ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)

for

Portion 71 of the Farm Knopjeslaagte 385 J.R.
within the City of Tshwane, Gauteng Province.
[Peach Tree Extension 26]

DRAFT FOR PUBLIC REVIEW

Applicant:

Generator Finance (Pty) Ltd

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April 2018

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GLOSSARY

Environmental Management Programme (EMPr)

The EMPr is an action plan that deals with the measures required to mitigate and manage impacts and needs to detail mitigation measures and roles and responsibilities (GN 654, 29 June 2010). This EMPr will be included as Appendix H of the BAR and submitted to GDARD for Environmental Authorisation (EA). Upon approval, this document will be used for site environmental compliance during the construction- and operation phase of the project.

Environment

In terms of the National Environmental Management Act [NEMA], (1998) Act No. 107 of 1998 as amended, 'environment' is defined as the *environment in which humans exist* and that is made up of

(i) Land, water and atmosphere of the earth;

(ii) Micro-organisms, plant and animal life;

(iii) Any part of combination of (i) and (ii) and the interrelationships among and between them;

(iv) Physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.

Rehabilitation

Rehabilitation is defined as the return of a disturbed area to a state which approximates the state, as far as possible, which it was before disruption. Rehabilitation should aim to accelerate the natural succession processes so that the plant community develops in the desired way (Henning, van Eden, Pienaar, 2009).

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ABBREVIATIONS

(That may have been used or referenced in the document)

BAR	-	Basic Assessment Report
DWS	-	Department of Water and Sanitation
EA	-	Environmental Authorisation
EAP	-	Environmental Assessment Practitioner
ECO	-	Environmental Control Officer
EMPr	-	Environmental Management Programme
GDARD	-	Gauteng Department of Agriculture and Rural Development
MSDS	-	Materials Safety Data Sheets
NEMA	-	National Environmental Management Act, 1998
NWA	-	National Water Act, 1998
OHSA	-	Occupational Health and Safety Act, 1993
PPE	-	Personal Protective Equipment
REG	-	Regulation
SABS	-	South African Bureau of Standards
SANS	-	South African National Standards
SAHRA	-	South African Heritage Resources Agency
SEA	-	Strategic Environmental Assessment
SUDS	-	Sustainable Urban Drainage Systems
WSUDS	-	Water Sensitive Urban Design
WUL	-	Water Use License

LIST OF APPENDICES

Specialist Reports

- Ecological Habitat Assessment Report; and
- Heritage Impact Assessment Report.

Note: Appendices to be attached to the EMPr for distribution once construction commences. For the purposes of review and authorisation by GDARD, appendices have been attached to the BAR, under the relevant sections.

1. Introduction

1.1. Project Background and Description

Generator Finance (Pty) Ltd is proposing to develop a residential township on Portion 71 of the Farm Knopjeslaagte 385 JR (hereinafter referred to as 'the study site') within the City of Tshwane Metropolitan Municipality, Gauteng Province.

The proposed configuration of the proposed development encompasses the following:

- Erven zoned Residential 1 (one dwelling per erf) = approximately 5,5 Ha;
- Erven zoned Residential 3 (FSR 0.5; Height 2 Storeys) = Approximately 3,5 Ha;
- Erven zoned Private Open Space, including a Clubhouse and Recreational Uses = Approximately 0,8 Ha;
- Erven zoned Private Road = Approximately 3 Ha;
- Erf zoned for Private Road for Access and Access Control = approximately 1 Ha;
- Proposed Streets and Widening = Approximately 1,2 Ha.

A Basic Assessment application are required for the proposed residential development as this development triggers the following activities under the EIA Regulations, 2017:

Listing Notice 1 (GN R 983 of 4 December 2014) [as amended]:

Activity 27: The proposed development is located outside an urban area and will require the removal of indigenous vegetation of an area of more than 1 hectare.

Activity 28: The study area is currently used for agricultural purposes and will be developed for residential land uses.

Listing Notice 3 (GN R 985 of 4 December 2014) [as amended]:

Activity 4: The study area is located within Critical Biodiversity Areas (Irreplaceable and Important) as identified by the Gauteng Conservation Plan V 3 and will require the development of roads wider than 4 metres.

Activity 12: The study area is located within Critical Biodiversity Areas (Irreplaceable and Important) as identified by the Gauteng Conservation Plan V 3 and will require the removal of indigenous vegetation of greater than 300 square m.

In terms of Heritage Resources, Prism EMS have also applied for a Heritage License under the **National Heritage Resources Act [NHRA], 1999 (Act no. 25 of 1999):**

- For Heritage Impact Assessments as required in Section 38(8) of the NHRA.

1.2. Project Location

The site is situated adjacent to and east of the M26 municipal road (K46 / P39-1), west of the Copperleaf Golf and Country Estate, approximately 1,5 km north of R511 provincial road intersection, within Region 4 of the City of Tshwane. The entire development footprint measures 14, 1607 Ha.

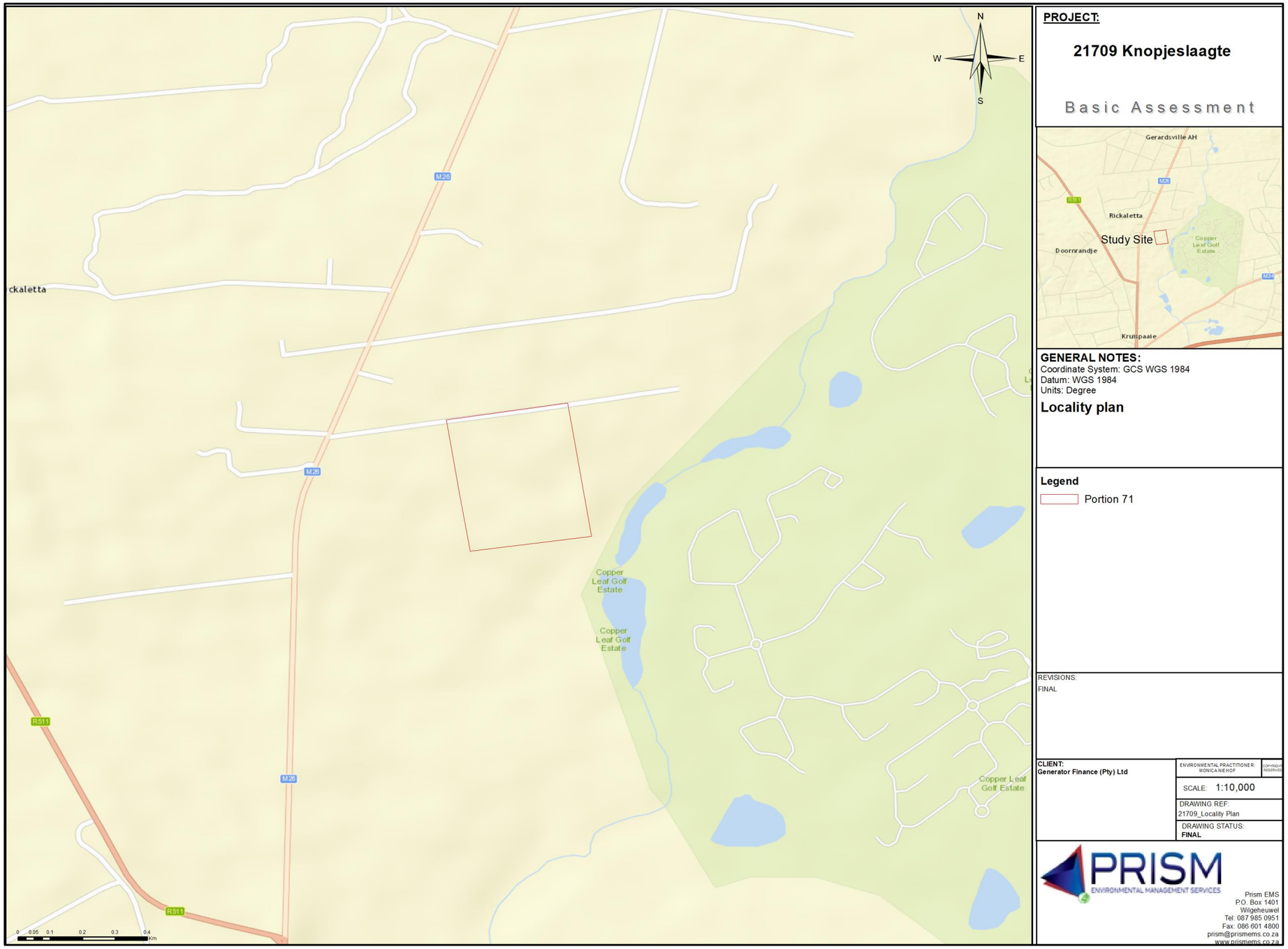

Figure 1: Locality map indicating the proposed development

1.3. Details of the Applicant

Table 1: Applicant Details

Name of Applicant	Generator Finance (Pty) Ltd
Contact Person	Mr Tinus Steenkamp
Postal Address	Postnet Suite 160, Private Bag X26, Steenberg, 7945
Telephone	021 701 2400
Email	Stoney61@gmail.com

1.4. Details of the EAP

In terms of the National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998), an independent Environmental Assessment Practitioner (EAP) is responsible for the coordination of environmental studies and to present the findings of all studies and information in a Basic Assessment Report and Environmental Impact Assessment Report, which is subject to a review process by all stakeholders.

Prism Environmental Management Services (Prism EMS) has been appointed as the independent environmental consultant to conduct the Basic Assessment process for the proposed Knopjeslaagte Residential Development, in terms of the NEMA, as amended and the Environmental Impact Assessment Regulations, 2017 (as amended on 7 April 2017).

Prism is a multi-disciplinary Environmental Management consultancy, established in 2005. With a vision encompassing a holistic understanding of integrated environmental management in marriage with sustainability, the company prides itself on excellent service and value-added solutions to a range of clients / Applicants. The Prism EMS team has extensive experience in environmental impact assessment and management. The team has conducted a diverse range of impact assessments for a wide range of projects throughout South-Africa.

Prism is independent and has no vested interest in the outcome of the environmental authorization applications.

The Principle Environmental Assessment Practitioner (EAP) responsible for this project is **De Wet Botha**. De Wet holds a Master's Degree in Environmental Management from the University of Johannesburg (UJ) (former RAU). He has more than **15 years'** experience consulting in the environmental field. De Wet is a founder member of EAPASA and a member of IAIAsa and Gauteng

Wetland Forum. His key focus is on strategic environmental assessment and advice, management and coordination of Environmental Impact Assessments (EIAs) and projects. The integration of environmental specialist studies into EIAs and Environmental Management Plans (EMPs) also forms part of his role. He has extensive knowledge and experience in the aquatic field, in specific wetland assessments, as well as associated Water Use Licenses (WULs). He is currently working on several Environmental Impact Assessment (EIA)'s and acts in an advisory role on major projects. He also forms part of the specialist aquatic team.

Prism EMS was appointment by the developers to attend to the required applications for environmental authorisation from the various and relevant government departments.

This Environmental Management Programme (EMPr) forms part of the submission documents in support of the Basic Assessment application and will be used for Environmental Auditing purposes throughout the construction phase of the project.

1.5. Applicable Documents

The following documents should be read in conjunction with this EMPr, as same is applicable to the project:

- The Basic Assessment Report (BAR); and
- Specialist reports that informed the Environmental Impact Assessment (EIA).
- The Environmental Authorisation pertaining to the project, issued by the Gauteng Department of Agriculture and Rural Development (GDARD) *(pending)*.

1.6. EMPr Administration

Copies of this EMPr must be kept at the site office at all times. Copies thereof must be distributed to all senior contract personnel. All senior personnel involved in the construction and operation of the new development and must familiarise themselves with the content of the EMPr.

A detailed induction protocol, incorporating the conditions of the EMPr and associated Environmental Authorisation, must be developed and all contractors and future permanent staff must be subjected to stringent training on these environmental (bio-physical and socio-economic) requirements and responsibilities.

It should also be noted that the EMPr will be updated if / when the Environmental Authorisation is released, and should it contain additional mitigating measures.

2. Legal Framework

The following environmental legislation was identified as being relevant to this project:

- National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998), amended;
- Environmental Impact Assessment Regulations, 2014 and amendments to the Listing Notices GN R 324, 325, 326 and 327 of 7 April 2017;
- National Heritage Resources Act (NHRA), 1999 (Act No. 25 of 1999); and
- National Water Act (NWA), 1998 (Act No. 36 of 1998).

Other legislation, which has been considered in the assessment of the proposed project is:

- National Environmental Management: Biodiversity Act (NEM:BA), 2004 (Act No. 10 of 2004);
- National Environmental Management: Air Quality Act (NEM:AQA), 2004 (Act No. 39 of 2004);
- Conservation of Agricultural Resources Act (CARA), 1983 (Act No. 43 of 1983); and
- Hazardous Substances Act (HAS), 1973 (Act No. 15 of 1973);

3. General Roles and Responsibilities

Although various parties are involved in the project, the most important, from an environmental responsibility perspective are the following:

- Regulatory Authorities:
    - The Gauteng Department of Agriculture and Rural Development (GDARD);
- Applicant:
    - The Developer (Generator Finance (Pty) Ltd;
    - Project Manager (Contractor).
- Independent Consultants:
    - The Environmental Control Officer (ECO); and
    - Sub-contractor(s).

a. Gauteng Department of Agriculture and Rural Development (GDARD)

Due to the location and nature of the activity, the GDARD is the designated authority tasked with assessing and considering the Environmental Authorisation (EA), as well as comment and possible approval of the EMPr.

Upon the granting of the EA, the Developer/Applicant will be responsible to appoint an ECO. It will be the responsibility of this ECO to assess environmental compliance of construction activities. Audit reports compiled by the ECO, as well as external audits done by an independent ECO, shall be submitted to the Department for their information and record purposes.

b. The Developer / Applicant

As contained in the relevant South African environmental legislation (NEMA, 1998) the Applicant / Employer is responsible and liable for the potential impact of the activities that are undertaken and is responsible for managing these impacts. The Applicant, as the employer, holds the overall environmental responsibility to ensure that the implementation of the EMPr complies with all relevant legislation, and conditions as stipulated by the EMPr.

c. Project Manager (Contractor)

The Developer / Applicant must identify a Project Manager who has overall responsibility for managing the Project Contractors and for ensuring that the environmental management requirements are met. During the construction phase, the Project Manager could be appointed as the Developer's / Applicant's construction manager; during the operations phase this role might be fulfilled by the operations manager. All decisions regarding environmental procedures and protocol must be approved by the Project Manager, who also has the authority to stop any construction activity in contravention of the EMPr.

The project manager:

- will be responsible to ensure the developer's and the contractor's responsibilities are executed on site, in terms of the relevant legislation and in compliance with the EA and EMPr.
- must appoint a suitably qualified ECO for the construction phase of the project.
- is responsible for ensuring all contractors receive a copy of this document and understand its contents.

- must be familiar with the requirements, mitigating measures and stipulations as per the relevant compliance documents.
- has the right to enforce penalties as per Section 4.
- Is responsible for any on-site decisions in respect of environmental management.
- Will be responsible for the following responsibilities, *inter alia*:
    - Ensuring that all required authorisations and permits have been obtained.
    - Reviewing and approving method statements compiled by the Contractor.
    - Assisting the Contractor in finding environmentally sensible solutions to problems, with input from the ECO where necessary.
    - Instruct the removal of persons and / or equipment not complying with the EMPr and facilitate correction of issues of non-compliance to ensure rectification.

d. Environmental Control Officer (ECO)

The ECO must be competent in the field of environmental management and hold at least one related qualification pertaining to interpretation and implementation of South African environmental laws, conservation or environmental management. The appointment of an ECO will remain with the developer at the start of the construction phase.

The ECO will be appointed by the developer and will be audited monthly, or alternatively, at the start and end, and one assessment mid-way through the project.

The ECO will:

- be conversant with the requirements, stipulated mitigating measures as per the relevant compliance documents, the EMPr.
- be responsible for implementation and, through the project manager, enforcement of the conditions of this EMPr and the Environmental Specifications included herein, throughout the construction phase of the project.
- ensure that all contractors, sub-contractors and employees are fully aware of their environmental responsibilities. This will take the form of an initial environmental awareness training programme in which requirements of this document will be explained.
- monitor site activities on a regular basis to ensure that there is minimal environmental impact due to construction activities.
- Ensure regular communication between the Project Manager and the Construction Manager on site should be maintained.

- determination and enforcement of environmental “no-go” areas in consultation with site management staff and related to haul and access roads on and off-site, site storage and accommodation areas.
- ensure that a ‘hotline’ exists for reporting incidents and resolving any problems speedily.
- will have access to the site and all activities occurring thereon, with due regard for all safety requirements. The ECO shall furthermore have unrestricted authority to order restriction or control measures over any activity which is contradictory to the EMPr, the Environmental Authorisation and the mitigating measures as included in Specialist Studies, through the appropriate site management structures.
- update the EMPr as necessary and inform the relevant parties of the changes.
- conduct a final or close-out environmental audit.
- on a regular, *ad hoc*, basis will inspect the site where construction might be in progress and / or where rehabilitation of an area might have commenced.

e. Contractor(s)

The contractor(s) in this case refers to any sub-contractor onsite, including the building contractor(s) and various sub-contractors appointed within each phase or section of the construction of the proposed residential development. All contractor(s) employed by the developer in respect of any aspect of the construction of the proposed development, will be bound by all and any agreement between the developer and the contractor, to ensure compliance with the Environmental Authorisation (EA), mitigating measures included in the Specialist Studies, as well as this EMPr.

The contractor will:

- take full responsibility for each of his / her employees.
- be familiar with the contents of the EMPr and the specifications contained herein;
- comply with the Environmental Specifications contained in the EMPr and subsequent revisions.
- confirm to legislative requirements for the construction works, and ensure that appropriate permissions and permits have been obtained before commencing activities;
- prepare Method Statements, programme of activities and drawings / plans for submission to the ECO when requested.
- undertake daily site inspections to monitor environmental performance and compliance with the Environmental Specifications.
- notify the ECO immediately in the event of any accident or infringements of the Environmental Specifications and ensure appropriate remedial action is taken;

- notify the ECO in advance of any activity he has reason to believe may have significant adverse environmental impacts, with specific reference to blasting, so that mitigatory measures may be implemented timeously.
- use the formats presented in this EMPr to report to the PM as to the compliance with this document.

4. Penalties

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

- A record of penalties will be maintained within the procurement department and may influence later commissions awarded to the contractor.
- The following, *inter alia*, represents a list of offences that could result in penalties:
    - Silt fences not installed as per EMPr where silt enters the environment unchecked and / or soil erosion is uncontrolled.
    - Insufficient sedimentation ponds which allows silt to enter the environment unchecked.
    - Inadequate and poor dust control.
    - Illegal activities.
    - On-going, repeated non-conformances.
    - Damage to no-go areas, specifically and most importantly, topsoil and the riparian buffer-zones.
    - Failure to provide adequate waste disposal certificates.

5. Reporting

5.1 Lines of Communication (Reporting)

Open and clear lines of communication shall be established and maintained between the contractor and any further parties to be appointed by the applicant (e.g. Independent ECO, etc.).

5.2 Compliance Monitoring

The contractor is to ensure that employees and all sub-contractors onsite are familiar with the requirements of the EMPr and conditions stipulated in the relevant environmental authorisations (i.e. NEMA EA) issued for the project. Therefore, the contractor should implement a management system reviewing compliance to these.

The applicant must appoint an internal, permanent ECO on site who will be monitoring the site and submitting monthly monitoring reports to the applicant.

Monitoring reports are to be sent to the relevant authorities by the Applicant/Developer or the appointed independent ECO, as per the specific requirements set in the project's environmental authorisations.

5.3 Communication with Authorities

Only the Applicant / Developer and the appointed independent ECO are to liaise with Authorities, except if the contractor must report Occupational Health and Safety incidents / accidents to the Department of Labour.

f. Particular Incidents

5.4.1 Incidents Reporting

The contractor is to conduct incident investigations immediately after occurrence. If an incident is identified as being a major incident, the contractor is to inform the applicant without delay.

The contractor is to ensure all employees are made aware on the relevant incident reporting procedures. The contractor must ensure that all relevant appointments are in place. An Incident Register must be kept on site and up to date at all times.

5.1.2 Legal Non-Compliance

Any legal non-compliance which may have a significant detrimental impact on the environment must be reported by the Developer / Applicant to the relevant Authority within 24 hours, unless otherwise stipulated.

5.1.3 Non-Compliance with Conditions

Any legal non-compliance that may have a significant detrimental impact on the environment with conditions stipulated in any Authorisation / License / Permit, to be reported by the applicant to the relevant Authority within 24 hours, unless otherwise stipulated.

5.5 Compliance Monitoring

Compliance monitoring will be done against, *inter alia*:

- Conditions of the EA;
- The EMPr;
- Specialist Reports;
    - Ecological Habitat Assessment
    - Heritage Assessment

- Applicable Environmental Legislation:
    - National Environmental Management Act, 1998 (Act No. 107 of 1998);
    - National Heritage Resources Development Act, 1999 (Act No. 25 of 1999);
    - National Water Act, 1998 (Act No. 36 of 1998);
    - Occupational Health and Safety Act, 1993 (Act No. 85 of 1993); and
    - National Road Traffic Act, 1996 (Act No. 93 of 1996)
- Occupational Health and Safety Act, 1993 (Act No. 85 of 1993)
    - Regulation 1031; and
- Procedures and policies prescribed and amended from time to time by the applicant.

The responsibilities in terms of **Environmental Compliance Monitoring** are as follows:

- The Developer / Applicant will be responsible for the appointment of a suitably qualified independent Environmental Control Officer (ECO) for the construction phase of the project.
- A management team must be appointed to ensure compliance with the Environmental Management Programme (EMPr) during the operational phase.
- The PM will be responsible to ensure all contractors receive a copy of this document and understand its contents.
- The ECO will ensure that all contractors / subcontractors / employees are fully aware of their environmental responsibilities.
- Contractors must ensure that all the environmental and safety precautions contained in the Environmental Authorisation, mitigating measures included in the Specialist Studies as well as this EMPr are adhered to, at all times.
- Compliance monitoring will take place by means of regular site visits and reporting by the ECO, for onwards transmission to the applicant and the relevant Government Departments (GDARD and SAHRA) for their information and record keeping.

6. Environmental Management Programme (EMPr)

g. Description of Receiving Environment

The study site is in quaternary catchment A21B in the old Crocodile (West) and Marico Water Management Area (WMA 3), now Limpopo (WMA 1). The study area falls within the Grassland Biome (Biome 06), and the Highveld Level-1 Ecoregion (Ecoregion 11) (Kleynhans et al., 2005).

The study area is surrounded by the Copperleaf Golf Estate, residential developments in various stages of development and agricultural small holdings. A stream is located to the east of the study area.

The proposed development site falls within an area with fragmented grasslands. Surrounding land uses include roads, residential areas and a golf course. The majority of the study area is disturbed, especially the northern section, consisting of buildings, modified vegetation and maize fields. Exotic Pine and Eucalyptus trees occurs in the northern section and along the boundaries of the site.

The grassland area occurring in the centre of the study area has an overall floral status of 'good', occurs within an endangered veld type (Egoli Granite Grassland) and according to the Gauteng C-plan the grassland vegetation is classified as 'important areas' and could therefore, be a possible important migratory corridor. However, only nine of the several grass species associated with Egoli Granite Grassland were observed in the study area and therefore this grassland is not seen to be representative of Egoli Granite Grassland. Therefore, the area of natural grassland observed on the proposed development site is considered to have a low-medium sensitivity.

Eight plant species occurring on the list of SANBI Red List of South African Plants, of conservation concern have a possibility of occurring on the study area due to habitat requirements. Four of the eight species have a threatened status. Only one mammal species of conservation concern, the *Atelerix frontalis* (Southern African Hedgehog) occurring on the 2016 SANBI Red List of Mammals of South Africa, Lesotho and Swaziland, possibly occur on the proposed development site, based on habitat requirements. The national conservation status of the *Atelerix frontalis* (Southern African Hedgehog) is Near Threatened, which is classified as a species of conservation concern, but not a threatened species, in the Mammal Red Data List, 2016.

The less disturbed southern section has two small rocky outcrops that are covered by the same species that are found in the surrounding grasslands. These rocky outcrops, together with a small area containing *Boophone disticha* were considered to be of medium sensitivity (refer to Figure 2).

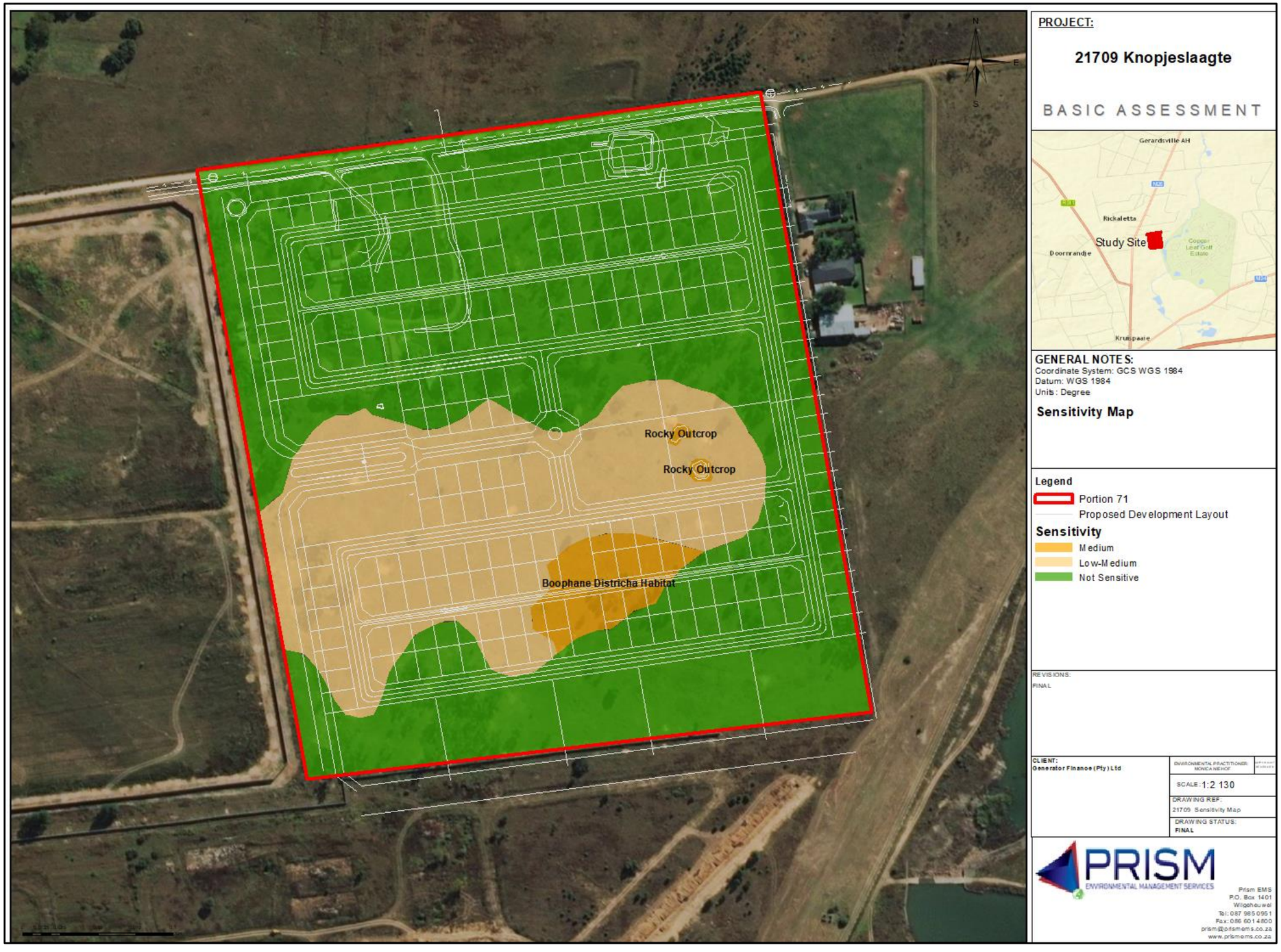

Figure 2: Site Sensitivity Map

h. Key Objectives of the EMPr

- To mitigate any possible negative impacts identified in the EMPr for the construction and operational phases of the proposed development;
- To minimise the area of disturbance by demarcating the construction and green zone areas;
- Preserve flora and fauna;
- Preserve topsoil for optimal rehabilitation and landscaping following construction;
- To ensure effective communication with stakeholders and regulatory authorities;
- To ensure good housekeeping practices and general neatness on site;
- To monitor the construction activities in terms of the EMPr and approved designs;
- To manage and control the formation of erosion;
- Control pollution to the receiving environment, both during the construction and operational phases;
- To ensure that environmental awareness programmes are enforced throughout the construction phase; and
- The timeframes for site audits are suggested as follows:
    - Site establishment phase – daily audits.
    - Construction phase – weekly site visits, bi-weekly reports and monthly compliance audits. Construction closure audit is required prior to the operational phase
    - Decommissioning phase – site closure audit to be conducted.
- Following each site visit an audit report must be compiled to relay any non-compliance issues that need to be addressed, as well as compliance matters.

i. Impact Mitigation Measures – Construction Phase

6.1.1 Primary Overarching Impacts

Table 2: Pre-construction

Activity	Mitigating Measure	Responsible Party
Sensitive vegetation	1. The proposed rescue and relocation plan for the red data listed plant species, *Hypoxis hemerocallidea* and *Boophone disticha,* found on the proposed development site to be implemented prior to site camp establishment.	Contractor / ECO Qualified Specialist
Existing buildings onsite	1. The age of the structures should be confirmed and if greater than 60 years of age, a destruction permit will be required from the PHRAG.	Developer / Applicant

Table 3:Site Camp Establishment

Activity	Mitigating Measure	Responsible Party
General Site Camp Establishment	1. Site establishment is to be undertaken within a demarcated area. 2. Camps must not be established within any 1:100-year floodline areas or within the environmentally sensitive areas / buffers as indicated by the Ecologist specialist (Figure 2). 3. No accommodation for workforce onsite, except a security presence. 4. Open fires are prohibited onsite. 5. No smoking allowed outside of designated areas. 6. Erosion protection measures should be linked to the crossing section and carefully designed and installed.	Contractor / ECO

Activity	Mitigating Measure	Responsible Party
Facilities at the Site Camp	1. Potable water must be made readily available to all construction staff. 2. Chemical toilets must be made available within the site camp. 3. Chemical toilets are to be provided by the Contractor, at a ratio of 1:10. 4. Chemical toilets must be erected within 100m from all workplaces outside buffer areas. 5. Chemical toilets are to be secured to the ground and must have a closing mechanism. 6. Toilet paper must be provided at these facilities. 7. Certified contractors to maintain and remove chemical toilets regularly, at least once weekly. 8. The contractor must ensure that leaks and spillage do not occur when toilets are cleaned / serviced 9. Discharge and disposal of waste into the environment and / or burial of waste are strictly prohibited. 10. Dedicated wash areas to be situated at least 100m away from buffer areas may be utilised. 11. Areas demarcated for eating must be cleaned on a daily basis, to ensure the highest possible standard of hygiene. 12. Washing must be done in an area designated as a washing area. 13. Wash water must be diverted to the oil trap	Contractor Contractor
Surrounding / adjacent Private Properties	1. Maintain an open channel of communication for surrounding stakeholders to raise comments and concerns by having a complaint register onsite. 2. Trespassing onto adjoining properties is prohibited at all times.	Contractor

Activity	Mitigating Measure	Responsible Party
	3. Damages affected to any private or public property must be repaired immediately and to the satisfaction of the owner. 4. Wastewater may not be discharged freely off site (surrounding streets or into naturally vegetated areas). 5. No littering may take place on the adjacent properties.	
Workshop Area	1. A method statement for 'workshop maintenance and cleaning of plant' must be prepared. 2. All vehicle and / or equipment maintenance must be done in the workshop area, equipped with a bund wall and grease trap oil separator. 3. Any spills from the workshop area must be cleaned immediately and remediated to the satisfaction of the ECO and PM. 4. Emergency spill kits must be available on site at all times.	Contractor / ECO

Table 4: Environmental Training

Activity	Mitigating Measure	Responsible Party
General training of all staff on site	1. Environmental awareness training is to be provided to all persons working on site (Toolbox talks, demo's and/or media attention). 2. Topics to be covered include, *inter alia*: • Reason for conservation and protection of the environment (EMPr objectives) • Identified impacts of construction activities on the environment. • Mitigation measures (as contained in Section 6 of EMPr) in respect of these impacts. • Emergency spills, awareness thereof and response there to. • Hydrocarbon spills and clean-up procedures. • Potential environmental emergencies. • Various sections of the EMPr. • Roles and Responsibilities. 3. Attendance registers and training material must be filed for every session. 4. Training must be given prior to commencement of construction regarding safety for dealing with wild animals such as snakes, scorpions etc.	ECO/PM/Contractor

Table 5: Fauna and Flora Management

Activity	Mitigating Measure	Responsible Party
General Fauna and Flora Management at the construction site	1. Cement slabs, paving and other hard surfaces will only be removed if specifically instructed to. 2. Areas not earmarked for construction activities must be clearly demarcated with barrier tape, or similar to prevent vehicular movement in these areas. 3. Areas that require vegetation clearance must be undertaken in accordance with the ECO to ensure biodiversity is maintained and sensitive areas not disturbed. 4. Prior to the start of construction, woody vegetation matter shall be stripped, collected and disposed of at an authorised disposal site. 5. Alien, invasive species found within the construction area should be eradicated as far as possible and disposed of at an authorised disposal site. 6. No trees / vegetation outside the construction area to be damaged / removed in any manner, for any reason. 7. Non-invasive indigenous flora should be used where required. 8. Cleared wood / vegetation is prohibited from being used as burning wood or for any other purpose. 9. Demarcated areas identified as no-go areas should be maintained, under consultation with the ECO. 10. The feeding or leaving of food for stray or wild animals in the area is strictly prohibited. 11. No animals may be hunted, trapped, disturbed or poached. 12. Identified nesting and breeding sites for birds and mammals must be avoided at all costs.	Contractor

Activity	Mitigating Measure	Responsible Party
General Fauna and Flora Management at the construction site *(continued)*	13. Should fauna be encountered during site clearance or during construction activities, earthworks shall cease immediately, until such fauna have been safely relocated. 14. Photographs of sensitive plants and animals must be displayed in the construction camp to heighten awareness.	Contractor / ECO

Table 6: Soils

Activity	Mitigating Measure	Responsible Party
Topsoil	1. A methodology sketch plan of the working areas for the storage of topsoil, movement of plant and subsoil storage must be approved prior to construction. 2. The ECO must document the management of topsoil via photographic evidence during the construction phase. 3. Stockpiles must not exceed 2m in height and contained. 4. All topsoil must be removed and stockpiled on site at a height not exceeding 1,5m to ensure that microbial activity and other biota within the topsoil mass, remain viable. 5. Stripping and stockpiling must not occur during rainfall to prevent compaction. 6. The slopes of soil stockpiles shall not have a vertical / horizontal gradient exceeding 1:1.5. 7. Clearance of topsoil to be done immediately prior to work commencing in the subject area. 8. Topsoil should not mix with construction rubble and no vehicle movement is allowed onto or in the area immediately surrounding the stockpiles. 9. Under no circumstances must topsoil and subsoil be mixed during stripping. 10. Ripping must be done at 250mm in 2 directions, at right angles. Topsoil must be placed in the same soil zone from which it has been stripped. 11. Topsoil stockpiles must be monitored for invasive exotic vegetation growth. 12. Remediation, where required to be done in consultation with the ECO. 13. Stockpiles are to be stabilised if signs of erosion are visible.	Contractor

Activity	Mitigating Measure	Responsible Party
Topsoil *(continued)*	14. Stockpiles must not be handled more than twice, once for piling and a second time for rehabilitation. 15. Dust suppression on stockpiles older than 2 months is required, with either water or biodegradable chemical agent.	Contractor
Soil Erosion	1. Instability and erosion of steep slopes must be stabilised immediately. Re-vegetation in consultation with landscape architect and ECO should be done if required. 2. To reduce the loss of material by erosion, disturbance must be kept to a minimum. 3. If clearing of slopes occur within the rainy season, earth berms must be created along the up-slope side of the construction area. 4. Where possible, natural vegetation should be retained to reduce the risk of erosion. 5. Should erosion occur due to negligence on the part of the Contractor to apply the above measures, the Contractor will be responsible for reinstatement of the eroded area to its former state at his own expense. Any surface-water pollution occurring as a result of this negligence will be cleaned up by the Contractor or a nominated clean up organisation at the expenses of the Contractor.	Contractor / ECO

Table 7: Stormwater and other watercourses found on site

Activity	Mitigating Measure	Responsible Party
Stormwater Management	1. The design of stormwater management system should be based on Sustainable Urban Drainage Systems (SUDS) and Water Sensitive Urban Design approach (WSUDS) which enhance natural drainage through permeable surfacing and which integrate landscaping with stormwater in line with best practice stormwater management 2. Stormwater should be allowed to drain into the area that it originally fell on to, as far as possible to retain the original orientation. 3. Increased run-off during construction should be managed using berms, temporary cut-off drains, attenuation ponds or other suitable structures, in consultation with the ECO and resident Engineer. 4. Cut off drains may not cause additional harm to environment. Care must be taken to consider their position and the receiving environment. 5. The Contractor is to ensure that excessive amounts of sand, silt and silt-laden water do not enter the stormwater system and / or natural watercourses found along the length of the construction line. 6. Run-off containing high sedimentation loads must not be released into natural or municipal drainage systems. 7. Silt fences must be used to stabilise the site, reduce erosion and silt entering the natural environment. No unchecked silt may enter the natural environment. 8. Silt fences must be fit for purpose, effective and regularly maintained.	Contractor

Activity	Mitigating Measure	Responsible Party
Stormwater Management (*continued*)	9. The contractor must submit a methodology statement for approval by the ECO and Project Manager prior to starting work for the installation of silt fences. 10. Stormwater management system is to be installed as soon as possible following site establishment, to attenuate stormwater during the construction phase, as well as during the operational phase (if applicable). 11. Surface- and stormwater to be directed away from trenches and areas of excavation. 12. The contractor is to provide a methodology for the settling ponds prior to commencement of works. Failure to install adequate settling ponds will amount to a penalty. 13. Any surface water pollution occurring as a result of this negligence will be cleaned up by the Contractor or a nominated clean up organisation at the expenses of the Contractor.	Contractor

Table 8: Sites/Buildings of Cultural or Heritage Value

Activity	Mitigating Measure	Responsible Party
Unearthing of Artefacts	1. Should any artefacts, or items that could be identified as having cultural or heritage value, be unearthed during excavations, work should immediately cease. 2. SAHRA, as well as the ECO, must be informed of the find within 24 hours and should be involved in the removal of these if required.	Contractor
Protection of natural features	1. Prohibit painting, defacing, marking or damage of nature features i.e. rock formations to occur.	Contractor

Table 9: Waste Management

Activity	Mitigating Measure	Responsible Party
Solid Waste and Waste Management	1. Compile a waste management plan: a. Areas where waste bins are to be provided, will be identified. b. Waste bins will be provided at all eating areas, office containers {on site and at the site camp, storage containers, small plant store, flammable and chemical store, employee camp (compound) and at the entrance gate (security guard shelter)}. c. An adequate number of waste bins will be provided for the site. d. The amount of waste bins on site will increase to correspond with the rising number of employees as the contract progresses. e. Waste bins will be of a weatherproof type (prevent rain from penetrating the bin), have a lid to prevent wind and animals access to the waste.	Contractor

Activity	Mitigating Measure	Responsible Party
	2. Area as identified in consultation with the ECO onsite will be utilised for the temporary management of various waste streams, i.e. general refuse, construction waste (wood and metals scrap) and contaminated waste. Location of such areas will seek to minimise the potential for impact on the surrounding environment, including prevention of contaminated runoff, seepage and vermin control. 3. Where possible, construction and general waste on-site will be reused or recycled. Bins and skips will be available on-site for collection, separation and storage of waste streams (such as wood, metals, general refuse, plastic, paper etc.) A recycling plan will be developed. Hydrocarbon waste will be contained and stored in sealed containers within an appropriately bunded area and disposed / recycled at a registered hazardous waste site facility. 4. Hazardous waste and surplus dangerous goods will be kept to a minimum and will be transported by approved waste transporters to sites designated for their disposal. 5. Uncontaminated waste will be removed at least weekly for disposal; other wastes will be removed for recycling / disposal at an appropriate frequency. 6. All solid waste shall be disposed of by a certified contractor, off-site, at a registered landfill site. The Contractor shall supply the ECO with a certificate of disposal for auditing purposes. 7. The mixing of general waste and hazardous materials is not permitted. Waste separation needs to occur before waste is placed in waste skips.	

Activity	Mitigating Measure	Responsible Party
	8. Litter (from outside the camp included) and concrete bags etc. must be collected and put into suitable closed bins on a daily basis. 9. Construction rubble must be disposed of at an authorised disposal site. 10. General wastewater on site to be collected and disposed of at a registered communal facility. 11. Waste to be disposed of at an authorised landfill site. 12. The area will be bermed to prevent dispersal by wind and rain. 13. Waste certificates will be kept on record. 14. Hazardous waste to be removed by certified waste contractor. A copy of the certificate of registration of hazardous waste transporter to be kept onsite and occurrences of collection on file	

Table 10: Health and Safety

Activity	Mitigating Measure	Responsible Party
Safety of Workers on Site	1. The Contractor must provide a method statement for 'Safety Measures', 'Standard Operating Procedures', and 'First Aid' to be adhered to on site. 2. A Health and Safety Plan (in terms of the OHSA, 1993) must be compiled and must be available on site, at all times. 3. An Incident Record of Health and Safety incidents must be kept on site and up to date. 4. Incidents must be reported to the ECO and the PM immediately. 5. Machinery and equipment must be maintained in a safe operating condition.	Contractor

Activity	Mitigating Measure	Responsible Party
	6. A First Aid Kit must be available at every site, where work / construction is in progress. A First Aid Representative should also be available. 7. Stockpiled material to be secure to prevent injury. 8. Personal Protective Equipment (PPE) must be made available to all construction workers and must be compulsory. 9. Hard hats and safety shoes must be worn at all times. 10. Dust masks and ear plugs as and when required. 11. No person must be allowed to enter the site without the required PPE. 12. Regular noise spot sampling should be undertaken in areas where construction is taking place to ensure that the noise levels are within required limits.	
Safety of Work Area	1. Trenches, uncovered manholes and other excavated areas must be cordoned off and clearly demarcated. 2. Warning signs must be adequate and clearly visible to inform of hazardous areas. 3. Firefighting equipment must be placed in prominent positions and must be distributed over the entire site. 4. Fire Hydrants must be in full, working condition and must include fire extinguishers, a sand buckets and fire beaters, if required and needed. 5. Emergency contact numbers for all Emergency services must be available and prominently displayed on a signage board that is clearly visible. 6. Each site responsible person to have the necessary emergency contact numbers on hand.	Contractor Contractor

Table 11: Construction Materials and Hazardous Materials (Hazmat)

Activity	Mitigating Measure	Responsible Party
Fuel, Oil and Chemicals	1. The Contractor must provide method statements for the 'Handling and Storage of Oil and Chemicals', 'Fire' and 'Emergency Spill Procedures'. 2. Staff who will be handling Hazmat must be trained to do so responsibly. 3. Fuel, Oil and Chemicals must be confined to specific and secured areas within the construction camp, in terms of and as per specifications of the OHSA, 1993. 4. Confinement areas (at construction camp) must be imperviously bunded with adequate containment to prevent pollution, even during periods of high rainfall. 5. Storage tanks earmarked to store chemicals or hydrocarbons must be placed in bunded areas and capacity must be 110% the total volume of the hazardous product to be stored. 6. Empty (used) cement bags must be collected and stored in weatherproof containers. 7. Hydrocarbon spills, will be treated in situ by means of a spill kit. 8. Any major hydrocarbon spills should be reported to the GDARD and DWS and a remediation plan should be submitted within 24 hours or as instructed by the regulatory authority. 9. Contaminated soils will be treated as hazardous up until such time as these have been remediated. 10. All areas earmarked for storage of chemicals and / or hydrocarbons will be clearly marked and MSDS's will be available. 11. No vehicle maintenance may take place on site; only in designated areas.	Contractor

Activity	Mitigating Measure	Responsible Party
	12. Drip trays must be placed under all vehicles when immobile. 13. Drip trays must be of a sufficient size and volume to catch any hydrocarbons that might leak from a stationary vehicle. 14. Spill kits must be available on site and in all vehicles that transport hydrocarbons for dispensing to other vehicles on the construction site. 15. Spilled substances must be contained in impermeable containers for removal to a licensed hazardous waste disposal area. 16. Contaminated wastewater to be contained. 17. Significant spills should be reported to the PM or CM who should report this to the relevant authority.	
Building Materials	1. Portland cement or white cement is considered a “hazardous chemical” under OHSA, Act 85 of 1993 Reg. 1179. Cement should not be allowed to spread to the surrounding environment. 2. Cement, concrete and chemicals must be mixed on an impermeable surface to prevent contamination of the receiving environment. 3. Provisions to contain spills onto soil must be made. 4. Runoff from batching areas shall be strictly controlled, and water containing cement-residue shall be collected, stored and disposed of at registered disposal site. 5. Contaminated soil must be contained and disposed of off-site at a registered landfill site. 6. Storage tanks earmarked to store hazmat must be placed in bunded areas and capacity must be 110% the total volume of the hazardous product to be stored.	Contractor

Activity	Mitigating Measure	Responsible Party
	7. Empty (used) cement bags must be collected and stored in weatherproof containers to prevent air pollution by cement dust and water contamination through stormwater run-off.	

Table 12: Safety and Security

Activity	Mitigating Measure	Responsible Party
Security and Safety	1. Security personnel and skeleton staff will be housed on site, unless it is authorised in the Environmental Authorisation for site staff. 2. Prohibit the usage of alcohol on site. 3. Prevent casual entrance into the works area 4. Cordon off the works area with a boundary fence. 5. ECO and Contractor to ensure that only authorised personnel are on site at all times.	Contractor

Table 13: Noise

Activity	Mitigating Measure	Responsible Party
Construction Activities	1. Noise levels shall be limited with due care to residents in urban, peri-urban and rural areas, as well as workers in the industrial area. Incidences to be reported in the complaints register. 2. Silencer units on plant and vehicles shall be maintained in good working order. 3. All construction equipment, including vehicles, will be properly and appropriately maintained in order to minimise noise generation.	Contractor

Activity	Mitigating Measure	Responsible Party
	4. Operations must be restricted to hours of 06:00 and 18:00 on weekdays to prevent undue noise disturbance. 5. Construction noise will be managed according to the Noise Control Regulations and SANS 10103.	

Table 14: Vehicles & Access

Activity	Mitigating Measure	Responsible Party
Smoke, Dust and Gasses Control	1. A speed limit of 20km/h to be maintained on all dirt roads. 2. Dust suppression by means of either water or biodegradable chemical agent is required. 3. The first dampening must commence with the start of work daily and the second watering to commence no longer than four hours later. During exceptional circumstances additional dampening may be required should the watering not be deemed effective by the ECO. The ECO will determine the nuisance and health issues in considering this recommendation. 4. Haul vehicles moving outside the construction site carrying material that can be wind-blown will be covered. 5. All vehicles and other plant should comply with road worthy requirements and comply with legislation in terms of allowable emissions. 6. All reasonable measures should be taken to minimize air emissions in the form of smoke, dust and gases. Burning or incineration of any material on-site will be prohibited.	Contractor
Site Roads and Access	1. Routes for temporary access, lay down areas, turning areas, additional soil storages outside of the working strip and haul roads shall be located within	Contractor / ECO / PM

Activity	Mitigating Measure	Responsible Party
Site Roads and Access *(continued*)	prior approved demarcated areas and vehicle movement shall be confined to these roads and areas. 2. Movement of vehicles outside the designated working areas shall not be permitted without approval from the ECO. 3. Access to the site shall be controlled and restricted to the contractor. 4. Planning of temporary access roads to the site, over areas that need to be cleared to facilitate same, must be done in conjunction with the ECO, the PM and the land owner. 5. Authorised clearing of access roads must be done under the supervision of the ECO. 6. Access roads for earthmoving equipment must be clearly demarcated and positioned as close as possible to the proposed construction area. 7. No driving off the marked roads is permitted, and designated parking areas must be identified and demarcated with applicable signage. 8. Neither the site nor the access roads must be allowed to be used for recreational activities. 9. Should construction vehicle traffic lead to compacting of soil, soil must be deep ripped to loosen compacted layers. 10. Designated access to the proposed site will be created to ensure safe entry and exit. 11. Signage will be established at appropriate points warning of turning traffic and the construction site (all signage to be in accordance with prescribed standards).	Contractor / ECO / PM

Activity	Mitigating Measure	Responsible Party
Site Roads and Access *(continued*)	12. All vehicles travelling on public roads will adhere to the specified speed limits and all drivers will be in possession of an appropriate valid driver's license.	

Table 15: Social Environment

Activity	Mitigating Measure	Responsible Party
Local Community	1. Road rehabilitation should take place as and when required, to ensure minimum inconvenience to other road users (where applicable). 2. Construction vehicles are to use only the designated roads. 3. Damage to infrastructure shall not be tolerated and damage is to be repaired immediately. 4. The Contractor shall assist the PM with responding to queries and complaints from the public by: a. documenting details and submitting the information to the PM for inclusion in the complaints register; b. bringing any such matters to the attention of the PM immediately as they arise and taking any remedial action as per the PM's instruction. 5. Any work on landowner property that is not within the approved working area, must have a written agreement from the landowner concerned. These agreements may not allow for illegal activities such as borrow pits, creation of dams etc.; 6. All disturbance areas to be rehabilitated. 7. A Public Complaints register will be kept on site for any public complaints and updated frequently.	Contractor / PM

Activity	Mitigating Measure	Responsible Party
Workforce	8. Local residents (including females) are to be offered unskilled job opportunities where possible. 9. Workers will have a formalised forum through which they can make inputs into the overall management of the project (e.g. a workplace committee).	Contractor / ECO / PM

Table 16: Recommendations by Heritage Specialist (Refer to Appendix G of Basic Assessment Report)

Activity	Mitigating Measure	Responsible Party
During the construction phase activities resulting in disturbance of surfaces and / or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological material or objects.	1. A Chance Find Procedure[#] should be incorporated into the EMPr should any sites be identified during the construction process. 2. If any graves are in discovered they should ideally be preserved in-situ or alternatively relocated according to existing legislation.	Contractor / ECO

Chance Find Procedures[#]

The possibility of the occurrence of subsurface finds cannot be excluded. Therefore, if during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped, and a qualified archaeologist must be contacted for an assessment of the find and therefor chance find procedures should be put in place. A short summary of chance find procedures is discussed below. This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting procedures to ensure compliance with this policy and its associated procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below.

- If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.
- It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area.
- The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA.

Table 17: Recommendations by Ecological Specialist (Refer to Appendix G of Basic Assessment Report)

Activity	Mitigating Measure	Responsible Party
Loss of habitat and sensitive areas: Clearing of vegetation	1. Alien species, indicated in Table 11 of the Ecological Habitat Assessment, must be removed to improve the ecological integrity of the area; 2. The grassland is considered a possible important migratory corridor, and this characteristic should be preserved as far possible in the design of the development; 3. The layout of the development should be designed to include individuals of *Boophone disticha* in conservation areas; 4. *Hypoxis hemerocallidea* is relatively easy to transplant and should be transplanted to the conservation areas of the development, if it cannot be included in the conservation areas by the design of the layout of the development; 5. *Boophone disticha* has been reported not to flower after being transplanted and should preferably not be removed or transplanted.	Contractor / ECO

Activity	Mitigating Measure	Responsible Party
Loss of habitat and sensitive areas: Clearing of vegetation *(continued)*	If transplanted, a management plan must be developed to assist with sustainability of the species (burning requirements etc.). It may be possible to design the layout of the development to include individuals of *Boophone disticha* in conservation areas and open landscaped gardens, because the individuals that have been recorded were located close to each other and close to the south-western corner of the site; 6. A search and rescue plan* are suggested for the *Hypoxis hemerocallidea* and *Boophone disticha* species to be transplanted, to be conserved in situ, within the development. This will ensure protection of the species; 7. During the construction phase of the development, building or waste material should be discarded in an authorised location, which should not be within the identified sensitive ecosystems. Movement of construction workers through sensitive areas should be minimised; 8. It is recommended that the natural grassland vegetation is conserved in open landscaped gardens; 9. All geophytes that currently occurs on the development site must be relocated to landscaped gardens; and 10. The use of “migratory friendly” property borders, such as palisade fencing or wire fencing with large gaps, should be considered as this will allow for the ongoing survival of most species presently	

Activity	Mitigating Measure	Responsible Party
	inhabiting the property. This will allow for the free movement of small mobile organisms (such as rodents).	

Proposed rescue and relocation plan for the red data listed plant species, Hypoxis hemerocallidea and Boophone disticha, found on the proposed development site

General information

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

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

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

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

Boophone disticha is a deciduous bulbous plant with a thick covering of dry scales above the ground. The large, round heads have short stems and appear to grow directly from the bulb, almost at ground level. The colour of the flowers varies from shades of pink to red and are sweetly scented (July to Oct.). The pedicels (flower stalks) elongate after flowering to form a large seed-head. This breaks off at the top of the scape (stalk) and tumbles across the veld, dispersing the seed. The greyish-green leaves are erect, arranged in a conspicuous fan and are usually produced after flowering. This spring-flowering species will flower even if it does not receive any water in winter (www.plantzafrica.com).

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

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

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

Proposed “Rescue and Relocation” Plan

Step 1:

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

Step 2:

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

Step 3:

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

Step 4:

Once removed, the plants must be placed in appropriately sized propagating bags (dependent on each individual plant), utilising soil directly from the site. Should the soil prove to be of poor quality, organic fertilizer or compost must be added to the soil. These plants

must be cared for until completion of the construction phase of the development. As these plants can tolerate moderate bouts of water stress, caution must be taken not to over-water or drown the individuals. Over-watering would also cause leeching of the soil, reducing nutrients available to the plants.

Step 5:

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

j. Impact Mitigation Measures – Operational Phase

Table 18: General

Activity	Mitigating Measure	Responsible Party
Operational phase of Development	1. A weed eradication programme shall be maintained and enforced on site, which could include pulling, cutting, targeted pesticide use, biological controls and native species reintroduction. 2. Use of “migratory friendly” property borders, such as palisade fencing or wire fencing with large gaps this free movement corridors for small animals should be retained throughout the operational phase. 3. It is recommended that the natural grassland vegetation is conserved in open landscaped gardens; 4. Retain natural vegetation as landscaped gardens; 5. Proper PPE should be used during the use of chemical pesticides. 6. Local employment will be preferred to undertake and implement the weed eradication programme. 7. The design and stormwater management of the development will allow for natural runoff to the aquatic resources as far as practically possible. 8. The Stormwater Management System will be maintained to ensure its effectiveness. 9. Disposal of runoff or stormwater to the municipal system will be undertaken in accordance with the requirements of the local by-laws.	Facility Manager

k. Impact Mitigating Measures – Decommissioning Phase

Table 19: Construction Site

Activity	Mitigating Measure	Responsible Party
Camp de-commissioning (associated infrastructure)	1. All rubble to be removed from the site and disposed of at a registered landfill site. 2. All rubbish / litter to be collected. 3. Surfaces to be checked for waste activities such as cement mixing and cleared as per instruction from the ECO. 4. Building / construction material not utilised to be removed off-site. 5. All natural surfaces hardened or compacted due to construction activities to be ripped and foreign material removed. 6. Sensitive areas are to be checked to ensure same is clean from litter, rubbish, and construction or waste materials. 7. All fences, demarcation barriers and signs associated with construction to be removed. 8. Residual stockpiles, following spreading of same over areas affected by construction for rehabilitation purposes, to be spread on site, as directed by ECO. 9. All construction / building related rubble left on site is to be collected and removed from site and disposed of at a registered dumpsite. 10. Rubble buried in the soil must be removed to a depth of 100mm.	Contractor / ECO
Equipment & Services	1. Structures comprising the construction camp to be removed. 2. Area that constituted the construction camp to be checked for spills / waste of materials such as oil, diesel, paint etc. These are to be cleaned.	Contractor / ECO

Activity	Mitigating Measure	Responsible Party
Equipment & Services *(continued)*	3. All temporary services to the site (sewage removal, waste removal etc.) to be cancelled.	
Rehabilitation	1. Existing access roads to be left accessible for maintenance purposes in the future. 2. The entire scarred area is to be levelled off as close as possible to the surrounding topography so as not to hinder water drainage and cause channelling which may in time lead to erosion. 3. Compacted soils should be ripped following the construction phase of the project. Topsoil should be spread over the work area to ensure optimal rehabilitation to a state similar to pre-construction activities. 4. If the area requires 'cut and fill' to a depth greater than 300mm, the topsoil is to be removed prior to cutting. 5. Care should be taken to not create slopes exceeding heights of surrounding areas, which could lead to soil erosion. 6. Erosion monitoring and control should be conducted, as part of the maintenance and control of the operation phase. 7. All areas subjected to hydrocarbon spills should be cleaned. The contaminated soils should be remediated and replaced. 8. Areas of standing water should be prevented. 9. Landscaping for the entire site and disturbed areas to be done by a landscape architect in accordance with the ECO. Only indigenous tree and other indigenous plant species to be used to enhance the conservation of indigenous biodiversity. Top soil to be used as far as possible applicable.	Contractor / ECO / PM

Activity	Mitigating Measure	Responsible Party
	10. Following completion of all rehabilitation measures, a final site inspection is to be conducted by the Contractor, the ECO and the PM, to ensure full compliance with all requirements as per the EA, the EMPr and the mitigating and rehabilitation measures as per the various Specialist Studies conducted.	

7. Conclusion

It is vital to ensure that the management and mitigation measures stipulated in the EMPr are adhered to and that all tasks are completed to ensure that no environmental pollution or degradation takes place during the construction and operational phases of the proposed development. The management measures of the EMPr must be implemented prior to the construction phase.

The applicant must also ensure that all relevant personnel are appointed to manage the project and ensure that the EMPr conditions are implemented.

Your attention is also drawn to the fact that this EMPr document is a legally binding document. It must be signed by the Applicant, thus agreeing to all aspects mentioned and instructions to be met accordingly. Signing and acceptance of this EMPr will be undertaken once an Environmental Authorisation was granted by GDARD.

LIST OF REFERENCES

- Government Notice, 546 Government Gazette 33333, 29 June 2010, *Approaching the Environmental Management Programme*
- Kleynhans C J, Thirion C and Moolman J A Level I River Ecoregion classification System for South Africa, Lesotho and Swaziland. [Report]. - Pretoria : Department of Water Affairs and Forestry, 2005.
- National Environmental Management Act, (1998)
- National Water Act (Act 36, 1998)
- Occupational Health and Safety Act [OHSA], (1993)

ACCEPTANCE

DECLARATION OF UNDERSTANDING BY THE DEVELOPER

I, _____

Representing _____

Declare that I have read and understood the contents of the Environmental Management Programme for:

Contract _____

I also declare that I understand my responsibilities in terms of enforcing and implementing the Environmental Specifications for the Contract. I also declare that I am aware that the management measures contained in this EMPr is binding on all contractors, labourers and personnel onsite.

Signed: _____

Place: _____

Date: _____

Witness 1: _____

Witness2: _____

DECLARATION OF UNDERSTANDING BY THE ENGINEER (IF APPLICABLE)

I, _____

Representing _____

Declare that I have read and understood the contents of the Environmental Management Programme for:

Contract _____

I also declare that I understand my responsibilities in terms of enforcing and implementing the Environmental Specifications for the Contract. I also declare that I am aware that the management measures contained in this EMPr is binding on all contractors, labourers and personnel onsite.

Signed: _____

Place: _____

Date: _____

Witness 1: _____

Witness2: _____

DECLARATION OF UNDERSTANDING BY THE CONTRACTOR (if applicable)

I, _____

Representing _____

Declare that I have read and understood the contents of the Environmental Management Programme for:

Contract _____

I also declare that I understand my responsibilities in terms of enforcing and implementing the Environmental Specifications for the Contract. I also declare that I am aware that the management measures contained in this EMPr is binding on all contractors, labourers and personnel onsite.

Signed: _____

Place: _____

Date: _____

Witness 1: _____

Witness2: _____

METHOD STATEMENTS

METHOD STATEMENT: Solid Waste Management

CONTRACT:…… **DATE**:……

WHAT WORK IS TO BE UNDERTAKEN? [give a brief description of the works to be undertaken on site that will generate waste (hazardous and non-hazardous wastes)]: * Note: please attach extra pages if more space is required.

*Insert additional pages as required

WHERE ARE THE WORKS TO BE UNDERTAKEN? (where possible, provide an annotated plan and a full description of the extent of the works): * Note: please attach extra pages if more space is required

*__Insert additional pages as required__

METHOD STATEMENT: Solid Waste Management (contd.)

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

Start Date:…….. **End Date:**…….

HOW IS WASTE TO BE MANAGED ON SITE? (provide as much detail as possible, including annotated sketches and plans where possible): * Note: please attach extra pages if more space is required

*__Insert additional pages as required__

DECLARATIONS for Method Statement **Solid Waste Management (contd.)**

1) ENGINEER

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

_____ _____

(Signed) (Print name)

Dated:._____

2) ECO

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

_____ _____

(Signed) (Print name)

Dated:._____

2) CONTRACTOR

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 and with approval by the Engineer, and that the SHE Coordinator, Construction Manager and ECO will audit my compliance with the contents of this Method Statement

_____ _____

(Signed) (Print name)

Dated: _____

METHOD STATEMENT:

Crew Camps and Construction Lay Down Areas

CONTRACT:…… **DATE**:……

WHAT CREW CAMPS AND CONSTRUCTION LAY DOWN AREAS ARE REQUIRED ON SITE DURING CONSTRUCTION? (give a brief description of these): * Note: please attach extra pages if more space is required

***Insert additional pages as required**

WHERE ARE THE CREW CAMPS AND CONSTRUCTION LAY DOWN AREAS TO BE LOCATED? (where possible, provide an annotated plan and a full description of the extent of the works): * Note: please attach extra pages if more space is required

*__Insert additional pages as required__

METHOD STATEMENT:

Crew Camps and Construction Lay Down Areas (contd.)

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

Start Date:…….. **End Date:**…….

HOW ARE CREW CAMPS AND CONSTRUCTION LAY DOWN AREAS TO BE MANAGED? (provide as much detail as possible, including annotated sketches and plans where possible): * Note: please attach extra pages if more space is required

*__Insert additional pages as required__

DECLARATIONS for Method Statement

Crew Camps and Construction Lay Down Areas (contd.)

1) ENGINEER

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

_____ _____

(Signed) (Print name)

Dated:._____

2) ECO

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

_____ _____

(Signed) (Print name)

Dated:._____

2) CONTRACTOR

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 and with approval by the Engineer, and that the SHE Coordinator, Construction Manager and ECO will audit my compliance with the contents of this Method Statement

_____ _____

(Signed) (Print name)

Dated: _____

METHOD STATEMENT:

Workshop and Maintenance/Cleaning of Plant

CONTRACT:…… **DATE**:…….

WHAT WORK IS TO BE UNDERTAKEN? (give a brief description of the works): * Note: please attach extra pages if more space is required

*__Insert additional pages as required__

WHERE ARE THE WORKSHOPS AND CLEANING BAYS TO BE LOCATED? (where possible, provide an annotated plan and a full description of the extent of the works): * Note: please attach extra pages if more space is required

***Insert additional pages as required**

METHOD STATEMENT:

Workshop and Maintenance / Cleaning of Plant (contd.)

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

Start Date:…….. **End Date:**…….

HOW ARE WORKSHOPS AND PLANT MAINTENANCE / CLEANING TO BE MANAGED DURING CONSTRUCTION? (provide as much detail as possible, including annotated sketches and plans where possible): * Note: please attach extra pages if more space is required

*__Insert additional pages as required__

DECLARATIONS for Method Statement

Workshop and Maintenance / Cleaning of Plant (contd.)

1) ENGINEER

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

_____ _____

(Signed) (Print name)

Dated:._____

2) ECO

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(Signed) (Print name)

Dated:._____

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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 and with approval by the Engineer, and that the SHE Coordinator, Construction Manager and ECO will audit my compliance with the contents of this Method Statement

_____ _____

(Signed) (Print name)

Dated: _____

METHOD STATEMENT:

Cement and Concrete Batching

CONTRACT:…… **DATE**:…….

WHAT WORK IS TO BE UNDERTAKEN? (give a brief description of the works): * Note: please attach extra pages if more space is required

*__Insert additional pages as required__

WHERE ARE THE WORKS TO BE UNDERTAKEN? (where possible, provide an annotated plan and a full description of the extent of the works): * Note: please attach extra pages if more space is required

*Insert additional pages as required

METHOD STATEMENT:

Cement and Concrete Batching (contd.)

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 sketches and plans where possible): * Note: please attach extra pages if more space is required

*__Insert additional pages as required__

DECLARATIONS for Method Statement

Cement and Concrete Batching (contd.)

1) ENGINEER

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

_____ _____

(Signed) (Print name)

Dated:._____

2) ECO

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(Signed) (Print name)

Dated:._____

2) CONTRACTOR

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 and with approval by the Engineer, and that the SHE Coordinator, Construction Manager and ECO will audit my compliance with the contents of this Method Statement

_____ _____

(Signed) (Print name)

Dated: _____

METHOD STATEMENT: Dust Control

CONTRACT:…… **DATE**:…….

WHAT WORK IS TO BE UNDERTAKEN ON SITE THAT COULD GENERATE DUST? (give a brief description of the works): * Note: please attach extra pages if more space is required

***Insert additional pages as required**

WHERE ARE THE WORKS TO BE UNDERTAKEN (where possible, provide an annotated plan and a full description of the extent of the works): * Note: please attach extra pages if more space is required

*Insert additional pages as required

METHOD STATEMENT: Dust Control (contd.)

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 SO AS TO MINIMISE AND CONTROL DUST GENERATION ON SITE? (provide as much detail as possible, including annotated sketches and plans where possible): * Note: please attach extra pages if more space is required

*__Insert additional pages as required__

DECLARATIONS for Method Statement

Dust Control (contd.)

1) ENGINEER

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

_____ _____

(Signed) (Print name)

Dated:._____

2) ECO

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

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(Signed) (Print name)

Dated:._____

2) CONTRACTOR

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 and with approval by the Engineer, and that the SHE Coordinator, Construction Manager and ECO will audit my compliance with the contents of this Method Statement

_____ _____

(Signed) (Print name)

Dated: _____

METHOD STATEMENT:

Hydrocarbon and Emergency Spill Procedure

CONTRACT:…… **DATE**:……

WHAT HAZARDOUS SUBSTANCES (INCL. FUELS) ARE TO BE STORED ON SITE? (give a brief description of the works): * Note: please attach extra pages if more space is required

*Insert additional pages as required

WHERE ARE THE THESE SUBSTANCES TO BE STORED ON SITE? (where possible, provide an annotated plan and a full description of the extent of the works): * Note: please attach extra pages if more space is required

*__Insert additional pages as required__

METHOD STATEMENT:

Hydrocarbon and Emergency Spill Procedures (contd.)

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

Start Date:…….. **End Date:**…….

HOW ARE HAZARDOUS SUBSTANCES TO BE MANAGED TO AVOID SPILLAGES AND WHAT EMERGENCY PROCEDURES ARE TO BE IMPLEMENTED IN CASE OF A SPILLAGE? (provide as much detail as possible, including annotated sketches and plans where possible): * Note: please attach extra pages if more space is required

*__Insert additional pages as required__

DECLARATIONS for Method Statement

Hydrocarbon and Emergency Spill Procedures (contd.)

1) ENGINEER

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

_____ _____

(Signed) (Print name)

Dated:._____

2) ECO

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(Signed) (Print name)

Dated:._____

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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 and with approval by the Engineer, and that the SHE Coordinator, Construction Manager and ECO will audit my compliance with the contents of this Method Statement

_____ _____

(Signed) (Print name)

Dated: _____

METHOD STATEMENT:

Diesel Tanks and Re-fueling Procedures

CONTRACT:…… **DATE**:…….

WHAT WORK IS TO BE UNDERTAKEN? (give a brief description of the number and capacity of diesel tanks to be kept on site): * Note: please attach extra pages if more space is required

***Insert additional pages as required**

WHERE ARE THE WORKS TO BE UNDERTAKEN? (where possible, provide an annotated plan and a full description of the extent of the works): * Note: please attach extra pages if more space is required

*__Insert additional pages as required__

METHOD STATEMENT:

Diesel Tanks and Re-fueling Procedures (contd.)

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

Start Date:…….. **End Date:**…….

HOW ARE DIESEL TANKS TO BE MANAGED AND RE-FUELLING TO BE UNDERTAKEN? (provide as much detail as possible, including annotated sketches and plans where possible): * Note: please attach extra pages if more space is required

*__Insert additional pages as required__

DECLARATIONS for Method Statement

Diesel Tanks and Re-fuelling Procedure (contd.)

1) ENGINEER

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

_____ _____

(Signed) (Print name)

Dated:._____

2) ECO

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_____ _____

(Signed) (Print name)

Dated:._____

2) CONTRACTOR

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 and with approval by the Engineer, and that the SHE Coordinator, Construction Manager and ECO will audit my compliance with the contents of this Method Statement

_____ _____

(Signed) (Print name)

Dated: _____

METHOD STATEMENT:

Topsoil Management

CONTRACT:…… **DATE**:…….

WHAT WORK IS TO BE UNDERTAKEN? (give a brief description of the works to be undertaken that require topsoil to be stripped): * Note: please attach extra pages if more space is required

*__Insert additional pages as required__

WHERE ARE THE WORKS TO BE UNDERTAKEN? (where possible, provide an annotated plan and a full description of the extent of the works): * Note: please attach extra pages if more space is required

*__Insert additional pages as required__

METHOD STATEMENT:

Topsoil Management (contd.)

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

Start Date:…….. **End Date:**…….

HOW ARE TOPSOIL STOCKPILES TO BE MANAGED? (provide as much detail as possible, including annotated sketches and plans where possible): * Note: please attach extra pages if more space is required

*__Insert additional pages as required__

DECLARATIONS for Method Statement

Topsoil Management (contd.)

1) ENGINEER

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

_____ _____

(Signed) (Print name)

Dated:._____

2) ECO

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_____ _____

(Signed) (Print name)

Dated:._____

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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 and with approval by the Engineer, and that the SHE Coordinator, Construction Manager and ECO will audit my compliance with the contents of this Method Statement

_____ _____

(Signed) (Print name)

Dated: _____

METHOD STATEMENT:

Fire Management

CONTRACT:…… **DATE**:…….

WHAT WORK IS TO BE UNDERTAKEN? (give a brief description of the works): * Note: please attach extra pages if more space is required

*__Insert additional pages as required__

WHERE ARE THE WORKS TO BE UNDERTAKEN? (where possible, provide an annotated plan and a full description of the extent of the works): * Note: please attach extra pages if more space is required

*__Insert additional pages as required__

METHOD STATEMENT:

Fire Management (contd.)

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 sketches and plans where possible): * Note: please attach extra pages if more space is required

*__Insert additional pages as required__

DECLARATIONS for Method Statement

Fire Management (contd.)

1) ENGINEER

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

_____ _____

(Signed) (Print name)

Dated:._____

2) ECO

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

_____ _____

(Signed) (Print name)

Dated:._____

2) CONTRACTOR

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 and with approval by the Engineer, and that the SHE Coordinator, Construction Manager and ECO will audit my compliance with the contents of this Method Statement

_____ _____

(Signed) (Print name)

Dated: _____

METHOD STATEMENT:

Stormwater Management

CONTRACT:…… **DATE**:…….

WHAT WORK IS TO BE UNDERTAKEN? (give a brief description of the works): * Note: please attach extra pages if more space is required

*__Insert additional pages as required__

WHERE ARE THE WORKS TO BE UNDERTAKEN? (where possible, provide an annotated plan and a full description of the extent of the works): * Note: please attach extra pages if more space is required

*__Insert additional pages as required__

METHOD STATEMENT:

Stormwater Management (contd.)

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 sketches and plans where possible): * Note: please attach extra pages if more space is required

*__Insert additional pages as required__

DECLARATIONS for Method Statement

Stormwater Management (contd.)

1) ENGINEER

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

_____ _____

(Signed) (Print name)

Dated:._____

2) ECO

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

_____ _____

(Signed) (Print name)

Dated:._____

2) CONTRACTOR

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 and with approval by the Engineer, and that the SHE Coordinator, Construction Manager and ECO will audit my compliance with the contents of this Method Statement

_____ _____

(Signed) (Print name)

Dated: _____

METHOD STATEMENT:

Soil Erosion Management

CONTRACT:…… **DATE**:…….

WHAT WORK IS TO BE UNDERTAKEN? (give a brief description of the works): * Note: please attach extra pages if more space is required

***Insert additional pages as required**

WHERE ARE THE WORKS TO BE UNDERTAKEN? (where possible, provide an annotated plan and a full description of the extent of the works): * Note: please attach extra pages if more space is required

*__Insert additional pages as required__

METHOD STATEMENT:

Soil Erosion Management (contd.)

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 sketches and plans where possible): * Note: please attach extra pages if more space is required

*__Insert additional pages as required__

DECLARATIONS for Method Statement

Soil Erosion Management (contd.)

1) ENGINEER

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

_____ _____

(Signed) (Print name)

Dated:._____

2) ECO

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

_____ _____

(Signed) (Print name)

Dated:._____

2) CONTRACTOR

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 and with approval by the Engineer, and that the SHE Coordinator, Construction Manager and ECO will audit my compliance with the contents of this Method Statement

_____ _____

(Signed) (Print name)

Dated: _____

METHOD STATEMENT:

Rehabilitation of Crew Camps and Other Disturbed Areas

CONTRACT:…… **DATE**:……

WHAT WORK IS TO BE UNDERTAKEN? (give a brief description of works to be undertaken that may result in the need for rehabilitation of the affected areas): * Note: please attach extra pages if more space is required

*__Insert additional pages as required__

WHERE ARE THE WORKS TO BE UNDERTAKEN? (where possible, provide an annotated plan and a full description of the extent of the works): * Note: please attach extra pages if more space is required

*__Insert additional pages as required__

METHOD STATEMENT:

Rehabilitation of Crew Camps and Other Disturbed Areas (contd.)

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

Start Date:…….. **End Date:**…….

HOW ARE THE REHABILITATION WORKS TO BE UNDERTAKEN? (provide as much detail as possible, including annotated sketches and plans where possible): * Note: please attach extra pages if more space is required

*__Insert additional pages as required__

DECLARATIONS for Method Statement

Rehabilitation of Crew Camps and Other Disturbed Areas (contd.)

1) ENGINEER

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

_____ _____

(Signed) (Print name)

Dated:._____

2) ECO

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

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(Signed) (Print name)

Dated:._____

2) CONTRACTOR

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 and with approval by the Engineer, and that the SHE Coordinator, Construction Manager and ECO will audit my compliance with the contents of this Method Statement

_____ _____

(Signed) (Print name)

Dated: _____

INCIDENT AND ENVIRONMENTAL LOG

ENVIRONMENTAL INCIDENT LOG				
Date	**Env. Condition**	**Comments** *(Include any possible explanations for current condition and possible responsible parties. Include photographs, records etc. if available)*	**Corrective Action Taken** (*Give details and attach documentation as far as possible)*	**Signature**

8. Alien Eradication Plan

1. Prevention and early removal

The prevention and early removal of Alien plant species must be guided through a prevention and early detection strategy which will allow for the effective rehabilitation of disturbed areas as well as assist with the prevention of unnecessary disturbances of natural areas.

The prevention and early removal strategy should include monitoring plans which are specifically designed to identify Alien Invasive plants. This monitoring plan should be update as new Alien Invasive plant species are detected to populate the document with relevant Alien Invasive species found on site. This will also allow for planning the removal of these Alien Invasive plants in accordance with the correct removal technique. It is best advised to ensure early detection of Alien Invasive species rather than allowing the establishment of Alien Invasive Species.

2. Containment and control

Should any alien invasive plants establish on site, Gauteng Department of Roads and Transport (GDRT) will be responsible to create action plans which should include the following aspects regarding the removal of these Alien Invasive Species: control, budgets, manpower considerations and time. A separate plan should be developed for each location and or each species, the action plan should also include registered chemicals and other techniques for the effective removal of the species. It is important to contain Alien Invasive species, this will allow that the least energy and resources are used.

3. Clearing and guiding principles

Control programmes for Alien Invasive Species are long term management projects, thus it must include an eradication plan which includes follow up actions. The smaller infested areas should be cleared first to prevent further infestation of the Alien Invasive species. All clearing actions should be recorded; and the records thereof must be kept, this will assist in monitoring and identifying areas due for a follow up clearing.

4. Control methods

- Different species require different control methods such as manual, chemical or biological methods or a combination of the two.
- Care should be taken to ensure that the clearing methods used do not encourage further invasion.
- As such, regardless of the methods used, soil disturbance should be kept to a minimum. The vegetative stage of the plants should also be considered before clearing.
- Fire is not a natural phenomenon in the area and should not be used in general for alien control or vegetation management at the site.
- The best-practice clearing method for each species identified should be used.
- The preferred clearing methods for most alien species can be obtained from the

Department of Water and Agricultural Affairs (DWAF) Working for Water website: http://www.dwaf.gov.za/wfw/Control/

5. Use of herbicides for alien control

Although it is usually preferable to use manual clearing methods where possible, such methods may create additional mechanical disturbance which may stimulate alien invasion and may also be ineffective for many woody species which re-sprout. Where herbicides are to be used, the impact of the eradication programme on the natural environment should be minimised be observing the following:

- Area contamination must be minimised by careful, accurate application with a minimum amount of herbicide to achieve good control.
- Care must be taken to prevent contamination of water bodies. This includes special care in storage, application, cleaning equipment and disposal of containers, product and spray mixtures.
- Equipment should be washed where there is no danger of contaminating water sources and washings carefully disposed of in a suitable place.
- To avoid damage to indigenous or other desirable vegetation, herbicides that would have the least effect on the indigenous vegetation should be used.
- Droplet nozzles with a course spray pattern should be fitted to avoid drift of herbicides onto neighbouring vegetation.
- The appropriate health and safety precautions should be followed regarding the storage, handling and disposal of herbicides.

9. Alien Management Plan

1. Construction phase activities

The following management actions are aimed at reducing soil disturbance during the construction phase of the development, as well as reducing the likelihood that alien species will be brought onto site or otherwise encouraged.

Table 20: Construction phase activities

Action	Frequency
The ECO must provide permission prior to any vegetation clearing.	Daily
Clearing of vegetation should be undertaken as the work progresses – mass clearing should not occur unless the cleared areas will be affected by construction immediately afterwards.	Weekly

Action	Frequency
Areas that will be exposed for some time should be protected with packed brush, or appropriately battered with fascine work. Alternatively, jute (Soil saver) may be pegged over the soil to protect it.	Weekly
Cleared areas that have become invaded can be sprayed with appropriate herbicides if these are such that break down on contact with the soil. Herbicides with a residual action should not be used to encourage the emergence of indigenous plants.	Weekly
Although organic matter is frequently used to encourage regrowth of vegetation on cleared areas, no foreign material such as straw and manure should be brought onto site. Brush of an indigenous nature from cleared areas should be used as much as possible. The use of manure or other soil amendments is likely to encourage invasion.	Weekly
Clearing of vegetation is not allowed in the following instances: • Within 32 metres of any wetland; • Within 1:100-year flood lines; • On slopes steeper than 1:3. Permission should be granted by the ECO to specifically allow construction activities in these areas.	Weekly
Care must be taken to avoid the introduction of alien plant species to the site and surrounding areas. (Attention must be paid to imported material such as building sand or dirty earth-moving equipment.) Stockpiled material should be checked on a regular basis and any weeds emerging from material stockpiles should be removed.	Weekly
Alien vegetation regrowth on areas disturbed by construction must be controlled throughout the entire site during the construction period.	Monthly
The alien plant removal and control method guidelines should adhere to the best practice for the species involved. Such information can be obtained from the DWS Working for Water website.	Monthly
Clearing activities must be contained within the affected zones and may not spill over into demarcated No-Go areas.	Daily
Pesticides may not be used. Registered herbicides may be used to control listed alien weeds and invaders only.	

2. MONITORING DURING CONSTRUCTION PHASE

The following monitoring actions should be implemented during the construction phase of the development.

Table 21: Monitoring activities during the construction phase

Monitoring action	Indicator	Timeframe
Document all alien species observed at the site	List of alien species	Pre-construction
Document alien plant distribution patterns	Alien plants distribution map within priority areas	3 Monthly
Document & record alien control measures implemented	Record of clearing activities	3 Monthly
Review & evaluate the control success rate	Decline in documented alien plant abundance over time	Bi-annually

3. OPERATIONAL PHASE ACTIVITIES

The following management actions are aimed at reduction of alien plant species within the site and maintaining non-invaded areas clear of aliens.

Table 22: Operational phase activities

Action	Frequency
Surveys for alien species should be conducted on a regular basis. Six monthly for the first two years after construction and annually thereafter. All aliens identified should be cleared.	Every 6 months for 2 Years and annually thereafter
Where areas of natural vegetation have been disturbed by construction activities, revegetation with indigenous, locally occurring species should take place where the natural vegetation is slow to recover or where repeated invasion has taken place following disturbance	Biannually, but revegetation should take place at the start of the rainy season
Areas of natural vegetation that need to be managed to reduce plant height or biomass, should be controlled using methods that leave the soil protected, such as using a weed-eater to mow above the soil level.	When necessary
No alien species should be cultivated on-site. If vegetation is required for aesthetic purposes, then non-invasive, water-wise species indigenous to the area should be used.	When necessary

4. MONITORING OPERATIONAL PHASE

The following monitoring and evaluation actions should take place during the operational phase of the development.

Table 23: Monitoring during the operational phase

Monitoring Action	Indicator	Timeframe
Document alien species Distribution and abundance over time at the site	Alien plant distribution map	Biannually
Document alien plant control Measures implemented & success rate achieved	Records of control measures and their success rate. A decline in alien distribution and cover over the time	Biannually
Document rehabilitation measures implemented and success achieved in problem areas	Decline in vulnerable open areas over time	Biannually