

**ENVIRONMENTAL MANAGEMENT PROGRAMME FOR PIPELINE ROUTE
RE-ALIGNMENT OF APPROXIMATELY 2KM AT WOODHILL GOLF ESTATE.**

PREPARED FOR



RAND WATER










COMPILED BY



JULY 2020

Rev 00

Project Name:	Proposed construction of pipeline route re-alignment of approximately 2km at woodhill golf estate.
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Report Title:	Environmental Management Programme (EMP) for Proposed construction of pipeline route re-alignment of approximately 2km at Woodhill Golf Estate.		
Reference Number: Land use query Ref number:			
Report Status	DRAFT EMP for approval		
Client:			
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Submission department:	Department of Environment, Forestry and Fisheries		
Details:	EIA Applications EIAApplications@environment.gov.za		

EXECUTIVE SUMMARY

Taktho Environmental Strategy has been appointed as an independent consultant by Rand Water in line with environmental legislation, to render all necessary professional services in respect of the environmental authorization process of the

proposed amendment of the R5 pipeline environmental authorization for pipeline route re-alignment of approximately 2km at Woodhill golf estate in Tshwane metropolitan municipality.

RandRand Water acquired and registered the notarial deed of servitude remainder of portion 484 of the farm Garsfontein 374, measuring 2, 5887 hectares in December 1997. At the time of registration of the servitude, there were no residential properties. The Woodhill Country Estate now appears in the servitude portion along with its golf fairways and greens. The full length of the servitude within the Estate, is 1.6 kilometres long, which translates into 1.634.1 metres, its width is 16 metres, plus 2 metres on each side, which adds an extra four (4) metres in terms of clause 2 of the servitude. This comprises the entire range of the registered servitude. The estate violated the Act as Rand water was denied access to the infrastructure since the construction of the Estate. The properties in the Estate encroach into the servitude area.

All encroachments encountered are constructed and laid along the breadth and width of the servitude, within the Estate which directly interferes with Rand Water's rights, entitlement, duties, powers, functions and obligations that it must exercise, in terms of the Act. Importantly, no person may in terms of section 82 unlawfully and intentionally or negligently, interfere with any water services work. The instant encroachment at the Estate has interfered with Rand Water's services work and significantly with its obligations. The attorneys representing the Estate have challenged the environmental authorisation from the Department of Agriculture and Rural Development. They informed Rand Water that according to the preferred alignment, Rand Water cannot utilise the servitude boundaries instead the adjacent area where Rand Water does not have the rights.

The preferred alignment will also deviate from the proposal in the Woodhill Golf Estate by being aligned around the golf fairways and greens since these have been developed on top of the existing servitude. Rand Water requests the amendment of the ROD, to permit Rand Water to lay the pipeline within the Rand Water servitude at Woodhill Estate. The environmental authorization is for the re-alignment of the pipeline at Woodhill Estate from the EA approved deviation (0.62 km) to the preferred alignment within RW servitude (1.16 km).

Taktho Environmental Strategy was appointed to submit an Environmental Management Programme to the Competent Authority (GDARD) on behalf of Rand Water.

Activities to be undertaken during the construction, operational and decommissioning phases include:

Construction Phase

- Site preparation;
 - Clearly delineate the construction footprint to avoid construction creep outside the approved development footprint;

- Search & rescue fauna & flora of conservation concern & protected status ahead of any construction activities;
- Establish service tracks (access roads pre-existing);
- Transport components and equipment to site;
- Establishment of laydown areas;
- Establishment of ancillary infrastructure;
- Construction of infrastructure foundations;
- Establishment of the substation and transformer;
- Site rehabilitation; and
- Environmental management & monitoring throughout the construction process, inclusive of:
 - Continuous monitoring and removal of alien & invasive plant species;
 - Dust monitoring & management;
 - Storm water monitoring & management;
 - Erosion monitoring and remediation;
 - Fire management;
 - Vegetation & habitat monitoring & management;
 - Hazardous substance monitoring & management, including detecting any leakage or spillage; and
 - Monitoring & management measures to protect hydrological features.

Operational Phase

- Maintenance and repairs of the substation and transformer and associated equipment inclusive of:
 - Maintenance of roads;
 - Cleaning and maintaining substation and transformer;
 - Removal of alien invasive vegetation; and
 - Maintain and repair fencing.
- Environmental management & monitoring throughout the operational process, inclusive of:
 - Continuous monitoring and removal of alien & invasive plant species;
 - Storm water monitoring & management;
 - Erosion monitoring and remediation;
 - Fire management and prevention;
 - Vegetation & habitat monitoring & management;
 - Monitoring & management measures to protect hydrological features.
- Waste (including hazardous and explosive) management; and
- Health and safety implementations.

Decommissioning

Complete decommissioning can occur should it no longer be economically feasible to continue the substation operation; Activities will include:

- Site reparation;
- Disassembly and recycling of existing components; and
- Rehabilitation of the site.

The implementation of the EMPr within the project is not an optional additional or “add on” requirement. The EMPr is legally binding, integral to the contract and is as important as the engineering aspects of the contract. The EMPr is a working document to be used throughout the life of the project, until such time that closure is achieved.

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CHECKLIST

An environmental management programme (EMPr) must comply with section 24N of the NEMA, 1998, as amended and contain those requirements prescribed in the EIA Regulations, 2014, as amended, including regulation 23 and Appendix 4. The full suite of requirements is listed in the table below, which have dictated the layout and content of this EMPr.

Environmental Management Programme Checklist.

Content of Environmental Management Programme (EMPr)	Checked
1. (1) An EMPr must comply with section 24N of the Act and include-	<input checked="" type="checkbox"/>
(a) details of	<input checked="" type="checkbox"/>
(i) the EAP who prepared the EMPr; and	<input checked="" type="checkbox"/>
(ii) the expertise of that EAP to prepare an EMPr, including a curriculum vitae;	<input checked="" type="checkbox"/>
(b) a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	<input checked="" type="checkbox"/>
(c) a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;	<input checked="" type="checkbox"/>
(d) a description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including-	<input checked="" type="checkbox"/>
(i) planning and design;	<input checked="" type="checkbox"/>
(ii) pre-construction activities;	<input checked="" type="checkbox"/>
(iii) construction activities;	<input checked="" type="checkbox"/>
(iv) rehabilitation of the environment after construction and where applicable post closure; and	<input checked="" type="checkbox"/>
(v) where relevant, operation activities;	<input checked="" type="checkbox"/>
(f) a description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable, include actions to -	<input checked="" type="checkbox"/>
(i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;	<input checked="" type="checkbox"/>
(ii) comply with any prescribed environmental management standards or practices;	<input checked="" type="checkbox"/>
(iii) comply with any applicable provisions of the Act regarding closure, where applicable; and	N/A
(iv) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;	<input checked="" type="checkbox"/>

<i>(g) the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);</i>	<input checked="" type="checkbox"/>
<i>(h) the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);</i>	<input checked="" type="checkbox"/>
<i>(i) an indication of the persons who will be responsible for the implementation of the impact management actions;</i>	<input checked="" type="checkbox"/>
<i>(j) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;</i>	<input checked="" type="checkbox"/>
<i>(k) the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);</i>	<input checked="" type="checkbox"/>
<i>(l) a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;</i>	<input checked="" type="checkbox"/>
<i>(m) an environmental awareness plan describing the manner in which-</i>	<input checked="" type="checkbox"/>
<i>(i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and</i>	<input checked="" type="checkbox"/>
<i>(ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and</i>	<input checked="" type="checkbox"/>
<i>(n) any specific information that may be required by the competent authority.</i>	<input checked="" type="checkbox"/>
<i>(2) Where a government notice gazetted by the Minister provides for a generic EMP, such generic EMP as indicated in such notice will apply.</i>	N/A

ABBREVIATIONS / ACRONYMS AND DEFINITIONS

List of terms for abbreviations used in this document.

Abbreviation / Acronym	Term
BA	Basic Assessment as provided for in NEMA (Act 107 of 1998) and EIA Regulations (2014), as amended.
CA	Competent Authority
CAR	Corrective Action Reports
CLO	Community Liaison Officer
CoTLM	City of Tshwane Local Municipality
CRE	Chief Resident Engineer
DEA	Department of Environmental Affairs (National)
DMR	Department of Mineral Resources
DWS	Department of Water & Sanitation
EA	Environmental Authorisation
EAPASA	Environmental Assessment Practitioners Association of South Africa

ECO	Environmental Control Officer
EDM	Ehlanzeni District Municipality
EIA	Environmental Impact Assessment as provided for in NEMA (Act 107 of 1998) and EIA Regulations (2014), as amended.
EIAr	Environmental Impact Assessment Report
ELU	Existing Lawful Use as per Part 3 of the National Water Act (Act 36 of 1998)
EM	Environmental Manager
EMPr	Environmental Management Programme
GA	General Authorisation as per Section 39 of the National Water Act (Act 36 of 1998)
HSO	Health & Safety Officer
I&Aps	Interested and Affected Parties
IDP	Integrated Development Plan
SEO	Site Environmental Officer
LA	Listed Activity (EIA Regulations, 2014)
LN1	Listing Notice 1: GN. No. R. 983, 4 December 2014, as amended in GN. No. R. 327, 7 April 2017.
LN2	Listing Notice 2: GN R. 984, 4 December 2014, as amended in GN. No. R. 325, 7 April 2017.
LN3	Listing Notice 3: GN R. 985, 4 December 2014, as amended in GN. No. R. 324, 7 April 2017.
MPRDA	Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NERSA	National Energy Regulator of South Africa
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NWA	National Water Act, 1998 (Act No. 36 of 1998)
SACNASP	South African Council for Natural Scientific Professions
SAHRA	South African Heritage Resources Agency
SDF	Spatial Development Framework
SEO	Site Environmental Officer
SO	Social Officer
RW	RandWater
WUL	Water Use License

DEFINITIONS OF SOME TERMS USED IN THIS DOCUMENT.

Continual Improvement: This is a recurring process resulting from Management Reviews used to enhance the requirements of the Environmental Management Programme in order to improve the overall environmental compliance and performance of an organisation.

Corrective Action: Action to eliminate the cause of a non-conformity (or non-compliance in the case of an EMP) and prevent recurrence.

Development: Means the building, erection, construction or establishment of a facility, structure or infrastructure, including associated earthworks or borrow pits, that is necessary for the undertaking of a listed or specified activity, but excludes any modification, alteration or expansion of such a facility, structure or infrastructure, including associated earthworks or borrow pits, and excluding the redevelopment of the same facility in the same location, with the same capacity and footprint.

Engineer: The Engineer in the context of this document and Project shall be the appointed engineering team which includes the Chief Resident Engineer, resident engineers, the Environmental Monitor etc. This team is to manage and oversee the construction of the Project against the requirements of the contract specifications, the EA and this EMP and others.

Environmental Aspect: Any element of an organisation's activities that can interact with the environment ultimately resulting in effects to the environment – whether positive or negative.

Environmental Impact: Any change to the environment, whether positive or negative, resulting from the organisation's environmental aspects.

Environmental Management System: This system forms part of the organisation's overarching management system and is used to develop and implement the environmental policy and manage its identified environmental aspects.

Environmental Objective: An overall environmentally related goal/ statement of achievement, consistent with the environmental policy, that the organisation sets itself to achieve.

Environmental Policy: Sets the overall intention and direction of the organisation with regard to its environmental compliance and performance as agreed upon by top management. The Policy provides a framework for action and for the setting of environmental objectives and targets.

Grey Water: Wastewater generated from activities such as washing of vehicles and plant as well as dishwashing.

Maintenance: Means actions performed to keep a structure or system functioning or in service on the same location, capacity and footprint.

Non-conformity: Failure of the organisation to adhere to the requirements of the relevant legislation governing its activities, conditions of the Record of Decision and Environmental Management Programme.

PM10: Particle matter equal to and less than 10microns in aerodynamic diameter which can be deposited in the lungs. PM includes dust, smoke, soot, pollen and soil particles.

Sensitive Receptors: A person or place where involuntary exposure to pollutants released by the proposed project could take place.

Significant impact: Means an impact that may have a notable effect on one or more aspects of the environment or may result in non-compliance with accepted environmental quality standards, thresholds or targets and is determined through rating the positive and negative effects of an impact on the environment based on criteria such as duration, magnitude, intensity and probability of occurrence.

SECTION 1: DETAILS & EXPERTISE OF THE EAP AND APPLICANT

Details of –

(i) *The EAP who prepared the report;*

Environmental Assessment Practitioner	Taktho Environmental Strategy
Contact Person	Takalani Muavha
Postal Address	P.O.BOX 73995 FAIRLAND 2030
Telephone	Cell: +27 72 741 6494 Alt: +27 84 524 4308
E-mail	takalani@takenviro.co.za

Project Applicant	Rand Water
Trading Name (if any)	Rand Water
Contact Person	Mr. Tom Wanakwany
Physical Address	522 Impala Road GLEN VISTA 2000
Postal Address	P.O.Box 1127 Glenvisa, Johannesburg,
Postal Code	2000
Telephone	+27(0) 11 862 0369
Cell	N/A
Fax	+27(0) 11 862 0640
Email	twanakwa@randwater.co.za

- (ii) *The expertise of the EAP to prepare the EMP, including a curriculum vitae;*

Name:	Tshia
Surname:	Malehase
Name of Firm:	Taktho Environmental Strategy
Position:	Environmental Consultant (Practitioner)
Date of Birth:	21 April 1988
Nationality:	South African
Languages:	English
Driver's license:	Code B
Years of Experience:	8 years

LANGUAGES:

English: Excellent
 Sesotho: Excellent
 Zulu: Moderate
 IsiXhosa: moderate
 Setswana: moderate

EDUCATIONAL QUALIFICATIONS

a) Masters in Environmental Management

Institution	: Tshwane University of Technology
Qualification	: Masters in Environmental Management
Completed	: 2017

b) Honors BSc Environmental Sciences

Institution	: Walter Sisulu University
Qualification	: Honours BSc Geography
Completed	: 2012

c) BSc Environmental Science

Institution	: Walter Sisulu University
Qualification	: BSc Environmental Science
Completed	: 2010

Institution registered with:	South African Council for Natural Scientific Professions
Registered as:	Professional Natural Scientist (Pr.Sci.Nat)

KEY SKILLS

- Conducting a research

- Water use licence applications
- Public participation process
- Good communication skills (verbal and written)
- Good planning, problem solving and leadership skills
- Good report writing and negotiation
- Water sampling

KEY EXPERIENCE

- **Environmental Impact Assessment**

Environmental Impact Assessment Process in a form of Scoping Reports under Environmental Conservation Act, 1989 (Act 73 of 1989) and in a form of Basic Assessment Reports under National Environmental Management Act, 1998 (Act 107 of 1998), as amended. Also undertook Environmental Impact Assessment Process in a form of Scoping Reports under The Environmental Management Act Cap 20:27 2002 (Zimbabwe) Project Experience includes the establishment of various housing developments, business and industrial park, construction of weirs, mining, timber, dam construction, private and ski resorts, hotels, as well as road constructions.

- **Environmental Management Programme Reports**

Environmental Management Plans for various housing developments, business and industrial park, construction of weirs, asphalt manufacturing plants, holiday and ski resorts, hotels, as well as road constructions, heavy minerals dam projects, quarry.

- **Integrated Water Use License applications**

Compilation and management of various integrated water use license applications, as required by Section 21 of the National Water Act, (Act No. 1998), and the National Environmental Management Act, 1998 (Act 107 of 1998) section 71 environmental management act cap20:27 Zim Projects include the establishment of various housing typologies, mining applications, commercial and industrial projects, infrastructure development (roads, sewer, water pipelines and storm water management).

- **Public Participation:**

Undertaken numerous public participation processes, ranging from basic to intermediate, as required by relevant environmental legislation.

- **Ecological Assessments:**

Ecological Assessments as part of specialist input into the State of the Environment Report.

- **Wetland Delineations and functionality assessments:**

Delineations of wetlands and assessing its functionality as part of Mashonaland central wetland data base.

EMPLOYMENT EXPERIENCE

1) Taktho Environmental Strategy CC (2012– current)**Environmental Management and Assessment**

- Project management and administration;
- Management and co-ordination of project teams and specialists;
- Liaison with clients, authorities and stakeholders;
- Co-ordination and facilitation of the public participation process
- Development of terms of reference, tenders and project proposals;
- Manage project timeframes;
- Assist the environmental manager with any project related issues; and
- Compilation of Environmental Impact Assessments (EIA's), Scoping Reports, Environmental Management Plans (EMPs) and Resource Management Plans (RMPs).

Projects include:

Year	Client	Project Type	Project Description
2020	Impande Enigma Consortium	Environmental Impact Assessment	Upgrading of Informal Settlement 14 sites for Region D & E Environmental Assessment Services (Basic Assessment) Biodiversity, Heritage Impact Assessment and Wetland Specialist.
2019-2020	Inkomati-Usuthu Catchment Management Agency	Environmental Engineering	Appointment of a Panel of Professional Service Providers (I.E. Water and Environmental Engineering Consultants for Water Resource and Environmental Related Pollution Remediation Implementation for a Period of Thirty-Six (36) months
2019-2020	Randwater	Environmental Authorisation	Randwater Environmental Authorisation Amendment of 2km the R5 Pipeline Woodhill Estate
2019-2020	University of Mpumalanga	ECO	Environmental Compliance Assessment and evaluation of the extent of compliance with the environmental authorization for the University of Mpumalanga new infrastructure
2018	Morad Consulting Engineers'	Section 24G and rehabilitation Pan	Section 24g for Poortview, Ruimsig

Year	Client	Project Type	Project Description
2018	Morad Consulting Engineers	Basic Assessment	Basic Assessment for the construction of Kokosi Ext6 Bulk Water Pipeline within Merafong Local Municipality
2018	Enigma Built Environment (Pty) Ltd	Environmental Fatal Assessment and Feasibility Study	The Housing Development Agency project for Environmental Fatal Flaw assessment for Queenstown Township Establishment
2018	Impande Enigma Consortium.	Environmental Impact Assessment	The Housing Development Agency project for Environmental Impact Assessment for VYFHOEK 428 Township Establishment
2017	Sasol Mining	Environmental Control Officer	Environmental Control Officer for the construction of Bridge at Sakhisizwe, Brendan Village, Embalenhle Township, and Govan Mbeki Municipality
2017	Muedzi Establishment of Brickyard – Limpopo province	Wetland assessment	Zeerust Establishment of Township - North West Province
2017	Muedzi Establishment of Brickyard – Limpopo province	ECO Monitoring	Implementing ISO14001 (Environmental Management System) and Waste Management
2016	Bagale Consulting (Pty) Ltd	Environmental Assessment	Phase 1 (Condition Assessment - Revitalisation Of Industrial Parks)- Free State Province
2016	Gauteng Department of Human Settlements	EIA	EIA For Township Establishment on Coronationville Extension1, Ref No: 002/16-17/E0053
2015	Demuco (Pty) Ltd	BAR	Basic Environmental Assessment for Ptn 76 Farm Roodekop 139, Junction Town, Germiston for proposed to be developed for industrial use.
2015	Frances Baard District Offices	Biodiversity	WQUOTE: 18/14 Biodiversity Study for establishing a new 1000 erven residential settlement in Barkley West Erf No. 687 within Dikgatlong Municipality
2016	Freddy Netshivhodza Frances Baard District Municipality Northern Cape Contact Number: (053) 8380 964 Freddy.Netshivhodza@fbdm.co.za	Biodiversity specialist studies	Barkly West 687 Biodiversity study

Year	Client	Project Type	Project Description
2016	Freddy Netshivhodza Frances Baard District Municipality Northern Cape Contact Number: (053) 8380 964 Freddy.Netshivhodza@fbdm.co.za	Scoping study and Environmental Impact Assessment	Environmental Impact Assessment on Erf 696 Tidimalo Delporthoop: Dikgatlong Municipality Qoute: 15/15
2015	Izigi Consulting	Section 24G/ BAR	Section 24g process - rectification for the illegal construction and operation together with the upgrade of the Waste Water Treatment Plant in Greylingstad on Farm Zyferfontein 576 IR Portion 53 Environmental Impact Assessment (Basic Assessment) Process
2015	Izigi Consulting	WULA	Water Use Licensing Application Process upgrade of the Waste Water Treatment Plant in Greylingstad on Farm Zyferfontein 576 IR Portion 53
2015	Izigi Consulting	BAR	Proposed Upgrade of a Vehicular Bridge at Sakhisizwe, Brendan Village, Embalenhle Township, and Govan Mbeki Municipality
2015	Izigi Consulting	WULA	Proposed Upgrade of a Vehicular Bridge at Sakhisizwe, Brendan Village, Embalenhle Township, and Govan Mbeki Municipality
2014	The Housing Development Agency	Enviro	Basic Environmental Investigations for Farm Altoostyd 506 LQ final Report Lephalale Municipality
2014	The Housing Development Agency	Enviro	Basic Environmental Investigations for Vlakfontein No 556 IR Dipaliseng Municipality
2014	The Housing Development Agency	Enviro	Basic Environmental Environmental Investigations for Portion of the Farm Mohlabas Location 567 Lt Measuring 36.0750ha
2012- 2013	Rustenburg Local Municipality	SoER	Rustenburg Local Municipality State of Environmental Report/ 2013 Environmental Outlook
2012- 2013	Two Rivers Platinum (Pty) Ltd.	EIA	Environmental Impact Assessment (EIA) for the proposed construction of geological, underground and plant samples fire assay laboratory

Year	Client	Project Type	Project Description
2012	Theralogix Investments (Pty) Ltd	EMPR	Prospecting Right of Platinum Groups Metals, Copper Ore, Ore and Chrome Ore In The Magisterial District Of Marico In The North West Province.
2012	PMG Mining	EIA & EMPR	Koedeskloof mining rights application, Scoping, EIA & EMP and Water Use license
2012	Cavionite Investments (Pty) Ltd	EMPR	Prospecting right application for Coal bed Methane in the Magisterial District of Mafikeng North West Province
2011	Blue Nightingale Pty (Ltd)	EIA & EMPR	Environmental Impact Assessment and Environmental Management Plan for Klipfontein Mining Right Application in Mpumalanga Province
2011	Lephalale Local Municipality	EMF	Lephalale Local Municipality Detailed Integrated Environmental Management Framework, 2011 -2012
2012	MJT CONSULTING	BAR	Nyanzela access road Construction-Basic assessment process
2012	Exxaro Tshikondeni coal	Waste, Environmental clean up	Waste Management Consulting Services
2012	Bagale Consulting (Pty) Ltd	Environmental scan /fatal flaw	Township enterprise hubs (Kagiso, Tembisa and Winterveld)

SECTION 2: INTRODUCTION & BACKGROUND

Taktho Environmental Strategy has been appointed as an independent consultant by Rand Water in line with environmental legislation, to render all necessary professional services in respect of the environmental authorization process of the proposed amendment of the R5 pipeline environmental authorization for pipeline route re-alignment of approximately 2km at Woodhill golf estate in Tshwane metropolitan municipality.

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All encroachments encountered are constructed and laid along the breadth and width of the servitude, within the Estate which directly interferes with Rand Water's rights, entitlement, duties, powers, functions and obligations that it must exercise, in terms of the Act. Importantly, no person may in terms of section 82 unlawfully and intentionally or negligently, interfere with any water services work. The instant encroachment at the Estate has interfered with Rand Water's services work and significantly with its obligations. The attorneys representing the Estate have challenged the environmental authorisation from the Department of Agriculture and Rural Development. They informed Rand Water that according to the preferred alignment, Rand Water cannot utilise the servitude boundaries instead the adjacent area where Rand Water does not have the rights.

The preferred alignment will also deviate from the proposal in the Woodhill Golf Estate by being aligned around the golf fairways and greens since these have been developed on top of the existing servitude. Rand Water requests the amendment of the ROD, to permit Rand Water to lay the pipeline within the Rand Water servitude at Woodhill Estate. The environmental authorization is for the re-alignment of the pipeline at Woodhill Estate from the EA approved deviation (0.62 km) to the preferred alignment within RW servitude (1.16 km).

Taktho Environmental Strategy was appointed to submit an Environmental Management Programme to the Competent Authority (GDRAD) on behalf of Rand Water.

SECTION 3: DESCRIPTION OF THE ASPECTS OF THE ACTIVITY

(b) a detailed description of the aspects of the activity that are covered by the EMP as identified by the project description.

Table 1 describes all the activities that will be undertaken during the lifespan of this project including the identified listed activities and associated activities that do not require environmental authorization, but are needed to achieve the desired objective, that is the extension of the existing substation via:

CONSTRUCTION OF PIPELINE ROUTE RE-ALIGNMENT OF APPROXIMATELY 2KM AT WOODHILL GOLF ESTATE.

SECTION 4: ENVIRONMENTAL MANAGEMENT APPROACH & POLICY

Environmental management approach

The environmental management approach is based on the Deming Cycle rationale (**Figure 4-1**) which is a simplified continuous improvement model consisting of four main iterative steps, namely: Plan, Do, Check and Act (PDCA). PDCA can be briefly described as follows:

- Plan : Establish the objectives and processes necessary to deliver results in accordance with the applicable organisation's environmental policy.
- Do : Implement the process.

- Check : Monitor and measure processes against environmental policy, objectives, legal and other requirements and report the results.
- Act : Take actions to continually improve environmental performance.

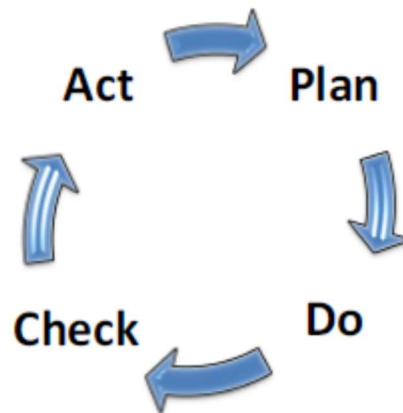


Figure 4-1 : The Deming Cycle

By basing the environmental management approach on the PDCA rationale, the EMP in essence adopts the approach of the internationally recognised ISO 14001 Environmental Management System (EMS) standard. This standard is also based on the PDCA approach which is adaptive and has a strong tendency towards continual improvement.

Continual improvement is achieved by periodic monitoring and review of the EMP and the subsequent implementation of corrective actions when required. Combining the PDCA rationale and ISO 14001 EMS standard translates into the environmental management philosophy and approach for this EMP. This EMP is a living document which should be continuously updated and possibly improved.

Table 1. A detailed description of the activities (including Listed Activities as per the EIA Regulations, 2014 as amended) and resultant aspects of the project that are covered by the EMPr.

Planning & Design (including pre-construction) Phase:

Activity	Sub-activities	Aspects
Compliance with legal requirements by acquiring authorisations, permits and/or licenses for activities/uses undertaken during construction and operation	Protected Species	Impacting protected species prior to obtaining the required licenses / permits.
	Access Roads (not exceed threshold & layout to have minimal impacts)	Poor alignment & extent of linear activities like roads, fences, pipelines or other cleared servitudes can increase runoff, cause erosion and sedimentation of aquatic habitats and result in regulatory non-compliance.
	Servitudes & wayleaves	Commencement without authorisation / permit from relevant authorities.
	Compliance monitoring	Commencement without appointment of an Environmental Control Officer (ECO) to monitor compliance with the EA & EMPr.
	Municipal bylaws	Non-compliance with the municipal bylaws.
	Protection of archaeological findings	Destruction of graves and other sites of archaeological value and need for relevant permits where necessary.
Socio-economic considerations	Employment of local labour	Insufficient employment of local labour.
		Presence of construction workforce.
		Influx of job seekers.
		Job seekers may begin enquiring prior to commencement of construction as awareness of the project grows.

Activity	Sub-activities	Aspects
	Economic benefits from professionals	If the professionals are unreasonably expensive, the funds to head the projects might be exhausted.
	Uncertainty (SIA)	Community confusion, frustration & lack of information.
	Construction and use of Temporary Access Roads	Dust generation.
		Loss of Vegetation, Habitat and soil fertility.
		Increased potential for erosion.
		Increase in vehicle movement in area.
	Provision of sanitation systems	Dust generation.
		Loss of vegetation, habitat and soil fertility.
		Ground water contamination.
	Demarcation, fencing and gates	Loss of vegetation and habitat.
		Impede faunal movement.
		Impeded human movement and disrupted daily activities.
	Vegetation Clearing & Soil Hardening	Loss of vegetation, habitat and soil fertility.
	Working near or on the watercourse	Decline in water availability of water resource.
	Water Use, abstraction and Management	

Construction Phase:

Activity	Sub-activities	Aspects
Site establishment (construction camp, sanitation,	Clear & grub (fence line, operations area, access roads, rack	Dust generation.
		Loss of vegetation, habitat and soil fertility.

Activity	Sub-activities	Aspects
temporary accommodation)	foundations, transformers and inverters, cables, substation)	Noise Generation.
	Construction and use of Temporary Access Roads	Loss of Vegetation, Habitat and soil fertility.
		Increased potential for erosion.
		Increased level of noise generation.
		Increase in vehicle movement in area.
		Dust generation.
	Sanitation	Dust generation.
		Loss of vegetation, habitat and soil fertility.
		Ground water contamination.
	Fencing & gates	Loss of vegetation and habitat.
		Impede faunal movement.
		Impeded human movement and disrupted daily activities.
	Lighting	Visual intrusion in remote areas.
Access control including fencing of perimeter	Construction and use of Temporary Access Roads	Loss of Vegetation, habitat and soil fertility.
		Increased potential for erosion.
		Increased level of noise generation.
		Increase in vehicle movement in area.
		Dust generation.
	Fencing & gates	Loss of vegetation and habitat.
		Impede faunal movement
		Impeded human movement and disrupted daily activities.
Contractor's employees (staff conduct, movement)	Water use and management	Water contamination.
		Misuse of available water.

Activity	Sub-activities	Aspects
	Cooking of food	Harvesting & fire control.
	Sanitation	Unpleasant odours.
		Mismanagement of sewerage.
	Employment of local labour	Insufficient employment of local labour.
		Presence of construction workforce.
		Influx of job seekers.
		Loss of income due to construction work.
Construction of permanent & temporary access roads	Vegetation Clearing & Soil Hardening	Dust generation.
		Loss of vegetation, habitat and soil fertility.
		Increased level of noise generation.
	Impact on the existing road conditions	The development of potholes.
		Damage to vehicles.
		Potential increase in vehicle accidents.
Transport on site & accommodation of traffic (parking areas)	Parking	Increase in vehicle movement in area.
		Impact on the existing road conditions.
		Increase human safety risk.
		Increase in the level of noise generation.
		Greenhouse gas emissions.
	Impact on the existing road conditions	The development of potholes.
		Damage to vehicles.
		Potential increase in vehicle accidents.
Sourcing & management of water (for drinking, sanitation & construction activities)	Drinking, dust suppression & sanitation	Water contamination.
		Misuse of available water.

Activity	Sub-activities	Aspects
Sourcing & management of building material	Excavation of suitable bedding and backfill material	Dust generation.
		Loss of vegetation, habitat and soil fertility.
		Increased potential for erosion.
	Topsoil stripping and storage	Dust generation.
		Loss of vegetation, habitat and soil fertility.
		Increased potential for erosion.
		Soil contamination.
		Encroachment and establishment of alien vegetation.
	Slopes and slope stabilisation	Dust generation.
		Increased potential for erosion.
		Water contamination.
		Decline in aesthetic quality of the environment.
		Increase human safety risk.
Stockpiling and material laydown areas (spoil, mulch, building sand, topsoil, windrows, material & equipment)	Topsoil stripping storage	Dust generation.
		Loss of vegetation, habitat and soil fertility.
		Increased potential for erosion.
		Soil contamination.
		Encroachment and establishment of alien vegetation.
	Slopes and slope stabilisation	Dust generation.
		Increased potential for erosion. The width and depth of the trench, as well as the working place (footprint) adjacent to the trench must be specified in the form of a method statement
		Water contamination.
		Decline in the aesthetic quality of the environment.

Activity	Sub-activities	Aspects
		Increase human safety risk. A safety officer must be on site at all times.
Earthworks & excavations (associated with the substation and transformers foundations)	Trenching	Dust generation.
		Increased potential for erosion.
		Increase human safety risk. The footprint area must be kept to a minimum.
		All trenches and work areas are to be well demarcated by hazard barriers and Signage.
		Open trenches must be checked on a daily basis for any wildlife that may have fallen into them
	Importing of suitable bedding and backfill material	Dust generation.
		Loss of vegetation, habitat and soil fertility.
		Increased potential for erosion.
	Topsoil stripping and storage	Dust generation.
		Loss of vegetation, habitat and soil fertility.
		Increased potential for erosion.
		Soil contamination.
		Encroachment and establishment of alien vegetation.
	Slopes and slope stabilisation	Dust generation.
		Increased potential for erosion.
		Water contamination.
		Decline in aesthetic quality of the environment.
		Increase human safety risk.

Activity	Sub-activities	Aspects
	Crushing of material	Dust generation.
		Loss of vegetation, habitat and soil fertility.
Construction of the substation and transformers and associated infrastructure	Spoil material generation and management	Dust generation.
		Loss of vegetation, habitat and soil fertility.
		Decline in the aesthetic quality of the environment.
	Transportation and storage of the cement and associated materials	Increase in vehicle movement in area.
		Impact on the existing road conditions.
		Increase human safety risk.
		Increase in the level of noise generation.
		Greenhouse gas emissions.
	Protection of archaeological findings	Destruction of graves and other sites of archaeological value.
Handling of waste & generation (solid & hazardous waste including 'spoil', liquid waste, separation, storage and disposal)	Domestic and construction waste collection, storage, handling and disposal	Unpleasant odours.
		Increase in waste generation.
		Decline in the aesthetic quality of the environment.
	Spoil material generation and management	Dust generation.
		Loss of vegetation, habitat and soil fertility.
		Decline in the aesthetic quality of the environment.
Handling of hazardous substances (fuel/oil, cement, bitumen, sewage/grey water) & management (including storage) at sanitation sites, kitchens, batching sites,	Maintenance of sanitation systems	Unpleasant odours.
		Soil contamination.
		Water contamination.
		Mismanagement of sewerage.
	Bund area for fuel storage	Dust generation.
		Loss of vegetation, habitat and soil fertility.

Activity	Sub-activities	Aspects
refuelling areas and on site.		Soil contamination.
	Use of flammable material and other material stores	Dust generation.
		Loss of vegetation, habitat and soil fertility.
		Soil contamination.
	Refuelling of construction vehicles and plant	Soil contamination.
		Water contamination.
	Handling, storage, disposal of hazardous waste	Unpleasant odours.
		Soil contamination.
		Water contamination
	Transportation of hazardous waste	Potential spillages of hazardous waste.
		Increase human safety risk.
		Greenhouse gas emission.
Plant management (parking, driving, repair and maintenance, and refuelling)	Refuelling of construction vehicles and plant	Soil contamination.
		Water contamination.
	Bund area for fuel storage	Dust generation.
		Loss of vegetation, habitat and soil fertility.
		Soil contamination.
	Operation and movement of construction vehicles and plant	Dust generation.
		Increase in level of noise generation.
		Soil contamination.
		Increase human safety risk.
		Vibration.
	Greenhouse gas emissions.	
Building work (concrete work)	Water use and management	Water contamination.

Activity	Sub-activities	Aspects
	Spoil material generation and management	Misuse of available water.
		Dust generation.
		Loss of vegetation, habitat and soil fertility.
		Decline in the aesthetic quality of the environment.
	Excavation of suitable bedding and backfill material	Dust generation.
		Loss of vegetation, habitat and soil fertility.
		Increased potential for erosion.
Disturbing natural areas	Slopes and slope stabilisation	Dust generation.
		Increased potential for erosion.
		Water contamination.
		Decline in aesthetic quality of the environment.
		Increase human safety risk.
	Topsoil stripping and storage	Dust generation.
		Loss of vegetation, habitat and soil fertility.
		Increased potential for erosion.
		Soil contamination.
Site closure & rehabilitation	Removal of structures and infrastructures	Increase in waste generation.
	Removal of inert waste and rubble	
	Hazardous waste and pollution control	
	Final shaping of disturbed areas	Increased potential for erosion.
	Topsoil replacement and soil	

Activity	Sub-activities	Aspects
	amelioration	
	Ripping and scarifying	
	Planting	
	Grassing	Encroachment and establishment of alien vegetation.
	Maintenance	Loss of vegetation, habitat and soil fertility.
	Management of alien vegetation	

Operation (including maintenance) Phase:

Activity	Sub-activities	Aspects
Operation employment	Consultation with affected parties	Insufficient consultation.
	Employment of local labour	Insufficient employment of local labour.
		Presence of construction workforce.
		Influx of job seekers.
Consumption (energy, water, and other resources)	Water use and management	Water contamination.
		Misuse of available water.
	Cooking of food	Fire hazard.
		Illegal wood harvesting.
Maintenance	Refuelling of construction vehicles and plant	Soil contamination.
		Water contamination.
	Handling, storage & disposal of waste	Unpleasant odours.
		Soil contamination.
		Water contamination.

Activity	Sub-activities	Aspects
	Maintenance of sanitation systems	Unpleasant odours.
		Mismanagement of sewerage.
Lighting to create visibility at night	Use of generators	Increase in level of noise generation.
		Soil contamination.
	Security	Trespassing.
Terrestrial and aquatic ecological management	Use of herbicides	Loss of vegetation, habitat and soil fertility.
		Soil contamination.
	Harvesting of indigenous plants	Encroachment and establishment of alien vegetation.
	Overgrazing	Increased potential for erosion.
		Dust generation.
Substation and transformers	Cleaning & Maintenance	Water contamination.
		Misuse of available water.
Social & community changes	Security	Trespassing.
	Fire Control	Loss of vegetation, habitat and soil fertility.
	Employment of local labour	Insufficient employment of local labour.
		Presence of construction workforce.
		Influx of job seekers.
	Visual aspects	Visual Intrusiveness.
Disposal of substation and transformer reinforced concrete and other waste	Demolition activities	Dust generation.
		Increased level of noise generation.
		Vibration.
		Increase in waste generation.
		Increase human safety risk.
	Removal of inert waste and rubble	Decline in the aesthetic quality of the environment.

Activity	Sub-activities	Aspects
		Soil contamination.
	Treatment or disposal of waste	Soil and groundwater contamination.
Roads and access routes	Topsoil stripping and storage	Dust generation.
		Loss of vegetation, habitat and soil fertility.
		Increased potential for erosion.
		Encroachment and establishment of alien vegetation.
	Road decommissioning & rehabilitation	Dust generation.
		Increased level of noise generation.
		Soil contamination.
Rehabilitation of affected footprint	Removal & transportation of structures and infrastructures;	Increase in vehicle movement in area.
		Impact on the existing road conditions.
		Increase human safety risk.
		Increase in the level of noise generation.
		Greenhouse gas emissions.
		Increased potential for erosion.
	Maintenance & management of alien vegetation	Loss of vegetation, habitat and soil fertility.
		Increased potential for erosion.
	Planting & grassing	Loss of vegetation, habitat and soil fertility.
	Topsoil replacement and soil improvement	
	Final Shaping of disturbed areas	Increased potential for erosion.

SECTION 5: LAYOUT MAP OF PROPOSED ACTIVITY

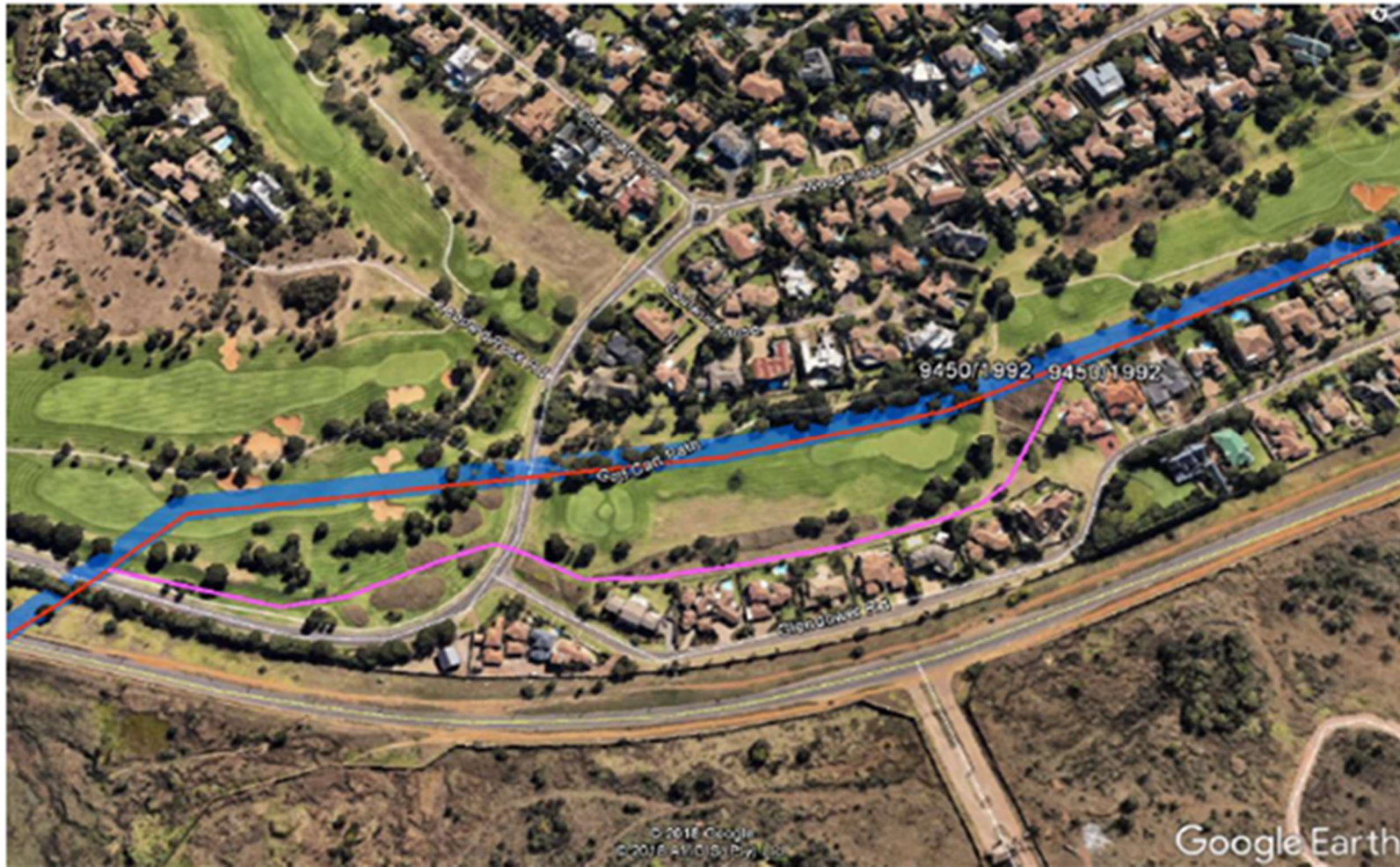
(c) a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that any areas that should be avoided, including buffers.

“The Environmental Management Programme (EMPr) to be submitted as part of the BAR must include the following:

- i. The final site layout map.*
- ii. An environmental sensitivity map indicating environmental sensitive areas and features identified during the BA process.*
- iii. A map combining the final layout map superimposed (overlain) on the environmental sensitivity map.”*

Figure 1. Provides a map of the final site layout of the proposed pipeline route re-alignment of approximately 2km at Woodhill golf estate.

Figure 1. Site layout map: Option C (Pink line) – approved deviation, red line indicates the proposed re-alignment within Rand Water servitude (blue area).



SECTION 6: ACTIVITIES, ASPECTS AND IMPACTS AND THEIR MANAGEMENT, MITIGATION & DESIRED OUTCOMES

(d) a description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including-

- (i) planning and design;*
- (ii) pre-construction activities;*
- (iii) construction activities;*
- (iv) rehabilitation of the environment after construction and where applicable post closure; and*
- (v) where relevant, operation activities;*

(f) a description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable, include actions to -

- (i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;*
- (ii) comply with any prescribed environmental management standards or practices;*
- (iii) comply with any applicable provisions of the Act regarding closure, where applicable; and*
- (iv) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;*

(g) the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);

(h) the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);

(i) an indication of the persons who will be responsible for the implementation of the impact management actions;

(j) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;

(k) the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);

(l) a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;

(m) an environmental awareness plan describing the manner in which-

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

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

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

The impacts are considered within the scope of the project, including but not limited to the Listed Activities. The relevant impacts resulting from Listed Activities and

associated activities, including environmental, socio-economic and cultural heritage, are informed by a predetermined list of potential environmental impacts.

As stipulated in regulation 1(1)(d) of Appendix 4 of the EIA regulation (2104), as amended; the setting of desired impact management outcomes forms the principle objective of an EMP. Outcomes are driven by impact management actions including measures and mitigations to avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; to comply with any prescribed environmental management standards or practices, including legal requirements and in some cases, “best practices” that the Implementer aspires to fulfil (e.g. Equator Principles). The outcomes are achieved by implementing and achieving measurable Targets (both quantitative & qualitative). Management and mitigation measures are set to afford guidance and parameters to the implementer to achieve the set outcomes. The following section describes management programmes for the different environmental attributes pertaining to the Project. As part of the Management Programmes, the section describes the potential environmental impacts which may result from the identified aspects / activities, the desired outcomes of mitigating these impacts as well as the targets used to measure the level of environmental compliance and performance.

The following legislation, guidelines, departmental policies, environmental management instruments and / or other decision-making instruments that have been developed or adopted by a competent authority in respect of activities associated with a development of this nature, were identified and considered in the preparation of this EMP:

1. Constitution of the Republic of South Africa Act, 1996 (No. 108 of 1996), including section 24;
2. Conservation of Agricultural Resources Act, 1993 (No 43 of 1983) and the regulations dealing with declared weeds and invader plants;
3. DAFF (1970) Sub-Division of Agricultural Land Act, 1970 (No. 70 of 1970),
4. DEA (2010), Guideline on Need and Desirability, Integrated Management Guideline Series 9, Department of Environmental Affairs (DEA), Pretoria, South Africa.
5. DEA (2010), Public Participation 2010, Integrated Environmental Management Guideline Series 7, Department of Environmental Affairs, Pretoria, South Africa;
6. DEA (2011), National list of ecosystems that are threatened and in need of protection. GN 1002, GG 34809, 9 December 2011.
7. DEA&DP (2010), Guideline on Alternatives, EIA Guideline and Information Document Series. Western Cape Department of Environmental Affairs & Development Planning (DEA&DP);
8. DEAT (2002), Specialist Studies, Information Series 4, Department of Environmental Affairs and Tourism (DEAT), Pretoria;
9. DWA (2007), Guideline for Developments within a Flood line (Edition 1), Department of Water Affairs and Forestry, Pretoria, South Africa;
10. DWAS (2016), General Authorisation in GN No. 538 published in Government Gazette No. 40243 dated 2 September, 2016;

11. Environment Conservation Act, 1989 (No 73 of 1989), including Schedules 4 and 5 of the National Regulations regarding Noise Control made under Section 25 of the Environment Conservation Act, 1989 (Act 73 of 1989) in GN No. R 154 of Government Gazette No. 13717 dated 10 January 1992. (Note that this particular section of the Environment Conservation Act is not repealed by NEMA (107 of 1998)). Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983);
12. Minerals and Petroleum Resources Development Act, 2002 (No 28 of 2002);
13. Biodiversity Conservation Sector Plan (2014)
14. National Environmental Management Act, 1998 (No 107 of 1998) including EIA Regulations, 2014 published in Government Notice No. R. 982, R. 983, R. 984 and R. 985 in Government Gazette No. 38282 dated 04 December 2014;
15. Amended EIA Regulations, 2014 published in Government Notice No. R. 324, R. 325, R. 327 and R. 328 in Government Gazette No. 40772 dated 07 April 2017;
16. National Environmental Management: Air Quality Act, 2003 (No 57 of 2003) including the list of activities which result in atmospheric emissions published in GN No. 248 of Government Gazette No. 33064 dated 31 March 2010;
17. National Environmental Management: Biodiversity Act, 2004 (No 10 of 2004);
18. National Environmental Management: Waste Act, 2009 (Act No. 59 of 2009) ("NEM: WA");
19. National Forest Act, 1998 (No 84 of 1998);
20. National Heritage Resources Act, 1999 (No 25 of 1999);
21. National Veld and Forest Fire Act, 1998 (No 101 of 1998);
22. National Water Act, 1998 (Act No. 36 of 1998), Sections 27, 28,29,30,31 and 39 (Sections dealing with General Authorisations and Water Use Licenses);

The following management programme aims to set management actions to achieve stated desired outcomes for each environmental aspect, including quantifying the measurable targets. While the impacts and management & mitigations have been addressed under the various project development phases, they are not intended to be mutually exclusive, and impacts from one phase are likely to occur in subsequent phases; but in the interest of reducing redundancy they have not been repeated for each phase. The appendices to this EMP form part of the EMP and must be implemented accordingly. If conditions within the following tables in anyway contradict the conditions of the aspect specific Management Plans (MP) in the appendices, the MP conditions must take precedent.

Table 2. Compliance Management.

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
2.1	All Phases with special emphasis on Planning & Design Phase (including Pre-Construction)						
2.1.1	PROTECTED SPECIES						
1	Impacts on protected plants.	Comply with the relevant sections of the National Forest Act (NFA) (Act 84 of 1984), National Environmental Management: Biodiversity Act, 2004 (NEM:BA) (Act No. 10 of 2004), and the Northern Cape Nature Conservation Act (NCNCA) (Act 9 of 2009).	Obtain and provide proof of issuance of necessary permits for any listed species under NFA, NEMBA & NCNCA.	The applicant shall apply for and obtain the relevant licenses / permits from the appropriate authorities (DAFF, DEA, and Provincial Authority) prior to disturbing or destroying any protected species.	Applicant / Contractor to appoint botanist.	Prior to commencement of construction.	Compliance to be verified by ECO & SEO.
2.1.2	WATER USE AUTHORISATION TO WORK WITHIN A WATERCOURSE						
1	Contravention of	The	Obtain a GA or	The preferred alternative	Applicant /	Prior to	Compliance

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
	section 21 (c) & (i) of the NWA.	commencement of water uses that are authorised in terms of the NWA, 1998 (Act No. 36 of 1998).	WUL for section 21(c) and (i) water uses, prior to constructing the substation and transformers.	development footprints will not be within a riparian zone and will be no need register a water use entitlement, i.e. a GA or WUL for section 21(c) and (i) water uses, prior to constructing the substation and transformers.	EAP.	commencement of construction.	to be verified by ECO & SEO.
2.1.3	Access Roads						
1	The construction or expansion of any access roads in exceedance of thresholds stipulated in NEMA listed activities, 2014.	Existing roads to be utilised.	Existing roads were not widened by more than 6m or lengthened by more than 1km.	Newly constructed service roads may not be wider than 4 metres with a reserve less than 13.5 metres, nor the widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre.	Applicant / Contractor.	Prior to commencement & throughout construction.	Compliance to be verified by ECO & SEO.
2.1.4	Compliance Monitoring						
1	Commencement of construction prior to the appointment of an ECO.	Ensure compliance with the WML and EMPr from the onset of construction and until the rehabilitated development is handed over to the Applicant for	Proof of ECO appointment prior to commencement of construction.	A qualified, suitably experienced & accredited independent ECO must be appointed to monitor and report to the competent authority on compliance with the EA and EMPr, and where necessary oversee or facilitate the identification and permitting / licensing of protected species prior to	Applicant.	Prior to commencement of construction and until the rehabilitated development is handed over to the applicant for operation. The minimum frequency for	To be verified by SEO.

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
		operation.		clearing of any vegetation.		ECO inspections is monthly.	
2.1.5	Municipal By-laws						
1	Commencement of construction prior to submission and approval of building plans by the City of Tshwane Local Municipality.	Local municipality approval of building plans.	Issuance of a certificate referred to in section 118(1) of the Local Government: Municipal Systems Act (Act 32 of 2000).	The plans and specifications for any building, whether of a temporary or permanent nature, to be erected on the land must be submitted to the City of Tshwane Local Municipality for approval in terms of the Local Government: Municipal Systems Act, 2000 (Act No. 32 of 2000).	Applicant.	Prior to commencement of construction.	Compliance to be verified by ECO & SEO.

Table 3. Construction Camp, Laydown Areas, Stockpiles, Stores & Equipment.

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
3.1	Planning & Design Phase (including Pre-Construction)						
1	Land surface pollution.	Low risk of pollution or harm to sensitive environments from the inappropriate location of construction related sites within or within proximity to those sensitive environments.	Approved and effectively implemented layout plan indicating designated construction-related sites.	<p>A construction site layout plan must be developed by the contractor and approved by the SEO to ensure that all construction related sites are located outside sensitive environments, including no-go areas and buffer zones.</p> <p>Furthermore, those construction related sites or activities with the greater risk or potential for causing pollution or harm to the receiving environment, including but not necessarily limited to laydown areas, material stockpiles, toilets, waste skips and stores, must not be within close proximity to the aforesaid sensitive environments, i.e. these construction related sites or activities must not, as far as is</p>	Applicant / Contractor	Prior to commencement of construction.	SEO, ECO & SEO.

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				practical, be located on the watercourse-side of any construction camp or area demarcated for construction activities.			
2	Degradation of the environment outside of the development footprint.	Zero construction creep into and subsequent degradation of areas outside the preferred or approved development footprint.	Approved and effectively implemented (demarcated on site) layout plan indicating all environmental sensitivities, especially no-go areas,	<p>Permanent and temporary construction footprints must be designated, and sensitive terrestrial & aquatic habitats demarcated as no-go areas during construction, including required buffer zones.</p> <p>The Contractor shall locate the construction camp on existing disturbed or the least sensitive sites above the 1:100-year flood line or further than 100m from the edge of a watercourse, whichever is greatest.</p> <p>The project footprint must be clearly demarcated on the ground to ensure that no construction creep results toward any watercourses or</p>	Applicant / Contractor	Prior to and ongoing enforcement during construction.	SEO, ECO & SEO.

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				<p>defined sensitive areas.</p> <p>Placement of infrastructure and laydown & stockpile areas must be done so as not to negatively affect surface water runoff in a way that leads to erosion and export of material to be deposited in any watercourses.</p>			
3.2	Construction Phase						
1	Land surface pollution.	To avoid and reduce human induced environmental pollution.	Incident registers that indicate reduction in pollution events, from the operation of construction plant, equipment or other vehicles, over time.	<p>Emergency breakdowns in the parking areas or along roads, must be addressed with immediate and adequate pollution containment measures have been implemented including but not limited to drip trays and spill kits.</p> <p>No washing of plant and equipment within the construction camp, and no repairs or servicing of construction plant, equipment or other vehicles, except for</p>	Applicant / Contractor	Throughout construction.	SEO, ECO & SEO.

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				<p>emergency breakdowns, are permitted within the preferred or approved development footprint, construction-related areas, no-go areas and on neighbouring properties.</p> <p>The contractor(s) and any sub-contractors, including their employees, are prohibited from entering the designated no-go areas for whatever reason and without the prior written consent of the SEO.</p> <p>Refuelling of vehicles and plant may only take place at a designated and permitted (from local Fire Chief) fuel storage tank or mobile fuel bowser, under the guidance of a Specific Operating Procedure (SOP) that limits spillage and addresses remedial actions in the event of a spillage.</p>			

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				<p>The contractor shall restrict the following activities to the construction camp:</p> <ul style="list-style-type: none"> - Sanitation, - Waste storage, - Parking, - Storing hazardous materials, - Emergency vehicle & plant repair & maintenance as far as practicable, - Designated concrete mixing area - Material stockpiles, and - Lay down areas. <p>Use chemical toilets that contain the sewerage in a closed and removable 'tank', i.e. do not use open drums. Environmentally friendly toilets should also be considered e.g. E-loo's.</p> <p>Use drip trays for refuelling, emergency repair / maintenance work and all</p>			

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				stationary construction plant and equipment that can leak, such as TLBs, compressors and generators. Washing of equipment including brushes shall not occur on site or in a watercourse but shall be restricted to the main construction camp where adequate containment measures are in place.			
2	Noise pollution.	To avoid nuisance noise to affected landowners & occupiers and reduce noise impacts to the environment.	Noise must fall within the parameters set by: 1.(SANS) Standard 10103:2008: The measurement and rating of environmental noise with respect to annoyance	Noise generation must be managed, including the use of radios and other music playing appliances. Vehicles and plant must be in a good state of repair to limit noisy operations.	Applicant / Contractor.	Frequency of monitoring as stipulated in relevant regulation and standard, as amended from time to time.	SEO or appointed specialist service provider. Verification to be done by ECO & SEO.

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
			and speech communication. 2.DEA Regulations No. R.154. Noise Control Regulations promulgated in terms of Section 25 of the Environment Conservation Act, 1989 (Act No. 73 of 1989). GG No. 13717, 10 January 1992.				
3	Degradation of the environment outside of the development footprint.	To avoid impacts to the biodiversity integrity and ecological function of areas outside	No impacts outside the development footprint. All contraventions to be recorded in incident	No residues of stockpiled material must be left on site, that can impede restoration of ecological function and remain a visual intrusion on the landscape.	Applicant / Contractor.	Update to incident register following each contravention.	ECO & SEO.

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
		the development footprint.	register.	<p>Disturbed habitats resulting from construction-related activities must be rehabilitated immediately after the cessation of those activities on or near the disturbed habitats.</p> <p>The alignment of fences or roads and the placement of potential impediments, such as walls, laydown & material stockpile areas must not alter surface water runoff patterns (i.e. impede or increase surface water runoff) in a way that will cause ponding or erosion and sedimentation of a watercourse.</p>			
No significant operational or decommissioning impacts expected.							

Table 4. Waste Management (Generation, Handling, Storage And Disposal, Including Hazardous Waste).

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
4.1	Planning & Design Phase (including Pre-Construction)						
1	Shortening the lifespan of the local waste	To minimise the generation of project-specific	Keep accurate records of waste	Establish and implement an Integrated Waste Management Strategy	Applicant / Contractor (SEO).	Prior to commencement of construction	ECO & SEO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
	disposal sites.	waste by implementing an effective waste management strategy based on the waste hierarchy.	volumes (litres, kg and / or m ³) generated by type.	<p>including avoidance, reduction, re-using, recycling and disposal, i.e. the production of hazardous waste can be avoided by providing drip trays, reduce waste by using the correct quantities, re-use concrete rubble as back fill or recycle steel off-cuts and dispose of non-hazardous solid waste at a registered municipal dump site.</p> <p>Induct all labourers on the waste management strategy and enforce it through regular (at least weekly) toolbox talks.</p> <p>Keep accurate records of waste generated by type.</p>		with ongoing maintenance and updates to Strategy.	
4.2	Construction Phase						
1	Removal of inert Waste and rubble.	Maintain ecological function and agricultural	Zero concrete hard pan layers observed on	In the unlawful event of concrete hard pan layers, break up all concrete hard pan layers and dispose of	Applicant / Contractor (SEO).	For each disposal event.	ECO & SEO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
	Loss of ecological function and agricultural potential.	potential'	the ground.	appropriately (at a legitimate dump site) or re-use the concrete.			
2	The high economic cost of disposing hazardous waste at authorised landfills, and potential contamination of land by illegal dumping.	The reduced generation of hazardous waste and the avoidance of environmental (land and water) contamination.	Indicators and trends in hazardous waste generation and management over time while considering amount of active construction to contextualise efforts. All waste waybills and landfill licenses in register and on file.	The contractor shall contain contaminated water from washing brushes and other tools as well as the dirty water (possibly hazardous) in a conservancy tank until sufficient volume warrants disposal by a registered hazardous waste management company. The contractor shall return used oil to the supplier or an oil recycling company.	Applicant / Contractor (SEO).	Throughout construction.	ECO & SEO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
3	Solid and liquid waste can be harmful to fauna if swallowed / ingested or if the creature becomes entangled or impaled.	Healthy animals (wild and domesticated).	Zero incidence (in the incident register) of waste induced harm to wildlife or livestock. No litter observed in the development footprint and no-go areas.	Designate a temporary waste storage area, enclose it in a fence that cannot be breached by fauna, and provide sufficient scavenger proof dust bins with black bags inside the construction camp. Do not litter and ensure sound housekeeping.	Applicant / Contractor (SEO).	Throughout construction.	ECO & SEO.
4	Improper handling, storage or disposal of waste can cause toxicity – the introduction of toxic or hazardous substances into a watercourse - spills can be washed into the watercourse by	To ensure sound waste management practices that do not affect any aquatic environments.	Zero incidence (in the incidence register) of waste induced impacts on aquatic environments.	Hard-surfaces and parking areas with storm water outlets should not channel litter, oil and fuel spills into a watercourse, causing water pollution. The contractor is prohibited from discharging waste water, including domestic water from sanitation facilities, into a watercourse.	Applicant / Contractor (SEO).	Throughout construction.	ECO & SEO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
	storm water run-off.			The contractor shall store & contain hazardous chemicals within a secure, safe and bunded facility at the construction camp, to ensure spillages do not enter any aquatic environments.			
5	Construction activities will produce solid and liquid waste, which can contaminate the ground (litter, spillage) if improperly handled, stored or disposed.	To reduce contamination of the soil through improper management of waste.	Low incidence of waste induced ground contamination, with a trend indicating constant improvement over time (not just quantities but procedural improvements too). Suitable close-out documentation	Do not mix concrete on open ground. Mix in a wheel barrow, a mixing tray or on a level plastic sheet. In the event of a leak or spill onto the ground, immediately remove contaminated soil to the depth of penetration and temporarily store in a designated solid hazardous waste container until sufficient volume warrants disposal at a registered hazardous waste dump site. Alternatively, onsite treatment of contaminated soil should be considered	Applicant / Contractor (SEO).	Throughout construction.	ECO & SEO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
			and reviews of SOPs & MS following significant contamination events.	<p>with a registered hazardous waste management company.</p> <p>The burning, burying or illegal dumping of waste is prohibited.</p> <p>When handling hazardous materials, such as when refuelling vehicles or generators, the contractor shall implement appropriate precautionary measures, such as a ground cover or drip trays, to prevent spills from contaminating the ground.</p> <p>The contractor shall prevent the run-off of slurry or cement contaminated water from concrete / plaster mixing sites.</p> <p>Adequate waste receptacles must be available, including</p>			

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				<p>those that track with the active work fronts, to ensure effective waste management.</p> <p>Remove ineffective danger tape / netting that has begun to litter the site or surrounding areas.</p> <p>Follow housekeeping rules to avoid littering (littering is likely to be more prevalent at designated eating / rest areas).</p>			
6	The contamination of soil.	To reduce the amount of hazardous waste, specifically contaminated soil, that is generated during construction.	<p>Sound management & disposal of contents of drip trays and / or utilisation of alternative hydrocarbon absorbents in drip trays.</p> <p>Zero sand</p>	<p>Use drip trays for refuelling, emergency repair work and all stationary construction plant and equipment that can leak, such as TLBs, compressors and generators.</p> <p>Drip trays must be regularly emptied, or they can be filled with hydrophobic hydrocarbon absorbent</p>	Applicant / Contractor (SEO & Plant Operators).	Throughout construction.	ECO & SEO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
			<p>observed in drip trays and bunds.</p> <p>Zero spills or leaks observed under or near stationary construction plant and equipment.</p>	material to avoid the content from overflowing during rainfall events.			
7	The contamination of soil (and generation of waste) by undesirable practices.	To reduce the amount of hazardous waste, specifically contaminated soil, that is generated during construction.	Zero observations of spills covered with soil.	<p>Do not cover spills with virgin soil. It merely increases the disposal cost for a greater volume of hazardous waste.</p> <p>Utilise as an alternative, hydrocarbon absorbents, for spillages.</p>	Applicant / Contractor.	Throughout construction.	ECO & SEO.
8	Illegal dumping will result in the loss of certain land uses like agriculture and conservation and	Continued self-sustainability of the site's ecological and agricultural integrity.	<p>Waybills or receipts from the service provider.</p> <p>No evidence</p>	The contractor shall dispose of general waste, that cannot be recycled, at a registered municipal dump site.	Applicant / Operator.	Throughout operation,	SEO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
	remove natural habitat.		of illegal dumping of project-specific waste within the development footprint, no-go areas or neighbouring properties.	All waste to be removed to a suitable waste disposal facility by a registered service provider.			
4.3	Operational Phase						
1	Solid waste can be blown away and into the landscape.	A pristine environment, devoid of wind-blown litter.	No litter or other open sources of waste observed within the fenced premises.	The site will be kept tidy always. All waste shall be picked up daily. Maintain good housekeeping tendencies.	Applicant / Operator.	Throughout operation.	SEO.
4.4	Decommissioning Phase						
1	The generation of potentially harmful waste that has the potential of contaminating the environment if	To minimize waste and ensure suitable disposal at the end of project life.	No evidence of residual structures relating to the project, unless specifically retained at	Properly dispose of all waste & residual structures. The substation and transformers should be emptied of all residual waste and taken to a licenced	Applicant.	At decommissioning phase.	SEO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
	not disposed at a licensed landfill or, if disposed at an appropriate landfill, reduces the capacity and lifespan of that site.		landowner's request.	waste management facility for either treatment or disposal.			
2	Illegal dumping sites cannot retain the ecological functions and land use required to generate ecosystem goods and services and tangible economic benefits including income from conservation or farming.	To ensure that no illegal waste dumps are left in situ following decommissioning.	Restoration of the footprint to a functional ecological and agricultural state.	The illegal dumping or disposal of waste generated from the decommissioning of the substation and transformers within the development footprint, no-go areas or on adjacent properties is strictly prohibited.	Applicant.	At decommissioning phase.	SEO.

Table 5. Fauna & Flora Management.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
5.1	Planning & Design Phase (including Pre-Construction)						
1	The construction of the substation extension can destroy plants of conservation concern.	To reduce the impacts of roads on fauna & flora.	The successful relocation of plants of conservation concern into suitable habitats.	Prior to the construction of any new roads, a search & rescue must be conducted by a suitably qualified specialist for protected fauna & flora and that of conservation concern; which must then be transplanted outside the works area in a comparative habitat type. Ascertaining similar habitat types may require soil sampling and analysis over and above above-ground similarities.	Applicant / Contractor.	Prior to & during construction.	SEO, ECO & SEO.
5.2	Construction Phase						
1	Increased risk of alien plant invasion to the detriment of the local ecology and agricultural potential.	To effectively control the invasion of any alien plants.	No new alien plant recruitment (directly or indirectly resulting from construction activities) within the development footprint and	Alien invasive vegetation recruitment must be controlled within and along the fence lines of the substation and transformer footprints. Manual control measures are preferred, but where herbicides are used they must be those	Applicant / Contractor.	Throughout construction.	SEO, ECO & SEO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
			neighbouring no-go areas or properties.	<p>endorsed & selective for the target species with the lowest environmental toxicity.</p> <p>Applicant shall collect and destroy all seeds of weed, invader and alien plant species occurring within disturbed and/or rehabilitated areas.</p> <p>Applicant shall immediately uproot, cut or debark weed, invader and alien plant species upon being identified.</p> <p>Areas disturbed during construction shall be monitored for the recruitment of weed, invader and alien plant species and controlled immediately upon being found to occur.</p>			

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				Recruitment of alien and invasive plants must be controlled to ensure they do not seed and propagate (both declared weeds and those that are outside of their natural distribution).			
2	Construction activities (i.e. clearing and grading) have the potential to directly impact, that is damage / injure and destroy / kill, local fauna and flora. (The impacts are exacerbated when the species affected are classified as protected, sensitive, rare, or threatened	To reduce in situ losses of protected and conservation important flora & fauna.	Spatially explicit "Search & Rescue" register indicating the nature & position of all translocated flora & fauna.	<p>A search and rescue must be undertaken of all footprints that will be temporarily or permanently affected during construction of the development footprint.</p> <p>All fauna and flora that are protected or of conservation importance must either be cordoned off and protected or translocated outside of the site establishment and substation and transformers footprint, into habitats of a similar nature.</p>	Applicant / Contractor. All search & rescue & translocation activities must be carried out by suitably qualified specialists.	Pre-Construction.	ECO & SEO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
	and endangered).			Avoid direct contact with fauna, through clearing and grading as it can cause injury or death.			
3	Harvesting of: - indigenous plants for muthi - firewood; and - poaching of animals.	To ensure no harvesting of natural resources within and adjacent to the development footprint.	Zero incidence of harvesting. All incidences recorded in the incident register including close-out actions.	The harvesting or collection of any natural product(s) from the environment is strictly forbidden. Do not poach or hunt animals within development footprint, no-go areas and neighbouring properties. “Problem” animals must be handled with assistance from the provincial conservation authority. Except for search and rescue operations authorized by the ECO, no mammal, bird, reptile,	Applicant / Contractor.	Throughout construction & operation.	ECO & SEO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				invertebrate or fish shall be intentionally caught, hunted or poached, within the development footprint and no-go areas.			
5.3	Operational Phase						
1	Disturbance to or destruction of roosting & nesting sites.	An uninterrupted breeding season for the avifauna.	The effective control of incidental bird breeding sites with the least impact to the affected birds during the breeding season, and then the prevention of future disturbances.	<p>Birds should not be shot, poisoned or harmed as this is not an effective control method and has negative ecological consequences.</p> <p>Birds already with eggs and chicks should be allowed to fledge their chicks before nests are removed.</p> <p>If there are any persistent problems with avifauna, then an avifaunal specialist should be consulted for advice on further mitigation.</p>	Applicant / Operator through appointed avifauna specialist.	Throughout construction & operation.	SEO & Avifauna Specialist.
5.4	Decommissioning Phase						
1	Impacts on	To ensure	No degraded	Reinstate ecological	Applicant /	At completion of	SEO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
	biological functioning and productivity of vegetation.	restoration of ecological function following decommissioning.	areas within the decommissioned footprint.	function by recreating an open system by removing all project related fencing. The Applicant is to rehabilitate the site after decommissioning.	Landowner.	decommissioning activities	
2	Alien Plant Invasion Risk.	To ensure no residual alien plants at cessation of operations.	Zero incidence of alien plants within the decommissioned footprint.	The rehabilitated servitudes shall be monitored following the completion of decommissioning of the substation and transformers for the recruitment and subsequent control of weed, invader and alien plant species, in accordance with Appendix 1 of this EMPr.	Applicant / Landowner.	At completion of decommissioning activities, within the growth season, as well as the following growth season following decommissioning.	SEO.

Table 6. Water Use & Management (Including Watercourses).

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
6.1	Planning & Design Phase (including Pre-Construction)						

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
1	Decrease in water quality of watercourses.	To minimise the risk of impacts to water resources in and around the project footprint.	No high-risk activities located within close proximity to water resources.	Avoid placing high risk (pollution generating) activities within close proximity to a watercourse as they can cause water pollution.	Applicant / Contractor.	During site establishment & throughout construction.	SEO, ECO & SEO.
6.2	Construction Phase						
1	Excessive abstraction from a watercourse or aquifer.	To reduce water usage for construction activities.	Evidence of dust control additives used to minimise water usage for dust suppression activities, including completed logbooks and no evidence of over wetting, i.e. erosion or pools of	An environmentally friendly water-soluble dust control additive / binder must be added as an additive to the water used for dust suppression. The additives generally assist with surface stabilization thereby significantly reducing water usage. All water bowsers must maintain logbooks in which quantities used for construction and dust suppression are recorded. Water bowsers implementing	Applicant / Contractor.	Throughout construction.	SEO, ECO & SEO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
			water (puddles).	dust suppression, must determine optimal rates of application to ensure over-wetting does not occur.			
2	Decrease in water quality of water resources.	To minimise the risk of water contamination and activities that impact negatively on water quality.	All high-risk activities to be located at least 100m away from any water resource (surface or ground).	Chemical toilets shall be in the shade, at least 100m from any watercourse. Re-fuelling with a mobile fuel bowser shall take place outside any watercourse.	Applicant / Contractor.	Throughout construction.	SEO, ECO & SEO.
6.3	Operational Phase						
1	Impediments to surface water runoff.	To retain as far as possible surface water hydrology.	Limited signs of erosion along or resulting from the fence line.	Fence lines must be regularly cleared of accumulating debris (accumulating debris does not refer to living plants, otherwise the removal of plants will cause more erosion), to allow surface water to flow uninhibited across the development footprint.	Applicant / Operator.	Throughout operation.	SEO.
2	The excessive and / or wasteful use of water has	To use water in a manner that is ecologically	No drips, leaks or other	Water leaks shall be repaired immediately upon being found.	Applicant / Operator.	Throughout operation.	SEO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
	the potential to reduce the ecological reserve required for sustaining the local ecosystem.'	sustainable and not wasteful.	evidence of wasteful water use.	<p>Water-saving showerheads shall be used, where relevant.</p> <p>Place a cistern displacement device in the toilet cistern.</p> <p>Educate employees on the importance and practices of water efficiency.</p> <p>If practical, consider harvesting rainwater from drainpipes.</p> <p>Use an aerator and / or a water flow-reducing spout on the taps and shower heads.</p>			
3	Poor water quality can be a health risk or harmful to humans and animals.	To ensure safe potable water for employees and livestock.	Compliance of potable water to SANS 241 standard.	Water used for potable (drinking) purposes must be tested to ensure compliance with the minimum standards. Should elements of the water not comply, the water must be treated to ensure no acute or chronic health risks.	Applicant / Operator.	Quarterly.	SEO.
There are no significant decommissioning related impacts expected.							

Table 7. Air Quality Management.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
7.1	Planning & Design Phase (including Pre-Construction)						
No pre-construction impacts associated with this phase.							
7.2	Construction Phase						
1	Old and poorly maintained vehicles cause the most air pollution from cars, specifically GHG emissions that are released to the atmosphere, contributing to global warming and acid rain.	To reduce the level of car or other combustion-related pollutants entering the atmosphere (by keeping well-maintained plant and equipment).	Evidence of servicing at required intervals. No visible evidence of excessive emissions.	Construction plant and equipment shall be kept in a good state of repair to reduce combustion-related emissions.	Applicant / Contractor.	During construction.	Plant Manager, SEO, ECO & SEO.
2	Negative effects on floral photosynthetic functioning and potential increase in breathing ailments of site staff, surrounding landowners,	To manage dust entrainment on access roads which may not exceed the thresholds stipulated in the National Dust Control	Full compliance with National Dust Regulations. Acceptable Dust fallout rate	Effective implementation of the National Dust Control Regulations. Excessive vehicle movement, and the transport and off-loading of dispersive materials shall be avoided during windy conditions, unless additional	Applicant / Contractor.	During construction, monthly.	Monitoring of dust fallout to be undertaken by a professional service provider and compliance

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
	communities and fauna.	Regulations.	(mg/m ² /day): Residential area < 600 Non-residential area < 1200 Exceedance not more than twice in a year, not sequential months.	dust suppression methods will ensure that the dust fallout does not exceed the acceptable limits. We suggest that the contractor take into consideration predicted wind speeds from the local weather station when planning construction-related activities with a high risk of generating dust. Dust suppressant must be prioritised for the drilling activities.			to be verified by ECO & SEO.
3	Safety risks and road accidents due to reduced visibility.	To reduce vehicular accidents due to poor dust-induced visibility.	Full compliance with National Dust Regulations.	Dust suppression must be carried out on access roads where high dust entrainment is evident.	Applicant / Contractor.	During construction. Dust fallout evaluation monthly and dust suppression as conditions dictate.	Monitoring of dust fallout to be undertaken by a professional service provider and compliance to be verified by ECO & SEO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
4	Unpleasant odours.	To reduce unpleasant odours often associated with ablution facilities.	Records of regular servicing, and daily cleaning log.	Chemical toilets shall be kept hygienic and cleaned daily to avoid unpleasant odours.	Applicant / Contractor.	During construction.	SEO, HSO, ECO & SEO.
7.3	Operational Phase						
1	Decrease in air quality.	To manage dust entrainment on access roads which may not exceed the thresholds stipulated in the National Dust Control Regulations.	Full compliance with National Dust Regulations.	Effective implementation of Dust Control Regulations. Dust suppression must be carried out on access roads to minimise operational dust emissions.	Applicant / Operator.	As required to minimise dust emissions.	SEO.
2	Unpleasant odours.	To manage odour generated by the substation and transformer waste treatment.	Excessive odour to be investigated and any complaints received.	Effective implementation of WML conditions for waste treatment and prevention of odours.	Applicant / Operator.	During Operation	SEO, HSO, ECO & SEO.
There are no significant impacts anticipated during the decommissioning phase.							

Table 8. Soil Management.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
8.1	Planning & Design Phase						
1	Loss of valuable topsoil.	To minimise disturbance & contamination of topsoil.	Compliance with site layout plans.	Clearing, and the location of topsoil stockpiles and / or windrows, shall take place in pre-authorised and clearly defined areas only.	Applicant / Contractor.	Prior to and during construction.	ECO & SEO.
8.2	Construction Phase						
1	Decline in soil organisms.	To maintain the biological integrity of disturbed soil.	The list of plant species, and their relative abundancies, chosen for rehabilitation reflects the natural plant communities that need to be rehabilitated.'	Seed disturbed areas after construction with grass seeds of the naturally occurring plant species to encourage invertebrate species richness.	Applicant / Contractor (SEO).	Following construction or construction induced disturbance.	ECO & SEO.
2	Loss of valuable topsoil.	To retain all disturbed and cleared topsoil.	Comparative quantification of cleared and reinstated topsoil volumes.	Any topsoil removed during the establishment of parking areas, temporary roads, or any other cleared areas, must be protected from vehicular and construction impacts. Do not mix topsoil with cement and / or subsoil or let	Applicant / Contractor (SEO).	During initial clearing and prior to reinstatement of topsoil.	ECO & SEO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				it be pulverised by trucks.			
3	Potential sterilisation of the soil.	To maintain soil viability.	Use of only selective, environmentally friendly herbicides.	<p>Where possible, refrain from using non-selective herbicides to control vegetation, depending on the active ingredient, it can sterilise the soil.</p> <p>Application of herbicides may only be applied by or under the supervision of a Certified Pest Control Officer.</p>	Applicant / Contractor (SEO).	Every treatment episode.	ECO & SEO.
4	Soil contamination.	To reduce and avoid soil contamination.	No evidence of contaminating activities on unprotected ground, or in the case of accidental spills, documented evidence of rapid remediation.	<p>Construction plant and equipment shall be kept in a good state of repair to reduce hydrocarbon leakages.</p> <p>Immediately remove contaminated soil to the depth of penetration and temporarily store in a designated solid hazardous waste container until sufficient volume warrants disposal at a registered hazardous waste dump site. Alternatively, onsite treatment of</p>	Applicant / Contractor (SEO).	During construction.	ECO & SEO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				<p>contaminated soil should be considered with and / or in consultation with a registered hazardous waste management company.</p> <p>Soil horizons must be stockpiled or windrowed separately during excavation to ensure they can be reinstated in reverse order and ensure restored soil structure.</p>			
5	Soil erosion, soil loss & associated degradation of ecosystems.	To reduce erosion induced soil losses and consequential ecosystem degradation.	To record all areas prone and affected by erosion and implement suitable pre-emptive and remedial measures.	<p>Areas disturbed and rehabilitated during construction shall be monitored for signs of erosion and if found to occur, immediately corrected ('source') and repaired ('symptom').</p> <p>Bulk shape the areas where material is introduced to mimic or blend in with the surrounding, natural topography. Do not fine shape</p>	Applicant / Contractor (SEO).	During construction.	ECO & SEO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				<p>or rake because an uneven surface will impede surface water run-off and facilitate infiltration.</p> <p>Correct any cause of erosion at the onset thereof by controlling / diverting storm water run-off, immediately repairing and stabilizing / rehabilitating impacted areas in the most appropriate manner.</p> <p>Ensure a quick and adequate cover with indigenous and local grass species on all substation servitudes.</p> <p>Ensure storm water run-off is adequately controlled on disturbed sites before rehabilitating them (ripping, replacing the topsoil and mulching/brush packing), i.e. cut-off berms.</p>			

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				<p>Grading of existing roads must not be promoted.</p> <p>Sediment traps may be necessary to prevent erosion and soil movement if there are topsoil or other waste heaps present during the wet season.</p> <p>The Contractor shall monitor the rehabilitated servitudes for the duration of the contract defects and liability period for signs of erosion.</p>			
There are no significant impacts expected during the operational and decommissioning phases.							

Table 9. Social, Health & Economic Management

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
9.1	Planning & Design Phase (including Pre-Construction)						
1	Concerns about social disturbance and community safety	To reduce human induced impacts and nuisance	No complaints from affected parties in the on-site	Adequate accommodation and transport must be provided for all staff to reduce impact on the	Applicant / Contractor (via CLO and SO).	Prior to and during construction and operation.	ECO & SEO

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
	(including loitering at construction site).	factors.	complaints register. Where complaints are lodged effective and timeous close-out must be demonstrated.	property owner and adjacent farms as well as relieving pressure off road networks.			
2	Community confusion, frustration & lack of information.	To avoid creating false hope where job creation opportunities are concerned.	Development of an effective job seeker database.	Implementation of a community relations strategy until all activities on site cease and rehabilitation is completed. Develop a job seeker database or integrate with an existing service provider in the adjacent towns, to ensure job seekers' details are captured. As positions become available, this database can be searched for suitable skills within the local populous before positions are outsourced.	Applicant / Contractor / Operator	Prior to and during construction and operation.	ECO & SEO

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				These measures will reduce the potential nuisance factor to the land owner, caused by job seekers reverting to visiting the proposed site of development.			
9.2	Construction & Operation Phase						
1	Increase in crime including damage to Woodhill Golf course infrastructure and vandalism.	Reduce impacts associated with crime.	No perpetuating criminal activity. Improvements to security must be demonstrated following an incident.	Security must be appointed throughout construction & operation phases to discourage criminal elements from site.	Applicant / Contractor / Operator.	At commencement of construction, especially site establishment and during operation.	ECO & SEO.
2	Potential social pathologies (social unrest).	Reduce impacts associated with disgruntled staff.	No strike actions by staff. Improvements to engagement with staff must be demonstrated	Ensure effective communication and engagement with staff and surrounding community via inter alia the appointment of a suitably qualified CLO. Transparent communication through the right channels to	Applicant / Contractor / Operator (CLO).	At commencement of construction, and during operation.	ECO & SEO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
			following an incident.	communicate with the community as to when and how their contracts will come to an end.			
3	Injury to site staff from construction, demolition and blasting activities.	To ensure effective Health & Safety implementation.	Appointment of a suitably qualified HSO and compliance monitoring against the OHSA (Act 85 of 1993).	Implement a safety plan, access protocols, grievance mechanism and compensation policy. All staff must undergo a site induction that outlines the socio-environmental constraints of the site.	Applicant / Contractor (HSO) / Operator.	Throughout Construction & Operation.	Health & Safety Audits biannually.
4	Injury to trespassers resulting in possible lawsuits.	To avoid inadvertent injuries to trespassers.	No recorded injuries to trespassers.	Increase security to protect trespassers from being electrocuted. Adequate signage must be placed around the development warning uninformed people of the potential hazards and dangers associated with the project.	Applicant / Contractor.	Throughout construction	ECO & SEO.
5	Potential increase in pedestrian	To reduce impacts and injuries to	No injuries recorded in incident	Awareness must be fostered to drive carefully to avoid killing or injuring people or	Applicant / Contractor / Operator.	Ongoing awareness.	ECO & SEO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
	accidents.	pedestrian.	register. Close-out Reports must demonstrate improvements to avert a recurrence.	animals and damage to property. Open excavations must be secure and cordoned off to avoid accidental injury to humans and animals alike.			
6	Potential exposure to Covid 19	To reduce contractors and Rand Water staff and pedestrians.	No exposures and positive tests recorded in incident register.	Awareness must be fostered to all persons involved. Facial Masks must be worn at all times. 70% Alcohol-based sanitisers must be made available. Temperatures must be taken and recorded on a daily basis.	Applicant / Contractor / Operator.	Ongoing awareness.	SHE Officer, ECO & SEO.
9.3	Decommissioning Phase						
1	Increased unemployment after construction & operation ends.	To minimize the negative social impacts at the end of each phase of the	Develop & effective implementation of an Exit Strategy.	Develop and implement a holistic Exit Strategy that adequately and timeously communicates and buffers staff lay-offs and mitigates	Applicant.	Prior to commencement of construction.	ECO & SEO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
		project.		<p>losses in employment and income through formalised and structured skills development programmes.</p> <p>Clearly make the terms and conditions of employment known to all employees (temporary & permanent) including anticipated duration of each phase.</p>			

Table 10. Cultural & Heritage Management.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
10.1	Planning & Design Phase (including Pre-Construction)						
1	Surveying and pegging of temporary footprints can disturb sites of historical significance, i.e. Graves.	To ensure initial survey & clearing activities do not disturb known heritage sites.	All graves and known heritage sites are secure (fenced or cordoned-off)	<p>Ensure that none of the layout & designs of permanent footprints will disturb sites of historical significance, including graves.</p> <p>All formal and informal cemeteries and burials must be left in situ and not be</p>	Applicant.	Prior to surveying.	ECO & SEO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				disturbed. If this is not possible, a permit must be applied for in terms of Section 36 of the NHRA (Act 25 of 1999) and is subject to mandatory public consultation.			
2	Lack of awareness of heritage resources.	To promote awareness about heritage resources and their presence within the development area.	Heritage content in site induction and toolbox and awareness talks.	<p>Include an awareness of heritage resources in the environmental induction. Categories of heritage resources include, inter alia:</p> <ul style="list-style-type: none"> • Evidence of archaeological sites or remains include remnants of stone-made structures, indigenous ceramics, bones, stone artifacts, ostrich eggshell fragments, marine shell and charcoal/ash concentrations. • Archaeological or paleontological sites over 100 years old, • Sites of cultural significance associated with oral histories, • Significant cultural landscapes or viewsapes, • Burial grounds, unmarked 	Applicant / Contractor.	Throughout construction.	ECO & SEO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				human burials, graves of victims of conflict, and/or graves older than 60 years, • Structures older than 60 years, • Fossils, etc.			
10.2	Construction Phase						
1	Loss of archaeological & palaeontological valuable artefacts.	To ensure construction activities do not disturb known or incidental heritage sites.	No loss of archaeological valuable artefacts. All known "heritage" sites within the development footprint is suitably cordoned off.	All areas of heritage value must be demarcated and avoided. Incidental discoveries during clearing and grubbing must be disclosed to site management with immediate cessation of activities until their significance can be assessed by a qualified heritage specialist. Any archaeological artefacts unearthed during excavations must be protected and left in situ. Works must cease until the significance of the finding can be assessed by a qualified archaeological specialist.	Applicant / Contractor.	Throughout construction.	ECO & SEO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
2	Loss of cultural and heritage value to society.	To ensure correct procedures are followed following chance finds to preserve the heritage resource.	Adherence to protocols specified in management actions following a chance find.	<p>Contact a professional archaeologist, depending on the nature of the finds, as soon as possible to inspect the findings.</p> <p>In the event of discovering a heritage resource, stop reconstruction activities and alert the SAHRA Archaeology, Palaeontology and Meteorites (APM) Unit immediately. Natasha Higgitt, Heritage Officer T: +27 21 462 4502 F: +27 21 462 4509 C: +27 82 507 0378. E: nhiggitt@sahra.org.za</p>	Applicant / Contractor.	Throughout construction.	ECO & SEO.
10.3	Operational & Decommissioning Phases						
Significant heritage impacts are mostly expected to occur during the construction phase.							

Table 11. Traffic Management (Including Parking On Site).

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
11.1	Planning & Design Phase (including Pre-Construction)						
1	Decrease in	To ensure the	Signed MoU	Consult with the Roads	Applicant.	Following	ECO & SEO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
	surface quality of access roads.	quality and function of unsurfaced roads leading to and from the project area.	with Roads Division of Responsible Municipality.	Division of the Responsible Municipality and enter a Memorandum of Understanding (MoU) outlining costs and responsibilities to be shared by both parties for the ongoing maintenance of affected unsurfaced roads.		successful award of tender.	
11.2	Construction & Operation Phase						
1	Dust entrainment from unsurfaced roads can result in unacceptably high dust fallout.	To manage dust entrainment on access roads which may not exceed the thresholds stipulated in the National Dust Control Regulations.	<p>Full compliance with National Dust Regulations.</p> <p>Acceptable Dust fallout rate (mg/m²/day): Residential area < 600 Non-residential area < 1200</p> <p>Exceedance not more than</p>	<p>Dust suppression must be carried out on access roads where high dust entrainment is evident. To reduce water usage, a suitable soil binder must be used in dust suppression activities.</p> <p>Excessive water usage to control dust on dirt roads can cause erosion and lead to hazardous conditions for road users.</p>	Applicant / Contractor.	During construction, monthly.	Monitoring of dust fallout to be undertaken by a professional service provider and compliance to be verified by ECO & SEO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
			twice in a year, not sequential months.				
2	Parking and driving carelessly can increase collisions with mammals, birds, reptiles, amphibians and insects – collectively referred to as “roadkills”.	To avoid and minimise impacts from traffic on animals residing on and around the property.	Compliance to speed limits. No recorded project vehicle associated animal mortalities.	Drivers shall adhere to the relevant speed limit(s) (ON the existing road network) at all times and restrict their movements to the existing and / or approved roadway or servitude. The speed limit on the property shall be 40 km/h and 30km/h within the development footprint. A register must be maintained of all animal mortalities recorded on the property and localised access roads.	Applicant / Contractor.	During construction.	Compliance to be verified by ECO & SEO.
3	Contamination from spills when refuelling, parking, driving, emergency repairing, operating plant or equipment to soil	To reduce contamination of soil from leaking plant and vehicles and upon occurrence is remediated	Spills are removed within 48 hours of event. Records of servicing by	Oil & fuel spills on roadways and parking areas must be removed to depth of penetration following their discovery and placed in a designated hazardous container for safe disposal.	Applicant / Contractor.	During construction.	Compliance to be verified by ECO & SEO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
	or nearby or within the watercourse.	promptly.	<p>off-site workshop.</p> <p>Drip tray issued to all plant and recorded in a register.</p>	<p>Drip trays must be placed under all plant that is parked overnight and extended periods not in operation.</p> <p>Drip trays can be filled with hydrophobic hydrocarbon absorbent material to avoid content being leached out during rainfall events.</p> <p>No servicing or washing of vehicles or plant may take place in parking bays, and all servicing must be done off-site, no service or wash-bays are to be constructed on site.</p> <p>Emergency breakdowns in the parking areas or along roads, must be addressed after adequate pollution containment measures have been implemented including but not limited to drip trays and spill kits.</p>			

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				Refuelling of vehicles and plant may only take place at a designated and permitted (from local Fire Chief) fuel storage tank or mobile fuel bowser, under the guidance of a Specific Operating Procedure (SOP) that limits spillage and addresses remedial actions in the event of a spillage.			
11.3	Decommissioning Phase						
There are no significant impacts expected during this phase.							

Table 12. Visual Aspects Management.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
12.1	Planning & Design Phase (including Pre-Construction)						
There are no significant impacts expected during this phase, as footprint location has already mitigated the planning and design requirements.							
12.2	Construction & Operational Phase						
1	Impact of construction on visual receptors near the substation facility,	To manage the facility in a way that minimised its reflectance impacts on the	Demonstration of effects to minimise visual impacts.	Use visual screens to minimise the visual impact on the scenic resources of this region. Have minimal placements that	Applicant.	Throughout the project lifecycle.	ECO & SEO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
	including road users.	surrounding environment.		can be visually intrusive to sensitive receptors. Utilise fencing options that do not create a significant visual barrier.			
There are no significant impacts expected during the decommissioning phase.							

Table 13. Rehabilitation Management.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
Construction & Post Construction Phase							
1	Impact of construction on the landscapes and aesthetics of the area.	To manage the impacts brought by the construction activities and to create equilibrium between the pre and the post construction state.	No loss insitu vegetation. No loss of the aesthetic state of the area.	To develop and implement rehabilitation that adequately and timeously addresses the impacts brought by the construction activities. Areas disturbed during the construction phase to be rehabilitated (Seeding/Planting) with indigenous species. Planting of species should be done in consultation with the ECO.	Applicant.	Throughout the project lifecycle.	ECO & SEO

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
	Construction & Post Construction Phase						
				Removed protected species during the construction phase should be replaced/replanted in line with the plant removal permit issued under the National Environmental Management: Biodiversity Act, 2004 (Act No 10 of 2004).			

SECTION 7: ENVIRONMENTAL AWARENESS PLAN

This section of the report is included in compliance with Section 24N(3)(c) of the NEMA and the EIA Regulations (2014) as amended.

The EMPr needs to include, inter alia:

An environmental awareness plan describing the manner in which-

- (i) The applicant intends to inform his or her employees of any environmental risk which may result from their work; and*
- (ii) Risks must be dealt with to avoid pollution or the degradation of the environment;*

Throughout the construction & operational phases environmental as well as health and safety awareness training should be provided to all employees to promote the effective implementation of the EMPr actions.

This section of the report focusses on the environmental awareness training. It provides a guideline as to the possible environmental risks that may be experienced as part of the project as well as way to avoid the risks and subsequent environmental degradation. The aim is to provide a guide to developing a comprehensive yet easily understandable awareness plan to present to employees of all education and skill levels which should be presented to the employees at least one week prior to commencement of construction. The following pointers are given for the environmental awareness training course:

- Environmental awareness training should be undertaken by the environmental and / or health and safety representative of RandWater and/or CoM with the input of an EAP or ECO if required;
- Environmental awareness reminders should be undertaken at least bi-annually to ensure that employees and Contractors are kept aware of the risks and management thereof;
- It is recommended that awareness posters be developed and placed on site in highly visible areas to provide the required information when it needs to be referred to as well as reminding employees of their obligations regarding environmental protection;
- A slideshow can also be developed for initial awareness induction and for use as a reminder of the environmental risks and responsibilities at the site or induction of future Contractors; and
- Throughout the presentations (posters, meetings, slideshows, etc.), it is recommended that visual aids be used to explain the potential risks and management thereof as thoroughly as possible.

Should any new personnel be contracted or arrive on site during the construction period, they should attend the environmental awareness course. The environmental awareness training should be provided to all labourers, technical staff and any other Contractor appointed.

The awareness training forms part of this EMPr and should be implemented as part of the conditions of environmental management and risk prevention. Refer to the management measures in above tables for proposed management and mitigation actions to be undertaken in order to prevent or minimise the risks described below. Attention should be focussed on the following areas of sensitivity during the construction phase:

- Removal of vegetation during site clearance;
- Animal habitat disturbance due to vegetation clearance;
- Soil erosion and pollution;
- Soil compaction;
- Health and safety;
- Degradation of roads; and
- Fire risks.

Other elements to be taken into consideration by the employees during both the construction and operational phases include:

- The presence of animals on site;
- Disturbances to neighbours due to noise and traffic;
- The positive impacts, of the greener technology being implemented, on the biophysical and socio-economic environments; and
- Awareness should be raised regarding the possible occurrence of sensitive plant and animal species and heritage features.

The awareness training for this project should aim to prevent, and where prevention is not possible, mitigate detrimental environmental impacts. It should promote awareness of environmental risks and management thereof. It should furthermore promote green thinking and provide information on alternative energy sources and energy consumption reduction.

SECTION 8: RESPONSIBILITIES OF ROLE PLAYERS

The approved EMPr shall be printed, completed and kept in an on-site file designated for all matters pertaining to environmental management. Co-operation is required between the applicant, contractor, and ECO to ensure that activities are managed in an amicable and responsible manner and in accordance with the philosophies of environmental legislation and principles of the EMPr.

This EMPr is predominantly compiled for the management of construction & operations associated with the substation facility, once the Planning and Authorisation phases are complete. The tabulated management programmes assign responsibilities to one or more role player, the below descriptions identify responsibilities and accountabilities in the case of any uncertainty.

Applicant

The applicant remains ultimately accountable for ensuring that the development is implemented according to the requirements of the EMPr. Although the applicant delegates specific responsibilities to role players to perform functions on his / her behalf, the ultimate accountability cannot be delegated. The developer is responsible for ensuring that sufficient resources (time, financial, man-power, equipment, etc.) are available to the other role players (e.g. the contractor, SEO, etc) to efficiently perform their tasks in terms of the EMPr. The responsibility of restoring the environment in the event of any negligence, which leads to damage of the environment, also falls to the applicant.

The applicant must ensure that the EMPr is included in any documents (tender, appointment etc.) so that any contractor who is appointed is bound to the conditions of the EMPr. The applicant must appoint an independent Environmental Control Officer (ECO) prior to commencement of construction, to help identify pre-construction & construction criteria that need to be fulfilled timeously, to avoid non-compliance with the overarching authorisation conditions and / or legislation.

Contractor

The contractor, as the developer's agent on site, is bound to the EMPr conditions through his / her contract with the developer and is responsible for ensuring that she / he adheres to all the conditions of the EMPr. The contractor shall be responsible for the actions undertaken by all their employees including sub-contractors. The contractor must thoroughly familiarise him / herself with the EMPr requirements before coming onto site and must request clarification on any aspect of these documents, should they be unclear. The contractor must ensure that he / she has provided sufficient budget for complying with all EMPr conditions at the tender / appointment stage.

The contractor must comply with all instruction (whether verbal or written) given by the environmental manager, project manager or site engineer in terms of the EMPr.

Site Environmental Officer (SEO)

The Site Environmental Officer (SEO) shall be appointed by the contractor to implement the EMPr daily. The SEO shall ensure that all construction activities are carried out in accordance with the relevant conditions of the EMPr, Environmental Authorisation (EA), General Authorisation (GA) or Water Use License (WUL) (under the National Water Act), wayleaves, provincial ordinances & provincial bylaws.

Environmental Control Officer (ECO)

The Environmental Control Officer (ECO) is appointed by the applicant as an independent monitor of the implementation of the EMPr, EA & GA / WUL. He / she must form part of the project team and be involved in all aspects of the project planning that can influence environmental conditions on the site.

The ECO must attend relevant project meetings, conduct inspections to assess compliance with the EMPr, EA & GA / WUL and be responsible for providing feedback on potential environmental problems associated with the development. In addition, the ECO is responsible for:

- Liaising with relevant authorities;
- Liaising with contractors regarding environmental management; and
- Undertaking routine monitoring and appointing a competent person / institution to be responsible for any specialist monitoring (if required).

The ECO has the right to enter the site and undertake monitoring and auditing at any time, subject to compliance with health and safety requirements applicable to the site (wearing safety boots, head gear, mouth mask etc.).

Independent Environmental Auditor (SEO)

An SEO shall be appointed by the Applicant to undertake EMPr, EA & GA / WUL compliance audits at 6-monthly intervals. The purpose of conducting a periodic compliance audit would be to systematically check and evaluate progress on EMPr, EA & GA / WUL implementation. The environmental audit will serve as a 'snapshot' of the environmental situation and progress at a given point in time. The purpose of the audit is to illustrate whether there has been any improvement or change over time.

The SEO will fulfil the auditing requirements by systematically auditing the Project's performance & compliance against the requirements of the EA, EMPr & GA / WUL in a process that is carefully planned, structured and organised. The audit process must, on a sampled basis, track past actions, activities, events, and procedures through using existing documentation, conducting interviews with managers and personnel, and observing practices on site.

SECTION 9. COMMUNICATION

At least monthly site meetings should be held where feedback can be given, and any potential problems identified and remedied. If they cannot be remedied then construction in that area should be stopped, until a suitable remedy is identified.

Monitoring Compliance

Pre-construction, Construction and Post-construction:

The ECO will be responsible for monitoring and reporting on compliance of the activity from pre- to post-construction.

Inspections and resulting compliance reports shall be a systematic, independent and documented process for obtaining compliance evidence and evaluating it objectively to determine the extent to which the compliance criteria are fulfilled. The compliance criteria (or reference) against which the compliance evidence is compared shall include this EMPr, the Environmental Authorisation & General Authorisations or a Water Use License (under then National Water Act).

The ECO must undertake bi-weekly inspections of the site and submit monthly environmental compliance reports to the National Department of Environmental Affairs (DEA) as the competent authority for this project, unless otherwise prescribed in the EA. The compliance reports must identify the actual and potential transgressions, describe the impacts, provide verifiable evidence (photographs, records or statements) and recommend corrective and preventive actions (including

completion dates). The compliance reports must measure the applicant / contractor's level of compliance against the aforesaid criteria. Performance scoring / reporting is optional.

The SEO shall maintain an on-site diary to record environmental aspects (elements of the construction activities that can interact with the environment) and environmental impacts (any change to the environment, whether adverse or beneficial, wholly or partially resulting construction activities), daily.

Operation:

The relevant authorities should be responsible for monitoring compliance with aspects of the activity that fall within their jurisdiction.

Time Periods and Failure to Comply with the EMPr

The time periods within which the measures prescribed in this EMPr must be implemented shall be applicable to the full duration of the activity that is being undertaken and mitigated. The time periods within which corrective and preventive actions need to be implemented shall be determined by the SEO and / or ECO, depending on the nature and severity of the finding. In the absence of a prescribed deadline or completion date, findings shall be corrected or prevented immediately upon being found to occur, if practical.

The EMPr is a legally binding document and should form part of the contract. Should there be failure to comply with the EMPr the following steps are envisaged:

Step 1

The ECO meets with the contractor and points out the deviation from the EMPr. The ECO and Contractor agree on a solution and this non-compliance is recorded by the ECO as well as the solution put forward to rectify it.

Step 2

Should there still be non-compliance or there is a more serious infringement of the EMPr the contractor is informed in writing with a deadline by which the problem must be rectified. Any extra costs that may be accrued must be borne by the contractor.

Step 3

If non-compliance persists, the Chief Resident Engineer (CRE) or Project Manager (PM) shall order the contractor to suspend construction in that specific area or the project as a whole until the activity at variance with the EMPr is corrected and or remedial actions taken. Any cost that occurs as a result of such action shall be for the account of the contractor.

Step 4

Where there is non-compliance with the EMPr and no evidence that the contractor intends complying even though the above 3 steps have been taken the applicant may terminate the contract due to non-compliance (breach of contract). Such measures do not replace any legal proceedings that may occur as a result of such non-compliance.

Environmental Awareness Plan

The applicant shall ensure that his project team, contractor and labourers are adequately trained with regard to the implementation of the EMPr, EA & GA / WUL throughout construction.

Pre-construction

Environmental Awareness Inductions shall be targeted at two distinct levels of employment: management (applicant, architect, engineer, contractor / site agent) and labourers (including the site foreman). The SEO shall be responsible for preparing and presenting inductions appropriate to the audience. Inductions shall be undertaken prior to the commencement of construction. Where possible the presentation will be conducted in the language of the employees.

The Environmental induction for management shall include mitigations that are relevant to or require management's involvement prior to implementation including, but not limited to, the following:

- Measures required during the Planning and Design, and Pre-construction phase, and
- Site establishment.

The Environmental induction for the contractor's labourers and foreman shall, as a minimum, include the following:

- A description of the actual and potential environmental impacts,
- Standard operating procedures for undertaking construction activities (i.e. mixing concrete, driving, etc.) that can have an environmental impact,
- Staff conduct including sanitation and movement,
- The integrated waste management strategy,
- The steps to be taken should any item of perceived environmental importance including archaeological artefacts be located or unearthed, and
- The environmental emergency plans.

Construction

The SEO and ECO shall undertake an informal training needs analysis throughout construction to identify appropriate environmental topics and the appropriate labourers to target. The analysis shall be informed by the findings contained in the site diary and compliance reports. Training shall be given during toolbox talks.

The SEO and ECO shall keep records of the environmental inductions and subsequent toolbox talks in an on-site file designated for all matters pertaining to environmental management.

SECTION 10: ENVIRONMENTAL EMERGENCY PLAN FOR THE CONTROL OF ENVIRONMENTAL INCIDENTS

Definition of an 'Environmental Incident'

1. An unexpected sudden occurrence including a major emission, fire or explosion leading to danger to the public or potentially serious pollution of or detriment to the environment whether immediate or delayed (NEMA, 1998, section 30 (1) (a)).
2. Any incident or accident in which a substance-
 - (a) pollutes or has the potential to pollute a water resource or
 - (b) has, or is likely to have, a detrimental effect on a water resource (NWA, 1998, section 20 (1))

Procedure

The contractor shall ensure that emergencies are reported and controlled in accordance with the sequence of events prescribed for spillages in a watercourse, on land and fire, including:

- Action to be taken
- Removal and remediation measures to be implemented
- Internal and external communication plan
- Prescribed reporting procedure

The contractor shall ensure that their employees are adequately trained to react to environmental emergencies in accordance with this procedure.

The SEO shall complete the table of contact numbers, erect them in a conspicuous place within the construction camp and make its whereabouts known to all of the contractor's staff.

Equipment

The following equipment is required to successfully implement this procedure. It must be ensured that the equipment is supplied to or is readily available for all living quarters, site offices, kitchen areas, workshop areas, stores and on site.

1. A spill kit including absorbent fibres, mats and booms
2. A net
3. A whistle
4. Adequate lighting for night shifts
5. Spades
6. Sand bags
7. Designated hazardous waste drums
8. (Trained personnel with) protective clothing for extinguishing fires
9. Fire extinguishers
10. Fire beaters
11. Water carts/tankers with pumps and hoses
12. Water pumps and pipes (for fires started at the watercourse crossings)

Contact Numbers

Organisation	Name	Telephone/cell Number
Project Personnel		
Applicant		
Engineer		
Contractor		
HSO		
SEO		
ECO		
Interested and Affected Parties		
Land Owner		
Adjacent Land Owner		
Adjacent Land Owner		
Emergency Services		
Spill Clean-up Service Provider		
Fire Department		
Chief Fire Officer (Fire Chief)		
SA Police Services		
Disaster Management Centre		
Local Municipality		
District Municipality		
Irrigation Board		
Water Catchment Management Agency		
Water Treatment Works		
DWS (Regional Head of Department / Chief Director)		
DWS (Regional Director: Water sector Regulation & Use)		
DEA (Provincial Head of Department)		
DEA (Director: Environmental Impact Management)		
DEA (Director General)		
DEA (Director: Environmental Impact Evaluation)		

EMP - PIPELINE ROUTE RE-ALIGNMENT OF APPROXIMATELY 2KM AT WOODHILL GOLF ESTATE
SPILLAGE IN A WATERCOURSE

ACTION TO BE TAKEN		
Personnel	Responsibility	Action
Employee	Reporting	The person responsible for, or who discovers, a hazardous substance spill must report the incident to their immediate Supervisor.
Supervisor	Reporting	Report the incident to the SEO, HSO and Resident Engineer. <ul style="list-style-type: none"> Note that the SEO will take control of all relevant actions once he/she arrives on the scene.
HSO	Reporting	Report the incident to an Inspector (designated under section 28 of the Occupational Health & Safety Act, 1993) within the prescribed period and manner.
Supervisor / SEO	Initial investigation	Determine the extent of the spill, i.e. its boundaries, by observing for the following: <ol style="list-style-type: none"> Any visual indication of pollution, Any odours or emissions detected, Any indication of the source of pollution, Any sign of damage to the natural system. <ul style="list-style-type: none"> The Supervisor / SEO should provide lighting if working at night.
Supervisor / SEO	Co-ordination	Sound an alarm/whistle. <ul style="list-style-type: none"> The designated response team consisting of area specific personnel and including the environmental leader, will congregate at the spill kit. All other employees who do not have specific duties to perform are to evacuate the affected area to a location designated by the Supervisor / SEO.
Supervisor / SEO	Co-ordination	Minimise the effects of the incident on the environment and persons by removing the source of the spill at least 100m away from the watercourse or cut-off the supply of the spill if the source is not moveable.
Supervisor / SEO	Co-ordination	Contain the spill by laying an absorbent sock or boom across the width of the watercourse AT A PRE-DETERMINED LOCATION downstream of the construction area (spill). <ul style="list-style-type: none"> A series of parallel booms may be required.
Supervisor / ECO	Co-ordination	Secure the affected area with danger tape.
HSO	Co-ordination	The site shall not be disturbed and no article or substance may be removed (without the consent of the inspector) if there is or likely to be a death, or if there is a loss of limb or part of a limb. However, action can be taken to prevent a further accident, to remove the injured or dead or rescue persons from danger.
Engineer / SEO / HSO	Decision-making	The Engineer will assess the situation in consultation with the SEO and HSO and act as required. <ul style="list-style-type: none"> The risk involved shall be assessed before anyone approaches the scene of the incident. The HSO will consult the MSDSs. The scale of the spill will dictate whether the spill will be cleaned up by using the on-site spill kit and in the prescribed manner, or by contacting a Spill Clean-Up Service Provider for assistance. The SEO will take photographs of the affected area. No person shall be allowed to approach a spill unless he/she is equipped with the personal protective clothing.

EMP - PIPELINE ROUTE RE-ALIGNMENT OF APPROXIMATELY 2KM AT WOODHILL GOLF ESTATE

SEO	Directions	If a Spill Clean-Up Service Provider is used, assist the emergency services by clearly marking the route to be taken to the spill site.
SEO	Co-ordination	Take such measures as the Catchment Management Agency may either verbally or in writing direct within the time specified by such institution.

EMP - PIPELINE ROUTE RE-ALIGNMENT OF APPROXIMATELY 2KM AT WOODHILL GOLF ESTATE
 SPILLAGE IN A WATERCOURSE

REMOVAL AND REMEDIATION MEASURES TO BE IMPLEMENTED		
Personnel	Responsibility	Action
SEO	Co-ordination	Remove the contaminated sock or boom from the surface of the water. If loose fibres were scattered on the surface to capture hydrocarbons in shallow (still) pools, 'fish' it out with a net.
SEO	Co-ordination	Remove the contaminated soil from the banks of the watercourse, to the depth of penetration using a spade or shovel.
SEO	Co-ordination	Temporarily store the contaminant in the designated hazardous waste facility at the construction camp.
SEO	Co-ordination	Contact a licensed hazardous waste service provider to collect and transport the waste to a licensed hazardous waste landfill site.
SEO	Co-ordination	Rehabilitate the banks of the watercourse by replacing the topsoil and planting indigenous plants.
SEO	Monitoring	Immediately follow any known spillage of toxic substances into a stream or river with monitoring of the receiving streams or rivers and public health.
SEO	Co-ordination	Should water downstream of the spill be polluted, and fauna and flora show signs of deterioration or death, specialist hydrological or ecological advice must be sought for appropriate treatment and remedial procedures to be followed.
SEO	Monitoring	Take photographs of the affected area during rehabilitation.

EMP - PIPELINE ROUTE RE-ALIGNMENT OF APPROXIMATELY 2KM AT WOODHILL GOLF ESTATE
SPILLAGE IN A WATERCOURSE

INTERNAL & EXTERNAL COMMUNICATION PLAN		
Personnel	Responsibility	Action
Employee	Reporting	The person responsible for, or who discovers, a hazardous waste spill must report the incident to their immediate Supervisor.
Supervisor	Reporting	Report the incident to the SEO, HSO and Resident Engineer.
HSO	Reporting	Report the incident to an Inspector (designated under section 28 of the Occupational Health & Safety Act, 1993) within the prescribed period and manner.
SEO	Reporting	Report the incident to the Site Agent and / or Manager and the ECO.
SEO	Reporting	If the spill is too big for the spill kit, contact a Spill Clean-Up Service Provider.
SEO	Reporting	<p>If the spill is going to affect downstream users, inform the Land Owner, the Irrigation Board and water treatment works (if applicable).</p> <ul style="list-style-type: none"> Provide the following information to the water treatment works: <ol style="list-style-type: none"> The exact location of the spillage, The time of the spillage, As much information about the nature of the pollution, The name and telephone number of the person contacting them. Irrigation Boards control river structures and may be able to divert/or impound the river to protect 'water supply intakes'.
SEO	Reporting	<p>Report the incident to the following authorities within 24 hours.</p> <ol style="list-style-type: none"> DEA (Director General), DWS (Director General and Chief Director), SA Police Services, Fire Department, Catchment Management Agency, DEA (provincial Head of Department) or Local Municipality, and Any persons whose health may be affected by the incident.
SEO	Reporting	<p>Provide the following information:</p> <ol style="list-style-type: none"> The nature of the incident, Any risks posed by the incident to public health, safety & property, the toxicity of substances or by-products released by the incident, and any steps that should be taken in order to avoid or minimise the effects of the incident on public health and the environment.
ECO / Applicant / Site Agent / CRE	Reporting	<p>If the nature of the impact constitutes a gross violation of the EA or any legislation:</p> <ul style="list-style-type: none"> The ECO must report the incident to the applicant. The applicant must report the incident to the Local Municipality, DEA, and DWS. The Site Agent and / or Manager must report the incident to their Environmental Group Manager, Divisional MD and CEO. The Resident Engineer must report the incident to his Superiors.

EMP - PIPELINE ROUTE RE-ALIGNMENT OF APPROXIMATELY 2KM AT WOODHILL GOLF ESTATE
SPILLAGE IN A WATERCOURSE

PRESCRIBED REPORTING PROCEDURE		
Incident recording		
Personnel	Responsibility	Action
SEO	Investigation	Conduct an investigation, including interviews, and record all details of the incident. <ul style="list-style-type: none"> • The cause must be investigated.
SEO	Reporting	Complete an Environmental Incident Report and forward it to all key project personnel, with the exception of the Emergency Services.
SEO	Reporting	Within 14 days of the incident, report the incident to the following authorities. 1. DEA (Director General), 2. DEA (Provincial Head of Department), 3. Local Municipality, 4. DWS (Regional Director).
SEO	Reporting	Provide the following information: 1. The nature of the incident, 2. The substances involved and an estimation of the quantity released and their possible acute effect on persons & the environment & data needed to assess these effects, 3. Initial measures to minimise impacts, 4. Causes of the incident, whether direct or indirect including equipment, technology, system or management failure, and 5. Measures taken & to be taken to avoid a recurrence of such incident.
SEO	Reporting	Submit an action plan within 14 days, or a shorter period of time, if specified by the Regional Director (DWS).
SEO	Reporting	The action plan must include the following information: 1. A detailed time schedule of measures taken to: 1.1 Correct the impacts resulting from the incident; 1.2 Prevent the incident from causing any further impact; and 1.3 Prevent a recurrence of a similar incident.
Progress reporting		
SEO	Revising Procedures	Identify methods for preventing the incident from re-occurring and revise method statements and/or procedures for implementing as early as possible.
SEO	Training	Conduct either a toolbox talk or environmental awareness training/re-induction to the all employees and include additional mitigations to avoid a re-occurrence. <ul style="list-style-type: none"> • Keep the program, including a signed attendance register, in the on-site environmental file.

SPILLAGE ON LAND

ACTION TO BE TAKEN		
Personnel	Responsibility	Action
Employee	Reporting	The person responsible for, or who discovers, a hazardous substance spill must report the incident to their immediate Supervisor.
Supervisor	Reporting	Report the incident to the SEO, HSO and Resident Engineer. <ul style="list-style-type: none"> Note that the SEO will take control of all relevant actions once he/she arrives on the scene.
HSO	Reporting	Report the incident to an Inspector (designated under section 28 of the Occupational Health & Safety Act, 1993) within the prescribed period and manner.
Supervisor / SEO	Initial investigation	Determine the extent of the spill, i.e. its boundaries, by observing for the following: <ul style="list-style-type: none"> Any visual indication of pollution, Any odours or emissions detected, Any indication of the source of pollution, Any sign of damage to the natural system. The Supervisor / SEO should provide lighting if working at night.
Supervisor / SEO	Co-ordination	Sound an alarm/whistle. <ul style="list-style-type: none"> The designated response team consisting of area specific personal and including the environmental leader, will congregate at the spill kit. All other employees who do not have specific duties to perform are to evacuate the affected area to a location designated by the Supervisor / SEO.
Supervisor / SEO	Co-ordination	Minimise the effects of the incident on the environment and persons by removing the source of the spill at least 100m away from the watercourse or cut-off the supply of the spill if the source is not moveable.
Supervisor / ECO	Co-ordination	Contain the spill to a confined area to prevent the spreading of the spilled chemical or substance. <ul style="list-style-type: none"> Use sand bags or construct earth berms. If relevant, close off all storm water drains with absorbent mats. Do not wash the spill with water as it will cause the spill to spread.
Supervisor / ECO	Co-ordination	Secure the affected area with danger tape.
HSO	Co-ordination	The site shall not be disturbed and no article or substance may be removed (without the consent of the inspector) if there is or likely to be a death, or if there is a loss of limb or part of a limb. However, action can be taken to prevent a further accident, to remove the injured or dead or rescue persons from danger.

Engineer / SEO / HSO	Decision-making	<p>The Engineer will assess the situation in consultation with the SEO and HSO and act as required.</p> <ul style="list-style-type: none"> • The risk involved shall be assessed before anyone approaches the scene of the incident. • The HSO will consult the MSDSs. • The scale of the spill will dictate whether the spill will be cleaned up by using the on-site spill kit and in the prescribed manner, or by contacting a Spill Clean-Up Service Provider for assistance. • The SEO will take photographs of the affected area. • No person shall be allowed to approach a spill unless he/she is equipped with the personal protective clothing.
SEO	Directions	<p>If a Spill Clean-Up Service Provider is used, assist the emergency services by clearly marking the route to be taken to the spill site.</p>

EMP - PIPELINE ROUTE RE-ALIGNMENT OF APPROXIMATELY 2KM AT WOODHILL GOLF ESTATE
 SPILLAGE ON LAND

REMOVAL AND REMEDIATION MEASURES TO BE IMPLEMENTED		
Personnel	Responsibility	Action
SEO	Co-ordination	Remove the contaminated soil to the depth of penetration using a spade or shovel.
SEO	Co-ordination	Temporarily store the contaminant in the designated hazardous waste facility at the construction camp.
SEO	Co-ordination	Contact a licensed hazardous waste service provider to collect and transport the waste to a licensed hazardous waste landfill site.
SEO	Co-ordination	Rehabilitate the area cleared of hazardous waste by replacing the topsoil and planting indigenous plants.
SEO	Monitoring	Immediately follow any known spillage of toxic substances with monitoring of the receiving environment, and public health if necessary.
SEO	Monitoring	Take photographs of the affected area during rehabilitation.

EMP - PIPELINE ROUTE RE-ALIGNMENT OF APPROXIMATELY 2KM AT WOODHILL GOLF ESTATE
 SPILLAGE ON LAND

INTERNAL & EXTERNAL COMMUNICATION PLAN		
Personnel	Responsibility	Action
Employee	Reporting	The person responsible for, or who discovers, a hazardous waste spill must report the incident to their immediate Supervisor.
Supervisor	Reporting	Report the incident to the SEO, HSO and Resident Engineer.
HSO	Reporting	Report the incident to an Inspector (designated under section 28 of the Occupational Health & Safety Act, 1993) within the prescribed period and manner.
SEO	Reporting	Report the incident to the Site Agent and/or Manager and the ECO.
SEO	Reporting	If the spill is too big for the spill kit, contact a Spill Clean-Up Service Provider.
SEO	Reporting	Report the incident to the following authorities. 1. DEA (Director General), 2. SA Police Services, 3. Fire Department, 4. DEA (Provincial Head of Department) or Local Municipality, and 5. Any persons whose health may be affected by the incident.
SEO	Reporting	Provide the following information: 1. The nature of the incident, 2. Any risks posed by the incident to public health, safety & property, 3. the toxicity of substances or by-products released by the incident, and 4. Any steps that should be taken in order to avoid or minimise the effects of the incident on public health and the environment.
ECO / Applicant / Site Agent / RE	Reporting	If the nature of the impact constitutes a gross violation of the EA or any legislation: • The ECO must report the incident to the applicant. • The applicant must report the incident to the Local Municipality, DEA, and DWS. • The Site Agent and/or Manager must report the incident to their Environmental Group Manager, Divisional MD and CEO. • The Resident Engineer must report the incident to his Superiors.

SPILLAGE ON LAND

PRESCRIBED REPORTING PROCEDURE		
Incident recording		
Personnel	Responsibility	Action
SEO	Investigation	Conduct an investigation, including interviews, and record all details of the incident. • The cause must be investigated.
SEO	Reporting	Complete an Environmental Incident Report and forward it to all key project personnel, with the exception of the Emergency Services.
SEO	Reporting	Within 14 days of the incident, report the incident to the following authorities. 1. DEA (Director General) 2. DEA (Provincial Head of Department), and 3. Local Municipality.
SEO	Reporting	Provide the following information: 1. The nature of the incident, 2. The substances involved and an estimation of the quantity released and their possible acute effect on persons & the environment & data needed to assess these effects, 3. Initial measures to minimise impacts, 4. Causes of the incident, whether direct or indirect including equipment, technology, system or management failure, and 5. Measures taken & to be taken to avoid a recurrence of such incident.
Progress reporting		
SEO	Revising Procedures	Identify methods for preventing the incident from re-occurring and revise method statements and/or procedures for implementing as early as possible.
SEO	Training	Conduct either a toolbox talk or environmental awareness training/re-induction to the employee(s) responsible for the spill and include additional mitigations to avoid a re-occurrence. • Keep the program, including a signed attendance register, in the on-site environmental file.

FIRE

ACTION TO BE TAKEN		
Personnel	Responsibility	Action
Employee	Reporting	The person who starts or discovers a fire must report the incident to their immediate Supervisor.
Supervisor	Reporting	Report the incident to the SEO, HSO and Resident Engineer. <ul style="list-style-type: none"> Note that the SEO will take over co-ordination of all relevant actions once he/she arrives on the scene.
SEO	Reporting	If there is potential for a fire to spread and endanger life, property or the environment, alert the landowner and Fire Department.
Land Owner	Reporting	Alert the owners of adjacent land.
HSO	Reporting	Report the incident to an Inspector (designated under section 28 of the Occupational Health & Safety Act, 1993) within the prescribed period and manner.
Supervisor / SEO	Co-ordination	Sound an alarm/whistle. <ul style="list-style-type: none"> The designated response team consisting of area specific personnel and including the environmental leader, will congregate at the fire-fighting equipment. All other employees who do not have specific duties to perform are to evacuate the affected area to a location designated by the Supervisor / SEO.
SEO	Directions	Assist the Fire Department by clearly marking the route to be taken to the fire.
SEO	Co-ordination	Extinguish the fire or assist in doing so.
SEO	Co-ordination	Stop the spread of the fire.
SEO	Co-ordination	Provide assistance to a fire protection officer or forest officer in the event that they take control over the fighting of a fire.
HSO	Co-ordination	The site shall not be disturbed and no article or substance may be removed (without the consent of the inspector) if there is or likely to be a death, or if there is a loss of limb or part of a limb. However, action can be taken to prevent a further accident, to remove the injured or dead or rescue persons from danger.

FIRE

REMEDATION MEASURES TO BE IMPLEMENTED		
Personnel	Responsibility	Action
SEO	Assessment	Immediately follow any fire with an assessment of the effects on the environment, public health, safety and property.
SEO	Search	Search the scorched earth for reptiles and other creatures that can be rehabilitated and saved. <ul style="list-style-type: none"> Use only a licensed rehabilitation facility.
SEO	Monitoring	Monitor for signs of erosion after the first few rains and new flush. <ul style="list-style-type: none"> Manage erosion resulting from a loss in plant basal or aerial cover. Ensure that the control measures are not destructive.
SEO	Managing	No Vehicles or plant are permitted to drive through burnt areas.

FIRE

INTERNAL & EXTERNAL COMMUNICATION PLAN		
Personnel	Responsibility	Action
Employee	Reporting	The person who starts or discovers a fire must report the incident to their immediate Supervisor.
Supervisor	Reporting	Report the incident to the SEO, HSO and Resident Engineer. <ul style="list-style-type: none"> Note that the SEO will take control over all relevant actions once he/she arrives on the scene.
SEO	Reporting	Report the incident to the Site Agent and/or Manager and the ECO.
SEO	Reporting	If there is potential for a fire to spread and endanger life, property or the environment, alert the landowner and Fire Department.
Land Owner	Reporting	Alert the owners of adjacent land.
HSO	Reporting	Report the incident to an Inspector (designated under section 28 of the Occupational Health & Safety Act, 1993) within the prescribed period and manner.
SEO	Reporting	Report the incident to the following authorities. 1. DEA (Director General), 2. SA Police Services, 3. Fire Department, 4. DEA (Provincial Head of Department) or Local Municipality, and 5. Any persons whose health may be affected by the incident.
SEO	Reporting	Provide the following information: 1. The nature of the incident, 2. Any risks posed by the incident to public health, safety & property, 3. the toxicity of substances or by-products released by the incident, and 4. any steps that should be taken in order to avoid or minimise the effects of the incident on public health and the environment.
ECO / Applicant / Site Agent / RE	Reporting	If the nature of the impact constitutes a gross violation of the EA or any legislation: <ul style="list-style-type: none"> The ECO must report the incident to the applicant. The applicant must report the incident to the Local Municipality, DEA, and DWS. The Site Agent and / or Manager must report the incident to their Environmental Group Manager, Divisional MD and CEO. The Resident Engineer must report the incident to his Superiors.

FIRE

PRESCRIBED REPORTING PROCEDURE		
Incident recording		
Personnel	Responsibility	Action
SEO	Investigation	Conduct an investigation, including interviews, and record all details of the incident. • The cause must be investigated.
SEO	Reporting	Complete an Environmental Incident Report and forward it to all key project personnel, with the exception of the Emergency Services.
SEO	Reporting	Within 14 days of the incident, report the incident to the following authorities. 1. DEA (Director General), 2. DEA (Provincial Head of Department), and 3. Local Municipality.
SEO	Reporting	Provide the following information: 1. The nature of the incident, 2. The substances involved and an estimation of the quantity released and their possible acute effect on persons & the environment & data needed to assess these effects, 3. Initial measures to minimise impacts, 4. Causes of the incident, whether direct or indirect including equipment, technology, system or management failure, and 5. Measures taken & to be taken to avoid a recurrence of such incident.
Progress reporting		
SEO	Revising Procedures	Identify methods for preventing the incident from re-occurring and revise method statements and/or procedures for implementing as early as possible.
SEO	Training	Conduct either a toolbox talk or environmental awareness training/re-induction to the employee(s) responsible for the spill and include additional mitigations to avoid a re-occurrence. • Keep the program, including a signed attendance register, in the on-site environmental file.