chemicals or any other potential pollutants must be put in place before construction commences. ○ Facilities to handle pollution and waste must be provided to residents. ○ Normal safety measures for electrical installations as used by Eskom. 					
		<p>4. HERPETOFAUNA & HERPETOFAUNA HABITAT:</p>	<p>Consult and Implement the full relevant specialist report i.e: (i.e. 'An assessment of vegetation, flora, vertebrate fauna and wetlands on Erf 350 of the Farm The Willows 340 JR, City of Tshwane, Gauteng. By G.J. Bredenkamp D.Sc. Pr.Sci.Nat.</p>					

			<p>J.P.C. van Wyk M.Sc. Pr.Sci.Nat. C.E. Venter M.Sc. Pr.Sci.Nat. Commissioned by Pierre Joubert Landscape Architect and Environmental Planner [EcoAgent CC PO Box 25533 Monument Park 0181. Tel 012 4602525. Cell 082 5767046. March 2021]).' - upon which the following mitigation measures applies i.e:</p> <ul style="list-style-type: none"> o The appropriate agency should implement an ongoing monitoring and eradication program for all invasive plant species growing on the site. o Any post-development re- vegetation or landscaping exercise should use species indigenous to South Africa. Plant species locally indigenous to the area are preferred. <p>NOTE: A registered ecologist and professional landscape architect with adequate experience should be appointed to assist with, plan, design and enforce, monitor and audit the planning, design, implementation and operational phases of the conservation of the sensitive ecological areas on site.</p>					
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5 DECOMMISSIONING

It is highly unlikely that decommissioning should be proposed in the near future.

However, should decommissioning of the proposed township be proposed the following minimum measures should be implemented i.e.

1. Areas and routes should be demarcated where demolishing and other vehicles may move in order to minimise impact on surrounding natural veldt. Care should be taken to avoid disturbance to any potential riparian or wetland areas.
2. A soil and vegetation rehabilitation specialist should be appointed to recommend the best rehabilitation methodology and provide supervision.
3. After the removal of the facilities, foundations and concrete slabs, the underlying compacted soil should be ripped and the stockpiled topsoil replaced.
4. Seed from the surrounding natural veldt areas should be collected, treated and sown onto the area, together with a non-invasive annual plant such as oats, in order to provide some protection to germinating seed.
5. Materials will be recycled where appropriate and any hazardous substances e.g asbestos must be removed and disposed of following the requirements of relevant legislation.
6. Materials used, and its associated infrastructure would need to be disposed of at an approved landfill site.

6 CONCLUSION

In conclusion it should be noted that the EMPr should be regarded as a living document and changes should be made to the EMPr as required by project evolution while retaining the underlying principles and objectives on which the document is based.

The compilation of the EMPr has incorporated impacts and mitigation measures from the PROPOSED RESIDENCES to be situated on Portion 350 of the FARM THE WILLOWS 340-JR (City of Tshwane Metropolitan Municipality, Gauteng) BAR as well as incorporating principles of best practice in terms of environmental management.

By identifying the impacts, mitigation measure, performance indicators, responsibilities, available resources, potential schedule, and verification responsibility the EMPr has provided a platform on which the planning & design phase (i.e. certain specified aspects), construction phase and the operational phase EMPr's can be founded. The EMPr has ensured that the individual EMPr's will be able to incorporate mitigation measures based on the project in its entirety as opposed to phase specific measures.

**APPENDIX 1:
LOCALITY PLAN, SITE PLANS, FACILITY
ILLUSTRATIONS & 'NO-GO' AREAS.**

Figure 1: Locality Plan of the Site: Portion 350 of the FARM THE WILLOWS 340-JR (City of Tshwane).

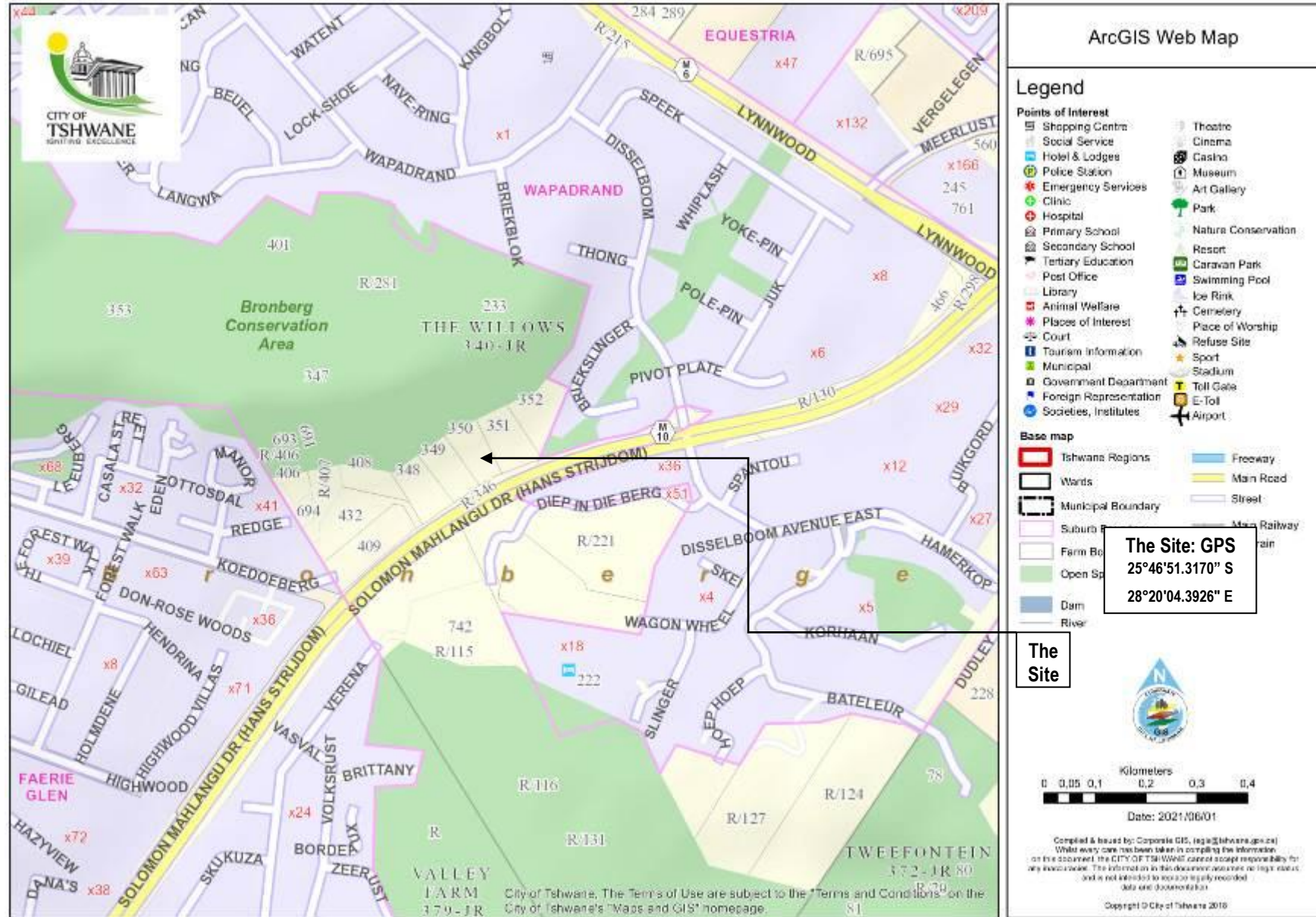


Figure 2: Aerial Photo of the site & other related information.

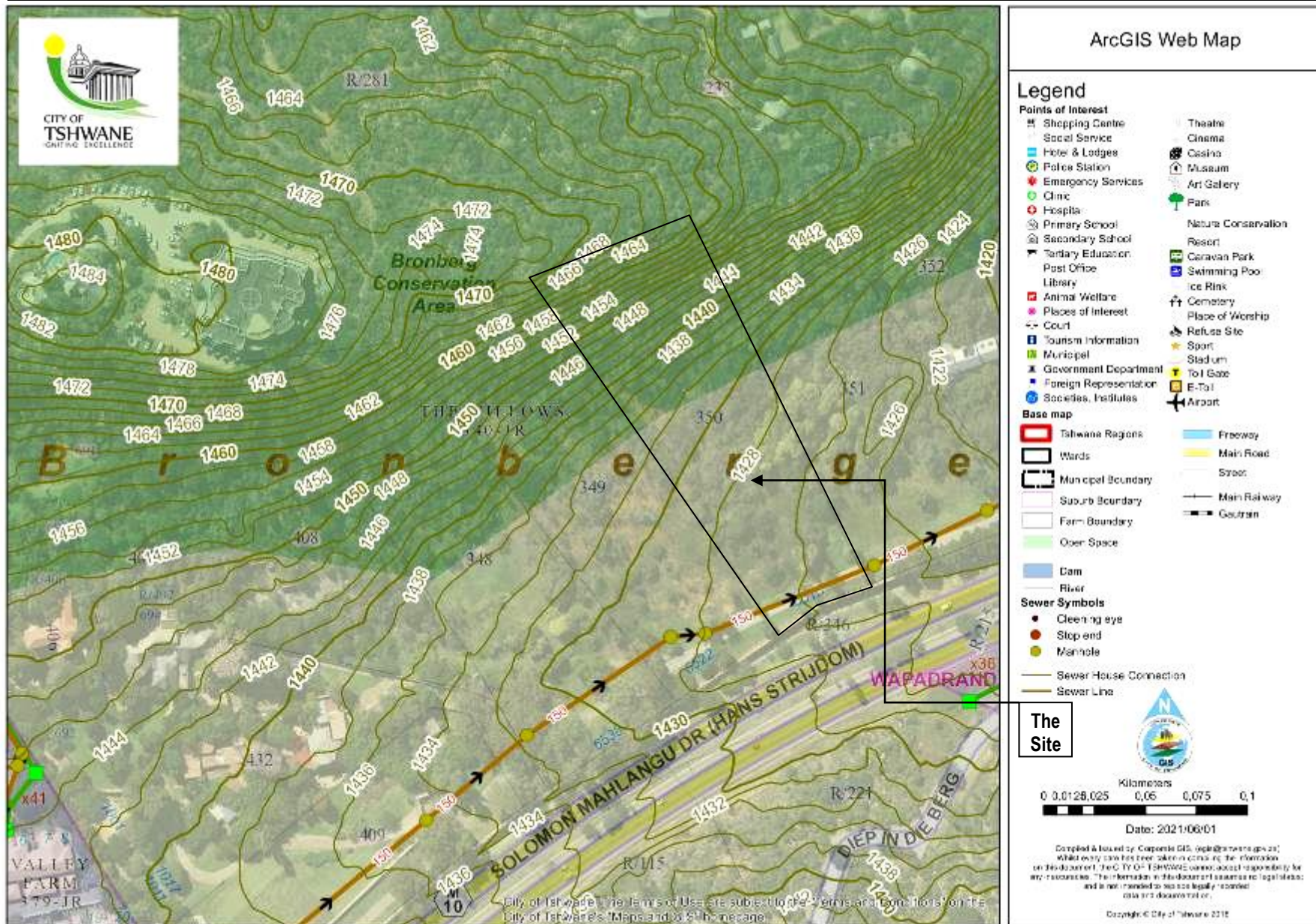


Figure 3: PROPOSAL: SITE LAYOUT PLAN of the PROPOSED RESIDENCE on Portion 350 of the FARM THE WILLOWS 340-JR (City of Tshwane Metropolitan Municipality, Gauteng).

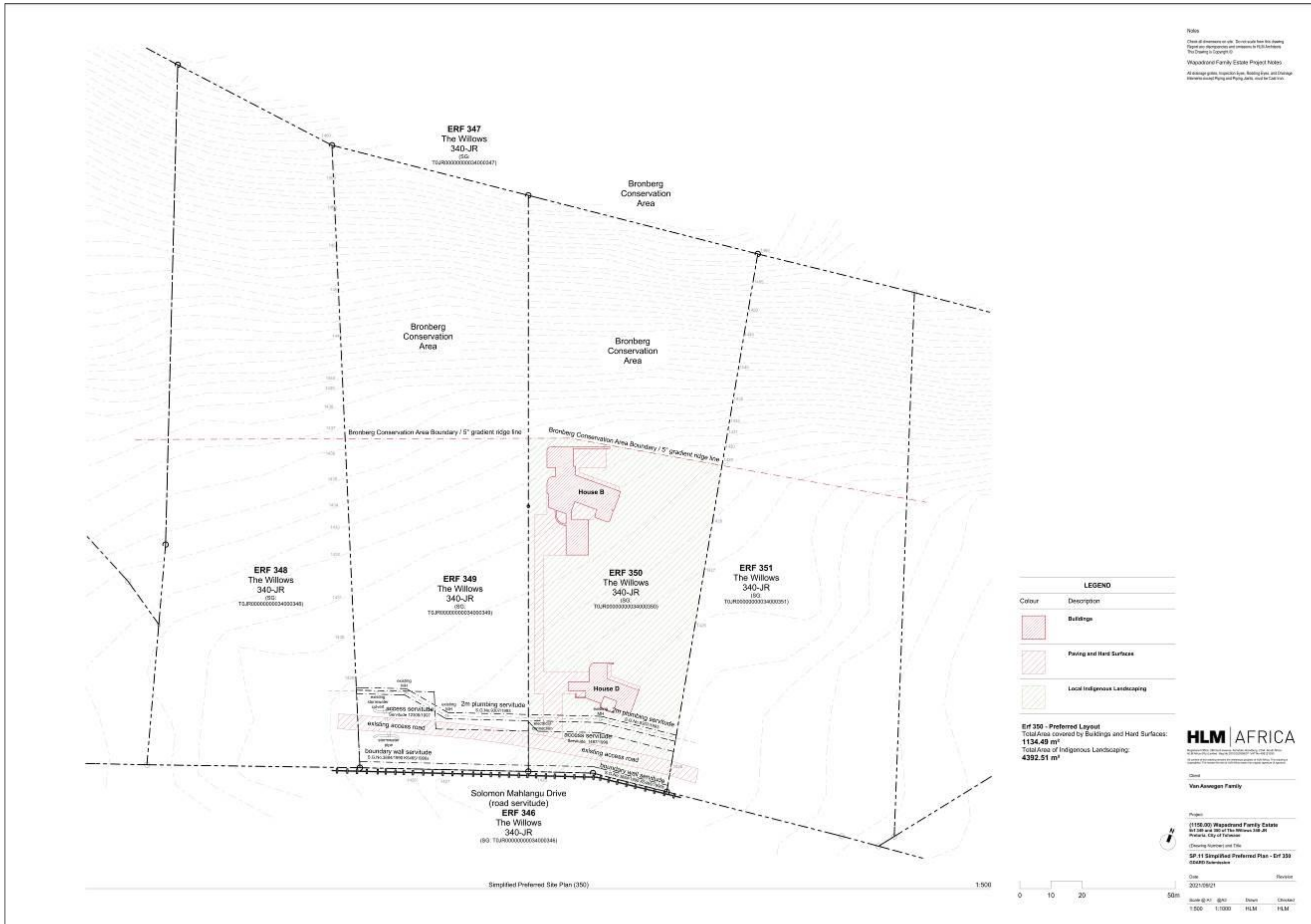


Figure 4: SITE LAYOUT PLAN with SENSITIVITY MAP & 'NO-GO' AREA of the PROPOSED RESIDENCE on Portion 350 of the FARM THE WILLOWS 340-JR (City of Tshwane Metropolitan Municipality, Gauteng).

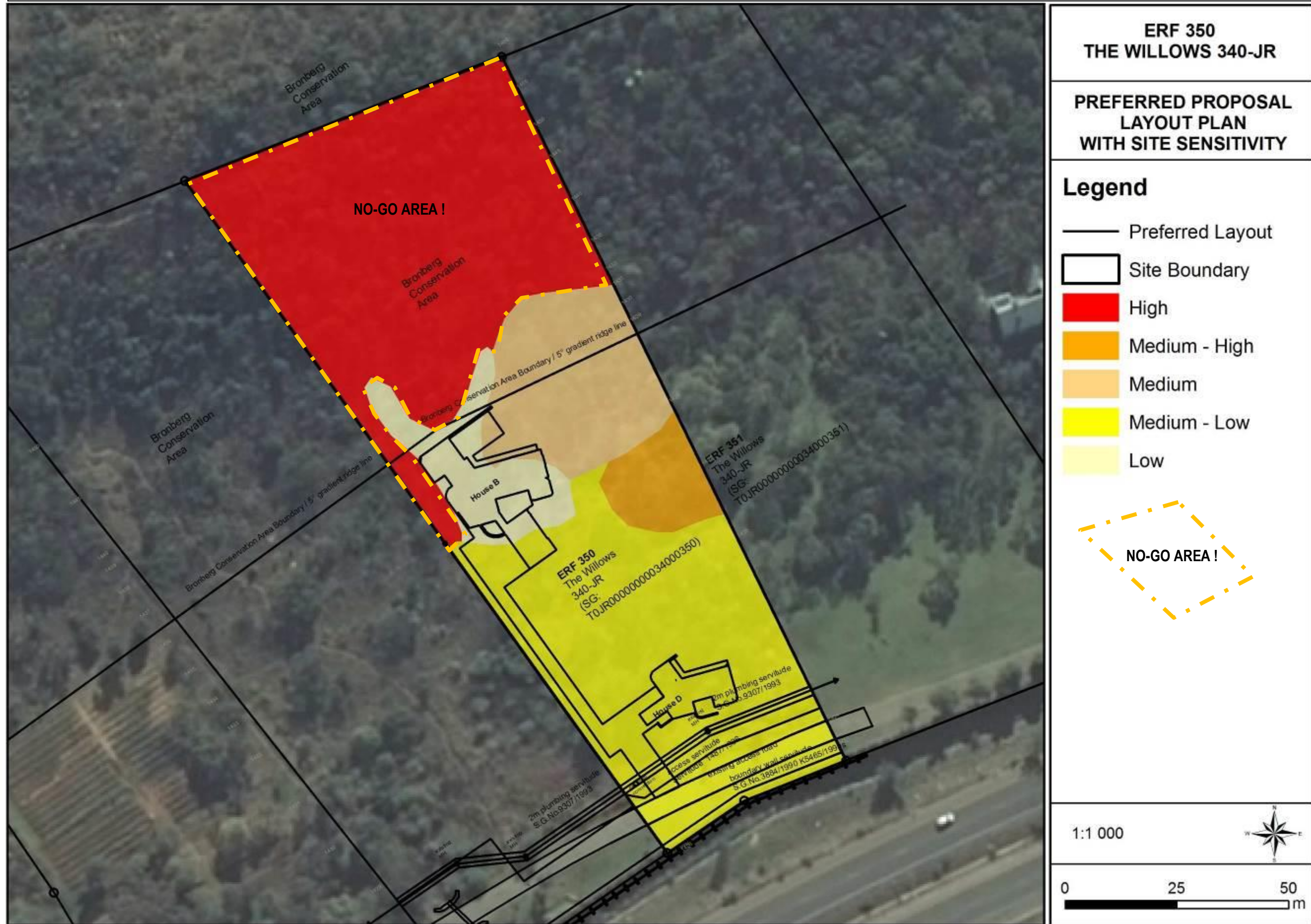


Figure 5: PROPOSAL: FACILITY ILLUSTRATION (Architect) of the PROPOSED RESIDENCE on Portion 350 of the FARM THE WILLOWS 340-JR (City of Tshwane Metropolitan Municipality, Gauteng).



APPENDIX 2: METHOD STATEMENT TEMPLATE

METHOD STATEMENT

CONTRACT: **DATE:**

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

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

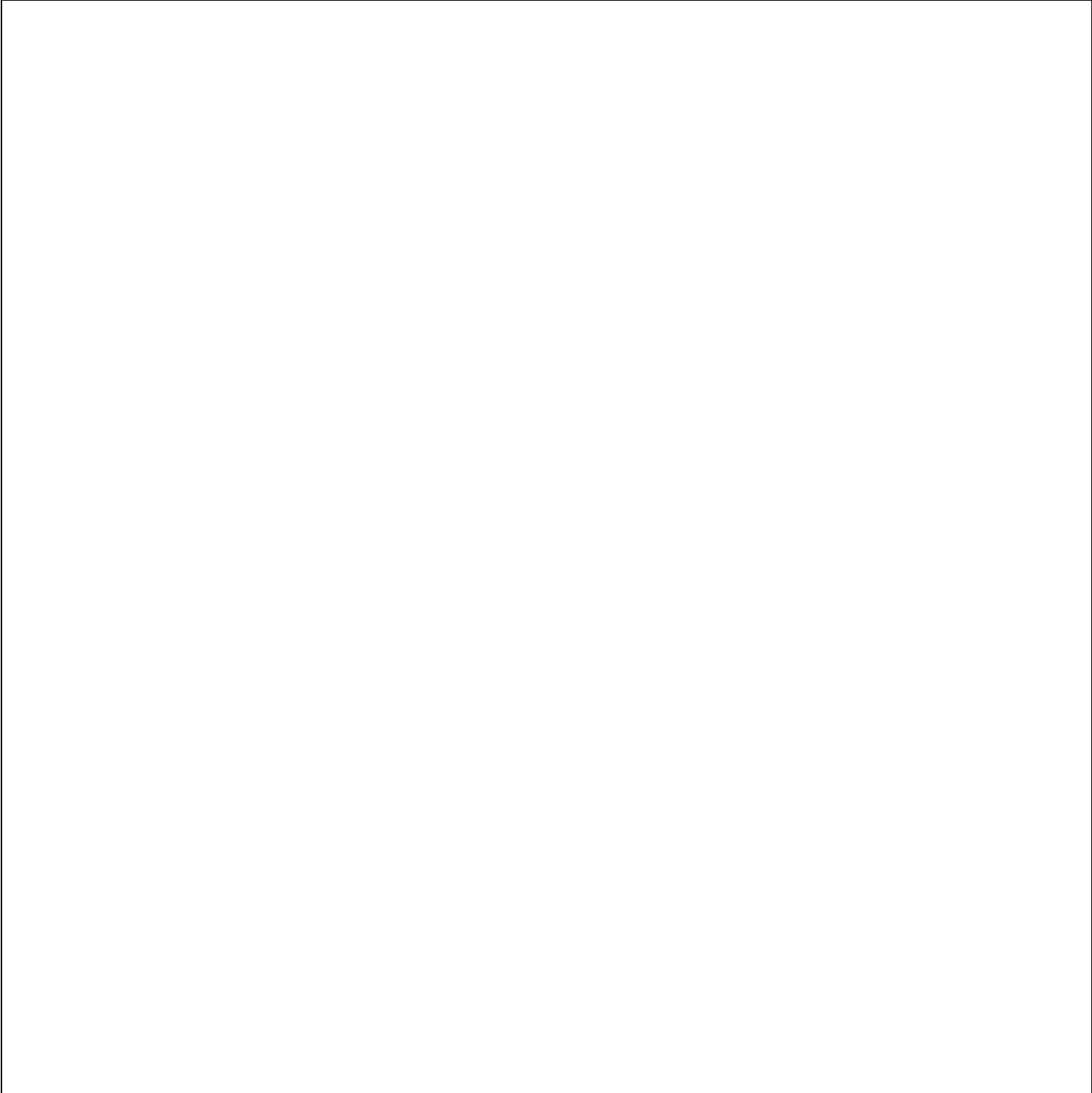
WHERE ARE THE WORKS TO BE UNDERTAKEN (where possible, provide an annotated plan and a full description of the extent of the works):

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

Start Date:

End Date:

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



** Note: please give too much information rather than too little. Please ensure that issues such as emergency procedures, hydrocarbon management, wastewater management, access, individual responsibilities, materials, plant used, maintenance of plant, protection of natural features etc are covered where relevant*

DECLARATIONS

1) RESPONSIBLE OFFICER (EO/ ESO)

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

(signed) (print name)

Dated: _____

2) PERSON UNDERTAKING THE WORKS

I understand the contents of this Method Statement and the scope of the works required of me. I further understand that this Method Statement may be amended on application to other signatories and that the EO/ ESO will audit my compliance with the contents of this Method Statement. I understand that this method statement does not absolve me from any of my obligations or responsibilities in terms of the Contract.

(signed) (print name)

Dated: _____

3) EMPLOYER (i.e. ASSOCIATION/ Owner)

The works described in this Method Statement are approved.

(signed) (print name) (designation)

Dated: _____

APPENDIX 3: *Curriculum Vitae* of Environmental Assessment Practitioner

