
PROPOSED ESTABLISHMENT OF THE TSHIVHASO COAL-FIRED POWER STATION AND ASSOCIATED INFRASTRUCTURE NEAR LEPHALALE, LIMPOPO PROVINCE

DEA Ref No: 14/12/16/3/3/3/211

ENVIRONMENTAL MANAGEMENT PROGRAMME

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Report
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PROJECT DETAILS

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DEFINITIONS AND TERMINOLOGY

Alternatives: Alternatives are different means of meeting the general purpose and need of a proposed activity. Alternatives may include location or site alternatives, activity alternatives, process or technology alternatives, temporal alternatives or the 'do nothing' alternative.

Archaeological material: Remains resulting from human activities which are in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures.

Commence: The start of any physical activity, including site preparation and any other activity on site furtherance of a listed activity or specified activity, but does not include any activity required for the purposes of an investigation or feasibility study as long as such investigation or feasibility study does not constitute a listed activity or specified activity.

Commercial Operation date: The date after which all testing and commissioning has been completed and is the initiation date to which the seller can start producing electricity for sale (i.e. when the project has been substantially completed).

Commissioning: Commissioning commences once construction is completed. Commissioning covers all activities including testing after all components of the power station are installed.

Construction: Construction means the building, erection or establishment of a facility, structure or infrastructure that is necessary for the undertaking of a listed or specified activity. Construction begins with any activity which requires Environmental Authorisation.

Cumulative impacts: The impact of an activity that in itself may not be significant, but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

Decommissioning: To take out of active service permanently or dismantle partly or wholly, or closure of a facility to the extent that it cannot be readily re-commissioned. This usually occurs at the end of the life of a facility.

Direct impacts: Impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity (e.g. noise generated by blasting operations on the site of the activity). These impacts are usually associated with the

construction, operation or maintenance of an activity and are generally obvious and quantifiable

'Do nothing' alternative: The 'do nothing' alternative is the option of not undertaking the proposed activity or any of its alternatives. The 'do nothing' alternative also provides the baseline against which the impacts of other alternatives should be compared.

Drainage: A drainage line is a lower category or order of watercourse that does not have a clearly defined bed or bank. It carries water only during or immediately after periods of heavy rainfall i.e. non-perennial, and riparian vegetation may or may not be present

Endangered species: Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included here are taxa whose numbers of individuals have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

Endemic: An "endemic" is a species that grows in a particular area (is endemic to that region) and has a restricted distribution. It is only found in a particular place. Whether something is endemic or not depends on the geographical boundaries of the area in question and the area can be defined at different scales.

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

- i. The land, water and atmosphere of the earth;
- ii. Micro-organisms, plant and animal life;
- iii. Any part or combination of (i) and (ii) and the interrelationships among and between them; and
- iv. The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Environmental assessment practitioner: An individual responsible for the planning, management and coordinating of environmental management plan or any other appropriate environmental instruments introduced by legislation.

Environmental impact: An action or series of actions that have an effect on the environment.

Environmental impact assessment: Environmental Impact Assessment (EIA), as defined in the NEMA EIA Regulations and in relation to an application to which scoping must be applied, means the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of that application.

Environmental management: Ensuring that environmental concerns are included in all stages of development, so that development is sustainable and does not exceed the carrying capacity of the environment.

Environmental management programme: A management plan that organises and coordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of a proposal and its on-going maintenance after implementation.

Fossil: Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment.

Heritage: That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act of 2000).

Hazardous waste: Any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment (Van der Linde and Feris, 2010;pg 185).

Incident: An undesired event which may result in a significant environmental impact but can be managed through internal response.

Indigenous: All biological organisms that occurred naturally within the study area prior to 1800

Indirect impacts: Indirect or induced changes that may occur as a result of the activity (e.g. the reduction of water in a stream that supply water to a reservoir that supply water to the activity). These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place as a result of the activity.

Interested and affected party: Individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, consumers, environmental interest groups and the general public.

Method statement: method statement is a written submission to the ECO and the site manager (or engineer) by the EPC Contractor in collaboration with his/her EO.

Perennial and non-perennial: Perennial systems contain flow or standing water for all or a large proportion of any given year, while non-perennial systems are episodic or ephemeral and thus contains flows for short periods, such as a few hours or days in the case of drainage lines.

Pollution: A change in the environment caused by substances (radio-active or other waves, noise, odours, dust or heat emitted from any activity, including the storage or treatment or waste or substances).

Pre-construction: The period prior to the commencement of construction, which may include activities which do not require Environmental Authorisation (e.g. geotechnical surveys).

Riparian: the area of land adjacent to a stream or river that is influenced by stream-induced or related processes. Riparian areas which are saturated or flooded for prolonged periods would be considered wetlands and could be described as riparian wetlands. However, some riparian areas are not wetlands (e.g. an area where alluvium is periodically deposited by a stream during floods but which is well drained).

Rare species: Taxa with small world populations that are not at present Endangered or Vulnerable, but are at risk as some unexpected threat could easily cause a critical decline. These taxa are usually localised within restricted geographical areas or habitats or are thinly scattered over a more extensive range. This category was termed Critically Rare by Hall and Veldhuis (1985) to distinguish it from the more generally used word "rare".

Red data species: Species listed in terms of the International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species, and/or in terms of the South African Red Data list. In terms of the South African Red Data list, species are classified as being extinct, endangered, vulnerable, rare, indeterminate, insufficiently known or not threatened (see other definitions within this glossary).

Significant impact: An impact that by its magnitude, duration, intensity, or probability of occurrence may have a notable effect on one or more aspects of the environment.

Waste: Any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, or required to be discarded or disposed of, by the holder of that substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered and includes all wastes as defined in Schedule 3 of the NEM WA; or any other substance, material or object that is not included in Schedule 3 of the NEM WA that may be defined as a waste by that is identified as waste by the Minister of Environmental Affairs (by notice in the Gazette). Any waste or portion of waste, referred to in the section above, ceases to be a waste:

- (i) once an application for its re-use, recycling or recovery has been approved or, after such approval, once it is, or has been re-used, recycled or recovered;
- (ii) where approval is not required, once a waste is, or has been re-used, recycled or recovered;

- (iii) where the Minister of Environmental Affairs has, in terms of Section 74 of the NEM WA, exempted any waste or a portion of waste generated by a particular process from the definition of waste; or
- (iv) where the Minister of Environmental Affairs has, in the prescribed manner, excluded any waste stream or a portion of a waste stream from the definition of waste.

Watercourse: as per the National Water Act means -

- (a) a river or spring;
- (b) a natural channel in which water flows regularly or intermittently;
- (c) a wetland, lake or dam into which, or from which, water flows; and
- (d) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks

Wetlands: land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which under normal circumstances supports or would support vegetation typically adapted to life in saturated soil (Water Act 36 of 1998); land where an excess of water is the dominant factor determining the nature of the soil development and the types of plants and animals living at the soil surface (Cowardin et al., 1979).

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PROJECT DETAILS

CHAPTER 1

Cennergi is proposing the construction of a coal-fired power station and associated infrastructure on a site near Lephalale in the Limpopo Province. The project is to be known as the Tshivhaso Coal-fired Power Plant. Coal is proposed to be sourced from Exxaro Coal's Thabametsi Coal-Mine development which is to be located in the vicinity of the proposed development site. The electricity generated from the power station will be fed into the Eskom electricity grid.

The Tshivhaso coal-fired power plant will have a generating capacity of up to 1200 MW (to be developed in 2 phases of 600MW each). The proposed site is located approximately 26km north-west of Lephalale within the Lephalale Local Municipality, in the Waterberg District Council of the Limpopo Province. The site is located within the Waterberg Coal Fields, in close proximity to a proven coal resource. Coal is to be supplied via conveyor from the Thabametsi coal mine to be developed in close proximity to the identified alternative sites. The power station will utilise Circulating Fluidised Bed CFB combustors (boilers) which have the advantage that sulphur trapping can take place with the sorbent bed (limestone) in these boilers. This ensures a plant with relatively low emissions. In addition, the power station will utilise dry cooling technology and dry ashing due to water availability constraints. An above-ground ash dumping (where ash is stacked in an ash dump within the power station area and the ash dump is rehabilitated (using topsoil and vegetation)) will be utilised.

The main infrastructure proposed power station includes:

- » Access roads;
- » Power plant production unit/s (boilers / furnaces, turbines, generators and associated equipment,);
- » Raw-Water pipeline, treatment and storage;
- » Waste-water storage and treatment;
- » Storm-water and polluted-water facilities, treatment and storage;
- » Coal transfer-house, strategic stockpile, working stockyard, silos and conveyors;
- » Limestone rail/road offloading, storage, silos and conveyors;
- » Ash-handling conveyors, -silos, -disposal and dump facilities;
- » Workshops, offices, warehouses and control rooms
- » Hazardous and non-hazardous waste, disposal facilities and logistics;
- » Heavy Fuel Oil (HFO), diesel, and Liquid Petroleum Gas (LPG) logistics and storage;
- » Rail-head extension from Grootgeluk Mine, rail-spur to power station, and tippler facilities;
- » High-voltage yards, substation and overhead power line to connect into the Eskom grid, and

- » Temporary facilities for construction, including workshop facilities, laydown areas, water-supply, electricity-supply and logistics.

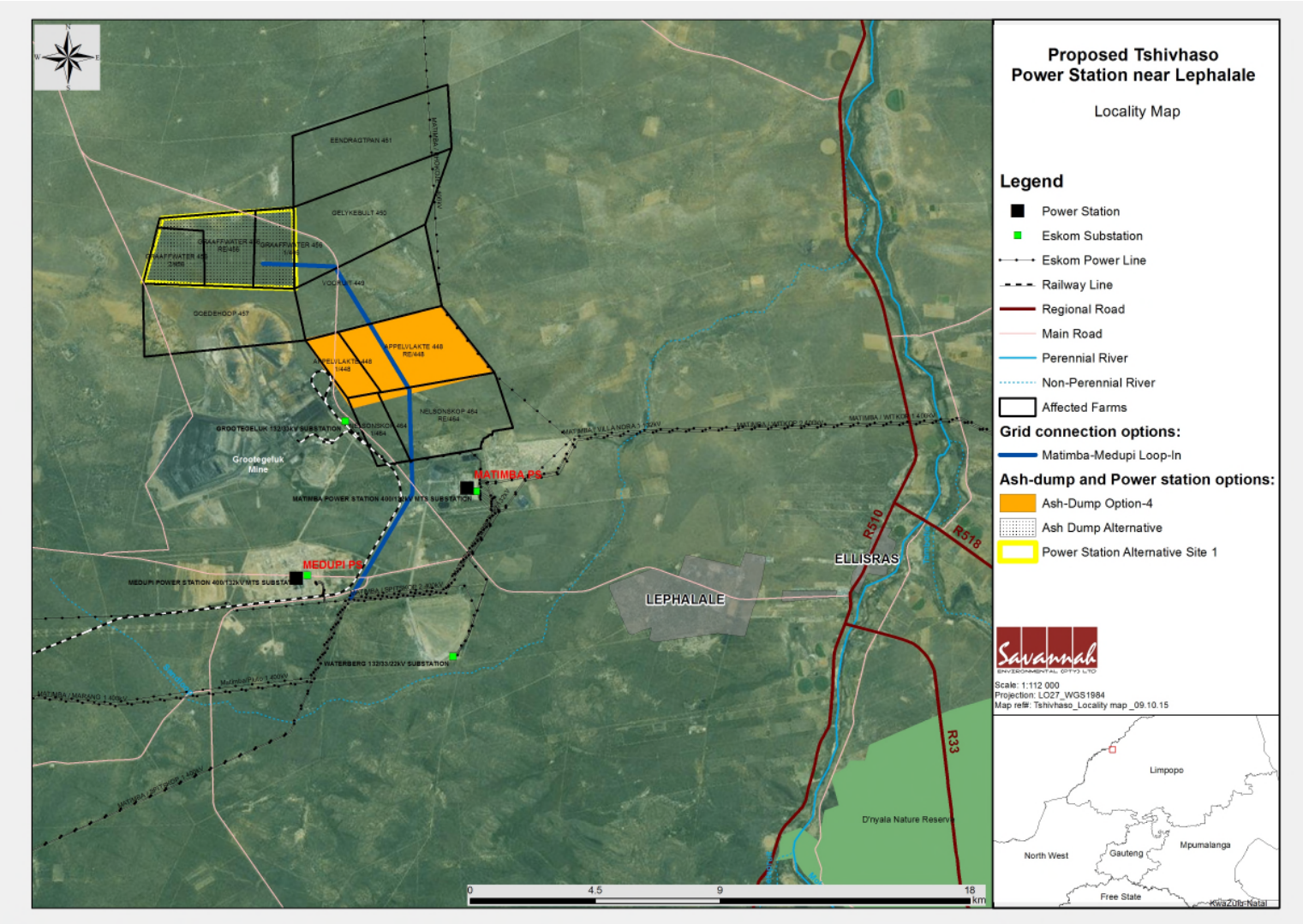


Figure 1.1: Locality map showing the proposed area for the establishment of the Tshivhaso Coal - Fired Power Station on a site near Lephalale, Limpopo Province

1.1. Activities and Components associated with the Power Station

1.1.1 Construction of a Coal-Fired Power Station

Construction of the proposed coal-fired power station is expected take between 48-54 months. The construction activity involves the following¹:

- » Prior to initiating construction, a number of surveys will be required including, but not limited to, geotechnical survey, transportation survey, site survey and confirmation of the power station footprint, survey of substation site, pipeline and survey of power line servitude;
- » Access roads will need to be established to the site;
- » Site preparation activities will include clearance of vegetation and excavations for foundations. These activities will require the stripping of topsoil, which will need to be stockpiled, backfilled and/or spread on site;
- » Thereafter civil works will take place which involves concrete works for structures such as foundation, the production unit (which houses the turbines, generator and so forth), stacks, cooling towers (if applicable), substation and associated infrastructure;
- » Mechanical and electrical work will then follow;
- » Ancillary infrastructure such as office buildings, pipeline, conveyor belt, and a power line linking to the electricity transmission grid will be established; and
- » As construction is completed in an area, and as all construction equipment is removed from the site, the site will be rehabilitated where practical and reasonable.

1.1.2 Operation of a Coal-Fired Power Station

Prior to the operation of the power station, testing and trails will need to be undertaken. The proposed facility will create ~239 permanent employment positions that will be retained for 40 years. It is anticipated that there will be full time security, maintenance and control room staff required at the site. In order to operate a coal-fired power station, resources are required (input), and processes and outputs occur from the electricity generation process. This concept is outlined in **Figure 1.2**.

¹http://www.eskom.co.za/live/monster.php?URL=%2Fcontent%2FCO_0003BuildCoalPSRev4.pdf&Src=Item+28).

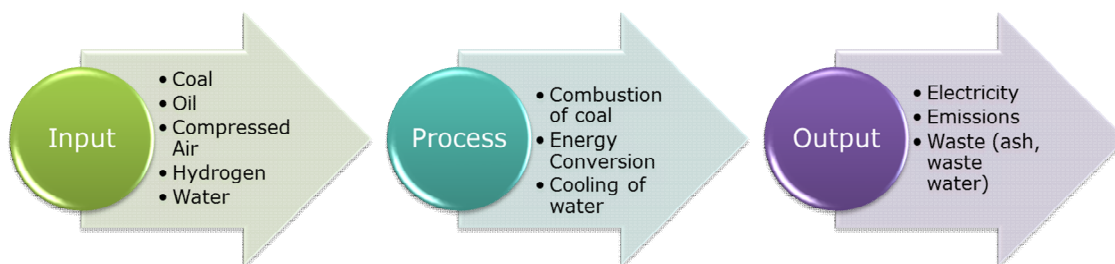


Figure 1.2: Resources (input), processes and outputs (waste) for a coal-fired power station

Figure 1.2 illustrates that in order to operate a coal-fired power station, natural resources such as coal and water will be required. For combustion, coal and air are required. Water is required in the power generation process – it is converted to steam for energy conversion (from thermal energy to mechanical energy). Water is also used for cooling in a power station. The output of the process is electricity as well as waste and by-products. The power station will operate for 24 hours a day and 7 days a week.

1.1.3 Decommissioning of a Coal-Fired Power Station

The lifespan of the proposed coal-fired power station is more than 30 years. Equipment associated with this facility would only be decommissioned once it has reached the end of its economic life. It is most likely that decommissioning activities of the infrastructure of the facility discussed in this EIA would comprise the disassembly and disposal of the infrastructure. Decommissioning activities will involve disassembly of the production units and ancillary infrastructure, demolishing of buildings, removal of hazardous waste and rehabilitation of the ash dumps and site.

1.2 Findings of the Environmental Impact Assessment

Environmental impacts associated with the construction and operation of the power station and associated infrastructure relate to:

- » Impacts on biodiversity
- » Impacts on Soils and Agricultural Potential
- » Impacts on Surface and Groundwater Resources
- » Impacts on air quality and human health
- » Impacts in terms of climate change
- » Noise impacts
- » Visual impacts
- » Impacts on Heritage Sites
- » Socio-economic impacts
- » Cumulative impacts

The findings of the specialist studies undertaken within the EIA to assess both the benefits and potential negative impacts anticipated as a result of the proposed project conclude that:

- » The impacts associated with the construction and operation of the power station and associated infrastructure are expected to be of Medium to Low significance with the implementation of appropriate mitigation measures. The project is considered to be acceptable from an environmental perspective.
- » Site option 1 (Graaffwater) is the preferred site for both the power station and the ash dump.
- » High sensitivity areas were identified within the preferred project development area (refer to Figure 1.3).
- » No environmental fatal flaws were identified to be associated with the proposed project.
- » The significance levels of the majority of identified negative impacts can be minimised by implementing the recommended mitigation measures.

Figure 1.3: Environmental Sensitivity map for the proposed area for the establishment of the Tshivhaso Coal - Fired Power Station on a site near Lephalale, Limpopo Province

PURPOSE AND OBJECTIVES OF THE EMPr

CHAPTER 2

An Environmental Management Programme (EMPr) is defined as “an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts associated with the planning, construction, operation and decommissioning of a project are avoided or mitigated, and that the positive benefits of the projects are enhanced.”² The objective of this EMPr is to provide consistent information and guidance for implementing the management and monitoring measures established in the permitting process and help achieve environmental policy goals. The purpose of an EMPr is to ensure continuous improvement of environmental performance, reducing negative impacts and enhancing positive effects during the construction and operation of the facility. An effective EMPr is concerned with both the immediate outcome as well as the long-term impacts of the project.

The EMPr provides specific environmental guidance for the construction and operation phases of a project, and is intended to manage and mitigate construction and operation activities so that unnecessary or preventable environmental impacts do not result. These impacts range from those incurred during start up (i.e. site clearing and site establishment), during the construction activities themselves (i.e. erosion, noise, dust, and visual impacts), during site rehabilitation (i.e. soil stabilisation, re-vegetation), during operation and during decommissioning (i.e. similar to construction phase activities).

This Environmental Management Programme has been compiled for the design, construction and operation of the Tshivhaso Coal-Fired Power Station. This EMPr is applicable to all employees and contractors working on the pre-construction, construction, and operation and maintenance phases of the project. The document must be adhered to, updated as relevant throughout the project life cycle.

This EMPr has been compiled in accordance with the 2014 EIA Regulations and will be further developed in terms of specific requirements listed in any authorisations issued for the proposed project. The EMPr has been developed as a set of environmental specifications (i.e. principles of environmental management), which are appropriately contextualised to provide clear guidance in terms of the on-site implementation of these specifications (i.e. on-site contextualisation is provided through the inclusion of various monitoring and implementation tools).

This EMPr has the following objectives:

² Provincial Government Northern Cape, Department of Environmental Affairs and Development Planning: *Guideline for Environmental Management Plans*. 2005

- » Outline mitigation measures and environmental specifications which are required to be implemented for the planning, construction and rehabilitation, operation, and decommissioning phases of the project in order to manage and minimise the extent of potential environmental impacts associated with the facility.
- » Ensure that all the phases of the project do not result in undue or reasonably avoidable adverse environmental impacts, and ensure that any potential environmental benefits are enhanced.
- » Identify entities responsible for the implementation of the measures and outline functions and responsibilities.
- » Propose mechanisms and frequency for monitoring compliance, and preventing long-term or permanent environmental degradation.
- » Facilitate appropriate and proactive responses to unforeseen events or changes in project implementation that was not considered in the EIA process.

The management and mitigation measures identified within the Environmental Impact Assessment (EIA) process are systematically addressed in this EMPr, and ensure the minimisation of adverse environmental impacts to an acceptable level.

The developer must ensure that the implementation of the project complies with the requirements of all environmental authorisations, permits, and obligations emanating from relevant environmental legislation. This obligation is partly met through the development and the implementation of this EMPr and through its integration into the contract documentation. Since this EMPr is part of the EIA process for the Tshivhaso Coal-Fired Power Station, it is important that this document be read in conjunction with the Scoping and EIA Reports compiled for this project. This will contextualise the EMPr and enable a thorough understanding of its role and purpose in the integrated environmental management process. Should there be a conflict of interpretation between this EMPr and the environmental authorisation, the stipulations in the environmental authorisation shall prevail over that of the EMPr, unless otherwise agreed by the authorities in writing. Similarly, any provisions in legislation overrule any provisions or interpretations within this EMPr.

This EMPr shall be binding on all the parties involved in the construction and operational phases of the project, and shall be enforceable at all levels of contract and operational management within the project. The document will be adhered to, and updated as relevant throughout the project life cycle. Any amendments to the EMPr must be undertaken in accordance with the relevant legislative requirements at the time.

KEY LEGISLATION APPLICABLE TO THE DEVELOPMENT

CHAPTER 3

The following legislation and guidelines have informed the scope and content of this EMP:

- » National Environmental Management Act (Act No 107 of 1998)
- » EIA Regulations, published under Chapter 5 of the NEMA (GNR R983, GNR984 and GN985)
- » International Standards – IFC Standards and Equator Principles

Several other Acts, standards, or guidelines have also informed the project process and the scope of issues addressed and assessed in the EIA Report. A review of legislative requirements applicable to the proposed project is provided in the table that follows.

Table 3.1: Relevant legislative permitting requirements applicable to the proposed Tshivhaso Coal-Fired Power Station

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
National Legislation			
Constitution of the Republic of South Africa (Act No. 108 of 1996)	In terms of Section 24, the State has an obligation to give effect to the environmental right. The environmental right states that: "Everyone has the right - » To an environment that is not harmful to their health or well-being; and » To have the environment protected, for the benefit of present and future generations, » through reasonable legislative and other measures that: » Prevent pollution and ecological degradation; » Promote conservation; and » Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."	Applicable to all authorities	There are no permitting requirements associated with this Act. The application of this clause however implies that environmental impacts associated with proposed developments are considered separately and cumulatively. It is also important to note that in the "right to an environment clause" include that justifiable economic and social development should be promoted, through the use of natural resources and ecologically sustainable development.
National Environmental Management Act (Act No 107 of 1998)	The EIA Regulations have been promulgated in terms of Chapter 5 of the Act. Listed activities which may not commence without an environmental authorisation are identified within these Regulations. In terms of S24(1) of NEMA, the potential impact on the environment associated with these listed activities must be assessed and reported on to the competent authority charged by NEMA with granting	Department of Environmental Affairs – competent authority Limpopo LEDET - commenting authority	The listed activities triggered by the proposed project have been identified and assessed in the EIA process being undertaken (i.e. Scoping and EIA).

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>of the relevant environmental authorisation.</p> <p>In terms of GN R983, R984 and 985 of 2014, a Scoping and EIA Process is required to be undertaken for the proposed project.</p>		
<p>National Environmental Management Act (Act No 107 of 1998)</p>	<p>In terms of the Duty of Care Provision in S28(1) the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to ensure that any pollution or degradation of the environment associated with this project is avoided, stopped or minimised.</p> <p>In terms of NEMA, it has become the legal duty of a project proponent to consider a project holistically, and to consider the cumulative effect of a variety of impacts.</p>	<p>Department of Environmental Affairs</p>	<p>While no permitting or licensing requirements arise directly by virtue of the proposed project, this section has found application during the EIA Phase through the consideration of potential impacts (cumulative, direct, and indirect). It will continue to apply throughout the life cycle of the project.</p>
<p>Environment Conservation Act (Act No 73 of 1989)</p>	<p>National Noise Control Regulations (GN R154 dated 10 January 1992)</p>	<p>Department of Environmental Affairs</p> <p>Limpopo LEDET</p> <p>Local Authorities</p>	<p>Noise impacts are expected to be associated with the construction & operation phase of the project and are not likely to present a significant intrusion to the local community. Therefore is no requirement for a noise permit in terms of the legislation.</p>
<p>National Water Act (Act No 36 of 1998)</p>	<p>Water uses under S21 of the Act must be licensed, unless such water use falls into one of the categories listed in S22 of the Act or falls under the general authorisation (and then registration of the water use is required).</p>	<p>Department of Water and Sanitation</p>	<p>The following Section 21 water uses have been identified for the proposed project, in terms of which a Water Use License will be required:</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>Consumptive water uses may include the taking of water from a water resource and storage - Sections 21a and b, however these are not anticipated.</p> <p>Non-consumptive water uses may include impeding or diverting of flow in a water course - Section 21c; and altering of bed, banks or characteristics of a watercourse - Section 21i.</p>		<ul style="list-style-type: none"> » 21(b) storing water; » 21(c) impeding or diverting the flow of water in a watercourse; » 21(g) disposing of waste in a manner which may detrimentally impact on a water resource; » 21(i) altering the bed, banks, course or characteristics of a watercourse
<p>Minerals and Petroleum Resources Development Act (Act No 28 of 2002)</p>	<p>A mining permit or mining right may be required where a mineral in question is to be mined (e.g. materials from a borrow pit) in accordance with the provisions of the Act.</p> <p>Requirements for Environmental Management Programmes and Environmental Management Plans are set out in S39 of the Act.</p> <p>S53 Department of Mineral Resources: Approval from the Department of Mineral Resources (DMR) may be required to use land surface contrary to the objects of the Act in terms of section 53 of the Mineral and Petroleum Resources Development Act, (Act No 28 of 2002): In terms of the Act approval from the Minister of Mineral Resources is required to ensure that proposed activities do not sterilise a mineral resource that might occur on site.</p>	<p>Department of Mineral Resources</p>	<p>As no borrow pits are expected to be required for the construction of the facility, no mining permit or right is required to be obtained.</p> <p>Anglo has gas prospecting rights over sections of land owned by Exxaro. A Section 53 application is required to be submitted to the DMR for the proposed development area.</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
<p>National Environmental Management: Air Quality Act (Act No 39 of 2004)</p>	<p>S21 – Listed activities requiring an Air Emissions License.</p> <p>Minimum emission standards are set for Listed Activities. The minimum emission standards are defined for existing and new plants in Government Notice 893 of 22 November 2013.</p> <p>Measures in respect of dust control (S32) and National Dust Control Regulations of November 2013.</p> <p>Measures to control noise (S34) - no regulations promulgated yet.</p> <p>The Act provides that an air quality officer may require any person to submit an atmospheric impact report if there is reasonable suspicion that the person has failed to comply with the Act.</p>	<p>Department of Environmental Affairs</p>	<p>Solid fuel combustion installations using solid fuel for electricity generation are Listed Activities (Category 1: Sub-category 1.1) in term of Section 21 of the NEM:AQA. Therefore an Air Emissions License must be obtained for the project.</p> <p>Measures in respect of dust control (S32) and the National Dust Control Regulations of November 2013.</p>
<p>National Heritage Resources Act (Act No 25 of 1999)</p>	<ul style="list-style-type: none"> » Stipulates assessment criteria and categories of heritage resources according to their significance (S7). » Provides for the protection of all archaeological and palaeontological sites, and meteorites (S35). » Provides for the conservation and care of cemeteries and graves by SAHRA where this is not the responsibility of any other authority (S36). 	<p>South African Heritage Resources Agency</p>	<p>An HIA has been undertaken as part of the EIA Process to identify heritage sites (Appendix I). Should a heritage resource be impacted upon, a permit may be required from SAHRA.</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<ul style="list-style-type: none"> » Lists activities which require developers any person who intends to undertake to notify the responsible heritage resources authority and furnish it with details regarding the location, nature, and extent of the proposed development (S38). » Requires the compilation of a Conservation Management Plan as well as a permit from SAHRA for the presentation of archaeological sites as part of tourism attraction (S44). 		
<p>National Environmental Management: Biodiversity Act (Act No 10 of 2004)</p>	<ul style="list-style-type: none"> » Provides for the MEC/Minister to identify any process or activity in such a listed ecosystem as a threatening process (S53) » A list of threatened and protected species has been published in terms of S 56(1) - Government Gazette 29657. » Three government notices have been published, i.e. GN R 150 (Commencement of Threatened and Protected Species Regulations, 2007), GN R 151 (Lists of critically endangered, vulnerable and protected species) and GN R 152 (Threatened or Protected Species Regulations). » Provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), vulnerable (VU) or protected. The first national list of threatened terrestrial ecosystems has been gazetted, together with supporting information on the listing process including the purpose and 	<p>Department of Environmental Affairs</p>	<p>Under this Act, a permit would be required for any activity which is of a nature that may negatively impact on the survival of a listed protected species.</p> <p>An ecological study has been undertaken as part of the EIA Phase. As such the potentially occurrence of critically endangered, endangered, vulnerable, and protected species and the potential for them to be affected has been considered.</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>rationale for listing ecosystems, the criteria used to identify listed ecosystems, the implications of listing ecosystems, and summary statistics and national maps of listed ecosystems (National Environmental Management: Biodiversity Act: National list of ecosystems that are threatened and in need of protection, (G 34809, GN 1002), 9 December 2011).</p> <p>» This Act also regulates alien and invader species.</p>		
<p>Conservation of Agricultural Resources Act (Act No 43 of 1983)</p>	<p>» Prohibition of the spreading of weeds (S5)</p> <p>» Classification of categories of weeds & invader plants (Regulation 15 of GN R1048) & restrictions in terms of where these species may occur.</p> <p>» Requirement & methods to implement control measures for alien and invasive plant species (Regulation 15E of GN R1048).</p>	<p>Department of Agriculture</p>	<p>This Act will find application throughout the life cycle of the project. In this regard, soil erosion prevention and soil conservation strategies must be developed and implemented. In addition, a weed control and management plan must be implemented.</p> <p>The permission of agricultural authorities will be required if the Project requires the draining of vleis, marshes or water sponges on land outside urban areas.</p>
<p>National Forests Act (Act No. 84 of 1998)</p>	<p>According to this Act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. The prohibitions provide that 'no</p>	<p>National Department of Forestry</p>	<p>A licence is required for the removal of protected trees. The presence of protected trees on the</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister’.</p>		<p>site was determined through the ecological impact assessment undertaken for the project</p>
<p>National Veld and Forest Fire Act (Act 101 of 1998)</p>	<p>In terms of S21 the applicant must ensure that the firebreak is wide and long enough to have a reasonable chance of preventing the fire from spreading, not causing erosion, and is reasonably free of inflammable material.</p> <p>In terms of S17, the applicant must have such equipment, protective clothing, and trained personnel for extinguishing fires.</p>	<p>Department of Agriculture, Forestry and Fisheries (DAFF)</p>	<p>While no permitting or licensing requirements arise from this legislation, this Act will find application during the construction and operational phase of the project.</p>
<p>Hazardous Substances Act (Act No 15 of 1973)</p>	<p>This Act regulates the control of substances that may cause injury, or ill health, or death due to their toxic, corrosive, irritant, strongly sensitising or inflammable nature or the generation of pressure thereby in certain instances and for the control of certain electronic products. To provide for the rating of such substances or products in relation to the degree of danger; to provide for the prohibition and control of the importation, manufacture, sale, use, operation, modification, disposal or dumping of such substances and products.</p> <p>Group I and II: Any substance or mixture of a substance that might by reason of its toxic,</p>	<p>Department of Health</p>	<p>It is necessary to identify and list all the Group I, II, III, and IV hazardous substances that may be on the site and in what operational context they are used, stored or handled. If applicable, a license is required to be obtained from the Department of Health.</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>corrosive etc, nature or because it generates pressure through decomposition, heat or other means, cause extreme risk of injury etc., can be declared as Group I or Group II substance Group IV: any electronic product; and Group V: any radioactive material.</p> <p>The use, conveyance, or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate license being in force.</p>		
<p>Development Facilitation Act (Act No 67 of 1995)</p>	<p>Provides for the overall framework and administrative structures for planning throughout the Republic.</p> <p>S (2-4) provide general principles for land development and conflict resolution.</p>	<p>Local Municipality</p>	<p>The applicant must submit a land development application in the prescribed manner and form as provided for in the Act. A land development applicant who wishes to establish a land development area must comply with procedures set out in the Act.</p>
<p>National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)</p>	<p>The Minister may by notice in the Gazette publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment.</p> <p>The Minister may amend the list by –</p> <ul style="list-style-type: none"> » Adding other waste management activities to the list. » Removing waste management activities from the list. » Making other changes to the particulars on the list. 	<p>National Department of Water and Environmental Affairs (hazardous waste)</p> <p>Provincial Department of Environmental Affairs (general waste)</p>	<p>A waste license is required for the disposal of waste to land (ash) and for the construction of the ash disposal facility associated with the power station.</p> <p>General waste handling, storage and disposal during construction and operation is required to be undertaken. The DWAF (1998) Waste Management Series: Minimum Requirements for the</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>In terms of the Regulations published in terms of this Act (GN 912), a Basic Assessment or Environmental Impact Assessment is required to be undertaken for identified listed activities.</p> <p>Any person who stores waste must at least take steps, unless otherwise provided by this Act, to ensure that:</p> <ul style="list-style-type: none"> » The containers in which any waste is stored, are intact and not corroded or in » any other way rendered unfit for the safe storage of waste. » Adequate measures are taken to prevent accidental spillage or leaking. » The waste cannot be blown away. » Nuisances such as odour, visual impacts and breeding of vectors do not arise; and » Pollution of the environment and harm to health are prevented. 		<p>Handling, Classification and Disposal of Hazardous Waste will also need to be considered.</p>
Subdivision of Agricultural Land Act (Act No 70 of 1970)	Details land subdivision requirements and procedures. Applies for subdivision of all agricultural land in the country	Department of Agriculture	Subdivision of land may be required in terms of S24 and S17 of the Act.
National Road Traffic Act (Act No 93 of 1996)	» The technical recommendations for highways (TRH 11): "Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads" outline the rules and conditions which	<ul style="list-style-type: none"> » South African National Roads Agency Limited (national roads) » Provincial 	An abnormal load/vehicle permit may be required to transport the various components to site for construction. These include route clearances and permits will be

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed.</p> <ul style="list-style-type: none"> » Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges, and culverts. » The general conditions, limitations, and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power/mass ratio, mass distribution, and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the National Road Traffic Act and the relevant Regulations. 	<p>Department of Transport</p>	<p>required for vehicles carrying abnormally heavy or abnormally dimensioned loads. Transport vehicles exceeding the dimensional limitations (length) of 22m. Depending on the trailer configuration and height when loaded, some of the power station components may not meet specified dimensional limitations (height and width).</p>
Provincial Legislation & Guidelines			
<p>Limpopo Environmental Management Act / LIMA (Act 7 of 2003)</p>	<p>This Act provides for the sustainable utilisation of wild animals, aquatic biota and plants; provides for the implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora; provides for offences and penalties for contravention of the Act; provides for the appointment of nature conservators to implement the provisions of the Act; and provides for the issuing of permits and other authorisations. Amongst other regulations, the following may apply</p>	<p>Limpopo Department of Economic Development, Environment and Tourism</p>	<p>A collection/destruction permit must be obtained from LEDET for the removal of any protected plant or animal species found on site. Additionally, a permit for the disturbance or destruction of indigenous species must be applied for.</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	to the current project: <ul style="list-style-type: none"> » Boundary fences may not be altered in such a way as to prevent wild animals from freely moving onto or off of a property; » Aquatic habitats may not be destroyed or damaged; » The owner of land upon which an invasive species is found (plant or animal) must take the necessary steps to eradicate or destroy such species. The Act provides lists of protected species for the Province.		
The Waterberg-Bojanala Priority Area Air Quality Management Plan and Threat Assessment (December 2015)	<ul style="list-style-type: none"> » Characterisation of the baseline air quality in the WBPA » Quantification of the potential threats posed to ambient air quality by emissions from future energy-based projects in the WDM up to 2030. » The development of the WBPA AQMP and its supporting Implementation Plan. 	Department of Environmental Affairs	No permitting requirements arise from the guideline. It is taken into account in the air quality assessment and AEL application.

STRUCTURE OF THIS EMPR

CHAPTER 4

The first two chapters provide background to the EMPr and the proposed project, while the chapters which follow consider the following:

- » Pre-Construction (Planning & Design) activities;
- » Construction activities;
- » Operation activities; and
- » Decommissioning activities.

These chapters set out the procedures necessary for The Project Developer, as the project developer, to minimise environmental impacts and achieve environmental compliance. For each of the phases of implementation, an over-arching environmental **goal** is stated. In order to meet this goal, a number of **objectives** are listed. The EMPr has been structured in table format in order to show the links between the goals for each phase and their associated objectives, activities/risk sources, mitigation actions, monitoring requirements and performance indicators. A specific EMPr table has been established for each environmental objective. The information provided within the EMPr table for each objective is illustrated below:

OBJECTIVE: Description of the objective, which is necessary to meet the overall goals; which take into account the findings of the EIA specialist studies

Project Component/s	» List of project components affecting the objective.
Potential Impact	» Description of potential environmental impact if objective is not met.
Activity/Risk Source	» Description of activities which could affect achieving objective.
Mitigation: Target/Objective	» Description of the target and/or desired outcomes of mitigation.

Mitigation: Action/Control	Responsibility	Timeframe
List specific action(s) required to meet the mitigation target/objective described above.	Who is responsible for the measures?	Periods for implementation.

Performance Indicator	Description of key indicator(s) that track progress/indicate the effectiveness of the EMPr.
Monitoring	Mechanisms for monitoring compliance; the key monitoring actions required to check whether the objectives are being achieved, taking into consideration responsibility, frequency, methods, and reporting.

The objectives and EMPr tables are required to be reviewed and possibly modified whenever changes, such as the following, occur:

- » Planned activities change (i.e. in terms of the components and/or layout of the facility);
- » Modification to or addition to environmental objectives and targets;
- » Relevant legal or other requirements are changed or introduced; and
- » Significant progress has been made on achieving an objective or target such that it should be re-examined to determine if it is still relevant or should be modified.

Any amendments to the EMPr must be undertaken in accordance with the relevant legislative requirements at the time.

4.1 Project Team

This draft EMPr was compiled by:

- » John von Mayer: holds a Bachelor of Science degree with Honours in Environmental Management and has 8 years' experience in environmental management and has undertaken numerous EIAs for infrastructure projects, renewable energy facilities and associated infrastructure in South Africa.
- » Jo-Anne Thomas, is a registered Professional Natural Scientist (in the practice of environmental science) with the South African Council for Natural Scientific Professions. She has gained extensive knowledge and experience on potential environmental impacts associated with electricity generation and transmission projects through her involvement in related EIA processes over the past eighteen (18) years. She has successfully managed and undertaken EIA processes for electricity generation projects throughout South Africa.

Specialists involved in the preparation of management measures include:

Specialist	Area of Expertise
Umoya Nilu	Air Quality
Bathusi Environmental Consulting	Biodiversity (Flora & Fauna)
Heritage Contracts and Archaeological Consulting cc	Heritage
M2 Environmental Connections CC	Groundwater)
Enviro-Acoustic Research	Noise
Urban-Econ Development Economists	Socio-Economics and land use

Specialist	Area of Expertise
Savannah Environmental (reviewed by ARC-Institute for Soil, Climate and Water)	Soils and agricultural potential
M2 Environmental Connections (Menco)	Surface Water and wetlands
Afzelia	Visual

The Savannah Environmental team have extensive knowledge and experience in EIAs and environmental management, having been involved in EIA processes over the past fifteen years. They have managed and drafted EMPs for other power generation projects throughout South Africa. CV's for the EAPs are included in Appendix I.

ROLES AND RESPONSIBILITIES

CHAPTER 5

5.1 Roles and Responsibilities for the Construction Phase of the Coal - Fired Power Station

As the Proponent, Cennergi (Pty) Ltd must ensure that the implementation of the Tshivhaso Power Station complies with the requirements of any and all environmental authorisations and permits, and obligations emanating from other relevant environmental legislation. This obligation is partly met through the development of the EMPr, and the implementation of the EMPr through its integration into the contract documentation. Cennergi (Pty) Ltd will retain various key roles and responsibilities during the construction of the Coal-fired Power Station. These are outlined below.

Specific responsibilities of the Owner's Representatives; Environmental Control Officer and EPC Contractor for the construction phase of this project are as detailed below.

The **Project Manager** will:

- » Ensure all specifications and legal constraints specifically with regards to the environment are highlighted to the Contractor(s) so that they are aware of these.
- » Ensure that its Contractors are made aware of all stipulations within the EMPr.
- » Ensure that the EMPr is correctly implemented throughout the project cycle by means of site inspections and meetings. This will be documented as part of the site meeting minutes.
- » Be fully conversant with the Environmental Impact Assessment for the project, the EMPr, the conditions of the Environmental Authorisation, and all relevant environmental legislation.

The **Site Manager** (On-site Representative) will:

- » Be fully knowledgeable with the contents of the Environmental Impact Assessment.
- » Be fully knowledgeable with the contents and conditions of the Environmental Authorisation.
- » Be fully knowledgeable with the contents of the EMPr.
- » Be fully knowledgeable with the contents of all relevant environmental legislation, and ensure compliance with these.
- » Be fully knowledgeable with the contents of all relevant licences and permits.
- » Have overall responsibility of the EMPr and its implementation.
- » Conduct audits to ensure compliance to the EMPr.
- » Ensure there is communication with the Project Manager, the Environmental Control Officer/s and relevant discipline Engineers on matters concerning the environment.
- » Ensure that no actions are taken which will harm or may indirectly cause harm to the environment, and take steps to prevent pollution on the site.
- » Confine activities to the demarcated construction site.

An independent **Environmental Control Officer (ECO)** must be appointed by the project proponent prior to the commencement of any authorised activities. The ECO will be responsible for monitoring, reviewing and verifying compliance by the Contractor with the environmental specifications of the EMPr and the conditions of the Environmental Authorisation. The ECO will:

- » Be fully knowledgeable of the contents with the Environmental Impact Assessment.
- » Be fully knowledgeable of the contents with the conditions of the Environmental Authorisation (once issued).
- » Be fully knowledgeable of the contents with the EMPr.
- » Be fully knowledgeable of the contents with all relevant environmental legislation, and ensure compliance with them.
- » Be fully knowledgeable of all the licences and permits issued to the site.
- » Ensure that the contents of this document are communicated to the Contractor site staff and that the Site Manager and Contractor are constantly made aware of the contents through discussion.
- » Ensure that the compliance of the EMPr is monitored through regular and comprehensive inspection of the site and surrounding areas.
- » Ensure that the Site Manager has input into the review and acceptance of construction methods and method statements.
- » Ensure that activities on site comply with all relevant environmental legislation.
- » Ensure that a removal is ordered of any person(s) and/or equipment responsible for any contravention of the specifications of the EMPr.
- » Ensure that any non-compliance or remedial measures that need to be applied are reported.
- » Keep record of all activities on site, problems identified, transgressions noted and a task schedule of tasks undertaken by the ECO.
- » Independently report to DEA in terms of compliance with the specifications of the EMPr and conditions of the Environmental Authorisation (once issued).
- » Keep record of all reports submitted to DEA.

The ECO shall remain employed until all rehabilitation measures, as required for implementation due to construction damage, are completed and the site handed over for operation.

Contractors and Service Providers: All contractors (including sub-contractors and staff) and service providers are ultimately responsible for:

- » Ensuring adherence to the environmental management specifications.
- » Ensuring that Method Statements are submitted to the Site Manager for approval before any work is undertaken. Any lack of adherence to this will be considered as non-compliance to the specifications of the EMPr.

- » Ensuring that any instructions issued by the Site Manager on the advice of the ECO are adhered to.
- » Ensuring that a report is tabled at each site meeting, which will document all incidents that have occurred during the period before the site meeting.
- » Ensuring that a register is kept in the site office, which lists all transgressions issued by the ECO.
- » Ensuring that a register of all public complaints is maintained.
- » Ensuring that all employees, including those of sub-contractors receive training before the commencement of construction in order that they can constructively contribute towards the successful implementation of the EMPr (i.e. ensure their staff are appropriately trained as to the environmental obligations).

Contractor's Environmental Representative: The Contractor's Environmental Representative (CER), employed by the Contractor, is responsible for managing the day-to-day on-site implementation of this EMPr, and for the compilation of regular (usually weekly) Monitoring Reports. In addition, the CER must act as liaison and advisor on all environmental and related issues and ensure that any complaints received from the public are duly recorded and forwarded to the Site Manager and Contractor.

The Contractor's Environmental Representative should:

- » Be well versed in environmental matters.
- » Understand the relevant environmental legislation and processes.
- » Understand the hierarchy of Environmental Compliance Reporting, and the implications of Non-Compliance.
- » Know the background of the project and understand the implementation programme.
- » Be able to resolve conflicts and make recommendations on site in terms of the requirements of this Specification.
- » Keep accurate and detailed records of all EMPr-related activities on site.

5.2. Roles and Responsibilities for the Operation Phase of the Coal - Fired Power Station

Formal responsibilities are necessary to ensure that key procedures are executed. Specific responsibilities of the Tshivhaso Coal-Fired Power Station Operations Manager, and Environmental Manager for the operation phase of this project are detailed below.

The **Power Station Manager** will:

- » Ensure that adequate resources (human, financial, technology) are made available and appropriately managed for the successful implementation of the operational EMPr.
- » Conduct annual basis reviews of the EMPr to evaluate its effectiveness.
- » Take appropriate action as a result of findings and recommendations in management reviews and audits.
- » Provide forums to communicate matters regarding environmental management.

The **Environmental Manager** will:

- » Develop and Implement an Environmental Management System (EMS) for the Power Station and associated infrastructure.
- » Manage and report on the facility's environmental performance.
- » Maintain a register of all known environmental impacts and manage the monitoring thereof.
- » Conduct internal environmental audits and co-ordinate external environmental audits.
- » Liaise with statutory bodies such as the National and Provincial Department of Environmental Affairs (DEA) on environmental performance and other issues.
- » Conduct environmental training and awareness for the employees who operate and maintain the coal-fired power station.
- » Compile environmental policies and procedures.
- » Liaise with interested and affected parties on environmental issues of common concern.
- » Track and control the lodging of any complaints regarding environmental matters.

MANAGEMENT PROGRAMME: PRE-CONSTRUCTION

CHAPTER 6

6.1. Goal for Pre-Construction Activities

Overall Goal for Pre-Construction: Undertake the pre-construction phase (planning and design) of the power station in a way that:

- » Ensures that the design of the power station responds to the identified environmental constraints and opportunities.
- » Ensures that pre-construction activities are undertaken in accordance with all relevant legislative requirements.
- » Ensures that adequate regard has been taken of any landowner concerns and that these are appropriately addressed through design and planning (where appropriate).
- » Ensures that the best environmental options are selected for the project.
- » Enables the power station construction activities to be undertaken without significant disruption to other land uses in the area.

In order to meet this goal, the following objectives have been identified, together with necessary actions and monitoring requirements.

6.2. Objectives

OBJECTIVE 1. : To ensure that the design of the facility responds to the identified environmental constraints and opportunities

A number of potentially sensitive areas were identified to be associated with the proposed project. These areas are illustrated in Figure 1.3.

Project component/s	Project components affecting the objective include all infrastructure including: <ul style="list-style-type: none">» power station» access roads» substation» power line» ash dumps» coal stockpile» wastewater treatment and management facilities
Potential Impact	» Design fails to respond optimally to the identified environmental considerations
Activities/risk sources	» Positioning of infrastructure for the power station

Mitigation: Target/Objective	» To ensure that the design of the facility responds to the identified environmental constraints and opportunities
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Mitigation: Action/control	Responsibility	Timeframe
1.1. Plan and conduct pre-construction activities in an environmentally acceptable manner	Project Developer	Pre-construction
1.2. Consider design-level mitigation measures recommended in the EIA Report and specialist studies.	Project Developer	Design
1.3. Conduct an ecological walk through survey (considering flora, fauna, wetlands and avifauna) for the power station and all associated infrastructure including power line once final designs are available. Results of this survey must guide permitting requirements for the removal of protected trees from the selected property.	Suitably qualified person/ specialist appointed by The Project Developer	Planning Phase (prior to construction/ during the detail design phase)
1.4. Conduct a heritage walk through survey for the power station and all associated infrastructure including power line once final designs are available. Any heritage sites recorded during this survey could be mitigated by micro adjustments of the layout.	Suitably qualified person/ specialist appointed by The Project Developer	Planning Phase
1.5. Develop a biodiversity monitoring programme for implementation during construction and operation.	Suitably qualified person/ specialist appointed by The Project Developer	Planning Phase
1.6. Compile a Fire Management Plan for implementation during construction and operation.	Suitably qualified person/ specialist appointed by The Project Developer	Planning Phase
1.7. Develop a capture and relocation programme for faunal species for implementation during the construction phase.	Suitably qualified person/ specialist appointed by The Project Developer	Planning Phase
1.8. Develop an alien and invasive management programme for implementation during construction and operation.	Suitably qualified person/ specialist appointed by The Project Developer	Planning Phase
1.9. Develop suitable procedures in the event of encountering potentially dangerous animals on the site for implementation during the construction phase.	Suitably qualified person/ specialist appointed by The Project Developer	Planning Phase
1.10. Develop a rehabilitation programme that makes use of locally endemic species.	Suitably qualified person/ specialist appointed by The Project Developer	Planning Phase
1.11. Develop a detailed stormwater management	Suitably qualified	Planning Phase

Mitigation: Action/control	Responsibility	Timeframe
plan for the stormwater and water pollution control facilities such as Pollution Control Dams and storm water drainage system. Pollution control infrastructure to be designed in accordance with GN 704 specifications.	person/ specialist appointed by The Project Developer	
1.12. Develop an Integrated Water Resource Management Plan for implementation during construction and operation.	Suitably qualified person/ specialist appointed by The Project Developer	Planning Phase
1.13. Develop a traffic management plan for the construction and operational phases of the power station.	Suitably qualified person/ specialist appointed by The Project Developer	Planning Phase
1.14. Diversion of external surface water: A system of storm water drains must be designed for implementation to ensure that all water that falls outside the area of the stockpile and ash dump is diverted clear of the deposit. Provision must be made for the maximum precipitation to be expected over a period of 24 hours with a probability of once in one hundred years. A freeboard of at least 0.5 m must be provided throughout the system above the predicted maximum water level.	Project Developer	Design
1.15. Develop a surface water monitoring programme to monitor impacts on water quality for the operation phase of the power station.	Suitably qualified person/ specialist appointed by The Project Developer	Planning Phase
1.16. Develop a Zero Liquid Effluent Discharge (ZLED) policy for the operation phase of the power station.	Project Developer	Planning Phase
1.17. Develop a groundwater monitoring programme (quarterly sampling) for sampling to establish a database of plume movement trends, to aid eventual decommissioning and rehabilitation for the operation phase of the power station. A basic groundwater monitoring programme is included in Appendix E.	Suitably qualified person/ specialist appointed by The Project Developer	Planning Phase
1.18. Develop an air quality management plan for the operational phase of the power station which must include an emission control and reduction strategy.	Suitably qualified person/ specialist appointed by The Project Developer	Planning Phase
1.19. With respect to stack height, it is recommended that the highest possible stack is considered to promote more effective dilution and dispersion of pollutants, ensuring the lowest possible ground	Project Developer	Design

Mitigation: Action/control	Responsibility	Timeframe
level concentrations		
1.20. Plan for consolidating infrastructure as far as possible and make use of already disturbed areas rather than pristine sites, wherever possible.	Project Developer	Planning Phase
1.21. Permits for transportation of abnormal loads on public roads must be obtained prior to commencement of construction, if required.	Project Developer	Planning Phase
1.22. The pollution control dams and ash dump should be lined with an impervious liner capable of containing all contaminants which may impact on the surrounding environment (as per GNR 636)	Project Developer	Planning Phase
1.23. Water use to be licensed for appropriate regulation and control. WUL must be obtained prior to commencement of water use.	Project Developer	Planning Phase
1.24. Avoid identified no-go areas	Project Developer	Planning Phase
1.25. The power station should be designed such that there is the opportunity to introduce alternative fuel sources (such as biomass) in future.	Project Developer	Design Phase
1.26. During the design and prior to construction the developer should meet with local communities and authorities to determine their concerns and take into consideration any mitigating proposals	Project Developer	Planning Phase
1.27. Perform a skills audit to determine the potential skills that could be sourced in the area	Project Developer	Planning Phase
1.28. Develop an apprenticeship programmes to build onto existing or develop new skills of construction workers, especially those coming from the local communities.	Project Developer	Planning Phase
1.29. Design the power line towers to be bird friendly and plan to implement bird diverters, where required, in accordance with Eskom standards in this regard.	Project Developer	Pre-construction
1.30. Submit final layout to DEA for approval prior to commencement of construction. Layout should indicate all areas where infrastructure is planned as well as temporary areas of disturbance during the construction phase (i.e. laydown areas, etc.).	Project Developer	Pre-construction

Performance Indicator	» Design and layouts etc. respond to the mitigation measures and recommendations in the EIA report.
Monitoring	» Ensure that the design implemented meets the objectives and mitigation measures in the EIA report through review of the design by the Project Manager and Environmental Control Officer (ECO) prior to the commencement of construction.

OBJECTIVE 2: To ensure effective communication mechanisms

On-going communication with affected and surrounding landowners is important to maintain during the construction and operational phases of the wind energy facility. Any issues and concerns raised should be addressed as far as possible in as short a timeframe as possible.

Project component/s	» Coal-fired power station
Potential Impact	» Impacts on affected and surrounding landowners and land uses
Activity/risk source	» Activities associated with construction » Activities associated with facility operation
Mitigation: Target/Objective	» Effective communication with affected and surrounding landowners » Addressing of any issues and concerns raised as far as possible in as short a timeframe as possible

Mitigation: Action/control	Responsibility	Timeframe
1.32. Implement a grievance mechanism procedure for the public to be implemented during both the construction and operational phases of the facility. This procedure should include details of the contact person who will be receiving issues raised by interested and affected parties, and the process that will be followed to address issues. Grievance mechanism included as Appendix B.	Developer/Owner EPC Contractor O&M Contractor	Pre-construction (construction procedure) Pre-operation (operation procedure)
1.33. Implement a transparent approach and open consultation with adjacent property owners, prior and throughout the construction period in order to provide a platform where grievances or requests can be addressed before issues become contentious.	Developer/Owner EPC Contractor	Pre-construction (construction procedure) Pre-operation (operation procedure)
1.34. Before construction commences, representatives from the local municipality, community leaders, community-based organisations and the surrounding property owners, should be informed of the details of the contractors, size of the workforce and construction schedules.	Owner	Pre-construction

Performance	» Effective communication procedures in place.
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Indicator	
Monitoring	» An incident reporting system should be used to record non-conformances to the EMPr.

MANAGEMENT PROGRAMME: CONSTRUCTION

CHAPTER 7

7.1. Overall Goal for Construction

Overall Goal for Construction: Undertake the construction phase of the coal-fired power station and associated infrastructure in a way that:

- » Ensures that construction activities are properly managed in respect of environmental aspects and impacts.
- » Enables the construction activities to be undertaken without significant disruption to other land uses in the area.
- » Minimises the impact on the environment to be affected by construction activities.
- » Minimises the impact on the archaeological and historical value of the site and where possible adds to the archaeological record of this area.

7.2. Objectives

In order to meet the goals for construction, the following objectives have been identified, together with necessary actions and monitoring requirements.

OBJECTIVE 2. : Site establishment and securing the site

Project component/s	Construction of all infrastructure including: <ul style="list-style-type: none"> » power station » access roads » substation » power line » ash dump
Potential Impact	<ul style="list-style-type: none"> » Hazards to landowners and public » Security of materials » Substantially increased damage to adjacent sensitive vegetation, due largely to ignorance of these sensitive areas.
Activities/risk sources	<ul style="list-style-type: none"> » Open excavations (foundations and cable trenches) » Movement of construction vehicles in the area and on-site
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To secure the site against unauthorised entry » To protect members of the public/landowners/residents

Mitigation: Action/control	Responsibility	Timeframe
2.1. Develop and implement a Health, Safety and Environmental Plan in accordance with the requirements of the Occupational Health and Safety Act (85 of 1993), Equator Principles and IFC Performance Standards to guide all activities on projects sites during the site preparation, construction and operation	Contractor/EPC	Pre-construction
2.2. Secure site, working areas and excavations in an appropriate manner.	Contractor	Construction: during site establishment Maintenance: for duration of Contract
2.3. Where necessary to control access, fence and secure area.	Contractor	Construction: during site establishment Maintenance: for duration of Contract
2.4. Fence and secure Contractor's equipment camp.	Contractor	Construction: during site establishment Maintenance: for duration of Contract
2.5. Minimise vegetation clearance associated with site establishment activities.	Contractor	Site establishment
2.6. All development footprints for permanent and temporary infrastructure should be appropriately demarcated. There is to be no disturbance outside these demarcated areas.	Contractor	Construction: during site establishment Maintenance: for duration of Contract
2.7. Establish the necessary ablution facilities with chemical toilets. Provide adequate sanitary facilities and ablutions for construction workers (1 toilet per every 15 workers) at appropriate locations on site.	Contractor	Construction: during site establishment Maintenance: for duration of Contract
2.8. Ablution or sanitary facilities should not be located within 100 m from a 1:100 year flood line including water courses, wetlands or within a horizontal distance of less than 100 m, whichever is applicable	Contractor	During site establishment, construction and maintenance
2.9. Supply adequate waste collection bins at site	Contractor	Construction:

Mitigation: Action/control	Responsibility	Timeframe
where construction is being undertaken.		during site establishment Maintenance: for duration of Contract within a particular area

Performance Indicator	<ul style="list-style-type: none"> » No unnecessary environmental impacts associated with site established » Site is secure and there is no unauthorised entry » No members of the public/ landowners injured
Monitoring	<ul style="list-style-type: none"> » An incident reporting system will be used to record non-conformances to the EMP » ECO to monitor all construction areas on a continuous basis until all construction is completed; immediate report backs to site manager in terms of non-conformances recorded.

OBJECTIVE 3. : Manage / reduce ecological impacts

Project component/s	Construction of all infrastructure including: <ul style="list-style-type: none"> » power station » access roads » substation » power line » ash dump
Potential Impact	<ul style="list-style-type: none"> » Unnecessary biodiversity loss » Damage to ecosystems
Activities/risk sources	Construction Activities including: <ul style="list-style-type: none"> » Site clearing » Site establishment » Excavations » Grading / levelling of surfaces » Concrete works
Mitigation: Target/Objective	<ul style="list-style-type: none"> » Limit biodiversity loss » Limit damage to ecosystems

Mitigation: Action/control	Responsibility	Timeframe
3.1. Manage the extent of construction activities to be limited to site only.	Contractor/ Contractor's Environmental Representative (CER)	Construction

Mitigation: Action/control	Responsibility	Timeframe
3.2. Prevent the uncontrolled spread of environmental impacts due to construction on adjacent areas of natural habitat.	Contractor / CER	Construction
3.3. Undertake a search and rescue for plant and animal species that can be relocated at suitable localities.	Contractor	Construction
3.4. Removal of vegetation/ plants shall be avoided until such time as soil stripping is required in an area, and similarly exposed surfaces must be re-vegetated or stabilised as soon as is practically possible after construction activities in an area are completed.	Contractor / CER	Construction
3.5. Implement a capture and relocation programme for faunal (animal) species prior to earthworks.	Contractor / CER	Construction
3.6. No animal may be hunted, trapped, snared or captured for any purpose whatsoever.	Contractor / CER	Construction
3.7. Implement a suitable procedure in the event of encountering potentially dangerous animals on the site.	Contractor / CER	Construction
3.8. Prevent contamination of any natural habitat and nearby wetlands from any source of pollution.	Contractor / CER	Construction
3.9. Promote construction staff awareness regarding minimisation of impacts to habitats and faunal species in the area.	Contractor / CER	Construction

Performance Indicator	<ul style="list-style-type: none"> » Limit biodiversity loss » Limit damage to ecosystems » Relevant procedures and method statements developed » Number of plants rescued and replanted » Number of animals rescued and relocated
Monitoring	<ul style="list-style-type: none"> » CER to keep a record of all search and rescue attempts. » An incident reporting system will be used to record non-conformances to the EMP » ECO to monitor all construction areas on a continuous basis until all construction is completed; immediate report backs to site manager in terms of non-conformances recorded.

OBJECTIVE 4. : Manage/ reduce impacts on wetlands

Project component/s	Construction of all infrastructure including: <ul style="list-style-type: none"> » power station
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	<ul style="list-style-type: none"> » access roads » substation » power line
Potential Impact	» Damage to wetlands
Activities/risk sources	Construction Activities including: <ul style="list-style-type: none"> » Site clearing » Site establishment » Excavations » Grading / levelling of surfaces » Concrete works
Mitigation: Target/Objective	<ul style="list-style-type: none"> » Limit impact on wetlands » Limit as sediment load in wetlands

Mitigation: Action/control	Responsibility	Timeframe
4.1. Transmission lines to span over pans and associated channels instead of placing pylon footprints within pan and channel footprints	Contractor	Construction
4.2. Limit the destruction of the pan catchment area	Contractor	Construction
4.3. Limit the areas where soil compaction takes place near wetlands.	Contractor	Construction
4.4. Construction servitudes should be kept outside of the delineated non-perennial pan wetland areas as detailed in the EIA Report, and these servitudes should be as narrow as possible to minimise the area affected by soil compaction.	Contractor	Construction
4.5. Hydrocarbon storage facilities, contaminated water storage areas and waste storage facilities should be located outside of the delineated non-perennial pan wetland areas as well as their immediate catchment areas.	Contractor / CER	Construction

Performance Indicator	<ul style="list-style-type: none"> » Limit impact on wetlands » Limit as sediment load in wetlands
Monitoring	<ul style="list-style-type: none"> » An incident reporting system will be used to record non-conformances to the EMP » ECO to monitor all construction areas on a continuous basis until all construction is completed; immediate report backs to site manager in terms of non-conformances recorded.

OBJECTIVE 5. : Good soil management

Project component/s	Construction of all infrastructure including: <ul style="list-style-type: none"> » power station
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	<ul style="list-style-type: none"> » access roads » substation » power line » ash dump
Potential Impact	<ul style="list-style-type: none"> » Soil Loss » Soil erosion » Sedimentation
Activities/risk sources	All constructional activities that disturb the soil below surface, such as levelling, excavations etc.
Mitigation: Target/Objective	Ensure effective topsoil covering on all disturbed areas.

Mitigation: Action/control	Responsibility	Timeframe
5.1 Strip and stockpile topsoil from all areas where soil will be disturbed.	Contractor	Construction
5.2 If an activity will mechanically disturb below surface in any way, then the upper 40 cm of topsoil should first be stripped from the entire disturbed surface and stockpiled for re-spreading during rehabilitation.	Contractor	Construction
5.3 Topsoil stockpiles must be conserved against losses through erosion by establishing vegetation cover on them or through the use of other appropriate means.	Contractor	Construction
5.4 Dispose of all subsurface spoils from excavations where they will not impact on agricultural land (for example on road surfaces) or where they can be effectively covered with topsoil.	Contractor	Construction
5.5 The stockpiled topsoil must be evenly spread over the entire disturbed surface.	Contractor	Construction
5.6 Utilise appropriate Erosion Control measures, where required. Maintain measures throughout the construction phase.	Contractor	Construction
5.7 Areas that have been compacted should be ripped to break up the compacted soil.	Contractor	Construction
5.8 After completion of construction activities, re-spread topsoil over the surface. Ensure effective topsoil covering to conserve soil fertility on all disturbed areas.	Contractor	Construction
5.9 Rehabilitate disturbed areas and stabilise soils after construction.	Contractor	Post-Construction
5.10 Implement biodiversity management plan and rehabilitation plan developed for the site in the pre-construction phase.	Contractor	Construction

Performance Indicator	<ul style="list-style-type: none"> » No disturbed areas are left without an effective covering of topsoil, and potential for re-vegetation. » Areas where erosion has developed are appropriately managed and maintained.
Monitoring	<ul style="list-style-type: none"> » An incident reporting system will be used to record non-conformances to the EMP » ECO to monitor all construction areas on a continuous basis until all construction is completed; immediate report backs to site manager in terms of non-conformances recorded. » Establish an effective record keeping system for each area where soil is disturbed/ poor soil management occurs during the construction phase . These records should be included in ECO reports, and should include all the records below. <ul style="list-style-type: none"> * Record the GPS coordinates of each area. * Record the date of topsoil stripping. * Record the GPS coordinates of where the topsoil is stockpiled. * Record the date of cessation of constructional (or operational) activities at the particular site. * Photograph the area on cessation of constructional activities. * Record date and depth of re-spreading of topsoil. * Photograph the area on completion of rehabilitation and on an annual basis thereafter to show vegetation establishment and evaluate progress of restoration over time.

OBJECTIVE 6. : Prevent/ Limit impacts on surface water bodies

Project component/s	<p>Construction of all infrastructure including:</p> <ul style="list-style-type: none"> » power station » access roads » substation » power line » ash dump
Potential Impact	<ul style="list-style-type: none"> » Damage to surface water resources » Clearance of project footprint could lead to increased sedimentation and siltation. » Road construction, pipelines and conveyance may alter the natural characteristics of the drainage system. » Accidental spills could lead to water pollution.
Activities/risk sources	<p>Power station located within quaternary drainage A41E and A42J that has PES and EIS category of C (largely undisturbed areas of ephemeral and episodic drainage patterns) therefore risks may occur due to construction activities including:</p> <ul style="list-style-type: none"> » Site clearing

	<ul style="list-style-type: none"> » Site establishment » Excavations » Grading / levelling of surfaces » Concrete works
Mitigation: Target/Objective	<ul style="list-style-type: none"> » Surface water quality on the site to comply with the Resource Quality Objectives set for the catchment. » No significant impacts on surface water bodies.

Mitigation: Action/control	Responsibility	Timeframe
6.1. Minimise construction footprint to be outside watercourses and riparian zones.	Contractor	Construction
6.2. Minimise disturbance to flow regime and prevent erosion by utilising erosion control measures in all disturbed areas resulting from construction activities where a potential for erosion exists.	Contractor	Construction
6.3. Implement appropriate stormwater management and water pollution control facilities such as pollution control dams, channels and storm water drainage system.	Contractor	Construction
6.4. Wherever possible, treatment of water for re-use should be undertaken. Only clean water should be discharged from the site (if required).	Contractor	Construction
6.5. As a last resort, discharge storm water in compliance with Department of Water Affairs' limits.	Contractor	Construction
6.6. Implement measures for the separation of clean and dirty water systems	Contractor	Construction
6.7. All contaminated water to be contained in dedicated pollution control structures/ facilities	Contractor	Construction
6.8. If possible, re-use, recycle and minimise all waste water generated on the site.	Contractor	Construction
6.9. The construction of pipelines, roads and road servitudes (disturbance zones) in or adjacent to the delineated wetland/riparian zones in the area is to be managed and strictly controlled to minimise damage these systems.	Contractor	Construction
6.10. Where applicable, disturbed wetlands and riparian zones (i.e. for those areas that will not form part of the road and pipeline infrastructure operational footprint but that were disturbed as part of the construction activities) should be re-vegetated using site-appropriate indigenous vegetation and/or seed mixes.	Contractor	Construction
6.11. In-stream habitat conditions (with regard to the river's morphology) should be recreated as far as possible; this pertains to those areas where	Contractor	Construction

Mitigation: Action/control	Responsibility	Timeframe
construction activities have disturbed the in-stream habitat beyond the operational footprint of the pipeline crossings, culverts or bridges.		
6.12. Implement water management plans developed in pre-construction phase.	Contractor	Construction

Performance Indicator	<ul style="list-style-type: none"> » Limited / no impact / contamination of surface water bodies during the construction phase. » Implement water monitoring programme
Monitoring	<ul style="list-style-type: none"> » ECO to monitor contractors performance » Photographic records

OBJECTIVE 7. : Management of Dust and Air Emissions

Project component/s	Construction of all infrastructure including: <ul style="list-style-type: none"> » power station » access roads » substation » power line » ash dump
Potential Impact	<ul style="list-style-type: none"> » Dust » Poor air quality during construction.
Activities/risk sources	Construction Activities including: <ul style="list-style-type: none"> » Site clearing » Site establishment » Excavations » Grading / levelling of surfaces » Concrete works » Road works
Mitigation: Target/Objective	<ul style="list-style-type: none"> » Current ambient air quality is maintained » Limited dust on the construction site

Mitigation: Action/control	Responsibility	Timeframe
7.1. Traffic control measures must be implemented to limit vehicle-entrained dust from unpaved roads, e.g. by limiting vehicle speeds and by restricting traffic volumes.	Contractor	Construction
7.2. Unpaved road surfaces should be sprayed with water or an appropriate surfactant to ensure high moisture content which will bind the silt.	Contractor	Construction
7.3. Stabilise open areas with dust palliative, gravel or similar.	Contractor	Construction

Mitigation: Action/control	Responsibility	Timeframe
7.4. Haul vehicles moving outside the construction site carrying material that can be wind-blown must be covered with tarpaulins.	Contractor	Construction
7.5. Disturbed areas must be re-vegetated as soon as practicable once construction is completed in an area.	Contractor	Construction
7.6. Utilise dust control measures during construction as and when required	Contractor	Construction
7.7. Construction vehicles and equipment must be maintained in a road-worthy condition at all times.	Contractor	Construction

Performance Indicator	<ul style="list-style-type: none"> » No complaints from the public regarding dust or other emissions from the construction site. » No visible dust plumes during the construction phase.
Monitoring	<ul style="list-style-type: none"> » The CER must undertake visually monitor dust through daily inspections of dust generation by construction activities throughout the construction phase. » A complaints register must be maintained, in which any complaints from residents/the community will be logged. Complaints will be investigated and, where appropriate, acted upon. » An incident reporting system must be used to record non-conformances to the EMP.

OBJECTIVE 8. : Control noise due to construction activities

Project component/s	<p>Construction of all infrastructure including:</p> <ul style="list-style-type: none"> » power station » access roads » substation » power line » ash dump
Potential Impact	<ul style="list-style-type: none"> » Increased noise levels at potentially noise-sensitive receptors. » Changing ambient sound levels could change the acceptable land use capability. » Any construction activities taking place at night.
Activities/risk sources	<p>Construction Activities including:</p> <ul style="list-style-type: none"> » Site clearing » Site establishment » Excavations » Grading / levelling of surfaces » Concrete works » Blasting (if required)

Mitigation: Target/Objective	<ul style="list-style-type: none"> » Ensure that the change in ambient sound/Rating levels as experienced by receptors is less than 5 dBA. » Prevent the generation of nuisance noises.
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Mitigation: Action/control	Responsibility	Timeframe
8.1. The potential noise impact must be reviewed should the power station or any of the project components are developed closer than 2,000 m from any potential noise-sensitive receptors.	Contractor	As and when required
8.2. The developer should consider using the smallest (quietest) equipment when operating near the receptor at night. The developer should ensure that the equipment is well-maintained and fitted with the correct and appropriate noise abatement measures. Implementation of white noise (not tonal) reverse alarms on vehicles traversing the proposed site should be considered. Acoustical mufflers (or silencers) should be considered on equipment exhausts.	Contractor	Prior to night-time construction activities
8.3. If a valid and reasonable complaint is registered relating to the construction of the facility, additional noise measurements should be undertaken as recommended by an acoustic consultant.	Suitably qualified person/ Acoustical Consultant appointed by The Project Developer	As and when required

Performance Indicator	<ul style="list-style-type: none"> » Ensure that the change in ambient sound levels or Rating level as experienced by receptors is less than 5 dBA at night. » Ensure that maximum noise levels at potentially sensitive receptors are less than 65 dBA. » No noise complaints are registered.
Monitoring	» ECO to monitor is any noise complaints is lodged with the Contractor.

OBJECTIVE 9. : Protection of sites of heritage value

Project component/s	<p>Construction of all infrastructure including:</p> <ul style="list-style-type: none"> » power station » access roads » substation » power line » Ash dump
Potential Impact	<ul style="list-style-type: none"> » Heritage objects or artefacts found on site are inappropriately managed or destroyed » Loss of fossil resources

Activity/risk source	<ul style="list-style-type: none"> » Site preparation and earthworks » Foundations or plant equipment installation » Mobile construction equipment movement on site » Power line construction activities
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To ensure that any significant heritage objects found on site are treated appropriately and in accordance with the relevant legislation

Mitigation: Action/control	Responsibility	Timeframe
9.1. Grave and burial areas must be identified and cordoned off prior to the commencement of development so that negative impact and vandalism is avoided.	Contractor	Pre-construction
9.2. Construction managers/foremen should be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites.	Contractor	Pre-construction
9.3. If any heritage finds such as tool scatters, bone or fossil remains are exposed or noticed during construction, activities must be stopped and a qualified archaeologist must be contacted to assess the heritage find.	Archaeologist/ suitably qualified person	As and when required
9.4. If a heritage object is found, work in that area must be stopped immediately, and appropriate specialists brought in to assess to site, notify the administering authority of the item/site, and undertake due/required processes.	Archaeologist/ suitably qualified person	As and when required
9.5. Develop a Heritage Chance Find Procedure prior to commencement of construction activities	Contractor	Pre-construction

Performance Indicator	<ul style="list-style-type: none"> » Minimal disturbance outside of designated work areas » All heritage items located are dealt with as per the legislative guidelines
Monitoring	<ul style="list-style-type: none"> » Observation of excavation activities by ECO throughout construction phase » Monitoring / Inspection of all clearing and earthworks by ECO. » An incident reporting system will be used to record non-conformances to the EMPr.

OBJECTIVE 10. : Construction traffic management

Project component/s	<ul style="list-style-type: none"> » Construction vehicles » Construction work force
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Potential Impact	<ul style="list-style-type: none"> » Traffic congestion » Risk of accidents » Deterioration of road pavement conditions (both surfaced and gravel road) due to abnormal loads
Activity/risk source	<ul style="list-style-type: none"> » Transportation of components to site » Construction vehicles utilising public roads
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To minimise impact of traffic associated with the construction of the power station on local traffic » To minimise potential for negative interaction between pedestrians or sensitive users and traffic associated with the construction of the power station.

Mitigation: Action/control	Responsibility	Timeframe
10.1. Implement a traffic management plan for the construction phase of the power station.	Contractor	Construction
10.2. All relevant permits for abnormal loads must be applied for from the relevant authority.	Contractor / Developer	Pre-construction
10.3. Designated accesses to the proposed site must be created to ensure safe entry and exit.	Contractor	Pre-construction
10.4. Appropriate road management strategies must be implemented on external and internal roads with all employees and contractors required to abide by standard road and safety procedures.	Contractor	Pre-construction
10.5. Any traffic delays as a result of construction traffic must be co-ordinated with the appropriate authorities.	Contractor	Duration of contract
10.6. Signage must be established at appropriate points warning of turning traffic and the construction site (all signage to be in accordance with prescribed standards and maintained for the entire construction period)	Contractor	Duration of contract
10.7. Appropriate maintenance of all vehicles must be ensured to minimise risk of break-downs.	Contractor	Duration of contract
10.8. All construction vehicles travelling on public roads must adhere to the specified speed limits and relevant legislation. All drivers must be in possession of an appropriate valid driver's license.	Contractor	Duration of contract

Performance Indicator	<ul style="list-style-type: none"> » No traffic incidents involving the power station construction vehicles. » Appropriate signage in place » No complaints resulting from traffic congestion, delays or driver negligence associated with construction of the power station.
Monitoring	<ul style="list-style-type: none"> » Visual monitoring of dust produced by traffic movement » Visual monitoring of traffic control measures to ensure they are effective

	<ul style="list-style-type: none"> » A complaints register must be maintained, in which any complaints from the community must be logged. Complaints must be investigated and, if appropriate, acted upon » An incident reporting system to be used to record non-conformances to the EMPr
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OBJECTIVE 11. : Mitigation of visual impacts associated with construction

Project Component/s	Construction site
Potential Impact	Visual impact of general construction activities, and the potential scarring of the landscape due to vegetation clearing and resulting erosion.
Activity/Risk Source	The viewing of the above mentioned by observers on or near the site.
Mitigation: Target/Objective	Minimal visual intrusion by construction activities and intact vegetation cover outside of immediate works areas.

Mitigation: Action/control	Responsibility	Timeframe
11.1. Ensure that vegetation is not unnecessarily cleared or removed during the construction period.	Contractor	Construction
11.2. Plan the placement of lay-down areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e. in already disturbed areas) wherever possible.	Contractor	Construction
11.3. Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.	Contractor	Construction
11.4. Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities.	Contractor	Construction
11.5. Reduce and control construction dust through the use of approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent).	Contractor	Construction
11.6. Rehabilitate all disturbed areas, construction areas, servitudes etc. immediately after the completion of construction works.	Contractor	Post-Construction

Performance Indicator	» Limited visual scarring of the landscape due to construction.
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Monitoring	<ul style="list-style-type: none"> » Monitoring of vegetation clearing during construction (by contractor as part of construction contract). » Monitoring of rehabilitated areas quarterly for at least a year following the end of construction (by contractor as part of construction contract).
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OBJECTIVE 12. : Stimulate and enhance positive socio-economic impacts during the construction phase

Project component/s	Construction
Potential Impact	High local economic benefits
Activities/risk sources	Construction procurement practices
Mitigation: Target/Objective	<ul style="list-style-type: none"> » Employ local community members as far as possible » Stimulate the local economy

Mitigation: Action/control	Responsibility	Timeframe
12.1. Increase the local procurement practices and employment of people from local communities as far as feasible to maximise the benefits to the local economies.	The project developer and contractors	Construction
12.2. Engage with local authorities and business organisations to investigate the possibility of procurement of construction materials, goods, and products from local suppliers where feasible.	The project developer and contractors	Construction
12.3. Inform the local community meetings to advise the local labour on the project that is planned to be established and the jobs that can potentially be applied for.	The project developer and contractors	Construction
12.4. Sub-contract to local construction companies where possible	The project developer and contractors	Construction
12.5. Use local suppliers where feasible.	The project developer and contractors	Construction
12.6. As much local labour as possible, should be considered for employment to increase the positive impact on the local economy	The project developer and contractors	Construction

Performance Indicator	<ul style="list-style-type: none"> » Developer has engaged with local authorities and business organisations. » Percentage of the expenditure spent on the project spent in the local communities versus the entire nation.
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	<ul style="list-style-type: none"> » Percentage of labour force employed from local community. » Number of contracts signed between contractor and the local construction companies to supply goods and services directly used in the construction and support of site activities
Monitoring	<ul style="list-style-type: none"> » The contractors to provide the information on local labour to the ECO to report in ECO reports.

OBJECTIVE 13. : Skills development and training during construction

Project component/s	Construction of the Coal-Fired Power Station and localisation of the project's expenditure
Potential Impact	Moderate local expertise development
Activities/risk sources	Construction procurement practice employed by the EPC contractor
Mitigation: Target/Objective	Developer's investment plan

Mitigation: Action/control	Responsibility	Timeframe
13.1. Facilitate knowledge and skills transfer between workers	Contractor	Construction
13.2. Implement apprenticeship programmes to build onto existing or develop new skills of construction workers, especially those coming from the local communities	Contractor	Construction

Performance Indicator	<ul style="list-style-type: none"> » Number of apprenticeships offered » Record of skills development programmes
Monitoring	<ul style="list-style-type: none"> » The developer to provide the information on training and skills development initiatives to the ECO to report in ECO reports.

OBJECTIVE 14. : Reduce social impacts related to crime, social conflicts, property damages and loss of assets

Project component/s	<p>Construction of all infrastructure including:</p> <ul style="list-style-type: none"> » power station » access roads » substation » power line » ash dump
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Potential Impact	<ul style="list-style-type: none"> » Increase in crime and social conflict incidents due to the influx of construction workers and job seekers into the area; » property damages; » theft and losses of assets on the nearby farms including poaching.
Activities/risk sources	<p>Construction Activities including:</p> <ul style="list-style-type: none"> » Site clearing » Site establishment » Excavations » Grading / levelling of surfaces » Concrete works
Mitigation: Target/Objective	<ul style="list-style-type: none"> » No illegal / criminal activities due to the construction work-force » No damage to property/ assets

Mitigation: Action/control	Responsibility	Timeframe
14.1. Develop and implement Human resources plan aligned with South African labour legislation		
14.2. The establishment of central recruitment office/ mechanism.	Contractor	Construction
14.3. Where employment will be lost in other sectors due to the effects of the power station, try as far as feasibly possible to absorb retrenched labour from local activities.	Contractor	Construction
14.4. Ensure that job seekers are not allowed to loiter around the gates or set up informal settlements in the vicinity of the site.	Contractor	Construction
14.5. Reimburse any resident who can adequately prove that any loss, damage or theft was the result of employees associated with the construction of the power plant.	Contractor / Liable Party	Construction
14.6. Construction workers must have a form of identification such as ID tags/ ID cards.	Contractor	Construction
14.7. Access to the construction site must be controlled.	Contractor	Construction
14.8. Any proven damage to privately owned land or assets as a result of the construction of the power station must follow a process to rectify / compensate any such person for any such losses.	Contractor / Liable Party	Construction

Performance Indicator	<ul style="list-style-type: none"> » Number of the workers employed in construction that come from local communities. » Access control system to the construction site. » Number of complaints regarding property damages and asset losses received from the affected and the percentage thereof that has been resolved.
Monitoring	<ul style="list-style-type: none"> » Developer to monitor the above.

OBJECTIVE 15. : Appropriate Waste Management during construction

Project component/s	Storage and handling of waste
Potential Impact	<ul style="list-style-type: none"> » Generation of contaminated wastes from used chemical containers » Inefficient use of resources resulting in excessive waste generation » Pollution of the surrounding environment through inappropriate waste management practices » Litter or contamination of the site or water through poor waste management practices
Activity/risk source	<ul style="list-style-type: none"> » Construction activities » Spoil material from excavation, earthworks and site preparation
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To ensure that the storage and handling of waste on-site does not cause pollution to the environment or harm to persons » To minimise production of waste » To ensure appropriate waste handling, storage and disposal » To avoid environmental harm from waste disposal

Mitigation: Action/control	Responsibility	Timeframe
15.1. Construction contractors must provide specific detailed waste management method statements to appropriately deal with all waste streams.	Contractor	Construction
15.2. An integrated waste management approach that is based on waste minimisation must be implemented. This approach must include reduction, recycling, re-use and disposal where appropriate.	Contractor	Construction
15.3. Soil contaminated/ polluted as a result of major spillages must be removed from the site and disposed of at a licensed hazardous waste disposal facility. Soils contaminated/ polluted through minor spills can be treated on site provided they are contained and have not penetrated the soil surface.	Contractor	Construction
15.4. Hazardous waste substances must not be stored where there could be accidental leakage into surface or subterranean water.	Contractor	Construction
15.5. Oily water from bunded areas and workshop areas (oil tanks) must be removed from site by licensed contractors and in secure containers to avoid spills.	Contractor	Construction
15.6. Any storage and disposal permits/approvals which may be required must be obtained, and the conditions attached to such permits and approvals	Contractor	Construction

Mitigation: Action/control	Responsibility	Timeframe
must be complied with.		
15.7. Specific areas must be designated on-site for the temporary management of various waste streams, i.e. general refuse, construction waste (wood and metal scrap) and contaminated waste. Location of such areas must seek to minimise the potential for impact on the surrounding environment, including prevention of contaminated runoff, seepage and vermin control.	Contractor	Construction
15.8. Storage, handling and disposal of waste must be in accordance with legislated requirements (as detailed in the NEM: Waste Management Act and associated Regulations and Standards)	Contractor	Construction
15.9. Where possible, construction and general wastes on-site must be reused or recycled. Bins and skips must be available on-site for collection, separation and storage of waste streams (such as wood, metals, general refuse etc.).	Contractor	Construction
15.10. Disposal of waste must be in accordance with relevant legislative requirements, including the use of licensed contractors.	Contractor	Construction
15.11. Waste bins must be available and located in the area where the contract staff are working.	Contractor	Construction
15.12. All general waste must be kept in sealable storage containers that are animal proof, i.e. bins or skips.	Contractor	Construction
15.13. All general waste on site must be collected weekly (or more regularly if required) by an approved contractor (holder of a certificate indicating where the waste will be disposed of) .	Contractor	Construction
15.14. No waste may be buried or burnt on site.	Contractor	Construction
15.15. Hydrocarbon waste must be contained and stored in sealed containers within an appropriately bunded area.	Contractor	Construction
15.16. Waste and surplus dangerous goods must be kept to a minimum and must be transported by approved waste transporters to sites designated for their disposal.	Contractor	Construction
15.17. Documentation (waste manifest) must be maintained detailing the quantity, nature and fate of any regulated waste. Waste disposal records must be available for review at any time.	Contractor	Construction
15.18. Dispose of all solid waste collected at an appropriately registered waste disposal site. The disposal of waste shall be in accordance with all	Contractor	Construction

Mitigation: Action/control	Responsibility	Timeframe
relevant legislation. Under no circumstances may waste be burnt on site.		
15.19. Where a registered waste site is not available close to the construction site, provide a method statement with regard to waste management.	Contractor	Pre-construction
15.20. Upon the completion of construction, the area must be cleared of potentially polluting materials.	Contractor	Completion of construction
15.21. Corrective action must be undertaken immediately if a complaint is made, or potential/actual leak or spill of polluting/toxic substance identified. This includes stopping the contaminant from further escaping, cleaning up the affected environment as much as practically possible and implementing preventive measures.	Contractor	Construction

Performance Indicator	<ul style="list-style-type: none"> » No water or soil contamination by spills » No complaints received regarding waste on site or indiscriminate dumping » Internal site audits ensuring that waste segregation, recycling and reuse is occurring appropriately » Provision of all appropriate waste manifests for all waste streams
Monitoring	<ul style="list-style-type: none"> » Observation and supervision of waste storage and handling practices and vehicle maintenance throughout construction phase. » Observation and supervision of waste management practices throughout the construction phase. » Waste collection to be monitored on a regular basis. » Waste documentation completed. » A complaints register must be maintained, in which any complaints from the community will be logged. Complaints must be investigated and, if appropriate, acted upon. » An incident reporting system will be used to record non-conformances to the EMPr.

OBJECTIVE 16. : Appropriate Storage and Handling of chemicals and hazardous substances during construction

Project component/s	Storage and handling of chemicals and hazardous substances
Potential Impact	<ul style="list-style-type: none"> » Release of contaminated water from contact with spilled chemicals » Generation of contaminated wastes from used chemical containers » Pollution of the surrounding environment through inappropriate materials management practices » Pollution of water and soil resources

Activity/risk source	<ul style="list-style-type: none"> » Construction activities » Hydrocarbon use and storage » Fuelling of vehicles
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To ensure that the storage and handling of chemicals and hydrocarbons on-site does not cause pollution to the environment or harm to persons » To ensure that the storage and maintenance of machinery on-site does not cause contamination/pollution of the environment or harm to persons » To avoid environmental harm from materials storage

Mitigation: Action/control	Responsibility	Timeframe
16.1. An effective monitoring system must be implemented during the construction phase to detect any leakage or spillage of hazardous substances during their transportation, handling, use and storage.	Contractor	Construction
16.2. Spill kits must be made available on-site for the clean-up of spills and leaks of contaminants.	Contractor	Construction
16.3. Corrective action must be undertaken immediately if a complaint is made, or potential/actual leak or spill of polluting/toxic substance identified. This includes stopping the contaminant from further escaping, cleaning up the affected environment as much as practically possible and implementing preventive measures.	Contractor	Construction
16.4. In the event of a major spill or leak of contaminants, the area must be demarcated/isolated and the relevant administering authority must be immediately notified as per the notification of emergencies/incidents.	Contractor	Construction
16.5. All concrete mixing on site must be conducted in a designated area on an appropriately sealed surface.	Contractor	Construction
16.6. Soil contaminated/ polluted as a result of a major spill must be removed from the site and disposed of at a licensed hazardous waste disposal facility. Soils contaminated/ polluted through minor spills can be treated on site provided they are contained and have not penetrated the soil surface.	Contractor	Construction
16.7. Routine servicing and maintenance of vehicles must take place in designated areas (except for emergency situations or large cranes which cannot be moved off-site). If repairs of vehicles must take place on site, an appropriate drip tray	Contractor	Construction

Mitigation: Action/control	Responsibility	Timeframe
must be used to contain any fuel or oils.		
16.8. All hazardous material and chemicals on site must be stored in a clearly marked, secure area. The secure area must be designed in a way to ensure that the hazardous material and chemicals will not leak or spill and harm the environment.	Contractor	Construction
16.9. All stored fuels to be maintained within a bunded area and on a sealed surface, or contained in an appropriate manner as per the requirements of SABS 089:1999 Part 1.	Contractor	Construction
16.10. Fuel storage areas must be inspected regularly to ensure bund stability, integrity and function.	Contractor ECO	Construction
16.11. Hazardous substances must not be stored where there could be accidental leakage into surface or subterranean water.	Contractor	Construction
16.12. Construction machinery must be stored in an appropriately demarcated, secure and sealed area.	Contractor	Construction
16.13. Oily water from bunded areas must be removed from site by licensed contractors and in secure containers to avoid spills.	Contractor	Construction
16.14. The storage of flammable and combustible liquids such as oils will be in designated areas which are appropriately bunded, and stored in compliance with MSDS files.	Contractor	Construction
16.15. Any storage and disposal permits/approvals which may be required must be obtained, and the conditions attached to such permits and approvals will be compiled with.	Contractor	Construction
16.16. Transport of all hazardous substances must be in accordance with the relevant legislation and regulations.	Contractor	Construction
16.17. Upon the completion of construction, the area must be cleared of potentially polluting materials.	Contractor	Completion of construction

Performance Indicator	<ul style="list-style-type: none"> » No chemical spills outside of designated storage areas » No water or soil contamination by spills » No complaints received regarding waste on site or indiscriminate dumping » Internal site audits ensuring that waste segregation, recycling and reuse is occurring appropriately » Provision of all appropriate waste manifests for all waste streams
Monitoring	<ul style="list-style-type: none"> » Observation and supervision of chemical storage and handling practices and vehicle maintenance throughout construction phase. » A complaints register must be maintained, in which any complaints

	<p>from the community will be logged. Complaints will be investigated and, if appropriate, acted upon.</p> <ul style="list-style-type: none"> » Observation and supervision of waste management practices throughout construction phase. » Waste collection to be monitored on a regular basis. » Waste documentation completed. » A complaints register will be maintained, in which any complaints from the community will be logged. Complaints will be investigated and, if appropriate, acted upon. » An incident reporting system will be used to record non-conformances to the EMPr.
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OBJECTIVE 17. : Effective management of concrete batching plants

Project component/s	» Batching plant and associated activities
Potential Impact	<ul style="list-style-type: none"> » Dust emissions » Release of contaminated water » Generation of contaminated wastes from used chemical containers » Inefficient use of resources resulting in excessive waste generation
Activity/risk source	<ul style="list-style-type: none"> » Operation of the batching plant » Packaging and other construction wastes » Hydrocarbon use and storage » Spoil material from excavation, earthworks and site preparation
Mitigation: Target/Objective	» To ensure that the operation of the batching plant does not cause pollution to the environment or harm to persons

Mitigation: Action/control	Responsibility	Timeframe
17.1. Where possible concrete batching plants should be sited such that impacts on the environment or the amenity of the local community from noise, odour or polluting emissions are minimised	Contractor	Construction phase
17.2. Where there is a regular movement of vehicles. Access and exit routes for heavy transport vehicles should be planned to minimise noise and dust impacts on the environment	Contractor	Construction phase
17.3. The concrete batching plant site should demonstrate good maintenance practices, including regular sweeping to prevent dust build-up	Contractor	Construction phase
17.4. The prevailing wind direction should be considered to ensure that bunkers and conveyors are sited in a sheltered position to minimise the effects of the wind.	Contractor	Construction phase

Mitigation: Action/control	Responsibility	Timeframe
17.5. Aggregate material should be delivered in a damp condition, and water sprays or a dust suppression agent should be correctly applied to reduce dust emissions and reduce water usage	Contractor	Construction phase
17.6. Conveyors must be designed and constructed to prevent fugitive dust emissions. This may include covering the conveyor with a roof, installing side protection barriers and equipping the conveyor with spill trays, which direct material to a collection point. Belt cleaning devices at the conveyor head may also assist to reduce spillage.	Contractor	Planning and Construction phase
17.7. The site should be designed and constructed such that clean stormwater, including roof runoff, is diverted away from contaminated areas and directed to the stormwater discharge system.	Contractor	Planning and Construction phase
17.8. Any liquids stored on site, including admixtures, fuels and lubricants, should be stored in accordance with applicable legislation	Contractor	Construction phase
17.9. Contaminated stormwater and process wastewater should be captured and recycled where possible. A wastewater collection and recycling system should be designed to collect contaminated water.	Contractor	Planning and Construction phase
17.10. Process wastewater and contaminated stormwater collected from the entire site should be diverted to a settling pond, or series of ponds, such that the water can be reused in the concrete batching process. The settling pond or series of ponds should be lined with an impervious liner capable of containing all contaminants found within the water they are designed to collect (as per GNR 636)	Contractor	Construction phase
17.11. Areas where spills of oils and chemicals may occur should be equipped with easily accessible spill control kits to assist in prompt and effective spill control	Contractor	Construction phase
17.12. Ensure that all practicable steps are taken to minimise the adverse effect that noise emissions. This responsibility includes not only the noise emitted from the plant and equipment but also associated noise sources, such as radios, loudspeakers and alarms	Contractor	Construction phase
17.13. Where possible, waste concrete should be used for construction purposes at the batching plant or project site.	Contractor	Construction phase

Mitigation: Action/control	Responsibility	Timeframe
17.14. The batching plant should be monitored by the ECO to ensure that the plant is operating according to its environmental objectives and within legislative requirements.	ECO	Construction phase

Performance Indicator	<ul style="list-style-type: none"> » No complaints regarding dust or contamination » No water or soil contamination by chemical spills » No complaints received regarding waste on site or indiscriminate dumping
Monitoring	<ul style="list-style-type: none"> » Observation and supervision of chemical storage and handling practices and vehicle maintenance throughout construction phase » A complaints register will be maintained, in which any complaints from the community will be logged. Complaints will be investigated and, if appropriate, acted upon » A complaints register will be maintained, in which any complaints from the community will be logged. Complaints will be investigated and, if appropriate, acted upon » An incident reporting system will be used to record non-conformances to the EMP » Developer or appointed ECO must monitor indicators listed above to ensure that they have been met for the construction phase

OBJECTIVE 18. : To minimise the potential risk of increased veld fires during the construction phase

Project component/s	Construction and establishment activities associated with the establishment of power station including infrastructure.
Potential Impact	Grass fires can pose a personal safety risk to local farmers and communities, and their homes, crops, livestock and farm infrastructure, such as gates and fences.
Activity/risk source	The presence of construction workers and their activities on the site can increase the risk of grass fires.
Mitigation: Target/Objective	To avoid and or minimise the potential risk of grass fires on local communities and their livelihoods.

Mitigation: Action/control	Responsibility	Timeframe
18.1. Ensure that open fires on the site for cooking or heating are not allowed except in designated areas.	The developer and contractors	During construction and operations
18.2. Provide adequate firefighting equipment onsite	contractors	During construction and operations
18.3. Provide fire-fighting training to selected	contractors	During construction

construction staff.		and operations
18.4. Compensate farmers / community members at full market related replacement cost for any losses, such as livestock, damage to infrastructure etc.	The developer and contractors	During construction and operations

Performance Indicator	<ul style="list-style-type: none"> » Conditions contained in the Construction EMPr. » Designated areas for fires identified on site at the outset of the construction phase. » Fire fighting equipment and training provided before the construction phase commences.
Monitoring	<ul style="list-style-type: none"> » The proponent and or appointed ECO must monitor indicators listed above to ensure that they have been met for the construction phase.

7.3. Detailing Method Statements

OBJECTIVE 19. : To ensure all construction are undertaken with the appropriate level of environmental awareness to minimise environmental risk, in line with the specifications of the EMPr.

The environmental specifications are required to be underpinned by a series of Method Statements, within which the Contractors and Service Providers are required to outline how any identified environmental risks will practically be mitigated and managed for the duration of the contract, and how specifications within this EMPr will be met. That is, the Contractor will be required to describe how specified requirements will be achieved through the submission of written Method Statements to the Site Manager.

A Method Statement is defined as "a written submission by the Contractor in response to the environmental specification or a request by the Site Manager, setting out the plant, materials, labour and method the Contractor proposes using to conduct an activity, in such detail that the Site Manager is able to assess whether the Contractor's proposal is in accordance with the Specifications and/or will produce results in accordance with the Specifications". The Method Statement must cover applicable details with regard to:

- » Details of the responsible person/s
- » Construction procedures
- » Materials and equipment to be used
- » Getting the equipment to and from site
- » How the equipment/material will be moved while on-site
- » How and where material will be stored
- » The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur

- » Timing and location of activities
- » Compliance/non-compliance with the Specifications, and
- » Any other information deemed necessary by the Site Manager.

Method Statements must be compiled for all activities which affect any aspect of the environment and should be applied consistently to all activities. Specific areas to be addressed in the method statement: pre, during and post construction include:

- » Site establishment (which explains all activities from induction training to offloading, construction sequence for site establishment and the different amenities and to be established etc. Including a site camp plan indicating all of these).
- » Preparation of the site (i.e. clearing vegetation, compacting soils and removing existing infrastructure and waste).
- » Soil management/stockpiling and erosion control.
- » Excavations and backfilling procedure.
- » Stipulate norms and standards for water supply and usage (i.e.: comply strictly to licence and legislation requirements and restrictions)
- » Stipulate the storm water management procedures recommended in the storm water management method statement.
- » Ablution facilities (placement, maintenance, management and servicing)
- » Solid Waste Management:
 - * Description of the waste storage facilities (on site and accumulative).
 - * Placement of waste stored (on site and accumulative).
 - * Management and collection of waste process.
 - * Recycle, re-use and removal process and procedure.
- » Liquid waste management:
 - * The design, establish, maintain and operate suitable pollution control facilities necessary to prevent discharge of water containing polluting matter or visible suspended materials into rivers, streams or existing drainage systems.
 - * Should grey water (i.e. water from basins, showers, baths, kitchen sinks etc.) need to be disposed of, link into an existing facilities where possible. Where no facilities are available, grey water runoff must be controlled to ensure there is no seepage into wetlands or natural watercourses.
- » Dust and noise pollution
 - * Describe necessary measures to ensure that noise from construction activities is maintained within lawfully acceptable levels.
 - * Procedure to control dust at all times on the site, access roads, borrow pits and spoil sites (dust control shall be sufficient so as not to have significant impacts in terms of the biophysical and social environments). These impacts include visual pollution, decreased safety due to reduced visibility, negative effects on human health and the ecology due to dust particle accumulation.
- » Hazardous substance storage (Ensure compliance with all national, regional and local legislation with regard to the storage of oils, fuels, lubricants, solvents, wood

treatments, bitumen, cement, pesticides and any other harmful and hazardous substances and materials. South African National Standards apply).

- * Lists of all potentially hazardous substances to be used.
 - * Appropriate handling, storage and disposal procedures.
 - * Prevention protocol of accidental contamination of soil at storage and handling areas.
 - * All storage areas, (i.e.: for harmful substances appropriately banded with a suitable collection point for accidental spills must be implemented and drip trays underneath dispensing mechanisms including leaking engines/machinery).
- » Fire prevention and management measures on site.
 - » Fauna and flora protection process on and off site (i.e. removal to reintroduction or replanting, if necessary).
 - * Rehabilitation and re-vegetation process.
 - » Incident and accident reporting protocol.
 - » General administration
 - » Designate access road and the protocol on while roads are in use.
 - » Requirements on gate control protocols.

The Contractor may not commence the activity covered by the Method Statement until it has been approved by the Site Manager, except in the case of emergency activities and then only with the consent of the Site Manager. Approval of the Method Statement will not absolve the Contractor from their obligations or responsibilities in terms of their contract.

Failure to submit a method statement may result in suspension of the activity concerned until such time as a method statement has been submitted and approved. The ECO should monitor the construction activities to ensure that these are undertaken in accordance with the approved Method Statement.

7.4. Awareness and Competence: Construction Phase of the Power Station

OBJECTIVE 20. : To ensure all construction personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and on-going minimisation of environmental harm

To achieve effective environmental management, it is important that Contractors are aware of the responsibilities in terms of the relevant environmental legislation and the contents of this EMPr. The Contractor is responsible for informing employees and sub-contractors of their environmental obligations in terms of the environmental specifications, and for ensuring that employees are adequately experienced and properly trained in order to execute the works in a manner that will minimise environmental impacts. The Contractors obligations in this regard include the following:

- » Employees must have a basic understanding of the key environmental features of the construction site and the surrounding environment.
- » Ensuring that a copy of the EMPr is readily available on-site, and that all site staff are aware of the location and have access to the document. Employees will be familiar with the requirements of the EMPr and the environmental specifications as they apply to the construction of the facility.
- » Ensuring that, prior to commencing any site works, all employees and sub-contractors have attended an Environmental Awareness Training course. The course must provide the site staff with an appreciation of the project's environmental requirements, and how they are to be implemented.
- » Basic training in the identification of archaeological sites/objects, paleontological sites, and protected flora and fauna that may be encountered on the site.
- » Awareness of any other environmental matters, which are deemed to be necessary by the ECO.
- » Ensuring that appropriate communication tools are used to outline the environmental "do's" and "don'ts" (as per the environmental awareness training course) to employees.
- » Records must be kept of those that have completed the relevant training.
- » Yearly Refresher sessions must be held to ensure the contractor's staff are aware of their environmental obligations.

7.5.1 Environmental Awareness Training

Environmental Awareness Training must take the form of an on-site talk and demonstration by the ECO before the commencement of site establishment and construction on site. The education/awareness programme should be aimed at all levels of management and construction workers within the contractor team. A record of attendance of this training must be maintained by the ECO on site.

7.5.2 Induction Training

Environmental induction training must be presented to all persons who are to work on the site – be it for short or long durations; Contractor's or Engineer's staff; administrative or site staff; sub-contractors or visitors to site.

This induction training should include discussing the developer's environmental policy and values, the function of the EMP and Contract Specifications and the importance and reasons for compliance to these. The induction training must highlight overall do's and don'ts on site and clarify the repercussions of not complying with these. The non-conformance reporting system must be explained during the induction as well. Opportunity for questions and clarifications must form part of this training. A record of attendance of this training must be maintained by the Contractors representative on site.

7.5.3 Toolbox Talks

Toolbox talks should be held on a scheduled and regular basis (at least twice a month) where foremen, environmental and safety representatives of different components of the Works and sub-consultants hold talks relating to environmental practices and safety awareness on site. These talks should also include discussions on possible common incidents occurring on site and the prevention of reoccurrence thereof. Records of attendance and the awareness talk subject must be kept on file.

7.5. Monitoring Programme: Construction Phase of the Power Station

OBJECTIVE 21.: To monitor the performance of the control strategies employed against environmental objectives and standards.

A monitoring programme must be in place not only to ensure conformance with the EMPr, but also to monitor any environmental issues and impacts which have not been accounted for in the EMPr that are, or could result in significant environmental impacts for which corrective action is required. The period and frequency of monitoring will be stipulated by the Environmental Authorisation (once issued). Where this is not clearly dictated, The Project Developer will determine and stipulate the period and frequency of monitoring required in consultation with relevant stakeholders and authorities. The Project Manager will ensure that the monitoring is conducted and reported.

The aim of the monitoring and auditing process would be to routinely monitor the implementation of the specified environmental specifications, in order to:

- » Monitor and audit compliance with the prescriptive and procedural terms of the environmental specifications
- » Ensure adequate and appropriate interventions to address non-compliance
- » Ensure adequate and appropriate interventions to address environmental degradation
- » Provide a mechanism for the lodging and resolution of public complaints
- » Ensure appropriate and adequate record keeping related to environmental compliance
- » Determine the effectiveness of the environmental specifications and recommend the requisite changes and updates based on audit outcomes, in order to enhance the efficacy of environmental management on site
- » Aid communication and feedback to authorities and stakeholders.

The Environmental Control Officer will ensure compliance with the EMPr, and to conduct monitoring activities. The Environmental Control Officer must have the appropriate

experience and qualifications to undertake the necessary tasks. The Environmental Control Officer will report any non-compliance or where corrective action is necessary to the Site Manager and/or any other monitoring body stipulated by the regulating authorities.

The Environmental Control Officer (ECO) will ensure compliance with the environmental authorisation (EA), EMP, relevant permits and licences and the environmental legislation during construction, and will conduct monitoring activities on a regular basis. An independent ECO must be appointed, and must have the appropriate experience and qualifications to undertake the necessary tasks. The ECO will report any non-compliance or where corrective action is necessary to the Site Manager, DEA and/or any other monitoring body stipulated by the regulating authorities.

7.6.1. Non-Conformance Reports

All supervisory staff including Foremen, Resident Engineers, and the ECO must be provided the means to be able to submit non-conformance reports to the Site Manager. Non-conformance reports will describe, in detail, the cause, nature and effects of any environmental non-conformance by the Contractor. Records of penalties imposed may be required by the relevant authority within 48 (forty eight) hours.

The non-conformance report will be updated on completion of the corrective measures indicated on the finding sheet. The report must indicate that the remediation measures have been implemented timeously and that the non-conformance can be closed-out to the satisfaction of the Site Manager and ECO.

7.6.2. Monitoring Reports

A monitoring report will be compiled by the ECO on a monthly basis and must be submitted to DEA for their records. This report should include details of the activities undertaken in the reporting period, any non-conformances or incidents recorded, corrective action required, and details of those non-conformances or incidents which have been closed out. Records relating to monitoring must be kept on site and made available for inspection to any relevant and competent authority in respect of this development.

7.6.3. Final Audit Report

A final environmental audit report must be compiled by an independent auditor and be submitted to DEA upon completion of the construction and rehabilitation activities (within 30 days of completion of the construction phase (i.e.: within 30 days of site handover) and within 30 days of completion of rehabilitation activities. This report must indicate the date of the audit, the name of the auditor and the outcome of the audit in terms of compliance with the environmental authorisation conditions and the

requirements of the EMPr. Records relating to audits must be kept on site and made available for inspection to any relevant and competent authority in respect of this development.

**MANAGEMENT PROGRAMME:
REHABILITATION OF DISTURBED AREAS**

CHAPTER 8

8.1. Overall Goal for the Rehabilitation of Disturbed Areas

Overall Goal for the Rehabilitation of Disturbed Areas: Undertake the rehabilitation measures in a way that:

- » Ensures rehabilitation of disturbed areas following the execution of the works, such that residual environmental impacts are remediated or curtailed

8.2. Objectives

In order to meet this goal, the following objective, actions and monitoring requirements are relevant:

OBJECTIVE 22. : Appropriate rehabilitation of disturbed areas following the execution of the works, such that residual environmental impacts are remediated or curtailed

Areas requiring rehabilitation will include all areas disturbed during the construction phase and that are not required for regular maintenance operations. Rehabilitation should be undertaken in an area as soon as possible after the completion of construction activities within that area. This is therefore an on-going activity and may commence while construction is still underway in other areas.

Project component/s	<ul style="list-style-type: none"> » Power Station Plant » Lay down areas » Substation site » Access roads not required for operation and maintenance » Power line servitude
Potential Impact	<ul style="list-style-type: none"> » Environmental integrity of site undermined resulting in reduced visual aesthetics, erosion, compromised land capability and the requirement for on-going management intervention
Activity/risk source	<ul style="list-style-type: none"> » Temporary laydown areas » Temporary access roads/tracks » Other disturbed areas/footprints
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To ensure and encourage site rehabilitation of disturbed areas » To ensure that the site is appropriately rehabilitated following the execution of the works, such that residual environmental impacts (including erosion) are remediated or curtailed

Mitigation: Action/control	Responsibility	Timeframe
22.1. All temporary facilities, equipment and waste materials must be removed from site as soon as practically possible after construction is complete.	Contractor	Following execution of the works
22.2. All temporary fencing and danger tape must be removed once the construction phase has been completed.	Contractor	Following completion of construction activities in an area
22.3. Necessary anti-erosion measures must be installed, where required, to minimise loss of topsoil and control erosion.	Contractor	Following completion of construction activities in an area
22.4. Disturbed areas must be rehabilitated/re-vegetated with appropriate natural vegetation and/or local seed mix. Re-use of native/indigenous plant species that were removed from disturbance areas in the rehabilitation phase.	Contractor in consultation with specialist/qualified person	Following completion of construction activities in an area
22.5. Re-vegetated areas may have to be protected from wind erosion and maintained until an acceptable plant cover has been achieved.	Contractor in consultation with a specialist/qualified person	Pre and Post-rehabilitation
22.6. All open spaces created through the construction process must be re-vegetated and rehabilitated in a manner recommended by the Rehabilitation Plan developed in the pre-construction phase.	Contractor in consultation with rehabilitation specialist	Pre and Post-rehabilitation
22.7. Any stockpiles should be re-vegetated to stabilise the soil, reduce run-off and minimise erosion.	Contractor	Following completion of construction activities in an area

Performance Indicator	<ul style="list-style-type: none"> » All portions of site, including construction equipment camp and working areas, cleared of equipment and temporary facilities » Topsoil replaced on all areas and stabilised » Disturbed areas rehabilitated and acceptable plant cover achieved on rehabilitated sites » Completed site free of erosion and alien invasive plants
Monitoring	<ul style="list-style-type: none"> » On-going inspection of rehabilitated areas in order to determine effectiveness of rehabilitation measures implemented

MANAGEMENT PROGRAMME: OPERATION

CHAPTER 9

9.1. Overall Goal for Operation

Overall Goal for Operation: To ensure that the operation of the power station does not have unforeseen impacts on the environment and to ensure that all impacts are monitored and the necessary corrective action taken in all cases. In order to address this goal, it is necessary to operate the power station in a way that:

- » Ensures that operation activities are properly managed in respect of environmental aspects and impacts.
- » Enables the operation activities to be undertaken without significant disruption to other land uses in the area, in particular with regard to noise impacts, farming practices, traffic and road use, and effects on local residents.

9.2. Objectives

In order to meet this goal, the following objectives have been identified, together with necessary actions and monitoring requirements.

OBJECTIVE 23. : Prevention of any further impact on flora, fauna and ecosystems

Project component/s	All infrastructure including: <ul style="list-style-type: none"> » power station » access roads » substation » power line » ash dump
Potential Impact	Ecosystem break down and loss of biodiversity
Activity/Risk Source	<ul style="list-style-type: none"> » Operation of the power plant and associated infrastructure » Movement of employee vehicles within and around site.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To maintain minimised footprints of disturbance of vegetation/habitats on-site. » To ensure and encourage plant regrowth in non-operational areas of post-construction rehabilitation.

Mitigation: Action/control	Responsibility	Timeframe
23.1. Restrict maintenance activities to footprint of infrastructure associated with the power station.	Operation and Maintenance	Operation

Mitigation: Action/control	Responsibility	Timeframe
	Contractor (O&M) and The Project Developer	
23.2. Implement a biodiversity monitoring programme for all components of the project.	The Project Developer and O&M Contractor	Operation
23.3. Implement an Air Quality Management Plan, including a dust management programme and emissions emission control and reduction strategy.	The Project Developer and O&M Contractor	Operation
23.4. Implement an appropriate alien and invasive management programme for all components of the project	The Project Developer and O&M Contractor	Operation
23.5. Implement an Integrated Water Resource Management Plan	The Project Developer and O&M Contractor	Operation
23.6. Implement a Water Demand and Conservation Plan for the power station operation.	The Project Developer	Operation
23.7. Implement surface and groundwater monitoring programmes to monitor impacts on water quality.	The Project Developer and O&M Contractor	Operation
23.8. Implement a Zero Liquid Effluent Discharge (ZLED) policy for the power station	The Project Developer and O&M Contractor	Operation
23.9. Independent environmental audits to be conducted during the operational phase at least once annually, or at a monitoring frequency to be determined by the DEA.	Independent environmental auditor	Operation Recommend bi-annual audits for first two years and then annually thereafter

Performance Indicator	<ul style="list-style-type: none"> » All plans are appropriately implemented. » Impacts on surrounding environment is minimised as far as possible.
Monitoring	<ul style="list-style-type: none"> » The Environmental Manager will keep records of the impacts and mitigation measures implemented during the operational phase. » Independent environmental auditing during the operational phase.

OBJECTIVE 24. : Protect Surface Water Resources

Project component/s	Construction of all infrastructure including: <ul style="list-style-type: none"> » power station » ash dump » coal stockpile » pollution control dams
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Potential Impact	<ul style="list-style-type: none"> » Surface Water contamination » Ash disposal to potentially degrade surface and groundwater resources » Accidental spills could lead to water pollution » Runoff from coal stockpiles, ashing plant area and power station surface infrastructure to pollute water resources
Activities/risk sources	<ul style="list-style-type: none"> » Ash dam management » coal stockpile management
Mitigation: Target/Objective	<ul style="list-style-type: none"> » Operate a Zero Effluent Discharge Facility » Limit impacts on surface water resources

Mitigation: Action/control	Responsibility	Timeframe
24.1. Obtain water use licence for the operation of the power plant	Project Developer	Operation
24.2. Implement an appropriate surface water monitoring programme.	Project Developer	Operation
24.3. Dirty and clean stormwater should be separated systems. Dirty stormwater to be contained	Project Developer	Operation
24.4. Where storm water enters the water resource, sediment and debris trapping, as well as energy dissipation control structures should be put in place.	Project Developer	Operation
24.5. Litter traps should be incorporated into the stormwater designs to ensure that litter runoff from the site cannot enter the Mokolo River catchment or other tributaries (Sandloop) directly.	Project Developer and O&M Contractor	Operation
24.6. The possibility of spillages should be catered for in the design of the infrastructure development where, pollution control dams or attenuation ponds could contain water prior to the discharge.	Project Developer and O&M Contractor	Operation
24.7. Storm water systems to be designed in such a way that it can be easily sealed off after the occurrence of a spill. If a spill occurs during the operational phase of the water use, a qualified team of experts will need to be consulted, rehabilitation plan drawn up and implemented and the Regional DWA Office should be informed immediately.	Project Developer and O&M Contractor	Operation
24.8. Good housekeeping (clean-up of spills and minimise informal storage of materials)	Project Developer and O&M Contractor	Operation
24.9. Run off will be contained in paddocks for collection and evaporation or run off will be captured in the drain system and channelled to the pollution control dams.	Project Developer	Operation

Mitigation: Action/control	Responsibility	Timeframe
24.10. Monitor seepage at the pollution control dams on a quarterly basis.	A suitably qualified person appointed by The Project Developer	Operation

Performance Indicator	» Issued water use license and external audit report indicating 100% compliance with water use licence conditions
Monitoring	» Surface water quality monitoring and monitoring reports

OBJECTIVE 25. : Manage impacts on ground water

Project component/s	<ul style="list-style-type: none"> » ash dumps » coal stock piles » power station plant » pollution control dams » evaporation ponds
Potential Impact	Groundwater pollution
Activities/risk sources	Ash dump management
Mitigation: Target/Objective	Avoid/ keep ground water impacts an absolute minimum

Mitigation: Action/control	Responsibility	Timeframe
25.1. Maintain liners of ash dump, coal stockpile and pollution control dams on a continual basis and rectify any areas which may be compromised as soon as possible.	Project Developer and O&M Contractor	Operation
25.2. Regular sampling and chemical analyses of the groundwater is imperative to establish a sound database: <ul style="list-style-type: none"> * Groundwater in all boreholes made available for monitoring, within a distance of less than two kilometres must be sampled regularly to establish a database against which future groundwater levels can be compared. * Sampling must preferably be quarterly, but at least twice annually, following the dry – and rainy seasons. 	A suitably qualified person appointed by The Project Developer	Quarterly
25.3. Groundwater sampling must performed to establish a database of plume movement trends, to aid eventual decommissioning and rehabilitation of the power station.	A suitably qualified person appointed by the Project Developer or and	Preferably Quarterly

Mitigation: Action/control	Responsibility	Timeframe
	O&M Contractor	
25.4. Water samples must be taken from all the monitoring boreholes by using approved sampling techniques and adhering to recognised sampling procedures. Samples should be analysed for both organic as well as inorganic pollutants, as activities at power stations often lead to hydrocarbon spills in the form of diesel and oil.	A suitably qualified person appointed by the Project Developer	Preferably Quarterly
25.5. If it is found during such a sampling event that groundwater from any extraction borehole is polluted beyond acceptable standards, alternative water will have to be supplied to the affected party by the Project Developer.	A suitably qualified person appointed by The Project Developer	As and when required
25.6. Additional mitigation measures guided by DWAF's best practice guidelines of July, 2008 should also be implemented.	A suitably qualified person appointed by The Project Developer	As and when required

Performance Indicator	» Limited ground water impacts from the power station activities.
Monitoring	» Ground water monitoring by a suitably qualified specialist on a regular basis (preferably quarterly but at least bi-annually).

OBJECTIVE 26. : Ensure good management of the environmental impacts of the ash dams and coal stockpile

There are two major contamination pathways from the ash dump and coal stockpile which are surface-runoff and seepage. Prevention/Management measures to management the impacts of the two major contamination pathways is discussed below.

Project component/s	» Ash dumps » Coal stockpile
Potential Impact	» Ground water pollution » Surface water pollution
Activities/risk sources	» Ash management » Coal stock pile management
Mitigation: Target/Objective	» No / limited surface and ground water pollution due to ash dumps and coal stock piles

Mitigation: Action/control	Responsibility	Timeframe
26.1. Construction of spillways: Spillways generally are	Project Developer	Operation

Mitigation: Action/control	Responsibility	Timeframe
<p>designed as temporary structures because they will change (i.e., be moved or increased in length) as raised embankments increase in height. They are constructed of an impervious material able to withstand rapid flow velocities. The spillway also is designed to contain and control hydraulic jumps that occur at the bottom of the spillway. In addition, a spillway design has to consider and plan for water treatment if the surface water runoff passes through the ash dump or stockpile.</p>	<p>and O&M Contractor</p>	
<p>26.2. Containment of Storm Water: All water that falls within the catchment area of the stockpile and ash dump must be retained within the area. Water that has been in contact with coal material, and must therefore be considered polluted, must be kept within the confines of the power station until evaporated, treated to rendered acceptable for release, or re-used in some other way. It should be based on the average monthly rainfall for the area concerned less the gross mean evaporation in the area plus the maximum precipitation to be expected over a 24 hour period with a frequency of once in 50 years.</p>	<p>Project Developer and O&M Contractor</p>	<p>Operation</p>
<p>26.3. Material from the stockpile and ash dump should be submitted for geochemical analysis to determine the leachability, acid generation capacity and contamination potential of each.</p>	<p>Project Developer and O&M Contractor</p>	<p>Operation</p>
<p>26.4. Seepage is the movement of water (contaminated and uncontaminated) through and around the stockpile and ash dump on site. Primary factors affecting the volume of seepage present in a system are depth to the groundwater table and infiltration capacities of the unsaturated zone and stockpiles. Assuming that the facilities have no lining present and no mitigation measures are in place to control seepage, the possibility of a pump and treat system could be investigated if monitoring data indicates that sulphate contamination is increasing beyond acceptable levels in groundwater. The reason for this mitigation option is due to the thickness of the unsaturated zone in this area, rendering other options such as cut off trenches, unfeasible. Seepage from these facilities may also take an extended period of time to reach the phreatic</p>	<p>Project Developer and O&M Contractor</p>	<p>Operation</p>

Mitigation: Action/control	Responsibility	Timeframe
surface due to its depth and the thickness of the unsaturated zone.		
<p>26.5. Due to the possibility of groundwater contamination, quarterly groundwater sampling must be done to establish a database of plume movement trends. Water samples must be taken from all the monitoring boreholes by using approved sampling techniques and adhering to recognised sampling procedures. Samples should be analysed for both organic as well as inorganic pollutants, as activity at power stations often lead to hydrocarbon spills in the form of diesel and oil. At least the following water quality parameters should be analysed for:</p> <ul style="list-style-type: none"> * Major ions (Ca, K, Mg, Na, SO₄, NO₃, Cl, F) * pH * Electrical Conductivity (EC), * Total Petroleum Hydrocarbons (TPH) * Total Alkalinity <p>These results should be recorded on a data sheet. It is proposed that the data should be entered into an appropriate computer database and reported to the Department of Water Affairs and Forestry.</p>	A suitably qualified person appointed by The Project Developer and O&M Contractor	Quarterly during the operation of the power station

Performance Indicator	» Limited surface and ground water pollution due to ash dumps and coal stock piles
Monitoring	» Quarterly groundwater sampling and monitoring reports. » The environmental manager / suitably qualified person to monitor groundwater impacts

OBJECTIVE 27. : Manage air emissions

Project component/s	» Ash dumps » Coal stock piles » Emissions from power station
Potential Impact	» Air pollution » Human health impacts
Activities/risk sources	» Power station operation » Ash management » Coal stock pile operations
Mitigation: Target/Objective	» Minimise air emissions

Mitigation: Action/control	Responsibility	Timeframe
27.1. Obtain Air Emissions Licence prior to commencement of operation	Project Developer	Prior to operation
27.2. Comply to the conditions of the air emissions licence throughout operational phase.	Project Developer	Operation
27.3. Implement a dust mitigation plan and undertake regular dust monitoring.	Project Developer	Operation
27.4. Implement an emission control and reduction strategy that aims to ensuring that the contribution to ambient concentrations is minimised.	Project Developer	Operation
27.5. Conduct air emissions monitoring	A suitably qualified person appointed by The Project Developer and O&M Contractor	Frequency to be determined by AEL
27.6. The sidewalls of the ash dump should be vegetated as they rise, and the vegetation cover should be maintained to reduce the exposed area and limit wind entrainment.	Project Developer	Operation
27.7. The top of the ash dump must be kept moist to bind the surface dust and prevent wind entrainment of dust.	Project Developer and O&M Contractor	Operation
27.8. Roads should be tarred or traffic control measures implemented to limit vehicle-entrained dust from unpaved roads e.g. by limiting vehicle speeds and by restricting traffic volumes. Unpaved road surfaces should be sprayed with a surfactant to ensure high moisture content which will bind the silt.	Project Developer and O&M Contractor	Operation

Performance Indicator	Compliance with the conditions of the air emission's licence.
Monitoring	<ul style="list-style-type: none"> » Emissions monitoring reports » Dust monitoring reports » Annual independent environmental auditing

OBJECTIVE 28. : Control noise from the power station plant

Projected noise levels during operation of the proposed development were modelled using the methodology as proposed by SANS 10357:2004. The resulting current and

future noise projections indicated that the operation of the facility would comply with the Noise Control Regulations (GN R154) and the SANS 10103:2008 guidelines during the day and night-time hours (worst-case scenario). The results of the study indicate that there is a low potential of a noise impact during the operational phase. No mitigation or routine noise monitoring is therefore required. However, appropriate management measures are required to be implemented in order to minimise the potential for impacts.

Project component/s	<ul style="list-style-type: none"> » Cooling fans » Heavy machinery » Heavy vehicles and trucks » Operational staff
Potential Impact	<ul style="list-style-type: none"> » Noise and disturbances
Activities/risk sources	<ul style="list-style-type: none"> » Operation of the power station 24 hours a day
Mitigation: Target/Objective	<ul style="list-style-type: none"> » Ensure that the change in ambient sound/Rating levels as experienced by receptors is less than 5 dBA; » Prevent the generation of nuisance noises; and » Ensure acceptable noise levels at surrounding stakeholders and receptors.

Mitigation: Action/control	Responsibility	Timeframe
28.1. Should any valid noise complaints registered relating to the operation of the power station noise measurements should be conducted as recommended by an acoustical consultant.	Acoustical Consultant / suitably qualified person appointed by The Project Developer	As and when required during operation
28.2. If noise measurements are conducted annual feedback should be presented to all stakeholders and other Interested and Affected parties in the area.	Acoustical Consultant / suitably qualified person appointed by The Project Developer	As and when required during operation
28.3. The findings of the noise report should also be made available to all potentially noise-sensitive developments in the area with the contents explained to them to ensure that they understand all the potential risks that the development may have on them and their families.	Acoustical Consultant / suitably qualified person appointed by The Project Developer	As and when required during operation

Performance Indicator	<ul style="list-style-type: none"> » No noise complaints from the public or adjacent landowners » Ensure that maximum noise levels at potentially sensitive receptors are less than 65 dBA
Monitoring	<ul style="list-style-type: none"> » No routine noise measurements recommended. » Environmental manager/ Power Station to maintain a complaints

register

OBJECTIVE 29. : Traffic management during operation

Project component/s	<ul style="list-style-type: none"> » Vehicles » Operation Staff » Trucks and heavy vehicles / abnormal loads transporting limestone and other goods
Potential Impact	<ul style="list-style-type: none"> » Traffic congestion » Risk of accidents » Deterioration of road pavement conditions (both surfaced and gravel road) due to abnormal loads
Activity/risk source	<ul style="list-style-type: none"> » Transportation of limestone to the site via road » Daily commuting of operational staff to the power station
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To minimise impact of traffic associated with the operation of the power station . » To minimise potential for negative interaction between pedestrians or sensitive users and traffic associated with the power station.

Mitigation: Action/control	Responsibility	Timeframe
29.1. All relevant permits for abnormal loads must be applied for from the relevant authority as required.	Contractors	As and when required
29.2. Designated accesses to the proposed site must be created to ensure safe entry and exit.	Project Developer and O&M Contractor	Operation
29.3. Appropriate road management strategies must be implemented on internal roads with all employees and contractors required to abide by standard road and safety procedures.	Project Developer and O&M Contractor	Operation
29.4. Any traffic delays as a result of the power station operation must be co-ordinated with the appropriate authorities.	Project Developer and O&M Contractor	Operation
29.5. Appropriate road signage must be established at and road markings appropriate points warning of turning traffic and the power station site entrance (all signage to be in accordance with prescribed standards and must be appropriately maintained throughout the operational phase)	Project Developer and O&M Contractor	Operation
29.6. Provision of lighting at sufficient standards at the intersections of the D2001 Road / Access.	Project Developer and O&M Contractor	Operation
29.7. In terms of public transport provision as well as pedestrian safety: No on-street pick up / drop	Project Developer and O&M Contractor	Operation

Mitigation: Action/control	Responsibility	Timeframe
offs at the intersection of the D2001 Road with the access road to the development should be allowed (drop-offs / pickup should be done on site	Contractor	

Performance Indicator	<ul style="list-style-type: none"> » No traffic incidents involving the power station vehicles. » Appropriate signage in place » No complaints resulting from traffic congestion, delays or driver negligence associated with power station.
Monitoring	<ul style="list-style-type: none"> » Visual monitoring of dust produced by traffic movement » Visual monitoring of traffic control measures to ensure they are effective » A complaints register will be maintained, in which any complaints from the community will be logged. Complaints will be investigated and, if appropriate, acted upon

OBJECTIVE 30.: Limit the visual impacts of the power station and associated infrastructure

The primary visual impact, namely the appearance of the power station and ancillary infrastructure is not possible to mitigate. The functional design of the power station cannot be changed in order to reduce visual impacts. The following mitigation is, however possible.

Project component/s	<ul style="list-style-type: none"> » power station » ancillary infrastructure (i.e. ash dam, access roads, substation, power line, security lighting, workshop, offices, etc.).
Potential Impact	Visual impact of facility degradation and vegetation rehabilitation failure.
Activities/risk sources	The viewing of the above mentioned by observers on or near the site (within 3km).
Mitigation: Target/Objective	Well maintained and neat facility.

Mitigation: Action/control	Responsibility	Timeframe
30.1. Maintain the general appearance of the facility as a whole, including the power station, servitudes and the ancillary structures.	Project Developer and O&M Contractor	Operation
30.2. Maintain roads and servitudes to forego erosion and to suppress dust.	Project Developer and O&M Contractor	Operation

Mitigation: Action/control	Responsibility	Timeframe
30.3. Monitor rehabilitated areas, and implement remedial action as and when required.	Project Developer and O&M Contractor	Operation
30.4. Implement and maintain green buffer zones surrounding the power station.	Project Developer and O&M Contractor	Operation
30.5. Maintain existing vegetation cover in all areas outside of the actual development footprint.	Project Developer and O&M Contractor	Operation
30.6. Mitigation of lighting impacts. Mitigation measures could include any of the following: <ul style="list-style-type: none"> * Shielding the sources of light by physical barriers (walls, vegetation, or the structure itself); * Limiting mounting heights of lighting fixtures, or alternatively using foot-lights or bollard level lights; * Making use of downward directional lighting fixtures; * Making use of minimum lumen or wattage in fixtures; * Making use of down-lighters, or shielded fixtures; * Making use of Low Pressure Sodium lighting or other types of low impact lighting. * Making use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes. 	Project Developer and O&M Contractor	Operation
30.7. During operation, the maintenance of the power station and ancillary structures and infrastructure will ensure that the facility does not degrade, thus aggravating visual impact/landscape scarring.	Project Developer and O&M Contractor	Operation
30.8. If required, where sensitive visual receptors are likely to be affected, it is recommended that the developer enter into negotiations regarding the potential screening of visual impacts, either at the receptor site or along the perimeter of the facility. This may entail the planting of vegetation or the construction of landscaped berms or screens at the visual receptor.	Project Developer and O&M Contractor	Operation

Performance Indicator	Well maintained and neat facility with intact vegetation on and in the vicinity of the facility.
Monitoring	Monitoring of the entire site on an ongoing basis

OBJECTIVE 31. : Manage social impacts or disturbances due to the operation of the power station

Project component/s	Operation and maintenance of the power station
Potential Impact	Loss of opportunities to stimulate production and employment of the local economy
Activities/risk sources	Labour and procurement practices employed during operations
Mitigation: Target/Objective	Maximise the production, and local community employment benefits in the local economy

Mitigation: Action/control	Responsibility	Timeframe
31.1. The operator of the power station should be encouraged to procure materials, goods and services required for the operation of the facility from local suppliers to increase the positive impact in the local economy as far as possible.	Project Developer and Contractor O&M	Operation
31.2. Where possible, the local labour should be considered for employment to increase the positive impact on the local economy.	Project Developer and Contractor O&M	Operation
31.3. Where possible train and empower local communities for employment in the operations of the power station.	Project Developer and Contractor O&M	Operation
31.4. Implement an apprenticeship programme to build onto existing or develop new skills of construction workers, especially those coming from the local communities.	Project Developer and Contractor O&M	Operation
31.5. Profit generated by the project supported through the social responsibility programme should be considered for re-investment in the community to create new businesses and generate more wealth for the community members.	Project Developer	Operation
31.6. Compensate landowners for losses. Agreements should be reached through negotiations so that developers can try to offset potential losses in property values.	Project Developer	Operation
31.7. The operator of the power station should be encouraged to procure materials, goods and services required for the operation of the facility from local suppliers to increase the positive impact in the local economy as far as possible.	Project Developer	Operation

Mitigation: Action/control	Responsibility	Timeframe
31.8. Implement a social and economic development programme	Project Developer	Operation
31.9. Compensate landowners for proven losses. Agreements should be reached through negotiations so that developers can try to offset potential losses in property values.	Project Developer	Operation

Performance Indicator	<ul style="list-style-type: none"> » Number of contracts and percentage of contract values allocated to local SMEs and companies » Number of people attending vocational training on an annual basis » Percentage of workers that were employed from local communities » Social and economic development programme that takes into account local policies, priorities and needs » Consultation with local authorities and communities on the social and economic needs and priorities » Percentage of profits reinvested back into local communities » Number of successful SME's initiated by CSI programmes
Monitoring	Environmental manager to collect information and to provide report in operational phase audit reports

**MANAGEMENT PROGRAMME:
DECOMMISSIONING**

CHAPTER 10

The lifespan of the proposed coal-fired power station is more than 30 years. Equipment associated with this facility would only be decommissioned once it has reached the end of its economic life. It is most likely that decommissioning activities of the infrastructure of the facility discussed in this EIA would comprise the disassembly and disposal of the infrastructure. Decommissioning activities will involve disassembly of the production units and ancillary infrastructure, demolishing of buildings, removal of hazardous waste and rehabilitation of the ash dumps and site. The decommissioning activities would need to comply with the legislation relevant at the time.

Should the activity ever cease or become redundant, the applicant shall undertake the required actions as prescribed by legislation at the time and comply with all relevant legal requirements administered at any relevant and competent authority at that time.

OBJECTIVE 32. : To avoid and or minimise the potential impacts associated with the decommissioning phase

Project component/s	» Decommissioning of the power station and associated infrastructure.
Potential Impact	» Decommissioning will result in job losses, which in turn can result in a number of social impacts. » Decommissioning is also similar to the construction phase in that it will also create temporary employment opportunities. » Decommissioning can cause environmental impacts.
Activity/risk source	» Decommissioning of the power station and associated infrastructure.
Mitigation: Target/Objective	» To avoid and or minimise the potential social and environmental impacts associated with decommissioning of the power station.

Mitigation: Action/control	Responsibility	Timeframe
32.1. Retrenchments should comply South African labour legislation of the day	Project Developer and O&M Contractor	Decommissioning.
32.2. Rehabilitation to be undertaken in terms of specifications outlined in the Rehabilitation Section of this EMP (Chapter 8) as well as in terms of any specific requirements applicable at the time.	Project Developer and O&M Contractor	Decommissioning.
32.3. Once the facility has exhausted its life span, the main facility and all associated	Project Developer and O&M Contractor	Decommissioning.

Mitigation: Action/control	Responsibility	Timeframe
<p>infrastructure not required for the post rehabilitation use of the site should be removed and all disturbed areas appropriately rehabilitated. An ecologist should be consulted to give input into rehabilitation specifications.</p>		
<p>32.4. All rehabilitated areas should be monitored for at least a year following decommissioning, and remedial actions implemented as and when required.</p>	<p>Project Developer /O&M Contractor</p>	<p>Decommissioning.</p>
<p>32.5. Rehabilitation of the site should start immediately after decommissioning is completed.</p>	<p>Project Developer /O&M Contractor</p>	<p>Decommissioning</p>
<p>32.6. All excavations must be rehabilitated with soil and topsoil, which should not contain invasive plant species</p>	<p>Project Developer /O&M Contractor</p>	<p>Decommissioning</p>
<p>32.7. Re-vegetation specifications to be developed.</p>	<p>Project Developer /O&M Contractor</p>	<p>Decommissioning</p>
<p>32.8. All building materials must be removed from the site. All compacted surfaces must be ripped and re-vegetated as per the re-vegetation specifications.</p>	<p>Project Developer/ O&M Contractor</p>	<p>Decommissioning</p>
<p>32.9. Rehabilitation to be conducted in a progressive manner (i.e. once decommissioning in an area has been completed the area will be rehabilitated). The rehabilitation of the area with indigenous vegetation must coincide with the rainfall events and all alien invasive vegetation shall be removed.</p>	<p>Project Developer/ appointed Contractor</p>	<p>Decommissioning</p>
<p>32.10. Rehabilitation measures for the site are to include the following:</p> <ul style="list-style-type: none"> » Re-contouring Subsoil stockpiles should be used to re-contour construction affected areas. The Contractor shall restore the profile, soil condition and landform to as close as possible state to the pre-construction state. » Scarification and ripping All areas where rehabilitation interventions are required shall be cross-ripped before topsoil placement. Topsoil and fertile soil shall be uniformly scarified to allow for vegetation growth » Fertilising The Contractor shall be required to perform soil analysis tests on the top 75mm of prepared surface prior to re-vegetation/seeding to 	<p>Project Developer/ appointed Contractor</p>	<p>Decommissioning</p>

Mitigation: Action/control	Responsibility	Timeframe
<p>determine the required fertiliser levels for permanent cover.</p> <p>» Seed acquisition The Contractor shall purchase seed from a South African National Seed Organisation (SANSOR) accredited dealer.</p>		
<p>32.11. Schedule works for placing of topsoil once all infrastructure has been successfully decommissioned. Seeding can then take place after the first rains of the season and should be concluded by one month before the end of the growing season.</p>	Project Developer/ appointed Contractor	Decommissioning
<p>32.12. The seed mix for use in rehabilitation must be an approved mix of indigenous grass species common to the area.</p>	Project Developer/ appointed Contractor	Decommissioning
<p>32.13. Maintain rehabilitated areas free of weeds and invader plants until the end of the Defects Notification Period applicable to rehabilitation. Control of weeds and invader plants must be done in accordance with the specifications stipulated in the CARA.</p>	Project Developer/ appointed Contractor	Decommissioning
<p>32.14. Implement appropriate measures to erosion in areas impacted upon by their activities. All erosion repairs must be implemented at the first signs thereof and no erosion shall be allowed to develop on a large scale.</p>	Project Developer/ appointed Contractor	Decommissioning
<p>32.15. All recyclable rubble and solid waste (e.g. scrap metal, cables, bottles, cans, and plastic residues) shall be collected and disposed of through a registered recycling company. Waste manifests will be kept by the Contractor and shown to the ECO on request.</p>	Project Developer/ appointed Contractor	Decommissioning
<p>32.16. All non-recyclable rubble and solid waste shall be collected and disposed of at an approved waste disposal site. Waste manifests will be shown to the ECO on request.</p>	Project Developer/ appointed Contractor	Decommissioning
<p>32.17. Prepare a Rehabilitation Close-Out Report</p>	Project Developer/ appointed Contractor	Post- Decommissioning
Performance Indicator	<p>» South African Labour legislation at the relevant time</p> <p>» Successful re-vegetation and rehabilitation of the site</p>	
Monitoring	<p>» Rehabilitation undertaken in accordance with the EMPr</p> <p>» Monitoring of Rehabilitation by ECO b& Rehabilitation Close-Out Report</p>	

**APPENDIX A:
STORMWATER MANAGEMENT PLAN**

STORMWATER, WASTEWATER AND EROSION MANAGEMENT PLAN

1. PURPOSE

It is widely recognised that developments impact negatively on drainage systems. By taking greater cognisance of natural hydrological patterns and processes it is possible to develop stormwater management systems in manner that reduces these potentially negative impacts and mimic nature. The main risks associated with inappropriate stormwater management are increased erosion risk and risks associated with flooding. Therefore, this stormwater management plan and the erosion management plan are closely linked to one another and be managed together.

This Stormwater Management Plan addresses the management of stormwater runoff from the development site and significant impacts relating to resultant impacts such as soil erosion and downstream sedimentation. The main factors influencing the planning of stormwater management measures and infrastructure are:

- » Annual average rainfall;
- » Rainfall intensities;
- » Soil and vegetation cover;
- » Topography and slope gradients; and
- » Placing of infrastructure and infrastructure design.

The objective of the plan is to provide measures to address runoff from disturbed portions of the site, such that they:

- » Do not result in concentrated flows into natural watercourses i.e. provision should be made for temporary or permanent measures that allow for attenuation, control of velocities and capturing of sediment upstream of natural watercourses.
- » Do not result in any necessity for concrete or other lining of natural watercourses to protect them from concentrated flows off the development.
- » Do not divert flows out of their natural flow pathways, thus depriving downstream watercourses of water.

This stormwater management plan must be updated and refined once the construction/ civil engineering plans have been finalised.

Exposed and unprotected soils are the main cause of erosion in most situations. Therefore, this erosion management plan and the revegetation and rehabilitation plan are closely linked to one another and should not operate independently, but

should rather be seen as complementary activities within the broader environmental management of the site and should therefore be managed together.

2. RELEVANT ASPECTS OF THE SITE

The soils are highly susceptible to wind erosion where pure sands are strongly dominant. The soils on the site have below 10% dominant clay in the top soils. The soils have a low susceptibility to water erosion which varies across the site. The general assumption is that the erosion susceptibility increases with an increase in the slope angle and/if the slope length is constant.

3. EROSION AND SEDIMENT CONTROL PRINCIPLES

The goals of erosion control during and after construction at the site should be to:

- » Protect the land surface from erosion;
- » Intercept and safely direct run-off water from undisturbed upslope areas through the site without allowing it to cause erosion within the site or become contaminated with sediment; and
- » Progressively revegetate or stabilise disturbed areas.

These goals can be achieved by applying the management practices outlined in the following sections.

3.1. On-Site Erosion Management

General factors to consider regarding erosion risk at the site includes the following:

- » Soil loss will be greater during wet periods than dry periods. Intense rainfall events outside of the wet season, such as occasional summer thunder storms can also cause significant soil loss. Therefore precautions to prevent erosion should be present throughout the year.
- Soils loss will be greater on steeper slopes. Ensure that steep slopes are not devegetated and subsequently become hydrophobic (i.e. have increased runoff and a decreased infiltration rate) increasing the erosion potential.
- » Soil loss is related to the length of time that soils are exposed prior to rehabilitation or stabilisation. Therefore the gap between construction activities and rehabilitation should be minimised. Phased construction and progressive rehabilitation are therefore important elements of the erosion control strategy.

- » The extent of disturbance will influence the risk and consequences of erosion. Therefore site clearing should be restricted to areas required for construction purposes only. As far as possible, large areas should not be cleared at a one time, especially in areas where the risk of erosion is higher.
- » Roads should be planned and constructed in a manner which minimises their erosion potential. Roads should therefore follow the contour as far as possible. Roads parallel to the slope direction should be avoided as far as possible.
- » Where necessary, new roads constructed should include water diversion structures present with energy dissipation features present to slow and disperse the water into the receiving area.
- » Roads and other disturbed areas should be regularly monitored for erosion. Any erosion problems recorded should be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur.
- » Compacted areas should have adequate drainage systems to avoid pooling and surface flow. Heavy machinery should not compact those areas which are not intended to be compacted as this will result in compacted hydrophobic, water repellent soils which increase the erosion potential of the area. Where compaction does occur, the areas should be ripped.
- » All bare areas should be revegetated with appropriate locally occurring species, to bind the soil and limit erosion potential.
- » Silt fences should be used where there is a danger of topsoil or material stockpiles eroding and entering streams and other sensitive areas.
- » Gabions and other stabilisation features should be used on steep slopes and other areas vulnerable to erosion to minimise erosion risk as far as possible.
- » Activity at the site after large rainfall events when the soils are wet and erosion risk is increased should be reduced.
- » Topsoil should be removed and stored separately during construction activities, and should be reapplied where appropriate as soon as possible in order to encourage and facilitate rapid regeneration of the natural vegetation on cleared areas.
- » Regular monitoring of the site for erosion problems during construction (ongoing) and operation (at least twice annually) is recommended, particularly after large summer thunderstorms have been experienced.

3.1.1. Erosion control mechanisms

The contractor may use the following mechanisms to combat erosion when necessary:

- Reno mattresses
- Slope attenuation
- Hessian material
- Shade catch nets

- Gabion baskets
- Silt fences
- Storm water channels and catch pits
- Soil bindings
- Geofabrics
- Hydro-seeding and/or re-vegetating
- Mulching over cleared areas
- Boulders and size varied rocks
- Tilling

3.2. Engineering Specifications

A detailed Stormwater Management Plan describing and illustrating the proposed stormwater control measures must be prepared by the Civil Engineers and this should include erosion control measures. Requirements for project design include:

- Erosion control measures to be implemented before and during the construction period, including the final stormwater control measures (post construction).
- The location, area/extent (m²/ha) and specifications of all temporary and permanent water management structures or stabilisation methods must be indicated within the Stormwater Management Plan.
- An onsite Engineer or Environmental Officer to be responsible for ensuring implementation of the erosion control measures on site during the construction period.
- The Developer holds ultimate responsibility for remedial action in the event that the approved stormwater plan is not correctly or appropriately implemented and damage to the environment is caused.

3.3. Monitoring

The site must be monitored continuously during construction and operation in order to determine any indications of erosion. If any erosion features are recorded as a result of the activities on site the Environmental Officer (during construction) or Environmental Manager (during operation) must:

- » Assess the significance of the situation.
- » Take photographs of the soil degradation.
- » Determine the cause of the soil erosion.
- » Inform the contractor/operator that rehabilitation must take place and that the contractor/operator is to implement a rehabilitation method statement and management plan.

- » Monitor that the contractor/operator is taking action to stop the erosion and assist them where needed.
- » Report and monitor the progress of the rehabilitation weekly and record all the findings in a site register.
- » All actions with regards to the incidents must be reported on a monthly compliance report which will be submitted to the Competent Authority (during construction) and kept on file for consideration during the annual audits (during construction and operation).

The Contractor/ Developer (in consultation with an appropriate specialist) must:

- » Select a system/mechanism to treat the erosion.
- » Design and implement the appropriate system/mechanism
- » Monitor the area to ensure that the system functions like it should. If the system fails, the method must be adapt or adjust to ensure the accelerated erosion is controlled.
- » Continue monitoring until the area has been stabilised.

4. STORMWATER MANAGEMENT PRINCIPLES

In the design phase, various stormwater management principles should be considered including:

- » Prevent concentration of stormwater flow at any point where the ground is susceptible to erosion.
- » Reduce stormwater flows as far as possible by the effective use of attenuating devices (such as swales, berms, silt fences). As construction progresses, the stormwater control measures are to be monitored and adjusted to ensure complete erosion and pollution control at all times.
- » Minimise the area of exposure of bare soils to minimise the erosive forces of wind, water and all forms of traffic.
- » Ensure that development does not increase the rate of stormwater flow above that which the natural ground can safely accommodate at any point in the sub-catchments.
- » Ensure that all stormwater control works are constructed in a safe and aesthetic manner in keeping with the overall development.
- » Plan and construct stormwater management systems to remove contaminants before they pollute surface waters or groundwater resources.
- » Contain soil erosion, whether induced by wind or water forces, by constructing protective works to trap sediment at appropriate locations. This applies particularly during construction.
- » Avoid situations where natural or artificial slopes may become saturated and unstable, both during and after the construction process.

- » Design and construct roads to avoid concentration of flow along and off the road. Where flow concentration is unavoidable, measures to incorporate the road into the major stormwater system should be taken, with the provision of detention storage facilities at suitable points.
- » To assist with the stormwater run-off, gravel roads should typically be graded and shaped with a 2-3% crossfall back into the slope, allowing stormwater to be channelled in a controlled manor towards the natural drainage lines and to assist with any sheet flow on the site.
- » Where the construction of a building causes a change in the vegetative cover of the site that might result in soil erosion, the risk of soil erosion by stormwater must be minimised by the provision of appropriate artificial soil stabilisation mechanisms or revegetation of the area. Any inlet to a piped system should be fitted with a screen, or grating to prevent debris and refuse from entering the stormwater system.
- » Preferably all rivers and drainage channels on site and contained within the larger area of the property (i.e. including buffer zone) should remain in the natural state so that the existing hydrology is not disturbed.

4.1. Engineering Specifications

A detailed Stormwater Management Plan describing and illustrating the proposed stormwater control measures must be prepared by the Civil Engineers during the detailed design phase. This should include erosion control measures. Requirements for project design include:

- » Erosion control measures to be implemented before and during the construction period, including the final stormwater control measures (post construction).
- » The location, area/extent (m²/ha) and specifications of all temporary and permanent water management structures or stabilisation methods must be indicated within the Stormwater Management Plan.
- » The drainage system for the site should be designed to specifications that can adequately deal with a 1:50 year intensity rainfall event or more to ensure sufficient capacity for carrying stormwater around and away from infrastructure.
- » Procedures for stormwater flow through a project site need to take into consideration both normal operating practice and special circumstances. Special circumstances in this case typically include severe rainfall events.
- » An onsite Engineer or Environmental Officer to be responsible for ensuring implementation of the erosion control measures on site during the construction period.
- » The Developer holds ultimate responsibility for remedial action in the event that the approved stormwater plan is not correctly or appropriately implemented and damage to the environment is caused.

During the construction phase, the contractor must prepare a Stormwater Control Method Statement to ensure that all construction methods adopted on site do not cause, or precipitate soil erosion and shall take adequate steps to ensure that the requirements of the Stormwater Management Plan are met before, during and after construction. The designated responsible person on site, as indicated in the Stormwater Control Method Statement shall ensure that no construction work takes place before the stormwater control measures are in place.

An operational phase stormwater management plan should be designed and implemented, with a view to preventing the passage of concentrated flows off hardened surfaces and onto natural areas.

5. WASTEWATER

It is theoretically possible, by using synthetic liners, to completely contain leachate from a waste site. This is, however, mostly impractical and very costly. It is also now generally accepted that all liners leak to a greater or lesser (or to some) extent. In reality, therefore, leachate that is generated in a disposal site may eventually reach the groundwater regime.

Surface hydrology design should include surface drainage and storm water diversion drains, to meet the requirements of the Water Act. This includes the separation of unpolluted from polluted surface water and the containment of polluted water on site in impoundments. Also, where leachate is generated, it must be contained separately from water which is only slightly polluted through contact with the waste.

In the case of hazardous waste disposal sites, the design must make provision for containment of hazardous waste. This implies the complete separation of the waste body and any associated leachate from the surrounding soil or rock strata, by means of a liner and a leachate collection system. Leachate management is necessary at hazardous waste disposal sites, where significant leachate is generated. The design includes a liner underlying the site, as well as leachate collection and treatment measures. It must make provision for the control of significant seasonal or continuous leachate generation, predicted by means of the Climatic Water Balance, or the Site Water Balance. Monitoring systems for surface and ground water pollution should be indicated. This will include the positions of both surface water sampling points and monitoring boreholes. Drains must divert or contain the peak design storm of 50 year return period for the particular catchment area. The system must effectively separate unpolluted water, that has not come into contact with waste, from polluted water. The upslope cut-off drains

must divert clean storm water around the site and into the natural drainage system.

It is a minimum requirement that there always be an acceptable physical separation between the proposed waste body and the wet season high elevation of the ground water. This applies whether cover excavations take place on site or not. The minimum permissible separation is 2m. Leachate collection is usually achieved using a graded underliner and drains which lead to a collection point or sump. Depending on soil quality, the underliner may be an engineered low permeability natural soil or clay liner, a geomembrane liner, or both.

All landfills have the potential to generate sporadic leachate. In all landfills, therefore, the base must be so sloped that any leachate formed, even sporadic leachate, is directed to a control point. The leachate treatment system will depend on the leachate composition and on the most appropriate method of treatment. This could be on-site chemical, physical or biological treatment, and/or off-site treatment where leachate is passed into a sewer or pipeline for treatment elsewhere.

Clean, uncontaminated water, which has not been in contact with the waste, must be allowed to flow off the site into the natural drainage system, under controlled conditions. All drains must be maintained. This involves ensuring that they are not blocked by silt or vegetation.

In the case of hazardous waste disposal sites, the design must make provision for containment of hazardous waste. This implies the complete separation of the waste body and any associated leachate from the surrounding soil or rock strata, by means of a liner and a leachate collection system. Leachate management is necessary at hazardous waste disposal sites, where significant leachate is generated. The design includes a liner underlying the site, as well as leachate collection and treatment measures. It must make provision for the control of significant seasonal or continuous leachate generation, predicted by means of the

Monitoring systems for surface and ground water pollution should be indicated. This will include the positions of both surface water sampling points and monitoring boreholes. Drains must divert or contain the peak design storm of 50 year return period for the particular catchment area. The system must effectively separate unpolluted water, that has not come into contact with waste, from polluted water. The upslope cut-off drains must divert clean storm water around the site and into the natural drainage system.

Polluted water, on the other hand, must be collected in toe drains, retained on the site and managed in accordance with the Department's directives. This may include controlled release, recycling and evaporation or treating with any leachate

that has been collected. It is a Minimum Requirement that there always be an acceptable physical separation between the proposed waste body and the wet season high elevation of the ground water. This applies whether cover excavations take place on site or not. The minimum permissible separation is 2m. Leachate collection is usually achieved using a graded underliner and drains which lead to a collection point or sump.

Depending on soil quality, the underliner may be an engineered low permeability natural soil or clay liner, a geomembrane liner, or both. All landfills have the potential to generate sporadic leachate. In all landfills, therefore, the base must be so sloped that Leaching/Seeping of contaminants into sub-surface any leachate formed, even sporadic leachate, is directed to a control point.

The leachate treatment system will depend on the leachate composition and on the most appropriate method of treatment. This could be on-site chemical, physical or biological treatment, and/or off-site treatment where leachate is passed into a sewer or pipeline for treatment elsewhere. Clean, uncontaminated water, which has not been in contact with the waste, must be allowed to flow off the site into the natural drainage system, under controlled conditions. All drains must be maintained. This involves ensuring that they are not blocked by silt or vegetation. The Department requires a Water Quality Monitoring Plan as part of the permitting requirements. This involves background analyses, detection monitoring, investigative monitoring and post-closure monitoring. The Water Quality Monitoring Plan ensures that the water quality in the vicinity of a waste disposal site is regularly monitored and reported upon throughout its life, so that, where necessary, remedial action can be taken.

6. REFERENCES

- Department of Environmental Affairs. (1983). *Conservation of Agricultural Resources Act 43 of 1983*. Pretoria: Department of Environmental Affairs.
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- van der Linde, M., & Feris, L. (2010). *Compendium of South African Legislation*. Pretoria: Pretoria University Press.

APPENDIX B: GRIEVANCE MECHANISM

GRIEVANCE MECHANISM / PROCESS

PURPOSE

This Grievance Mechanism has been developed to receive and facilitate resolution of concerns and grievances about the Project's environmental and social performance. The aim of the grievance mechanism is to ensure that grievances or concerns raised by local landowners and or communities are addressed in a manner that:

- » Provides a predictable, transparent, and credible process to all parties, resulting in outcomes that are seen as fair, effective, and lasting.
- » Builds trust as an integral component of broader community relations activities.
- » Enables more systematic identification of emerging issues and trends, facilitating corrective action and pre-emptive engagement.

The aim of this Grievance Mechanism is to address grievances in a manner that does not require a potentially costly and time consuming legal process.

PROCEDURE FOR RECEIVING AND RESOLVING GRIEVANCES

- » Local landowners, communities and authorities must be informed in writing by the Project Company of the grievance mechanism and the process by which grievances can be brought to the attention of the Project Company through its designated representative.
- » A company representative must be appointed as the contact person for grievances to be addressed to. The name and contact details of the contact person must be provided to local landowners, communities and authorities.
- » Project related grievances relating to the construction, operational and or decommissioning phase must be addressed in writing to the contact person. The contact person should assist local landowners and or communities who may lack resources to submit/prepare written grievances.
- » The grievance must be registered with the contact person who, within 2 working days of receipt of the grievance, must contact the Complainant to discuss the grievance and agree on suitable date and venue for a meeting in order to discuss the grievances raised. Unless otherwise agreed, the meeting should be held within 2 weeks of receipt of the grievance.
- » The contact person must draft a letter to be sent to the Complainant acknowledging receipt of the grievance, the name and contact details of Complainant, the nature of the grievance, the date that the grievance was raised, and the date and venue for the meeting (once agreed).
- » Prior to the meeting being held the contact person must contact the Complainant to discuss and agree on the parties who should attend the

meeting. The people who will be required to attend the meeting will depend on the nature of the grievance. While the Complainant and or proponent are entitled to invite their legal representatives to attend the meeting/s, it should be made clear that to all the parties involved in the process that the grievance mechanism process is not a legal process. It is therefore recommended that the involvement of legal representatives be limited.

- » The meeting should be chaired by the company representative appointed to address grievances. The Project Company must provide a person to take minutes of and record the meeting/s. Any costs associated with hiring venues must be covered by the Project Company.
- » Draft copies of the minutes must be made available to the Complainant and the proponent within 4 working days of the meeting being held. Unless otherwise agreed, comments on the Draft Minutes must be forwarded to the company representative appointed to manage the grievance mechanism within 4 working days of receipt of the draft minutes.
- » In the event of the grievance being resolved to the satisfaction of all the parties concerned, the outcome must be recorded and signed off by the relevant parties. The record should provide details of the date of the meeting/s, the names of the people that attended the meeting/s, the outcome of the meeting/s, and where relevant, the measures identified to address the grievance, the party responsible for implementing the required measures, and the agreed upon timeframes for the measures to be implemented.
- » In the event of a dispute between the Complainant and the proponent regarding the grievance, the option of appointing an independent mediator to assist with resolving the issue should be discussed. The record of the meeting/s must note that a dispute has arisen and that the grievance has not been resolved to the satisfaction of all the parties concerned.
- » In the event that the parties agree to appoint a mediator, the Project Company will be required to identify three (3) mediators and forward the names and CVs to the Complainant within 2 weeks of the dispute being declared. The Complainant, in consultation with the Project Company, must identify the preferred mediator and agree on a date for the next meeting. The cost of the mediator must be borne by the Project Company. The Project Company must provide a person to take minutes of and record the meeting/s.
- » In the event of the grievance, with the assistance of the mediator, being resolved to the satisfaction of all the parties concerned, the outcome must be recorded and signed off by the relevant parties, including the mediator. The record should provide details on the date of the meeting/s, the names of the people that attended the meeting/s, the outcome of the meeting/s, and where relevant, the measures identified to address the grievance, the party responsible for implementing the required measures, and the agreed upon timeframes for the measures to be implemented.
- » In the event of the dispute not being resolved, the mediator must prepare a draft report that summarises the nature of the grievance and the dispute. The

report should include a recommendation by the mediator on the proposed way forward with regard to the addressing the grievance.

- » The draft report must be made available to the Complainant and the Project Company for comment before being finalised and signed by all parties. Unless otherwise agreed, comments on the draft report must be forwarded to the company representative appointed to manage the grievance mechanism within 4 working days. The way forward will be informed by the recommendations of the mediator and the nature of the grievance.

A Complaint is closed out when no further action can be or needs to be taken. Closure status will be classified in the Complaints Register as follows:

- » Resolved. Complaints where a resolution has been agreed and implemented and the Complainant has signed the Confirmation Form.
- » Unresolved. Complaints where it has not been possible to reach an agreed resolution and the case has been authorised for close out by the Appeals Committee.
- » Abandoned. Complaints where the Complainant is not contactable after one month following receipt of a Complaint and efforts to trace his or her whereabouts have been unsuccessful.

The grievance mechanism does not replace the right of an individual, community, group or organization to take legal action should they so wish. In the event of the grievance not being resolved to the satisfaction of Complainant and or the proponent, either party may be of the opinion that legal action may be the most appropriate option.

APPENDIX C: ALIEN PLANT MANAGEMENT PLAN

OPEN SPACE & ALIEN PLANT MANAGEMENT PLAN

1. PURPOSE

Invasive alien species pose the second largest threat to biodiversity after direct habitat destruction. The purpose of this Alien Plant Management Plan is to provide a framework for the management of alien and invasive plant species during the construction and operation of the power station. The broad objectives of the plan include the following:

- » Ensure alien plants do not become dominant in parts or the whole site through the control and management of alien and invasive species presence, dispersal & encroachment.
- » Develop and implement a monitoring and eradication programme for alien and invasive species.
- » Promote the natural re-establishment and planting of indigenous species in order to retard erosion and alien plant invasion.

2. RELEVANT ASPECTS OF THE SITE

The Table below reflects the following weeds, encroacher and invasive plants recorded during the survey period.

Table 1: Exotic, invasive, weeds and encroacher species recorded in the study area		
<i>Binomial Name</i>	<i>Colloquial Name</i>	<i>Status</i>
<i>Acacia mellifera</i>	Black Thorn (e), Swarthaak (a)	Declared indicator of encroachment, medicinal poison source
<i>Achyranthes aspera</i>	Burrweed (e), Grootklitsbossie (a)	Naturalised exotic
<i>Albucca seineri</i> (Engl. & K.Krause) J.C.Manning & Goldblatt	--	Indicator of overgrazing
<i>Alternanthera pungens</i> Humb.	Khaki Weed (e), Dubbeltjie (a)	Weed, pioneer species
<i>Bidens pilosa</i> L.	Black-jack (e), Knapsekêrel (a)	Naturalised exotic, edible parts, Invader Species Schedule 13 (Mpumalanga Nature Conservation Act 10 of 1998)
<i>Cereus jamacuru</i> (L.) Mill.	Queen of the night (e), Nagblom (a)	Declared Invader - Category 1B (NEM:BA, 2002 AIP, 2014), Invader Species, Schedule 13 (Mpumalanga Nature Conservation Act 10 of 1998)
<i>Crotalaria sphaerocarpa</i> Perr. Ex DC. Subsp. <i>sphaerocarpa</i>	Mealie Crotalaria (e), Mielie-crotalaria	Sometimes a weed of cultivation
<i>Cynodon dactylon</i> (L.) Pers.	Common Couch Grass (e), Gewone kweekgras (a)	Indicator of disturbed areas, grazing potential
<i>Cyperus esculentus</i>	Yellow nutsedge (e), Geeluintjie (a)	Weed, edible parts (tuber)
<i>Dichrostachys cinerea</i>	Sicklebush (e), Sekelbos (a)	Invader, medicinal properties, traditional uses firewood, weaving
<i>Flaveria bidentis</i> (L.) Kuntze	Smelter's bush, Smelterbossie (a)	Declared Invader - Category 1B (NEM:BA, 2002 AIP, 2014)
<i>Gomphrena celosioides</i> Mart.	Bachelor's button (e), Mierbossie (a)	Weed, South America
<i>Grewia flava</i> DC.	Velvet Raisin (e), Fluweelrosyntjebos (a)	Edible parts, weaving, traditional uses, declared indicator of encroachment
<i>Opuntia stricta</i> Haw.	Pest pear of Australia (e)	Declared Invader - Category 1B (NEM:BA, 2002 AIP, 2014), Invader Species, Schedule 13 (Mpumalanga Nature Conservation Act 10 of 1998)
<i>Schkuhria pinnata</i> (Lam.) Cabrera	Dwarf Marigold (e), Bitterbossie (a)	Medicinal uses, weed (S. America)
<i>Solanum elaeagnifolium</i> Cav.	Silver-leaf bitter apple (e)	Declared Invader - Category 1B (NEM:BA, 2002 AIP, 2014)
<i>Solanum</i> species	Tamato (e), Tamatie (a)	Declared Invader - Category 1B (NEM:BA, 2002 AIP, 2014) (see act for details)

3. LEGISLATIVE CONTEXT

Conservation of Agricultural Resources Act (Act No. 43 of 1983)

In terms of the amendments to the regulations under the Conservation of Agricultural Resources Act (Act No. 43 of 1983), all declared aliens must be effectively controlled. Landowners are legally responsible for the control of invasive alien plants on their properties. In terms of this Act, 198 alien species were listed as declared weeds and invaders and ascribed to one of the following categories:

- » Category 1: Prohibited and must be controlled.
- » Category 2 (commercially used plants): May be grown in demarcated areas provided that there is a permit and that steps are taken to prevent their spread.
- » Category 3 (ornamentally used plants): May no longer be planted. Existing plants may be retained as long as all reasonable steps are taken to prevent the spreading thereof, except within the flood line of watercourses and wetlands.

National Environmental Management: Biodiversity Act, 2004 (Act No.10 of 2004)

The National Environmental Management: Biodiversity Act (NEM:BA) regulates all invasive organisms in South Africa, including a wide range of fauna and flora. Regulations have been published in Government Notices R.506, R.507, R.508 and R.509 of 2013 under NEMBA. According to this Act and the regulations, any species designated under Section 70 cannot be propagated, grown, bought or sold without a permit. Below is an explanation of the three categories:

- » Category 1a: Invasive species requiring compulsory control. Any specimens of Category 1a listed species need, by law, to be eradicated from the environment. No permits will be issued.
- » Category 1b: Invasive species requiring compulsory control as part of an invasive species control programme. Remove and destroy. These plants are deemed to have such a high invasive potential that infestations can qualify to be placed under a government sponsored invasive species management programme. No permits will be issued.
- » Category 2: Invasive species regulated by area. A demarcation permit is required to import, possess, grow, breed, move, sell, buy or accept as a gift any plants listed as Category 2 plants. No permits will be issued for Cat 2 plants to exist in riparian zones.
- » Category 3: Invasive species regulated by activity. An individual plant permit is required to undertake any of the following restricted activities (import, possess, grow, breed, move, sell, buy or accept as a gift) involving a Category 3 species. No permits will be issued for Cat 3 plants to exist in riparian zones.

Plants listed under the categories above are detailed within Notice 1 of the Alien and Invasive Species published in GNR599 of 01 August 2014. The following guide is a useful starting point for the identification of alien species: Bromilow, C. 2010. Problem Plants and Alien Weeds of South Africa. Briza, Pretoria.

It is important to note that alien species that are regulated in terms of the Conservation of Agricultural Resources Act (Act 43 of 1983) (CARA) as weeds and invader plants are exempted from NEM:BA. This implies that the provisions of the CARA in respect of listed weed and invader plants supersede those of NEM:BA.

4. ALIEN PLANT MANAGEMENT PRINCIPLES

4.1. Prevention and early eradication

A prevention strategy should be considered and established, including regular surveys and monitoring for invasive alien plants, effective rehabilitation of disturbed areas and prevention of unnecessary disturbance of natural areas.

Monitoring plans should be developed which are designed to identify Invasive Alien Plant Species shortly after they arrive in the project area. Keeping up to date on which weeds are an immediate threat to the site is important, but efforts should be planned to update this information on a regular basis. When new Invasive Alien Plant Species are recorded on site, an immediate response of locating the site for future monitoring and either hand-pulling the weeds or an application of a suitable herbicide should be planned. It is, however, better to monitor regularly and act swiftly than to allow invasive alien plants to become established on site.

4.2. Containment and control

If any alien invasive plants are found to become established on site, action plans for their control should be developed, depending on the size of the infestations, budgets, manpower considerations and time. Separate plans of control actions should be developed for each location and/or each species. Appropriate registered chemicals and other possible control agents should be considered in the action plans for each site/species. The key is to ensure that no invasions get out of control. Effective containment and control will ensure that the least energy and resources are required to maintain this status over the long-term. This will also be an indicator that natural systems are impacted to the smallest degree possible.

4.3. General Clearing & Guiding Principles

Alien control programs are long-term management projects and should include a clearing plan which includes follow up actions for rehabilitation of the cleared area. The lighter infested areas should be cleared first to prevent the build-up of seed banks. Pre-existing dense mature stands ideally should be left for last, as they probably won't increase in density or pose a greater threat than they are currently. Collective management and planning with neighbours may be required in the case of large woody invaders as seeds of aliens are easily dispersed across boundaries by wind or water courses. All clearing actions should be monitored and documented to keep records of which areas are due for follow-up clearing.

i. Clearing Methods

Different species require different clearing methods such as manual, chemical or biological methods or a combination of both. Care should however be taken that the clearing methods used do not encourage further invasion. As such, regardless of the methods used, disturbance to the soil should be kept to a minimum.

Fire should not be used for alien control or vegetation management at the site. The best-practice clearing method for each species identified should be used. The preferred clearing methods for most alien species can be obtained from the DWAF Working for Water Website. <http://www.dwaf.gov.za/wfw/Control/>

» Mechanical control

This entails damaging or removing the plant by physical action. Different techniques could be used, e.g. uprooting, felling, slashing, mowing, ringbarking or bark stripping. This control option is only really feasible in sparse infestations or on small scale, and for controlling species that do not coppice after cutting. Species that tend to coppice, need to have the cut stumps or coppice growth treated with herbicides following the mechanical

treatment. Mechanical control is labour intensive and therefore expensive, and could cause severe soil disturbance and erosion.

» **Chemical Control**

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

- * Area contamination must be minimised by careful, accurate application with a minimum amount of herbicide to achieve good control.
- * All care must be taken to prevent contamination of any water bodies. This includes due care in storage, application, cleaning equipment and disposal of containers, product and spray mixtures.
- * Equipment should be washed where there is no danger of contaminating water sources and washings carefully disposed of in a suitable site.
- * To avoid damage to indigenous or other desirable vegetation, products should be selected that will have the least effect on non-target vegetation.
- * Coarse droplet nozzles should be fitted to avoid drift onto neighbouring vegetation.
- * The appropriate health and safety procedures should also be followed regarding the storage, handling and disposal of herbicides.

For all herbicide applications, the following Regulations and guidelines should be followed:

- * Working for Water: Policy on the Use of Herbicides for the Control of Alien Vegetation.
- * Pesticide Management Policy for South Africa published in terms of the Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1947) – GNR 1120 of 2010.
- * South African Bureau of Standards, Standard SANS 10206 (2010)

According to Government Notice No. 13424 dated 26 July 1992, it is an offence to *“acquire, dispose, sell or use an agricultural or stock remedy for a purpose or in a manner other than that specified on the label on a container thereof or on such a container”*.

Contractors using herbicides need to have a valid Pest Control Operators License (limited weeds controller) according to the Fertilizer, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act No. 36 of 1947). This is regulated by the Department of Agriculture, Forestry and Fisheries.

» **Biological control**

Biological weed control consists in the use of natural enemies to reduce the vigour or reproductive potential of an invasive alien plant. Biological control agents include insects, mites, and micro-organisms such as fungi or bacteria. They usually attack specific parts of the plant, either the reproductive organs directly (flower buds, flowers or fruit) or the seeds after they have dropped. The stress caused by the biological control agent may kill a plant outright or it might impact on the plants reproductive capacity. In certain instances, the reproductive capacity is reduced to zero and the population is effectively sterilised. All of these outcomes will help to reduce the spread of the species.

To obtain biocontrol agents, provincial representatives of the Working for Water Programme or the Directorate: Land Use and Soil Management (LUSM), Department of Agriculture, Forestry and Fisheries (DAFF) can be contacted.

4.4. General management practices

The following general management practices should be encouraged or strived for:

- » Establish an ongoing monitoring programme for construction phase to detect and quantify any alien species that may become established and identify the problem species.
- » Alien vegetation regrowth on areas disturbed by construction must be immediately controlled once recorded throughout the entire site during construction and operation.
- » Care must be taken to avoid the introduction of alien invasive plant species to the site. Particular attention must be paid to imported material such as building sand or dirty earth-moving equipment. Stockpiles should be checked regularly and any weeds emerging from material stockpiles should be removed.
- » Cleared areas that have become invaded by alien species can be sprayed with appropriate herbicides provided that these are such that break down on contact with the soil. Residual herbicides should not be used.
- » The effectiveness of vegetation control varies seasonally and this is also likely to impact alien species. Control early in the wet season will allow species to re-grow and follow-up control is likely to be required. It is tempting to leave control until late in the wet season to avoid follow-up control. However, this may allow alien species to set seed before control and hence will not contribute towards reducing alien species abundance. Therefore, vegetation control should be aimed at the middle of the wet season, with a follow-up event towards the end of the wet season. There are no exact dates that can be specified here as each season is unique and management must therefore respond according to the state and progression of the vegetation.

- » Alien management is an iterative process and it may require repeated control efforts to significantly reduce the abundance of a species. This is often due to the presence of large and persistent seed banks. However, repeated control usually results in rapid decline once seed banks become depleted.
- » Some alien species are best individually pulled by hand and in the case of *Opuntia* removed from the site.
- » Regular vegetation control to reduce plant biomass within the site should be conducted. This should be timed so as to coincide with the critical growth phases of the most important alien species on site. This will significantly reduce the cost of alien management as this should contribute towards the control of the dominant alien species and additional targeted control will be required only for a limited number of species.
- » No alien species should be cultivated on-site. If vegetation is required for aesthetic purposes, then non-invasive, water-wise locally-occurring species should be used
- » During operation, surveys for alien species should be conducted regularly. It is recommended that this be undertaken every 6 months for the first two years after construction and annually thereafter. All aliens identified should be cleared using appropriate means.

4.5. Monitoring

In order to monitor the impact of clearing activities, follow-ups and rehabilitation efforts, monitoring must be undertaken. This section provides a description of a possible monitoring programme that will provide an assessment of the magnitude of alien invasion on site as well as an assessment of the success of the management programme.

In general, the following principles apply for monitoring:

- » Photographic records must be kept of areas to be cleared prior to work starting and at regular intervals during initial clearing activities. Similarly, photographic records should be kept of the area from immediately before and after follow-up clearing activities. Rehabilitation processes must also be recorded.
- » Simple records must be kept of daily operations, e.g. area/location cleared, labour units and, if ever used, the amount of herbicide used.
- » It is important that, if monitoring results in detection of invasive alien plants, that this leads to immediate action.

The following monitoring should be implemented to ensure management of alien invasive plant species.

Construction Phase

Monitoring Action	Indicator	Timeframe
Document alien species present at the site	List of alien species	Preconstruction & monthly thereafter
Document alien plant distribution	Alien plant distribution map within priority areas	3 Monthly
Document & record alien control measures implemented	Record of clearing activities	3 Monthly
Review & evaluation of control success rate	Decline in documented alien abundance over time	Biannually

Operation Phase

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

APPENDIX D: REHABILITATION PLAN

REVEGETATION AND REHABILITATION PLAN

1. PURPOSE

The purpose of the rehabilitation plan is to ensure that areas cleared or impacted during construction activities of the proposed Facility are rehabilitated with a plant cover that reduces the risk of erosion from these areas as well as restores some ecosystem function. The purpose of the rehabilitation plan for the site can be summarised as follows:

- » Achieve long-term stabilisation of all disturbed areas to minimise erosion potential.
- » Re-vegetate all disturbed areas with suitable local plant species.
- » Minimise visual impact of disturbed areas.
- » Ensure that disturbed areas are safe for future uses.

This rehabilitation plan should be closely aligned with other site-specific plans, including the erosion management plan, soil management plan, alien plant management plan, and plant rescue and protection plan. Prior to commencement of construction, a detailed rehabilitation plan and Method Statement for the site should be compiled with the aid of a rehabilitation specialist.

2. RELEVANT ASPECTS OF THE SITE

The study area corresponds to the Savanna Biome and more particularly to the Central Bushveld Bioregion as defined by Mucina & Rutherford (2006) and comprehends an ecological type known as Limpopo Sweet Bushveld (Mapping Unit SVcb 19; Mucina & Rutherford, 2006), currently afforded a Least Threatened conservation status, and comprising an extensive geographic coverage.

Development of vegetation is generally a result of complex interacting driving forces that include climatic-, geological (soil), topographical- and moisture gradients typical of the savanna regions of southern Africa. Principally, the flora of the sites is recognised as the *Acacia erubescens* – *Stipagrostis ciliata* woodland that is typical and representative of the flora of the region. The TWINSpan classification resulted in the recognition of three broad communities, namely:

- » *Eragrostis rotifer* - *Echinochloa holubii* ephemeral pans representing small water bodies and shallow depressions that tend to hold surface water when inundated. This habitat type was uncommon on the study area and mainly confined to a few depressions located on the northern part of the Farm Graaffwater. A medium floristic sensitivity was ascribed to these parts of the study area;
- » *Acacia mellifera* - *Acacia tortilis* microphyllous woodland on clay soils community, representing vegetation that is prominent along the drainage

lines and on clay soils that are characterised by a high prominence of dense *Acacia* woodland. A medium floristic sensitivity was ascribed to these parts of the study area; and

- » *Combretum zeyheri* - *Eragrostis pallens* undifferentiated broad-leaf woodland on sandy soils is prominent and by far the most dominant habitat on the study area. It corresponds to deep, highly leached sandy soils, and is earmarked by a high prominence of medium to tall semi-deciduous woodland. These areas exhibit a medium-high floristic sensitivity.

3. REHABILITATION METHODS

- » Immediately after replacing topsoils in disturbed areas, the soil surface must be revegetated with a suitable plant cover.
- » It is expected that soil seed banks of indigenous vegetation will be present to initiate initial vegetation cover. However, simply applying this topsoil to a well prepared rehabilitation site does not result in the same species richness and diversity as the surrounding areas. In some areas the natural regeneration of the vegetation may be poor and the application of seed to enhance vegetation recovery may be required.
- » Where possible, seed should be collected from plants present at the site during plant rescue operations. Indigenous seeds may also be harvested for purposes of re-vegetation in areas that are free of alien or invasive vegetation, either at the site prior to clearance or from suitable neighbouring sites.
- » Seed collection should be undertaken by a suitably qualified specialist who is familiar with the various seed types associated with the plant species and rehabilitation in the area.
- » Seed collection may be done throughout the year as seed ripens, but can also be restricted to summer, when a large amount of the perennial seed should have ripened. The collection of unripe seeds will reduce the percentage germination thereby reducing the effectiveness of the rehabilitation efforts. Seeds should be stored in paper or canvas bags dusted with insecticide, and sown at the onset of the rainy season.
- » Seed can be sown onto the soil, but should preferably be applied in conjunction with measures to improve seedling survival such as scarification of the soil surface or simultaneous application of mulch. Additional organic material may be added to the soil mix, if required, to assist with water retention during the early stages of seedling establishment.
- » It should be ensured that the seed mix is as diverse as possible in the first season. After the first season, when pioneer plant communities have successfully established, attempts should be made to re-sow and replant the area with more perennial and woody species. It is a process that will require several follow-ups.

- » Planting is dependent on species involved. Planting of species recommended for rehabilitation should be carried out as far as is practicable to coincide with the onset of the first significant rains. In general however, planting should commence as soon as possible after construction is completed in order to minimise the potential for erosion.
- » The final vegetation cover should resemble the original (non-encroached and indigenous) vegetation composition and structure as far as practicably possible.
- » Progressive rehabilitation is an important element of the rehabilitation strategy and should be implemented where feasible. Re-vegetation of disturbed surfaces must occur immediately after construction activities are completed.
- » Once revegetated, areas should be protected to prevent trampling and erosion.
- » No construction equipment, vehicles or unauthorised personnel should be allowed onto areas that have been vegetated.
- » Where rehabilitation sites are located within actively grazed areas, they should be fenced.
- » Fencing should be removed once a sound vegetative cover has been achieved.
- » Any runnels, erosion channels or wash ways developing after revegetation should be backfilled and consolidated and the areas restored to a proper stable condition.

4. MONITORING AND FOLLOW-UP ACTION

Throughout the lifecycle of the development, regular monitoring and adaptive management must be in place to detect any new degradation of rehabilitated areas. During the construction phase, the EO and contractor will be responsible for initiating and maintaining a suitable monitoring system. Once the development is operational, the project company will need to identify a suitable entity that will be able to take over and maintain the monitoring cycle and initiate adaptive management as soon as it is required. Monitoring personnel must be adequately trained.

The following are the minimum criteria that should be monitored:

- » Composition and density of replanted vegetation, distinguishing between species introduced for initial revegetation only and species that are part of the pre-determined desirable end state.
- » Associated nature and stability of surface soils.
- » Re-emergence of alien and invasive plant species. If noted, remedial action must be taken immediately.

The initial revegetation period post construction is estimated to be over a period of 6 (minimum) to 12 months (maximum), or a time period specified by the rehabilitation specialist, particularly if planting of trees and shrubs occurs. The rehabilitation phase (including post seeding maintenance) should be at least 12 months (depending on time of seeding and rainfall) to ensure establishment of an acceptable plant cover is achieved (excluding invasive plant species or weeds).

As rehabilitation success, monitoring and follow-up actions are important to achieve the desired cover and soil protection. The following monitoring protocol is recommended:

- » Re-vegetated areas should be monitored every 4 months for the first 12 months following construction.
- » Re-vegetated areas showing inadequate surface coverage (less than 20% within 12 months after re-vegetation) should be prepared and re-vegetated;
- » Any areas showing erosion, should be re-contoured and seeded with indigenous grasses or other locally occurring species which grow quickly.

If the plants have not established and the acceptable plant cover is not achieved within the specified maintenance period, maintenance of these areas shall continue until an acceptable plant cover is achieved (excluding alien plant species or weeds). Additional seeding or planting may be necessary to achieve acceptable plant cover. Hand seeding may have to be considered as an option in this case.

Monitoring of rehabilitation success and follow-up adaptive management, together with clearing of emerging alien plant species should continue until the decommissioning phase has been completed.

APPENDIX E: WASTE MANAGEMENT PLAN

WASTE MANAGEMENT PLAN

1. PURPOSE

A Waste Management Plan (WMP) plays a key role in achieving sustainable waste management. This purpose of this plan is to ensure that effective procedures are implemented for the handling, storage, transportation and disposal of waste that is generated from the activities on site. The plan prescribes measures for the collection, temporary storage and safe disposal of the waste streams associated with the project and includes provisions for the recovery, re-use and recycling of waste.

This WMP has been compiled as part of the project Environmental Management Programme (EMPr) and includes waste stream information available at the time of compilation. Construction practices and operations must be measured and analysed in order to determine the efficacy of the plan and whether further revision of the plan is required. This plan should be further updated should further detail regarding waste quantities and categorisation become available, during the construction and/or operational stages.

2. LEGISLATIVE REQUIREMENTS

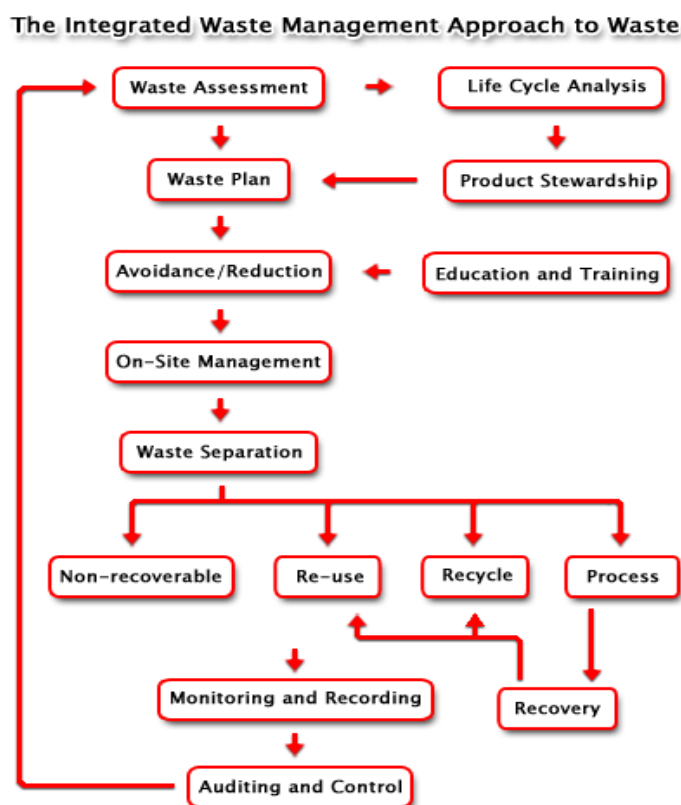
Waste in South Africa is currently governed by means of a number of pieces of legislation, including:

- » National Environmental Management: Waste Act (NEM:WA), 2008 (Act 59 of 2008)
- » National Environmental Management: Waste Amendment Act, 2014 (Act 26 of 2014)
- » The South African Constitution (Act 108 of 1996)
- » Hazardous Substances Act (Act 5 of 1973)
- » Health Act (Act 63 of 1977)
- » Environment Conservation Act (Act 73 of 1989)
- » Occupational Health and Safety Act (Act 85 of 1993)
- » National Water Act (Act 36 of 1998)
- » The National Environmental Management Act (Act 107 of 1998)
- » Municipal Structures Act (Act 117 of 1998)
- » Municipal Systems Act (Act 32 of 2000)
- » Mineral and Petroleum Resources Development Act (Act 28 of 2002)
- » Air Quality Act (Act 39 of 2004)

Storage of waste must be undertaken in accordance with the National Norms and Standards for the Storage of Waste published in GN926.

3. WASTE MANAGEMENT PRINCIPLES

An integrated approach to waste management on site is needed. Such an approach is illustrated in the figure below.



Source: <http://www.enviroserv.co.za/pages/content.asp?SectionId=496>

It is important to ensure that waste is managed with the following objectives in mind during all phases of the project:

- » Reducing volumes of waste is a priority;
- » If reduction is not feasible, the maximum amount of waste is to be recycled; and
- » Waste that cannot be recycled is to be disposed of in the most environmentally responsible manner as possible.

3.1. Construction phase

A plan for the management of waste during construction waste is detailed below. As previously stated, construction practices must be measured and analysed in order to determine the efficacy of the plan and whether further revision of the

plan is required. A Method Statement detailing specific waste management practices during construction should be prepared by the Contractor prior to the commencement of construction.

4.1.1. Waste Assessment / Inventory

- » The Environmental Officer must develop, implement and maintain a waste inventory reflecting all waste generated during construction for both general and hazardous waste streams.
- » Construction method and materials should be carefully considered in view of waste reduction, re-use, and recycling opportunities.
- » Once a waste inventory has been established, targets for recovery of waste (minimisation, re-use, recycling) should be set.
- » The Environmental Officer must conduct waste classification and rating in terms of SANS 10288 and Government Notice 634 published under the NEM: WA.

4.1.2. Waste collection, handling and storage

- » Each subcontractor must implement their own waste recycling system, i.e. separate bins for food waste, plastics, paper, wood, glass cardboard, metals, etc.
- » Portable toilets must be monitored and maintained daily.
- » Below ground storage of septic tanks, if installed, must withstand the external forces of the surrounding environment. The area above the tank must be demarcated to prevent any vehicles or heavy machinery from driving around the area.
- » Waste collection bins and hazardous waste containers must be provided by the principal contractor and placed at various areas around site for the storage of organic, recyclable and hazardous waste.
- » A dedicated waste area must be established on site for the storage of all waste streams, before removal from site.
- » Signage/ colour coding must be used to differentiate disposal areas for the various waste streams (i.e. paper, cardboard, metals, food waste, glass etc.).
- » Hazardous waste must be stored within a bunded area constructed according to SABS requirements. The volume of waste stored in the bunds must not exceed 110% of the bund capacity.
- » The location of all temporary waste storage areas must aim to minimise the potential for impact on the surrounding environment, including prevention of contaminated runoff, seepage, and vermin control.
- » Waste storage shall be in accordance with all Regulations and best-practice guidelines and under no circumstances may waste be burnt on site.

- » A dedicated waste management team must be appointed by the principal contractors' EO, whom will be responsible for ensuring the continuous sorting of waste and maintenance of the area. The waste management team must be trained in all areas of waste management and monitored by the EO.
- » All waste removed from site must be done so by a registered/ licensed subcontractor, whom must supply information regarding how waste recycling/ disposal will be achieved. The registered subcontractor must provide waste manifests for all removals at least once a month.

4.1.3. Management of waste storage areas

- » The position of all waste storage areas must be located away from water courses and ensure minimal degradation to the environment. The main waste storage area must have a suitable storm water system separating clean and dirty storm water.
- » Collection bins placed around site and at subcontractors' camps must be maintained and emptied on a regular basis by the principal contractor.
- » Inspections and maintenance of the main waste storage area must be undertaken daily. Skips and storage containers must be clearly marked or colour coded and well-maintained, not allowing access to vermin or other rodents. Shade cloth should ideally be used to ensure avifauna does not have access to waste.
- » Waste must be stored in designated containers and not on the ground.
- » Inspections and maintenance of bunds must be undertaken daily. Bunds must be inspected for leaks or cracks in the foundation and walls.
- » It is assumed that any rainwater collected inside the bund is contaminated and must be removed and stored as hazardous waste, and not released into the environment. If any leaks occur in the bund, these must be removed immediately.

4.1.4. Disposal

- » Waste generated on site must be removed on a regular basis, as determined by the Environmental Officer. This frequency may change during construction depending on waste volumes generated at different stages of the construction process.
- » Waste must be removed by a suitably qualified contractor and disposed at an appropriately licensed landfill site. Proof of appropriate disposal must be provided by the contractor.

4.1.5. Record keeping

The success of the waste management plan is determined by measuring criteria such as waste volumes, cost recovery from recycling, cost of disposal. Recorded data can indicate the effect of training and education, or the need for education. It will provide trends and benchmarks for setting goals and standards. It will provide clear evidence of the success or otherwise of the plan.

- » Documentation (waste manifest, certificate of issue or safe disposal) must be kept detailing the quantity, nature, and fate of any regulated waste for audit purposes.
- » Waste management must form part of the monthly reporting requirements in terms of volumes generated, types, storage and final disposal.

4.1.6. Training

Training and awareness regarding waste management shall be provided to all employees and contractors as part of the toolbox talks or on-site awareness sessions

4. Operational phase

It is expected that the operational phase will result in the production of general waste consisting mostly of cardboard, paper, plastic, tins, metals and a variety of synthetic compounds. Limited hazardous wastes (grease, oils) may also be generated during maintenance activities. All waste generated will be required to be temporarily stored at the facility in appropriate sealed containers prior to disposal at a permitted landfill site.

The following waste management principles apply during the operational phase:

- » The Environmental Manager must develop, implement and maintain a waste inventory reflecting all waste generated during construction for both general and hazardous waste streams.
- » Adequate waste collection bins at site must be supplied. Separate bins should be provided for general and hazardous waste.
- » Recyclable waste must be removed from the waste stream and stored separately.
- » All waste must be stored in appropriate temporary storage containers (separated between different construction wastes, and contaminated or wet waste) at each construction area prior to being taken to the construction camp for final sorting (if required) and further temporary storage. Waste storage shall be in accordance with all best-practice guidelines and under no circumstances may waste be burnt on site.

- » Waste generated on site must be removed on a regular basis throughout the operational phase.
- » Waste must be removed by a suitably qualified contractor and disposed at an appropriately licensed landfill site. Proof of appropriate disposal must be provided by the contractor.

5. Monitoring of Waste Management Activities

Records must be kept of the volumes/ mass of the different waste streams that are collected from the site throughout the life of the project. The appointed waste contractor is to provide monthly reports to the operator containing the following information:

- » Monthly volumes/ mass of the different waste streams collected;
- » Monthly volumes/ mass of the waste that is disposed of at a landfill site;
- » Monthly volumes/ mass of the waste that is recycled;
- » Data illustrating progress compared to previous months.

This report will aid in monitoring the progress and relevance of the waste management procedures that are in place. If it is found that the implemented procedures are not as effective as required, this WMP is to be reviewed and amended accordingly.

APPENDIX F: EMERGENCY RESPONSE PLAN

EMERGENCY RESPONSE PLAN

1. PURPOSE

The purpose of the Emergency Response Plan is:

- To assist contractor personnel to prepare for and respond quickly and safely to emergency incidents, and to establish a state of readiness which will enable prompt and effective response to possible events.
- To control or limit any effect that an emergency or potential emergency may have on site or on neighbouring areas.
- To facilitate emergency response and to provide such assistance on the site as is appropriate to the occasion.
- To ensure communication of all vital information as soon as possible.
- To facilitate the reorganisation and reconstruction activities so that normal operations can be resumed.
- To provide for training so that a high level of preparedness can be continually maintained.

This plan outlines response actions for potential incidents of any size. It details response procedures that will minimise potential health and safety hazards, environmental damage, and clean-up efforts. The plan has been prepared to ensure quick access to all the information required in responding to an emergency event. The plan will enable an effective, comprehensive response to prevent injury or damage to the construction personnel, public, and environment during the project. Contractors are expected to comply with all procedures described in this document. A Method Statement should be prepared at the commencement of construction detailing how this plan is to be implemented as well as details of relevant responsible parties for the implementation.

2. PROJECT-SPECIFIC DETAILS

Fuel will be stored within the construction camp on site during construction. The potential for contaminating the soil resource is dependent on the presence of vehicles, machinery and processes involving various types of chemicals. The presence of people on the site during both construction and operation could increase the risk of fire in the area if appropriate prevention measures are not in place.

3. EMERGENCY RESPONSE PLAN

There are three levels of emergency as follows:

- Local Emergency: An alert confined to a specific locality.
- Site Emergency: An alert that cannot be localised and which presents danger to other areas within the site boundary or outside the site boundary.
- Evacuation: An alert when all personnel are required to leave the affected area and assemble in a safe location.

If there is any doubt as to whether any hazardous situation constitutes an emergency, then it must be treated as an Evacuation.

Every effort must be made to control, reduce or stop the cause of any emergency provided it is safe to do so. For example, in the event of a fire, isolate the fuel supply and limit the propagation of the fire by cooling the adjacent areas. Then confine and extinguish the fire (where appropriate) making sure that re-ignition cannot occur; for a gas fire it is usually appropriate to isolate the fuel and let it burn itself out but keep everything around the fire cold.

3.1. Emergency Scenario Contingency Planning

3.1.1. Scenario: Spill which would result in the contamination of land, surface or groundwater

i. Spill Prevention Measures

Preventing spills must be the top priority at all operations which have the potential of endangering the environment. The responsibility to effectively prevent and mitigate any scenario lies with the Contractor and the Environmental Manager. In order to reduce the risk of spills and associated contamination, the following principles should be considered during construction and operation activities:

- » All equipment refuelling, servicing and maintenance activities should only be undertaken within appropriately sealed designated areas.
- » All maintenance materials, oils, grease, lubricants, etc. should be stored in a designated area in an appropriate storage container.
- » No refuelling, storage, servicing, or maintenance of equipment should take place within 50m of drainage lines or sensitive environmental resources in order to reduce the risk of contamination by spills.
- » No refuelling or servicing should be undertaken without absorbent material or drip pans properly placed to contain spilled fuel.
- » Any fluids drained from the machinery during servicing should be collected in leak-proof containers and taken to an appropriate disposal or recycling facility.
- » If these activities result in damage or accumulation of product on the soil, the contaminated soil must be disposed of as hazardous waste. Under no

circumstances shall contaminated soil be added to a spoils pile and transported to a regular disposal site.

- » Chemical toilets used during construction must be regularly cleaned. Chemicals used in toilets are also hazardous to the environment and must be controlled. Portable chemical toilets could overflow if not pumped regularly or they could spill if dropped or overturned during moving. Care and due diligence should be taken at all times.
- » Contact details of emergency services and HazMat Response Contractors are to be clearly displayed on the site. All staff are to be made aware of these details and must be familiar with the procedures for notification in the event of an emergency.

ii. Procedures

The following action plan is proposed in the event of a spill:

1. Spill or release identified.
2. Assess person safety, safety of others and environment.
3. Stop the spill if safely possible.
4. Contain spill to limit entering water bodies and surrounding areas.
5. Identify substance spilled.
6. Quantify spill (under or over guideline/threshold levels).
7. Notify Site Manager and emergency response crew and authorities (in event of major spill).
8. Inform users (and downstream users) of potential risk.
9. Clean up of spill using spill kit or by HazMat team.
10. Record of spill incident on company database.

a) Procedures for containing and controlling the spill (i.e. on land or in water)

Measures can be taken to prepare for quick and effective containment of any potential spills. Each contractor must keep sufficient supplies of spill containment equipment at the construction sites, at all times during and after the construction phase. These should include specialised spill kits or spill containment equipment. Other spill containment measures include using drip pans underneath vehicles and equipment every time refuelling, servicing, or maintenance activities are undertaken.

Specific spill containment methods for land and water contamination are outlined below.

Containment of Spills on Land

Spills on land include spills on rock, gravel, soil and/or vegetation. It is important to note that soil is a natural sorbent, and therefore spills on soil are generally less serious than spills on water as contaminated soil can be more easily recovered. It is important that all measures be undertaken to avoid spills reaching open water bodies. The following methods could be used:

» *Dykes*

Dykes can be created using soil surrounding a spill on land. These dykes are constructed around the perimeter or down slope of the spilled substance. A dyke needs to be built up to a size that will ensure containment of the maximum quantity of contaminant that may reach it. A plastic tarp can be placed on and at the base of the dyke such that the contaminant can pool up and subsequently be removed with sorbent materials or by pump into barrels or bags. If the spill is migrating very slowly, a dyke may not be necessary and sorbents can be used to soak up contaminants before they migrate away from the source of the spill.

» *Trenches*

Trenches can be dug out to contain spills. Spades, pick axes or a front-end loader can be used depending on the size of trench required. Spilled substances can then be recovered using a pump or sorbent materials.

Containment of Spills on Water

Spills in water can negatively impact water quality and aquatic life. All measures need to be undertaken to contain spills on open water. The following methods could be used:

» *Weirs*

Weirs can be used to contain spills in streams and to prevent further migration downstream. Plywood or other materials found on site can be placed into and across the width of the stream, such that water can still flow under the weir. Weirs are however only effective for spilled substances which float on the water surface.

» *Barriers*

In some situations barriers made of netting or fence material can be installed across a stream, and sorbent materials placed at the base to absorb spilled substance. Sorbents will need to be replaced as soon as they are saturated. Water will be allowed to flow through.

b) Procedures for transferring, storing, and managing spill related wastes

Used sorbent materials are to be placed in plastic bags for future disposal. All materials mentioned in this section are to be available in the spill kits. Following clean up, any tools or equipment used must be properly washed and decontaminated, or replaced if this is not possible.

Spilled substances and materials used for containment must be placed into empty waste oil containers and sealed for proper disposal at an approved disposal facility.

c) Procedures for restoring affected areas

Criteria that may be considered include natural biodegradation of oil, replacement of soil and revegetation. Once a spill of reportable size has been contained, the Environmental Control Officer and the relevant Authority must be consulted to confirm that the appropriate clean up levels are met.

3.1.2. Scenario: Fire (and fire water handling)

i. Action Plan

The following action plan is proposed in the event of a fire:

1. Quantify risk.
2. Assess person safety, safety of others and environment.
3. If safe – attempt to extinguish fire using appropriate equipment.
4. If not safe to extinguish, contain fire.
5. Notify Site Manager and emergency response crew and authorities.
6. Inform users (and downstream users) of potential risk of fire.
7. Record of incident on company database.

ii. Procedures

Because large scale fires may spread very fast in the environment it is most advisable that the employee/contractor not put his/her life in danger in the case of an uncontrolled fire.

Portable firefighting equipment must be provided in line with the Building Code of South Africa and the relevant provincial building code. All emergency equipment including portable fire extinguisher, hose reels, hydrants must be maintained and

inspected by a qualified contractor in accordance with the relevant legislation and National standards.

Current evacuation signs and diagrams for the building or site that are compliant to relevant state legislation must be provided in a conspicuous position, on each evacuation route. Contact details for the relevant emergency services should be clearly displayed on site and all employees should be aware of procedures to follow in the case of an emergency.

a) Procedures for initial actions

Persons should not fight the fire if any of the following conditions exist:

- » They have not been trained or instructed in use of a fire extinguisher.
- » They do not know what is burning.
- » The fire is spreading rapidly.
- » They do not have the proper equipment.
- » They cannot do so without a means of escape.
- » They may inhale toxic smoke.

b) Reporting procedures

- » Report fire immediately to the Site Manager, who will determine if it is to be reported to the relevant emergency services and authorities.
- » The Site Manager must have copies of the Report form to be completed.

SUMMARY: RESPONSE PROCEDURE

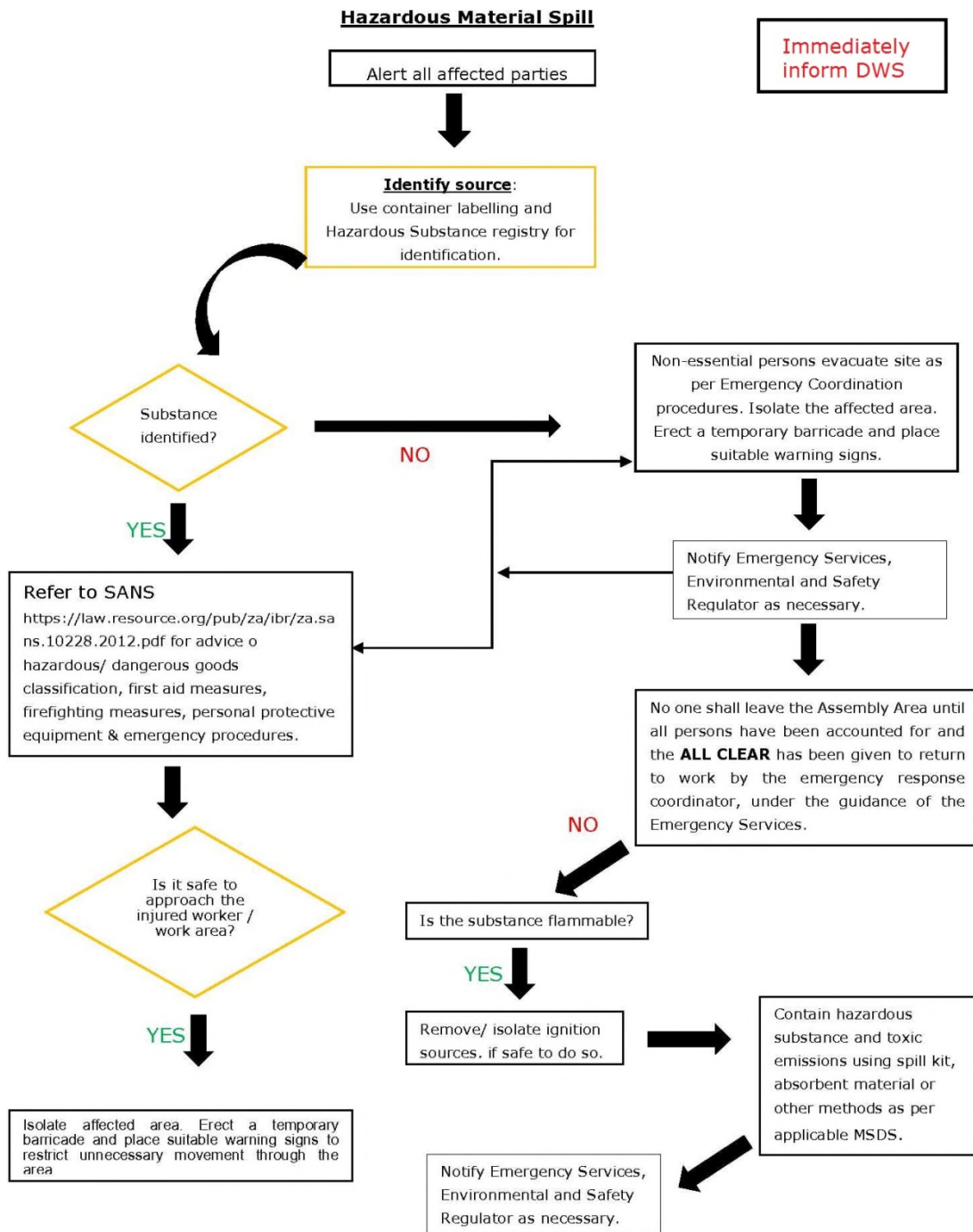


Figure 1: Hazardous Material Spill

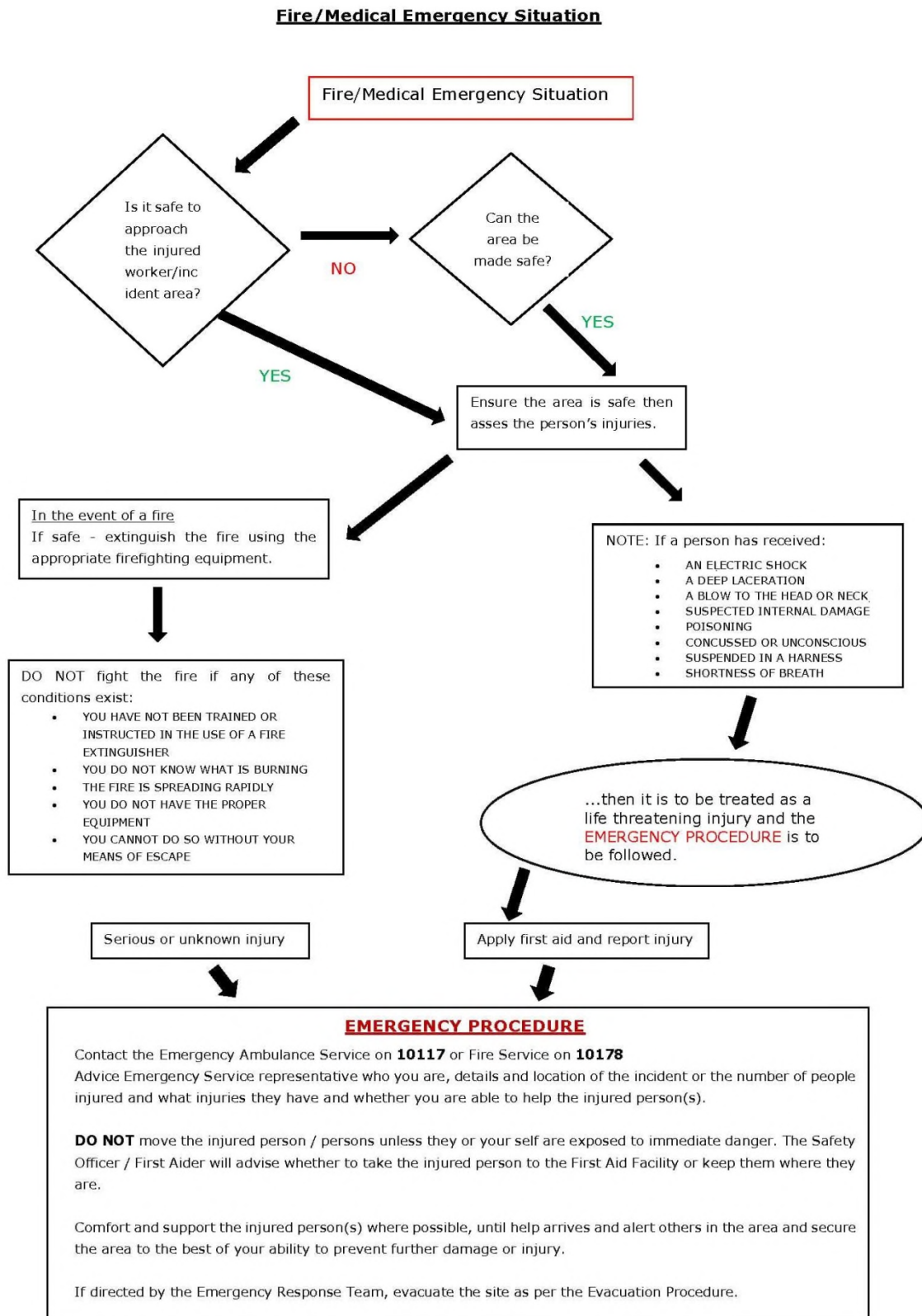


Figure 2: Emergency Fire/Medical

APPENDIX G: SOIL MANAGEMENT PLAN

SOIL MANAGEMENT PLAN

1. PURPOSE

Some of the most significant impacts on soil properties occur as a result of activities associated with construction. Construction activity can have adverse impacts on soil in a number of ways by:

- » Covering soil with impermeable materials, effectively sealing it and resulting in significant detrimental impacts on soils' physical, chemical and biological properties, including drainage characteristics.
- » Contaminating soil as a result of accidental spillage or the use of chemicals.
- » Over-compacting soil through the use of heavy machinery or the storage of construction materials.
- » Reducing soil quality, for example by mixing topsoil with subsoil.
- » Wasting soil by mixing it with construction waste or contaminated materials, which then have to be treated before reuse or even disposed of at landfill as a last resort.

Careful management of topsoil and subsoil is an important aspect of sustainable use of materials that are being stripped. Without a proper Soil Resource Plan there is the risk of losing, damaging or contaminating valuable soil resources. The purpose of this Soil Management Plan is to outline principles for soil management to ensure the integrity of the resource during and post-construction. This plan should be read together with the Emergency Response Plan in order to minimise the risk of contamination of soils.

2. SOIL HORIZONS

Topsoil

The top-most soil layer (0-25 cm) in undisturbed areas. This soil layer is important as it contains nutrients, organic material, seeds, communities of micro-organisms, fungi and soil fauna. All the contents of the topsoil layer are necessary for soil processes such as nutrient cycling, and support growth of new plants. The biologically active upper layer of soil is fundamental in the development of soils and the sustainability of the entire ecosystem. Fungi, algae, cyanobacteria and non-vascular plants form a 'living crust' on the soil surface that influences the retention of resources (principally nutrients and water), as well as reducing the potential for soil erosion.

In general, the greatest concentration of seeds (i.e. up to 90% of the seedbank) is found in the top 5-10 cm of topsoil. Soil nutrients and other biological elements also have a higher concentration in the top 5 – 10 cm of soil, but can occur up to 25 cm.

Subsoil

Soil generally deeper than 25 cm. The subsoil contains lower levels of nutrients, but the soil texture is still suitable for plant growth.

Overburden

All the soil below the subsoil layer, generally characterised by a fine soil texture which is sometimes high in clay and salt content which makes plant growth difficult. Such soils comprise a sterile growth medium, devoid of nutrients, and depending on the clay content, are of high salinity and often phytotoxic. Even shallow-lying overburden soils are largely depleted of nutrients. These soils constitute an unsuitable medium for the establishment of plants.

3. PRINCIPLES FOR SOIL MANAGEMENT

3.1. The correct handling of topsoil

- » Before beginning work on site, topsoil should be stripped from all areas that will be disturbed by construction activities. Appropriate equipment must be used and appropriate work practices must be implemented for soil stripping as mishandling soil can have an adverse effect on its properties.
- » Topsoil should be stripped in the driest condition possible.
- » Topsoil must be retained on site in order to be used in site rehabilitation. The correct handling of the topsoil layer is in most cases the key to rehabilitation success.
- » It is important that the correct depth of topsoil is excavated in order to ensure good plant growth. If excavation is too shallow, then an important growth medium for new seedlings could be lost. If excavation is too deep, this could lead to the dilution of the seed and nutrient rich topsoil with deeper sterile soil.
- » Topsoil and subsoil layers must never be mixed. The mixture of topsoil with the deeper sterile soil hinders the germination of seeds which are buried too deep in the soil layer. Mixture of soil layers also leads to the dilution of nutrient levels which are at highest concentration within the topsoil, resulting in lower levels of nutrients available for new seedlings.
- » To enable soil to be reused on site at a later stage, it needs to be stored in temporary stockpiles to minimise any damage or loss of function. Stockpiles should not be higher than 2m. Alternatively topsoil berms can be created on the site boundaries. There are a number of important considerations when creating stockpiles - including soil erosion, pollution to watercourses and the risk of flooding. These will be affected by the size, height and method of forming stockpiles, and how they are protected and maintained.
- » Topsoil must be stored separately from other soil in heaps until construction in an area is complete.

- » The duration of topsoil storage should be minimised as far as possible. Storing topsoil for long periods leads to seed bank depletion following germination during storage, and anoxic conditions develop inside large stockpile heaps.
- » All stockpiles must be positioned away from drainage lines.
- » Sediment fencing should be erected downslope of all stockpiles to intercept any sediment and upslope runoff should be diverted away from stockpiles.

3.2. Stripping of Subsoil

The following protocols must be followed when stripping subsoil:

- » On many sites subsoil will not need to be stripped but merely protected from damage. However, on other sites it might need to be temporarily removed. Where subsoil is required to be stripped, this should be undertaken before commencement of construction from all areas that are to be disturbed by construction activities or driven over by vehicles.
- » Subsoil stripping depths depend on the correct identification of the sub-soil types on an ad-hoc basis, where no formal survey data exists.
- » Subsoil should be stripped in the driest condition possible.
- » To enable soil to be reused on site at a later stage, it needs to be stored in temporary stockpiles to minimise any damage or loss of function. There are a number of important considerations when creating stockpiles - including soil erosion, pollution to watercourses and the risk of flooding. These will be affected by the size, height and method of forming stockpiles, and how they are protected and maintained.
- » All stockpiles must be positioned away from drainage lines.
- » Sediment fencing should be erected downslope of all stockpiles to intercept any sediment and upslope runoff should be diverted away from stockpiles.

**APPENDIX H: TRAFFIC AND TRANSPORTATION
MANAGEMENT PLAN**

PRINCIPLES FOR TRAFFIC AND TRANSPORTATION MANAGEMENT

1. PURPOSE

The purpose of this traffic and transportation management plan (TMP) is to address regulatory compliance, traffic management practices, and protection measures to help reduce impacts related to transportation and the construction of temporary and long-term access within the vicinity of the project site. The objectives of this plan include the following:

- » To avoid incidents and accidents while vehicles are being driven and while transporting personnel, materials, and equipment to and from the project site.
- » To raise greater safety awareness in each driver and to ensure the compliance of all safe driving provisions for all the vehicles.
- » To raise awareness to ensure drivers respect and follow traffic regulations.
- » To ensure compliance with all legislation regulating traffic and transportation within South Africa.
- » To avoid the deterioration of access roads and the pollution that can be created due to noise and emissions produced by equipment, machinery, and vehicles.

2. TRAFFIC AND TRANSPORTATION MANAGEMENT PRINCIPLES

- » Prior to the commencement of construction the contractor must develop their own Transport Management Plan (TMP) based on the requirements laid out in this plan.
- » The contractor must ensure that all required permits for the transportation of abnormal loads are in place prior to the transportation of equipment and project components to the site. Specific abnormal load routes must be developed with environmental factors taken into consideration.
- » Before construction commences, authorised access routes must be clearly marked in the field with signs or flagging. The Construction Contractor must review the location of designated access and will be responsible for ensuring construction travel is limited to designated routes. The entrance of the main access road must not be constructed before a blind rise or on a bend of the public road.
- » All employees must attend an environmental induction on site. Through this induction, employees will be instructed to use only approved access roads and obey jurisdictional and posted speed limits to minimise potential impacts to the environment and other road users.

- » The contractor will be responsible for making sure that their suppliers, vendors, and subcontractors strictly comply with the principles of this TMP and the contractor's TMP.
- » Adjacent landowners must be notified of the construction schedule.
- » Access roads and entrances to the site should be carefully planned to limit any intrusion on the neighbouring property owners and road users.
- » Signs must be posted in the project area to notify landowners and others of the construction activity.
- » Flagging must be provided at access points to the site and must be maintained until construction is completed on the site.
- » Speed limits must be established and enforced over all construction traffic.
- » Speed controls and implementation of appropriate dust suppression measures must be enforced to minimise dust pollution.
- » Throughout construction the contractor will be responsible for monitoring the condition of access roads used by project traffic and for ensuring that roads are maintained in a condition that is comparable to the condition they were in before the construction began.
- » Drivers must have an appropriate valid driver's license.
- » All vehicles must be maintained in good mechanical, electrical, and electronic condition, including but not limited to the brake systems, steering, tires, windshield wipers, side mirrors and rearview mirror, safety belts, signal indicators, and lenses.
- » Any traffic delays attributable to construction traffic must be co-ordinated with the appropriate authorities.
- » No deviation from approved transportation routes must be allowed, unless roads are closed for reasons outside the control of the contractor.
- » Impacts on local communities must be minimised. Consideration should be given to limiting construction vehicles travelling on public roadways during the morning and late afternoon commute time.

3. MONITORING

- » The principal contractor must ensure that all vehicles adhere to the speed limits. Repeat offenders must be penalised. A speeding register must be kept with details of the offending driver.
- » Where traffic signs are not being adhered to, engineering structures must be used to ensure speeds are reduced.

Appendix I: EAP CVs

CURRICULUM VITAE
JO-ANNE THOMAS

Profession : Environmental Consultant
Specialisation : Environmental Management; Strategic environmental advice;
Environmental compliance advice & monitoring; Environmental Impact
Assessments; Policy, strategy & guideline formulation; Project
Management; General Ecology
Years experience : Twelve (12) years in the environmental field

KEY RESPONSIBILITIES

Provide technical input for projects in the environmental management field, specialising in Strategic Environmental Advice, Environmental Impact Assessment studies, environmental permitting, public participation, Environmental Management Plans and Programmes, environmental policy, strategy and guideline formulation, and integrated environmental management. Key focus on integration of the specialist environmental studies and findings into larger engineering-based projects, strategic assessment, and providing practical and achievable environmental management solutions and mitigation measures. Responsibilities for environmental studies include project management; review and manipulation of data; identification and assessment of potential negative environmental impacts and benefits; review of specialist studies; and the identification of mitigation measures. Compilation of the reports for environmental studies is in accordance with all relevant environmental legislation.

Undertaking of numerous environmental management studies has resulted in a good working knowledge of environmental legislation and policy requirements. Recent projects have been undertaken for both the public- and private-sector, including compliance advice and monitoring, electricity generation and transmission projects, various types of linear developments (such as National Road, local roads and power lines), waste management projects (landfills), mining rights and permits, policy, strategy and guideline development, as well as general environmental planning, development and management.

SKILLS BASE AND CORE COMPETENCIES

- Project management for a range of projects
- Identification and assessment of potential negative environmental impacts and benefits through the review and manipulation of data and specialist studies
- Identification of practical and achievable mitigation and management measures and the development of appropriate management plans
- Compilation of environmental reports in accordance with relevant environmental legislative requirements
- External and peer review of environmental reports & compliance advice and monitoring
- Formulation of environmental policies, strategies and guidelines
- Strategic and regional assessments; pre-feasibility & site selection
- Public participation processes for a variety of projects
- Strategic environmental advice to a wide variety of clients both in the public and private sectors
- Working knowledge of environmental planning processes, policies, regulatory frameworks and legislation

EDUCATION AND PROFESSIONAL STATUS

Degrees:

B.Sc Earth Sciences, *University of the Witwatersrand, Johannesburg*, 1993

B.Sc Honours in Botany, *University of the Witwatersrand, Johannesburg*, 1994

M.Sc in Botany, *University of the Witwatersrand, Johannesburg*, 1996

Courses:

Environmental Impact Assessment, *Potchefstroom University*, 1998

Environmental Law, *Morgan University*, 2001

Professional Society Affiliations:

Professional Natural Scientist (Registration No 400024/00).

EMPLOYMENT

Current: Director of Savannah Environmental (Pty) Ltd. Independent specialist environmental consultant

October 1997-November 2005: Bohlweki Environmental (Pty) Ltd: Senior Environmental Scientist; Environmental Management and Project Management

January to July 1997: Junior Science Teacher, Sutherland High School, Pretoria

PROJECT EXPERIENCE

Current projects include:

Electricity Sector Projects: Wind Energy

- Project manager for the proposed Klipheuwel/Dassiesfontein wind energy facility and associated infrastructure at a site within the Overberg area of the Western Cape (for BioTherm Energy)
- Project manager for the proposed Suurplaat wind energy facility and associated infrastructure at a site within the Western Cape (for Moyeng Energy)
- Project manager for the proposed West Coast One wind energy facility and associated infrastructure at a site within the Western Cape (for Moyeng Energy)
- Project manager for the proposed Rheboksfontein wind energy facility and associated infrastructure at a site within the Western Cape (for Moyeng Energy)
- Project manager for the proposed EXXARO West Coast wind energy facility and associated infrastructure at a site within the Western Cape (for EXXARO Resources)
- Project manager for the proposed Oyster Bay wind energy facility, Eastern Cape Province (for Renewable Energy Resources Southern Africa)
- Project manager for the proposed Spitskop Bay wind energy facility, Eastern Cape Province (for Renewable Energy Resources Southern Africa)
- EIA and EMP for the proposed wind energy facility and associated infrastructure at a site within the Western Cape (for Eskom Generation)
- EIA and EMP for the proposed wind energy facility and associated infrastructure at a site near Hopefield, Western Cape Province (for Umoya Energy)

Electricity Sector Projects: Solar Energy

- Project manager for the EIA and EMP for the proposed Waterberg PV plant, Limpopo Province (for Thupela Energy)
- Project manager for the EIA and EMP for the proposed Project Ilanga (125MW CSP facility) near Upington, Northern Cape Province (for Ilangethu Energy)
- Project manager for the EIA and EMP for PV sites within the Northern cape Province (for MedEnergy Global)
- Project manager for the Basic Assessment and EMP for PV sites within 4 ACSA airports within South Africa (for ACSA PV)
- Project manager for the Basic Assessment and EMP for a PV site near Rustenburg, North-West Province (for Momentous Energy)

Electricity Sector Projects: Eskom

- Project manager for the EIA and EMP for the proposed Mokopane Integration Project, Limpopo Province (for Eskom Transmission)
- Project manager for the proposed transmission lines from the Koeberg-2 Nuclear Power Station site, Western Cape Province (for Eskom Transmission)
- Project manager for the proposed Tshwane strengthening project, Phase 1, Gauteng Province (for Eskom Transmission)
- Project manager for the EIA and EMP for the proposed Kyalami Strengthening Project, Gauteng Province (for Eskom Transmission)
- Project manager for the EIA and EMP for the proposed Steelpoort Integration Project, Limpopo Province (for Eskom Transmission)
- Project manager for the EIA and EMP for the proposed conversion of the existing Open Cycle Gas Turbine (OCGT) Ankerlig Power Station (located in Atlantis Industria) to a Combined Cycle Gas Turbine (CCGT) power station, and the associated 400 kV transmission power line between Ankerlig Power Station and the Omega Substation (for Eskom Generation)
- Project manager for the EIA and EMP for the proposed conversion of the existing Open Cycle Gas Turbine (OCGT) Gourikwa Power Station (located near Mossel Bay) to a Combined Cycle Gas Turbine (CCGT) power station, and the associated 400 kV transmission power line between Gourikwa Power Station and the Proteus Substation (for Eskom Generation)
- Basic Assessment for proposed wind monitoring masts on a site north of Koekenaap, Western Cape Province (for EXXARO Resources)
- Basic Assessment for proposed wind monitoring masts on a site in the Overberg area, Western Cape Province (for BioTherm Energy)
- Basic Assessment for proposed wind monitoring masts on a site near Beaufort West, Western Cape Province (for Umoya Energy)
- Basic Assessment for proposed wind monitoring masts on a site near Laingsburg, Western Cape Province (for Umoya Energy)

Compliance Monitoring

- ECO compliance monitoring for the construction of the De Hoop Dam and the deviation of the R555, Limpopo Province
- Project manager – ECO compliance monitoring for the rehabilitation of Blaauwpan Dam, Gauteng Province
- Project manager – ECO compliance monitoring for the expansion of Waterval WCW, Gauteng Province
- Project manager - ECO compliance monitoring for the Mine Water Recovery Project at Duvha Power Station, Mpumalanga Province

Strategic and Regional Assessments

- Strategic Assessment for the location of wind energy facilities within the Western Cape Province (for Western Cape Department of Environmental Affairs and Development Planning)
- Regional Assessments for wind energy developments within identified areas in the Overberg Area of the Western Cape Province (for BioTherm Energy)
- Regional Assessment for wind energy developments within an identified area in the Sutherland Area of the Northern and Western Cape Province (for Investec Bank Limited)
- Regional Assessment for wind energy developments within an identified area on the West Coast of the Western Cape Province (for Investec Bank Limited)
- Regional Assessment for wind energy developments within an identified area on the West Coast of the Western Cape Province (for Eskom Holdings Limited)

Environmental Management Tools

- Review the effectiveness and efficiency of the environmental impact management (EIA) system in South Africa on behalf of the Department of Environmental Affairs and Tourism
- Development of a comprehensive site-specific EMP for the construction and operation of the Eskom Braamhoek Integration Project, Free State and KwaZulu-Natal Provinces
- Compilation of Provincial Guidelines for off-road routes within the Western Cape Province
- Water use permit applications for water use at Tiffindell Ski Resort, Eastern Cape Province
- Water use permit applications for various properties within the Olifants West Game Reserve, Limpopo Province
- Environmental Risk Analysis for Salbro Property Holdings, Gauteng Province
- Project integration and compilation of a Strategy for Sustainable Development for Gauteng Province
- Advice regarding environmental compliance of existing and future development at Tiffindell Ski, Eastern Cape Province
- Advice regarding environmental compliance at Salberg factory, Gauteng Province

Peer Review

- Review of EIAs submitted in terms of the ECA for the Northern Cape Department of Tourism, Environment and Conservation, including:
 - * EIA for a new wastewater treatment works in Warrenton
 - * EIA for chicken layer houses in Kimberley
 - * EIAs for the upgrading of petrol stations in Kimberley
 - * EIA for a new up-market residential development in Kathu
 - * EIA for residential development in Kimberley
- Review of EIA and EMP for the proposed Waterfall Wedge development, Gauteng Province

Infrastructure Projects

- Project manager for the EIA and EMP for the proposed bridge across the Ngotwane River located on the border of South Africa and Botswana

Mining Sector Projects

- Environmental Impact Assessment and Environmental Management Programme in terms of the MPRDA for the proposed Elitheni Coal Mine near Indwe, Eastern Cape Province
- Environmental Management Programmes for three borrow pits associated with the proposed Groot Letaba River Development Project, Limpopo Province

Water resources projects

- Project manager for the EIA and EMP for the proposed modification of the existing Hartebeestfontein Water Care Works, Gauteng Province (for ERWAT)
- Project manager for the EIA and EMP for the proposed expansion of the existing Welgedacht Water Care Works, Gauteng Province (for ERWAT)

Projects undertaken on behalf of Bohlweki Environmental include:

Specialist projects

- Development of an Environmental Policy for the Ekurhuleni Metropolitan Municipality
- Development of an Integrated Environmental Policy for the City of Tshwane Metropolitan Municipality Environmental Opportunities and Constraints Assessment for the Wonderboom Airport
- Review of the State of the Environment Report for the North West Province

Transport sector projects

- Environmental Impact Assessment and Environmental Management Plan for the proposed N2 Wild Coast Toll Road between East London (Eastern Cape) and Durban (KwaZulu-Natal)
- Environmental input to the Denneboom Local Integrated Transport Plan
- Environmental input to the Ekurhuleni transportation corridors study
- Environmental Impact Assessment for the proposed Platinum Highway from Warmbaths via Pretoria to Skilpadhek (on the South Africa-Botswana border), including obtaining all environmental permits required.
- Environmental Scoping Study and public participation process for the upgrading of Provincial Main Road 100 between the intersection with Main Road 521 and Ndwedwe
- Environmental Management Plan for repairs of portions of the N3 and N1, Gauteng
- Environmental Scoping Study and public participation process for the Kingsway Relief Road in Maseru, Lesotho

Electricity Sector projects

- Project manager for the undertaking of an EIA and compilation of an EMP for the proposed Open Cycle Gas Turbine (OCGT) Power Station and associated 400 kV Transmission lines and substation at Atlantis, Western Cape Province
- Environmental Scoping Study for a new coal-fired power station in the Lephalale area, Limpopo Province
- Project manager for the undertaking of Environmental Scoping Study and compilation of an Environmental Management Plan for various 132 kV Sub-Transmission lines and substations within the Mpumalanga Province
- Project manager for the undertaking of an EIA for the proposed 765 kV Transmission line between the existing Hydra Substation (near De Aar) and the proposed Gamma Substation (near Victoria West), Northern Cape Province
- Detailed Environmental Scoping Study and public participation for the proposed Capacity Increase Project at Arnot Power Station, Mpumalanga Province
- Project manager for the undertaking of an Environmental Scoping Study and EMP for the proposed 132 kV sub-Transmission line between the GaRankuwa and Dinaledi substations, North West Province

- EIA & public participation for the proposed new Ikaros Substation and associated 400 kV Transmission line infrastructure, North West Province
- Environmental Scoping Study public participation for the Establishment of Eskom Infrastructure for Power Supply to the C-Cut Development at Premier Mine, Cullinan, Gauteng Province
- EIA & public participation for the proposed 3rd 400 kV Transmission line between the Poseidon and Grassridge Substations in the Eastern Cape Province
- EIA & public participation for the proposed new 400 kV Transmission line between Matimba Substation (near Lephalale) and Witkop Substation (near Polokwane), Limpopo Province
- Environmental Impact Study and public participation for the proposed 2nd 400 kV Transmission line between the Grassridge Substation and the Poseidon Substation in the Eastern Cape.
- Public Participation Process for the proposed Return-to-Service of the Camden Power Station, Mpumalanga Province
- Detailed Environmental Scoping Study and public participation for the Breyten Strengthening Project: proposed new Breyten Substation and associated 88 kV Distribution line, Mpumalanga Province
- Environmental Pre-Scoping Study for the proposed Concentrating Solar Plant, in the Northern Cape Province
- Environmental Impact Assessment public participation for the proposed new nine 132 kV power lines between the Grassridge Substation and the Coega Industrial Development Zone, Eastern Cape Province

Pipelines

- Environmental Impact Assessment for the proposed Petronet New Multi-Products Pipeline (NMPP) between Durban and Gauteng Province
- Exemption application for the construction of a gas pipeline between Majuba Mine and Majuba Power Station, Mpumalanga Province.
- Exemption application for the construction of an emergency water supply pipeline from Mamelodi to Ekandustria via Cullinan, Gauteng Province.
- Environmental Scoping Study for the installation of a new water supply pipeline from Centurion to Diepsloot, Gauteng Province.

EIAs for Technology projects

- Environmental Impact Assessment for the proposed Alternative Fuels and Resources Project at Alpha's ULCO Plant near Kimberley in the Northern Cape Province
- Environmental Impact Assessment for the proposed Alternative Fuels and Resources Project at Dudfield Plant, North West Province
- Environmental Impact Assessment for the proposed Blending Platform to be established within the Gauteng Province
- Investigation of possible alternative Scrap tyre collection and disposal strategies in Gauteng, South Africa

Mining sector projects

- Environmental Management Programme Report (EMPR) for the proposed small-scale kaolin clay mine near Ndwedwe, KwaZulu-Natal Province
- Environmental Management Programme Report (EMPR) for prospecting activities within the Premier Mine Game Farm, Cullinan for De Beers Consolidated Mines Limited

- Environmental Management Plan for the Proposed C-Cut Development at Premier Mine, Cullinan
- Environmental Management Programme Report for the Proposed C-Cut Development at Premier Mine, Cullinan
- Environmental Impact Assessment and public participation process for the Proposed C-Cut Development at Premier Mine, Cullinan

Development projects

- A detailed Environmental Scoping Study and public participation process for the Thaba ya Batswana Development on portions of the Farm Rietvlei 101 IR, Gauteng
- Environmental Scoping Report and public participation process for the development of a Community Safety Centre in Khutsong-South, Carletonville

Water resources projects

- A detailed Environmental Impact Assessment of new regional water care infrastructure in the DD5A sub-drainage district in Eastern Gauteng (adjacent to the Blesbokspruit Ramsar Site) for the East Rand Water Care Company (ERWAT)

CURRICULUM VITAE

JOHN VON MAYER

Profession : Senior Environmental Consultant
Specialisation : Environmental Impact Assessment
Years experience : 7 years

KEY RESPONSIBILITIES

- Project management and compilation of EIAs and EMPs in application for Environmental
- Authorisations for large scale infrastructure - energy sector projects.
- Public participation processes and stakeholder consultation and mediation.
- Government authorities consultation.

SKILLS BASE AND CORE COMPETENCIES

- Environmental Authorisations and Licensing
- Environmental Monitoring and Auditing

EDUCATION AND PROFESSIONAL STATUS

Degrees:

- *BSc (Hons) degree in Geography and Environmental Science*

Courses:

- SAIGS Geological Core Logging and Soil Profiling Course
- "Standout, Speak Out and Win" public speaking seminar and course

Professional Society Affiliations:

- *The South African Council for Natural Scientific Professions: Professional Natural Scientist
Pr.Sci.Nat: Registration Number: 4/336/11*

EMPLOYMENT HISTORY

- December 2014 – current: Senior Environmental Consultant at Savannah Environmental
- June 2012 – December 2014: Senior Environmental Scientist at Mills and Otten Environmental
- June 2008 – June 2012: Environmental Consultant at Savannah Environmental

PROJECT EXPERIENCE

ENVIRONMENTAL IMPACT ASSESSMENTS

- Environmental Impact Assessment for the Hopefield Wind Energy Facility, Western Cape Province (Umoya Energy)
- Environmental Impact Assessment for a Wind Energy Facility near Cookhouse, Eastern Cape Province (African Clean Energy Developments)
- Environmental Impact Assessments for the Amakhala Emoyeni Wind Energy Facilities near Bedford, Eastern Cape Province (Windlab Systems)
- Environmental Impact Assessments and Environmental Management Plans for Wind Energy Facilities near Indwe and Sterkstroom, Eastern Cape Province (Rainmaker Energy Projects)
- Environmental Impact Assessment and Management Plan for Happy Valley Wind Energy Facility near Humansdorp, Eastern Cape Province (Renewable Energy Investments South Africa)
- Environmental Impact Assessment and Management Plan for 200km of Eskom Transmission Lines in Limpopo Province: Mokopane Integration Project (Eskom Transmission)

- Environmental Impact Assessment and Management Plan for Tsitsikamma Community Wind Energy Facility in the Eastern Cape Province (Exxaro Resources and Watt Energy)
- Environmental Impact Assessment and Management Plan for a Photo-Voltaic Solar Energy Facility near Vredendal in the Western Cape province (INCA Energy)
- Environmental Impact Assessment for Pofadder Renewable Energy Facility (Mainstream Renewable Power)
- Environmental Impact Assessment for Moorreesburg Wind Farm (INCA Energy)
- Environmental Impact Assessment for Castle Wind Farm near De Aar (juwi)
- Basic Assessments for power line projects throughout the Western, Eastern and Northern Cape provinces.

ENVIRONMENTAL COMPLIANCE AUDITING AND ECO

- Provision of Environmental Consulting Services for the Implementation and Compliance Monitoring of the Cookhouse Wind Energy Facility Environmental Authorisation And Environmental Management Plan (African Clean Energy Developments)
- Environmental Audits and Compliance Monitoring for Eskom Duvha Mine Water Recovery Project (Eskom).
- Environmental Post Construction Audits for Wind Monitoring Masts near Cookhouse and Oyster Bay (African Clean Energy Developments and Renewable Energy Systems)

WATER USE LICENCES / WASTE LICENSES

- Water Use Licences for access roads within Cookhouse Wind Energy Facility (African Clean Energy Developments)
- Various Waste License Applications for filling stations throughout Gauteng (Total SA)