

GENERAL WASTE DISPOSAL SITE AT ESKOM MAJUBA POWER STATION NEAR VOLKSRUST, MPUMALANGA PROVINCE

Environmental Impact Assessment Report

DFFE Reference No.: 14/12/16/3/3/3/403

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PROJECT DETAILS

DFFE Reference:	14/12/16/3/3/3/403
Title	: Environmental Impact Assessment Process: Environmental Impact Assessment Report for the General Waste Disposal Site at the Eskom Majuba Power Station near Volksrust, Mpumalanga Province
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PURPOSE OF THE SCOPING REPORT AND INVITATION TO COMMENT

Eskom Majuba Power Station is proposing the development of a new general waste disposal site adjacent to their existing, closed landfill site within the Majuba Power Station property boundary, located approximately 13km southwest of Amersfoort and 40km north-northwest of Volksrust, within jurisdiction of the Dr Pixley Ka Isaka Seme Local Municipality, which forms part of the Gert Sibande District Municipality in the Mpumalanga Province. Access to the site is possible via the N11, onto existing secondary roads that lead to the site.

In accordance with Regulation 12 of the EIA Regulations, 2014, as amended, Eskom had previously appointed BTW & Associates as the Independent Environmental Assessment Practitioner (EAP) to undertake the Scoping and Environmental Impact Assessment (EIA) process and prepare a Scoping and EIA Report in support of the proposed project.

The Scoping Report and Plan of Study for the Environmental Impact Assessment (EIA) prepared by BTW & Associates was submitted to the Department of Forestry, Fisheries on the Environment (DFFE) on 20 September 2019. The Scoping Report was accepted and the Plan of Study for the EIA approved by the DFFE on 04 November 2019. Since acceptance of the Scoping Report and approval of the Plan of Study for the EIA by the DFFE in 2019, an EIA Report, inclusive of specialist reports and an Environmental Management Programme (EMPr), has not been submitted to DFFE for their consideration and decision-making.

As it has been over two (2) years since the date of acceptance of the Scoping Report, and no EIA Report, inclusive of specialist studies and an EMPr has been submitted to the Department, the Scoping and EIA process for this project is being reinitiated and Eskom has now appointed Savannah Environmental (Pty) Ltd as the independent environmental consultant to undertake the S&EIA for the proposed project. The S&EIA process is being undertaken in accordance with the requirements of the 2014 EIA Regulations, as amended, promulgated in terms of the National Environmental Management Act (NEMA; Act No. 107 of 1998).

This EIA Report has been compiled in accordance with Appendix 3 of the EIA Regulations, 2014 (as amended) and consists of the following sections:

- » **Chapter 1** provides background to the proposed project and the S&EIA process.
- » **Chapter 2** provides a description of the general waste disposal site and associated infrastructure, including feasible alternatives identified and considered for the project.
- » **Chapter 3** outlines the strategic legal context for waste planning in South Africa and describes the need and desirability of the project within this context.
- » **Chapter 4** outlines the process which was followed during the Scoping Phase of the EIA Process.
- » **Chapter 5** describes the existing biophysical and socio-economic environment affected by the proposed project.
- » **Chapter 6** provides a description and assessment of the potential issues and impacts associated with the proposed project, including potential cumulative impacts.
- » **Chapter 7** provides the conclusions of the EIA Report.
- » **Chapter 8** provides a list of all references used in the compilation of the EIA Report.

The EIA Report was made available for a 30-day review and comment period from, **Friday, 01 July 2022 to Monday, 01 August 2022** on the Savannah Environmental website: <http://www.savannahsa.com/public-documents/waste/>. All comments received and recorded during the 30-day review and comment period have been included, considered, and addressed within this final EIA Report for the consideration of the DFFE. Changes made in this report have been underlined for ease of reference.

EXECUTIVE SUMMARY

Eskom Majuba Power Station is proposing the development of a new general waste disposal site adjacent to their existing, closed landfill site at the Majuba Power Station, located approximately 13km southwest of Amersfoort and 40km north-northwest of Volksrust, within jurisdiction of the Dr Pixley Ka Isaka Seme Local Municipality, which forms part of the Gert Sibande District Municipality in the Mpumalanga Province (refer to **Figure 1**). Access to the site is possible via the N11, onto existing secondary roads that lead to the site.

A project site, with an extent of ~866ha has been identified by Eskom as a technically feasible site for the development of a new general waste disposal site. A development footprint of ~6ha has been identified within the project site by the proponent for the development. The 6ha will accommodate the actual landfill, together with the associated infrastructure that will be required for the operation of the site.

Infrastructure associated with the new general waste disposal site will include the following:

- » Fencing with appropriate signage.
- » An adequate access road (gravel or surfaced).
- » An access control gate.
- » A guard house with an ablution facility.
- » A conservancy tank connected to the ablution facility.
- » Covered parking facilities.
- » A designated area for parking and servicing of plant and machinery.
- » Sorting and storage facilities for recyclables.
- » Adequate water and electricity connection from the existing rising mains.
- » Stormwater drainage network and a stormwater evaporation pond for the stormwater entering the site through the waste body.
- » A leachate management system and a leachate evaporation pond.

Two (2) alternative sites are being considered for establishment of the general waste disposal site, namely Alternative A, located on Portion 6 of the Farm Witkoppies 81HS and Alternative B, located on Portions 1 and 2 of the Farm Witkoppies 81HS. Both sites are contained within Eskom-owned land.

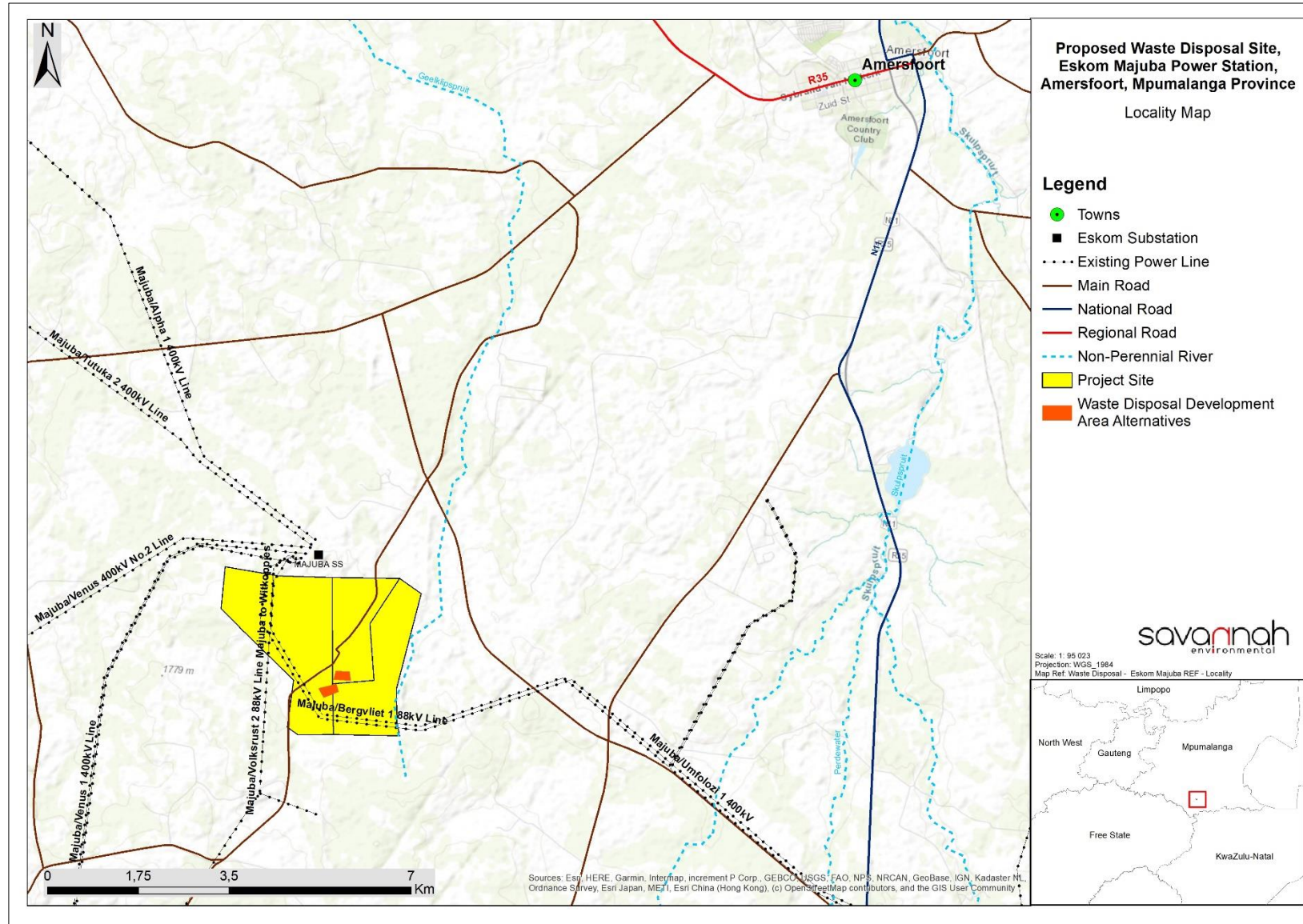


Figure 1: Locality map showing the area proposed for the establishment of the general waste disposal site.

1. Environmental Permitting Requirements

The general waste disposal site at the Eskom Majuba Power Station triggers the need for the following environmental permits:

- » An **Environmental Authorisation (EA)** from the National Department of Forestry, Fisheries and the Environment (DFFE), in consultation with the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs, in accordance with the requirements of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and Environmental Impact Assessment (EIA) Regulations (GNR 326), 2014, as amended.
- » A **Waste Management License (WML)** from the DFFE for the disposal of general waste, as well as the construction of infrastructure for this purpose, in accordance with the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM:WA), and the List of Waste Management Activities (GNR 921 of 29 November 2013).

Savannah Environmental has been appointed as the Independent Environmental Assessment Practitioner (EAP) in accordance with NEMA and Regulations 21 to 24 of the 2014 EIA Regulations (GNR 326) to undertake the required S&EIA in support of an integrated application for Environmental Authorisation (EA) and a Waste Management License (WML), and the public participation process for the project, in order to identify and assess all potential environmental impacts associated with the proposed general waste disposal site and recommend appropriate mitigation measures in an Environmental Management Programme (EMPr).

An EIA is an effective planning and decision-making tool for the project developer as it allows for the identification and management of potential environmental impacts. It provides the opportunity for the developer to be fore warned of potential environmental issues and allows for the resolution of issues reported on in the Scoping and EIA Reports as well as a dialogue with Interested and Affected Parties (I&APs). Comprehensive, independent environmental specialist studies are required in accordance with the EIA Regulations to provide the competent authority with sufficient information in order to make an informed decision. The EIA process being undertaken for the proposed general waste disposal site comprises two phases – i.e., Scoping and Impact Assessment – and involves the identification and assessment of environmental impacts through specialist studies, as well as public participation. The process followed in these two phases is as follows:

- » The **Scoping Phase** includes the identification and description of potential impacts associated with the proposed project through a desktop study and consultation with interested and affected parties and key stakeholders. This phase considers the broader project area in order to identify and delineate any environmental fatal flaws, no-go or sensitive areas, as well as project alternatives in order to determine which should be assessed in more detail in the EIA Phase. Following the public review period of the Scoping Report, this phase culminates in the submission of a final Scoping Report and Plan of Study for the EIA Phase to the competent authority for acceptance and approval to continue with the EIA Phase of the process. The Final Scoping Report and Plan of Study for the EIA Phase for the general waste disposal site was submitted to the DFFE on **11 January 2022**, and acceptance was received on **17 February 2022**, therefore marking the start of the EIA Phase. A request for an extension in terms of Regulation 3(7) of the EIA Regulations, 2014, as amended, was submitted to the DFFE on **10 March 2022**. Approval of the request for an extension was provided by the Department on **23 March 2022** wherein the prescribed timeframes for the project were extended by a period of 60 days such that the Final EIA

Report be submitted to the DFFE 166 days after the acceptance of Scoping was received by the applicant (i.e., on or before **08 August 2022**).

- » The **EIA Phase** involves a detailed assessment of potentially significant positive and negative impacts (direct, indirect, and cumulative) identified in the Scoping Phase. This phase considers a proposed development footprint and includes detailed specialist investigations (including field surveys), consideration of feasible alternatives and public consultation. Recommendations of practical and achievable mitigation and management measures are included in an Environmental Management Programme (EMPr) considering all phases of the project. Following the public review period of the EIA Report and EMPr, this phase culminates in the submission of a Final EIA Report and EMPr to the competent authority for review and decision-making.

2. Potential Impacts Identified

An Environmental Impact Assessment (EIA) was undertaken for the proposed project in accordance with the requirements of the EIA Regulations, 2014 (as amended). The EIA Report, together with the specialist studies contained within **Appendices D-K**, provide a detailed assessment of the potential impacts that may result from the development of the general waste disposal site.

No environmental fatal flaws were identified in the detailed specialist assessments conducted subject to implementation of the recommended mitigation measures. Implementation of the recommended mitigation measures would reduce impacts to acceptable levels. The potential environmental impacts associated with the general waste disposal site identified and assessed through the EIA process include:

- » Impacts on terrestrial biodiversity (including flora and fauna).
- » Impacts on delineated wetlands and aquatic biodiversity.
- » Impacts on groundwater resources.
- » Impacts on heritage resources.
- » Impacts on palaeontological heritage.
- » Impacts on air quality.

The environmental sensitivities identified by the relevant specialists for the development footprint alternatives are illustrated in **Figure 2**. The development footprint alternatives, as assessed, have been overlain with the relevant environmental sensitivities

2.1. Impacts on Terrestrial Biodiversity (including flora and fauna)

The project site within which the development footprint for the general waste disposal site and associated infrastructure will be located is mapped as falling within the Amersfoort Highveld Clay Grassland, which is considered Vulnerable, but is not listed as a Threatened Ecosystem according to Notice 1002 of Government Gazette 34809, 9 December 2011.

The DFFE Environmental Screening Tool indicates that the development footprint alternatives have a High Animal Theme, Medium Plant Theme and Very High Terrestrial Biodiversity Theme. The main drivers of these assessments are several potentially occurring threatened and near threatened (NT) plant and animal species as well as the area being assessed as a Critical Biodiversity Area (CBA_: Irreplaceable in the Mpumalanga Biodiversity Sector Plan (MBSP)). However, due to the high disturbance levels and degraded

habitats, very few threatened and NT plant and animal species are likely to occur. The macro-scale assessment of the conservation importance of natural vegetation in Mpumalanga does not allow for small discrepancies where vegetation is disturbed or degraded, such as is present within the development footprint alternatives. A re-assessment, using a finer scale, may well result in a revision of the CBA assessment. However, a greater portion of Alternative A falls outside this classification and within Heavily or Moderately Modified areas and is the more ecologically compromised site of the two.

Two vegetation communities were identified within the development footprint alternatives, namely Short Grassland, which dominates Alternative B, and Secondary Grassland, which dominates Alternative A. The Site Ecological Importance for Short Grassland is Medium, while that of Secondary Grassland is Low. Clearing for construction of the landfill will result in the destruction of 6ha of historically disturbed natural vegetation.

The proposed general waste disposal site will have impacts of medium to low significance on terrestrial biodiversity. All impacts can be reduced to low significance following the implementation of mitigation measures. Provided the recommendations suggested in the Terrestrial Biodiversity Impact Assessment are followed, and the developer complies with all relevant legislation pertaining to the development activities (such as the NEMA and National Environmental Management: Biodiversity Act (NEM:BA), there is no objection to the proposed development from an ecological perspective. Alternative A is preferred, while Alternative B is considered acceptable.

2.2. Impacts on Delineated Wetlands and Aquatic Biodiversity

Numerous hillslope seepage wetlands, which cover ~17% of the 500m study boundary, were identified, with areas of seasonal and permanent saturation. The closest seasonal wetlands are some 80m from the nearest proposed landfill, while the closest permanent wetland is some 320m from the nearest proposed landfill. A 30m buffer has been recommended around these wetland features. The aim of the buffer zone is to maintain the ecological integrity and functioning of the seepage wetlands by minimising indirect impacts that could be associated with the proposed landfill. There are no aquatic habitats within the two proposed footprint areas, so the proposed development will have no direct impacts on aquatic biodiversity.

The two proposed development options will have no direct impacts on aquatic ecosystems and as such, there was no justification for a management plan for alien invasive vegetation with respect to aquatic ecosystems. An alien invasive management plan is included in the Specialist Report on Terrestrial Biodiversity. There was also no justification for a wetland offset as the two proposed development options will have no direct impacts on aquatic ecosystems. Furthermore, potential indirect impacts can be managed, and the two proposed development options are unlikely to have measurable impacts on aquatic ecosystems.

The proposed general waste disposal site will have impacts of medium to low significance on freshwater resources. All impacts, with the exception of impacts on water quality due to seepage and stormwater runoff from the landfill, can be reduced to low significance following the implementation of mitigation measures. There is no preference in terms of alternatives considered. Authorisation of either of the two proposed waste disposal site alternatives in terms of risks to aquatic biodiversity is recommended.

2.3. Impacts on Groundwater Resources

The water quality of the nine (9) sampling points scattered around the site are, with the exception of one data point (i.e., BH2), currently indicative of an unpolluted water regime.

The landfill site is characterised by an aquifer of low significance and can only be used for monitoring purposes, confirming the fact that the site is not located in an area characterised by aquifers with a potentially strategic value. Furthermore, the surrounding area is seemingly devoid of groundwater boreholes and stock watering is not an issue as there is sufficient surface sources available.

The proposed general waste disposal site will have impacts of medium to low significance on groundwater resources. All impacts can be reduced to low significance following the implementation of mitigation measures. Alternative A is preferred while Alternative B is considered to be fatally flawed from a groundwater perspective; reason being Alternative B intersects the spring line and is partially stripped of cover soils required for interlayering and capping and as such, pollution of groundwater sources is highly probable over the long term on this site. Given the potential hydrogeological impacts, the development of Alternative A can only be viable if the mitigation measures are implemented and adhered to. Groundwater monitoring is imperative and necessary in order to detect groundwater contamination before impacting nearby receptors. From a groundwater perspective, it is the specialist's opinion that the project can be authorised for Alternative A, provided the recommended mitigation measures are implemented and adhered to.

2.4. Impacts on Heritage Resources

A field survey was conducted on 03 April 2018 according to generally accepted archaeological practices, and was aimed at locating possible sites, objects, and structures of archaeological significance within the project site and development footprint. The field survey identified no sites, features or objects of archaeological significance within the project site and development footprint alternatives dating to the Stone Age, Iron Age and Historic Period.

As no sites, features or objects of cultural historic significance have been identified in the project area, there would be no impact as a result of the proposed development regardless of the development footprint alternative selected. From a heritage point of view, it is recommended that the proposed project be allowed to continue on acceptance of the conditions proposed for inclusion in the project's EMPr.

2.5. Impacts on Palaeontological Heritage

The proposed development footprint alternatives are primarily underlain by Jurassic dolerite while surrounding areas are underlain by potentially fossiliferous sedimentary rocks of the Early Permian Volksrust Formation (Ecca Group, Karoo Supergroup). However, recent Shape files updates (Council for Geosciences, Pretoria) indicate that the proposed waste disposal site is entirely underlain by the Volksrust Formation (Ecca Group, Karoo Supergroup). According to the PalaeoMap on the South African Heritage Resources Information System (SAHRIS) database, the palaeontological sensitivity of Jurassic dolerite is zero as it is igneous in origin and does not contain fossils while that of the Volksrust Formation is High.

Numerous impact assessments of the area have been conducted over the years with several site investigations - no fossils heritage was uncovered on the Majuba footprint. Although fossil heritage in this area is uncommon, fossil finds would be significant if found.

The proposed general waste disposal site will have an impact of medium significance on fossil heritage which can be reduced to low significance following the implementation of mitigation measures. As the geology and palaeontology of the proposed development footprint alternatives is similar, there would be no preferences on the grounds of palaeontological fossil heritage for any specific alternative under

consideration. An overall low palaeontological sensitivity is allocated to the development footprint. It is therefore considered that the proposed development is deemed appropriate and will not lead to detrimental impacts on the palaeontological reserves of the area.

2.6. Impacts on Air Quality

The Air Quality Impact Assessment assessed baseline meteorological and ambient air quality data from the Eskom Majuba Air Quality Monitoring Station, located approximately 2.5km east-northeast of the proposed general waste disposal site for the period January 2016 to December 2019.

The operation of the waste disposal site will result in the emission of landfill gas. Landfill gas emissions from the general waste disposal site gradually increase to reach a maximum during the operation of the last cell, when the maximum amount of waste is in place, whereafter it gradually decreases after closure of the landfill. During operation of the last cell when emissions are at a maximum, an estimated 6 m³/hr of landfill gas will be generated.

Decomposition of the compacted waste continues after the landfill is closed and capped, but since no more waste is deposited, the decomposable material becomes gradually less and less, resulting in a gradual decrease in the amount of landfill gas generated. Therefore, the maximum landfill gas generation (and emission) rate occurs just as, or very soon after, the maximum amount of waste is in place.

While landfill gas generation gradually decreases as the decomposable material is depleted, the "tail" of the LFG generation is quite long, with landfill gas generation only nearing zero after about 100 years. This has been annotated in the graph below.

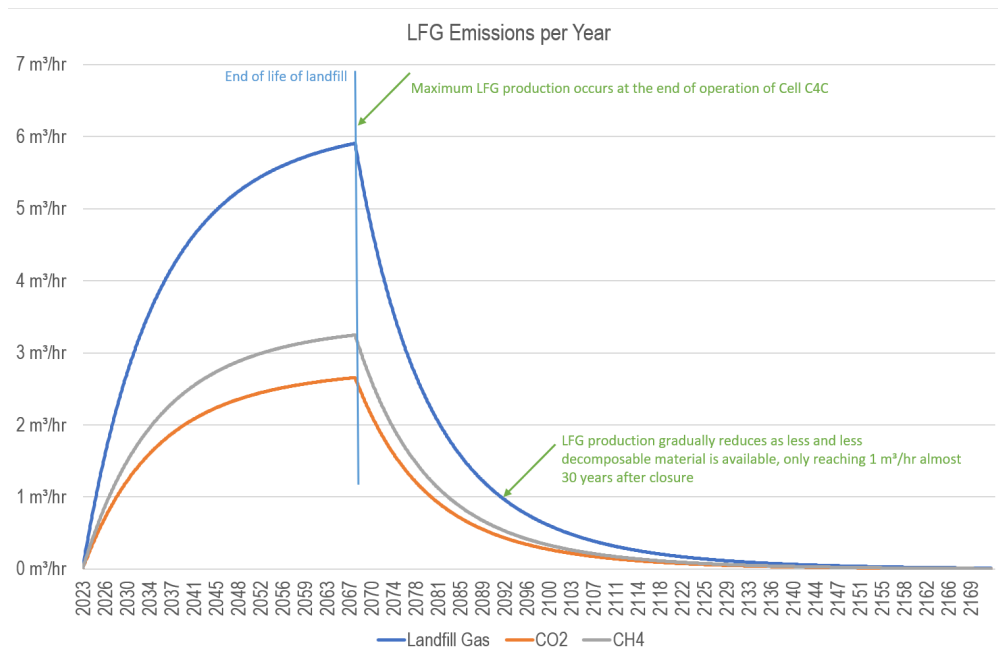


Figure 2: Estimated landfill gas emission rate

In terms of greenhouse gas emissions, over its lifetime, the general waste disposal site is estimated to result in a lifetime total of 2 030 tonnes of CO₂ and 740 tonnes of CH₄ emissions. Annual greenhouse gas emissions

are expected to reach a maximum during the operation of the last cell. The maximum annual greenhouse gas emissions were estimated at 42.7 tonnes of CO₂/annum and 15.6 tonnes of CH₄ per annum.

From an air quality perspective, there is no need to mitigate or measure post-closure methane emissions, as emissions and their resultant impacts will be insignificant (with the exception of greenhouse gas impacts, which could be more significant). The landfill designers will need to stipulate if there are any management / monitoring measures to prevent methane build-up which could lead to fires or explosions.

Simulated PM₁₀, PM_{2.5} and benzene concentrations are in compliance with the SA National Ambient Air Quality Standards (NAAQS) for all areas outside the landfill site, and negligible for all areas outside the property boundary and at all sensitive receptor locations. Simulated dust fallout rates due to the operation of the general waste disposal site are below the SA National Dust Control Regulation (NDCR) limits for all areas outside the landfill site, and negligible at all areas outside the property boundary, including at all sensitive receptor locations.

The combined hazard index for all non-carcinogenic pollutant emissions from the general waste disposal site is below 0.1 for all areas outside the landfill site for all pollutants considered. The simulated cancer risk for all areas outside the property boundary, including at all sensitive receptor location, is negligible (less than 1:1 000 000 000 or one in a billion increased risk). Simulated concentrations of all odorous compounds considered were below 10% of the odour detection threshold for all areas, including within the landfill site.

The proposed general waste disposal site has a simulated low impact on air quality, including health impacts, cancer risk and odour impacts at all areas outside the landfill site, with a negligible impact at all identified sensitive receptor locations. There is no preference in terms of alternative considered. From an air quality perspective, it is the opinion of the specialist that the project be authorised subject to implementation of the specified recommendations.

2.7. Assessment of Cumulative Impacts

Cumulative impacts are expected to occur with the development of the general waste disposal site during all phases of the project life cycle. The main aim for the assessment of cumulative impacts is to test and determine whether the development will be acceptable within the landscape proposed for the development, and whether the loss, from an environmental and social perspective, will be acceptable without whole-scale change.

The assessment of the cumulative impacts was undertaken through the consideration of impacts in isolation and compared to the cumulative impacts of the proposed general waste disposal site in combination with other similar land uses within the area. The significance of the cumulative impacts associated with the development of the landfill is expected to be low. There are no impacts or risks identified to be considered as unacceptable with the development of the general waste disposal site when considered together with other developments within the surrounding area. In addition, no impacts which will result in whole-scale change are expected.

The limited potential for cumulative impacts and risks makes the location of this project within the identified site a desirable location for the proposed project, provided that environmental impacts are mitigated to suitable standards as recommended within this EIA Report.

2.8. Comparative Assessment of the Development Footprint Alternatives

This assessment considered the development of a general waste disposal site at the Eskom Majuba Power Station. Two (2) alternative sites are being considered for establishment of the general waste disposal site, namely Alternative A, located on Portion 6 of the Farm Witkoppies 81HS and Alternative B, located on Portions 1 and 2 of the Farm Witkoppies 81HS.

From the specialist studies undertaken, the following conclusions were made regarding the development footprint alternatives:

Specialist Study	Alternative A	Alternative B
Terrestrial Biodiversity	Preferred	Acceptable
Aquatic Biodiversity	Acceptable	Acceptable
Geohydrology	Preferred	Fatally Flawed
Heritage	Acceptable	Acceptable
Palaeontology	Acceptable	Acceptable
Air Quality	Acceptable	Acceptable

From the above summary of the specialist findings, it was determined that Alternative A is the preferred option from a terrestrial biodiversity and groundwater perspective as it is dominated by Secondary Grassland, which is regarded to be of Low Site Ecological Importance, while Alternative B is dominated by Short Grassland, which is regarded to be of Medium Site Ecological Importance and also because the uppermost spring-line is some 9m below the crest of Alternative A and the 3m deep excavation for the landfill is sufficiently shallow to prevent interference with the phreatic line. Alternative A also has sufficient interlayer and capping material available on site and mitigation measures will reduce risk of contamination between low and medium for Alternative A.

Alternative B is considered acceptable from an aquatic biodiversity, heritage, palaeontology and air quality perspective and is fatally flawed from a groundwater perspective. Both alternatives are acceptable from an aquatic, heritage, palaeontology and air quality perspective. This is because Alternative B intersects the spring line and is partially stripped of cover soils required for interlayering and capping and as such, pollution of groundwater sources is highly probable over the long term on this site.

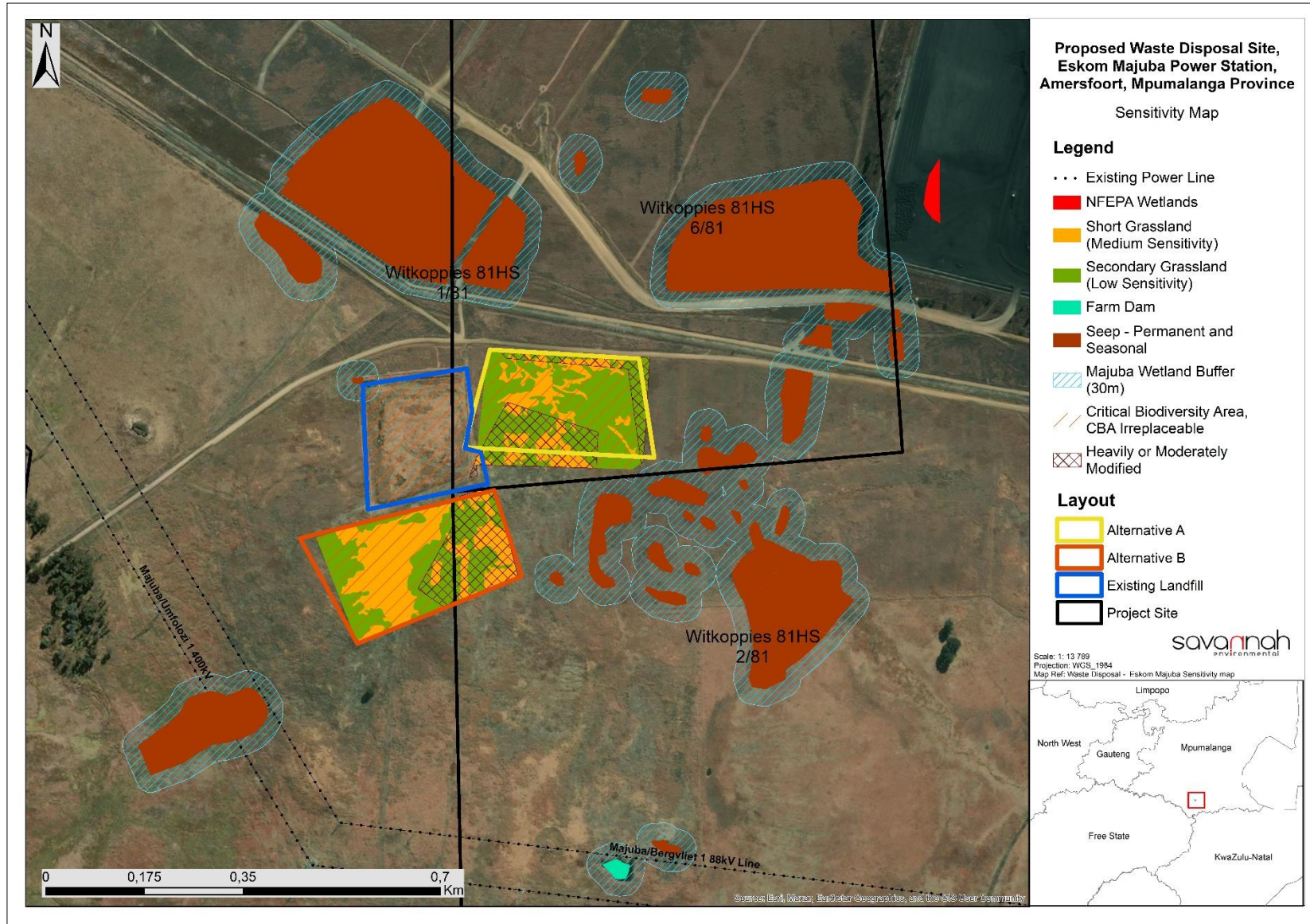
Considering the above findings, it can be concluded that Alternative A can be considered for implementation as it is not regarded as fatally flawed based on the specialist findings.

3. Environmental Sensitivity Mapping

The development footprint alternatives are located within two untransformed vegetation communities, namely, *Aristida congesta* – *Heteropogon contortus* Short Grassland and *Hyparrhenia hirta* Secondary Grassland. The Site Ecological Importance for Short Grassland is Medium, while that of Secondary Grassland is Low. Sensitive features in the form of permanent and seasonal wetlands were identified within the 500m regulated area of the development footprint alternatives. None of these wetlands encroach into the development footprint alternatives (refer to **Figure 3**). The closest seasonal wetlands are some 80m from the nearest proposed landfill, while the closest permanent wetland is some 320m from the nearest proposed landfill. A 30m buffer no-go has been recommended around these wetland features. The aim of the buffer zone is to maintain the ecological integrity and functioning of the seepage wetlands by minimising indirect

impacts that could be associated with the proposed landfill. Both alternatives are located outside of this buffer.

Alternative A is situated within an area classified as Heavily or Moderately Modified and a CBA: Irreplaceable by the MBSP. Alternative B is mostly situated within an area classified as CBA: Irreplaceable by the MBSP, with the eastern section of the site being situated within an area classified as Heavily or Moderately Modified. There are no sites, features or objects of archaeological significance within the project site and development footprint alternatives dating to the Stone Age, Iron Age and Historic Period. The palaeontological sensitivity of the project site ranges from insignificant to high.



4. Overall Conclusion (Impact Statement)

The construction and operation of the general waste disposal site on a site located approximately 13km southwest of Amersfoort and 40km north-northwest of Volksrust, within jurisdiction of the Dr Pixley Ka Isaka Seme Local Municipality, which forms part of the Gert Sibande District Municipality in the Mpumalanga Province is proposed by Eskom Majuba Power Station.

Two (2) alternative sites are being considered for establishment of the general waste disposal site, namely Alternative A, located on Portion 6 of the Farm Witkoppies 81HS and Alternative B, located on Portions 1 and 2 of the Farm Witkoppies 81HS. The development footprint alternatives were assessed as part of the EIA process by independent specialists, and their findings have informed the results of this EIA Report.

Through a review of relevant policy and planning documentation, it was concluded that the proposed project is aligned with the local and provincial developmental policies and spatial frameworks.

The developer has proposed a technically viable and suitable layout for the project and associated infrastructure. The specialist findings have indicated that there are no identified environmental fatal flaws associated with the development of the general waste disposal site at either site considered. Sensitive features in the form of permanent and seasonal wetlands were identified within the 500m regulated area of the development footprint alternatives; however, none of these wetlands encroach into the development footprint alternatives. A 30m no-go buffer has been recommended around these wetland features to maintain the ecological integrity and functioning of the seepage wetlands by minimising indirect impacts that could be associated with the proposed landfill. Both alternatives are located outside of this buffer.

From the results of the specialist studies undertaken, it can be concluded that all impacts associated with the project can be mitigated to acceptable levels through implementation of the recommended mitigation measures. The layout map (including all associated infrastructure) provided in this EIA Report (**Figure 4**) is considered to be the preferred layout of the general waste disposal site for implementation.

Through the assessment of the development of the general waste disposal site within the development footprint alternatives, it can be concluded that the development of the waste disposal site is environmentally acceptable subject to the implementation of the recommended mitigation measures.

Based on the comparative assessment undertaken, it was determined that Alternative A is the preferred option from a terrestrial biodiversity and groundwater perspective as it is dominated by Secondary Grassland, which is regarded to be of Low Site Ecological Importance, while Alternative B is dominated by Short Grassland, which is regarded to be of Medium Site Ecological Importance and also because the uppermost spring-line is some 9m below the crest of Alternative A and the 3m deep excavation for the landfill is sufficiently shallow to prevent interference with the phreatic line. Alternative A also has sufficient interlayer and capping material available on site and mitigation measures will reduce risk of contamination between low and medium for Alternative A.

Alternative B is considered acceptable from an aquatic biodiversity, heritage, palaeontology and air quality perspective and is fatally flawed from a groundwater perspective. Both alternatives are acceptable from an aquatic, heritage, palaeontology and air quality perspective. This is because Alternative B intersects the spring line and is partially stripped of cover soils required for interlayering and capping and as such, pollution of groundwater sources is highly probable over the long term on this site.

Considering the above findings, it can be concluded that Alternative A can be considered for implementation as it is not regarded as fatally flawed based on the specialist findings.

5. Overall Recommendation

Considering the findings of the independent specialist studies, the impacts identified, and the development footprint alternatives proposed, it is the reasoned opinion of the EAP that the development of the general waste disposal site is acceptable within the landscape and can reasonably be authorised for Alternative A (**Figure 4**). The recommended validity period of the integrated EA is 10 years.

The authorisation should include the approval of the layout reflected in **Figure 4**, and described in the engineering design report (refer to **Appendix K**) which includes the following main infrastructure:

- » Fencing with appropriate signage.
- » An adequate access road (gravel or surfaced).
- » An access control gate.
- » A guard house with an ablution facility.
- » A conservancy tank connected to the ablution facility.
- » Covered parking facilities.
- » A designated area for parking and servicing of plant and machinery.
- » Sorting and storage facilities for recyclables.
- » Adequate water and electricity connection from the existing rising mains.
- » Stormwater drainage network and a stormwater evaporation pond for the stormwater entering the site through the waste body.
- » A leachate management system and a leachate evaporation pond.

The key conditions listed in Chapter 7 would be required to be included within an authorisation issued for the proposed general waste disposal site.

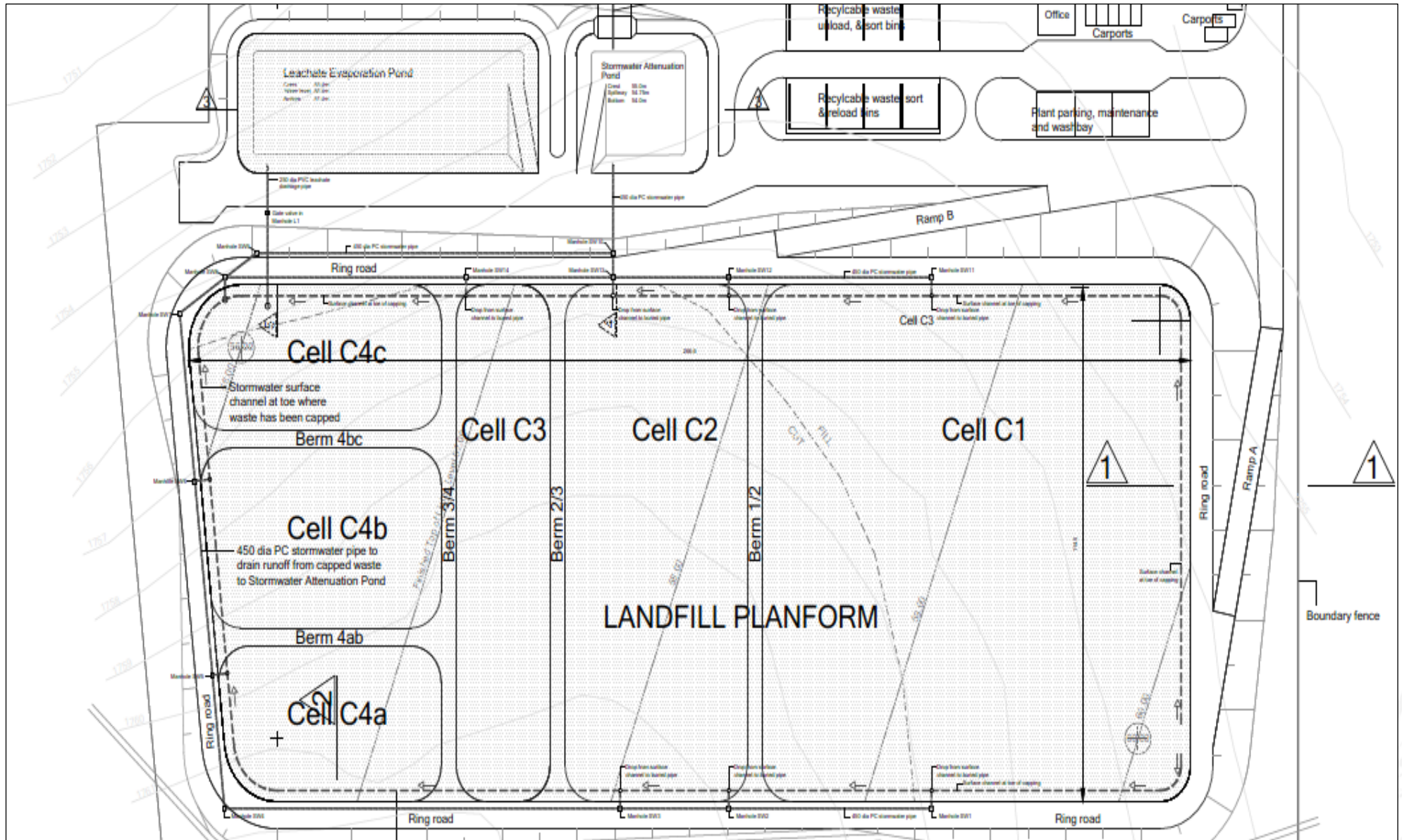


Figure 4: Preliminary general layout for the proposed new general waste disposal site

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CHAPTER 1: INTRODUCTION

Eskom Majuba Power Station is proposing the development of a new general waste disposal site adjacent to their existing, closed landfill site at the Majuba Power Station, located approximately 13km southwest of Amersfoort and 40km north-northwest of Volksrust, within jurisdiction of the Dr Pixley Ka Isaka Seme Local Municipality, which forms part of the Gert Sibande District Municipality in the Mpumalanga Province (refer to **Figure 1.1**). Access to the site is possible via the N11, onto existing secondary roads that lead to the site.

1.1. Requirement for an Environmental Impact Assessment Process

The general waste disposal site at the Eskom Majuba Power Station triggers the need for the following environmental permits:

- » An **Environmental Authorisation (EA)** from the National Department of Forestry, Fisheries and the Environment (DFFE), in consultation with the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs, in accordance with the requirements of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and Environmental Impact Assessment (EIA) Regulations (GNR 326), 2014, as amended.
- » A **Waste Management License (WML)** from the DFFE for the disposal of general waste, as well as the construction of infrastructure for this purpose, in accordance with the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM:WA), and the List of Waste Management Activities (GNR 921 of 29 November 2013).

In terms of Section 24C (2) of the NEMA and Section 43(1) of the NEM:WA, the Minister, i.e., the DFFE, is the competent authority and/or the licensing authority where a waste management activity is undertaken by an organ of state.

1.2. Legal Requirements as per the EIA Regulations for the undertaking of an Environmental Impact Assessment Report, 2014 (as amended)

This EIA Report has been prepared in accordance with the requirements of the EIA Regulations published on 08 December 2014 (and amended on 07 April 2017) promulgated in terms of Chapter 5 of the National Environmental Management Act, 1998 (Act No. 107 of 1998). This chapter of the EIA Report includes the following information required in terms of Appendix 3: Scope of Assessment and Content of Environmental Impact Assessment Reports:

Requirement	Relevant Section
3(1)(a) the details of (i) the EAP who prepared the report and (ii) the expertise of the EAP to carry out scoping procedures; including a curriculum vitae.	The details of the EAP and the expertise of the EAP have been included in section 1.5 . The Curriculum vitae of the Savannah Environmental team have been included as Appendix A .
3(1)(b) the location of the development footprint of the activity on the approved site as contemplated in the accepted scoping report, including (i) the 21-digit Surveyor General code of each cadastral land parcel;	The location of the project site proposed for the development of the general waste disposal site is included as Figure 1.1 . The details of the affected

Requirement	Relevant Section
(ii) where available, the physical address and farm name; and (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties.	properties including the property names and numbers, as well as the SG-codes are included in Table 1.1 .
3(1)(c) a plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is (i) a linear activity, a description, and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken.	The locality of the project site is illustrated on a locality map included as Figure 1.1 . The centre and corner point co-ordinates of the project site are included in Table 1.1 .

This EIA Report consists of eight chapters, as follows:

- » **Chapter 1** provides background to the proposed project and the S&EIA process.
- » **Chapter 2** provides a description of the general waste disposal site and associated infrastructure, including feasible alternatives identified and considered for the project.
- » **Chapter 3** outlines the strategic legal context for waste planning in South Africa and describes the need and desirability of the project within this context.
- » **Chapter 4** outlines the process which was followed during the Scoping Phase of the EIA Process.
- » **Chapter 5** describes the existing biophysical and socio-economic environment affected by the proposed project.
- » **Chapter 6** provides a description and assessment of the potential issues and impacts associated with the proposed project, including potential cumulative impacts.
- » **Chapter 7** provides the conclusions of the EIA Report.
- » **Chapter 8** provides a list of all references used in the compilation of the EIA Report.

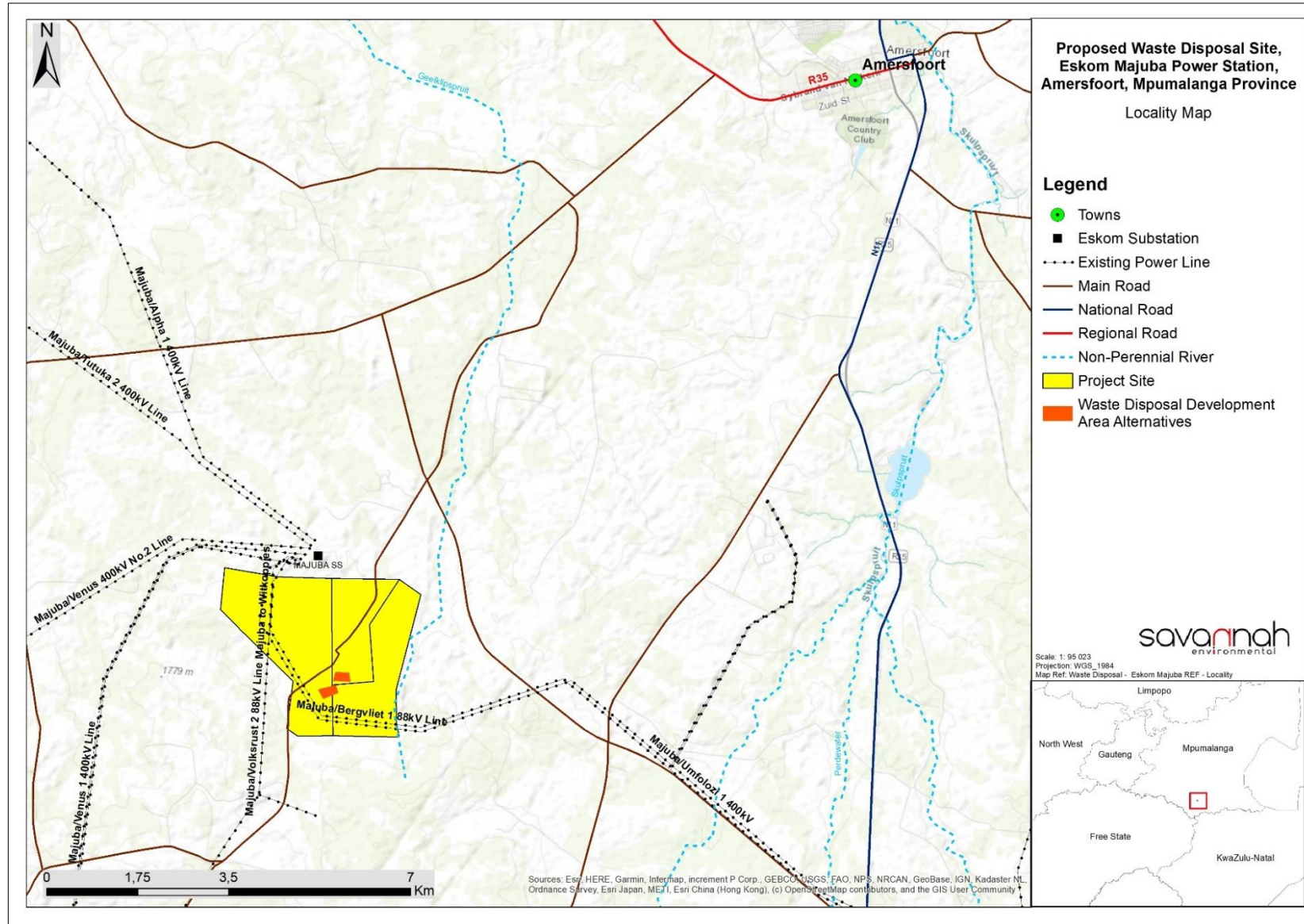


Figure 1.1: Locality map showing the area proposed for the establishment of the general waste disposal site.

1.3. Project Overview

A project site, with an extent of ~866ha has been identified by Eskom Majuba Power Station as a technically feasible site for the development of a new general waste disposal site adjacent to their existing, closed landfill site. A development footprint of ~6ha has been identified within the project site by the proponent for the development. The 6ha will accommodate the actual landfill, together with the associated infrastructure that will be required for the operation of the site. Two (2) alternative sites are being considered for establishment of the general waste disposal site, namely Alternative A, located on Portion 6 of the Farm Witkoppies 81HS and Alternative B, located on Portions 1 and 2 of the Farm Witkoppies 81HS (refer to **Figure 1.2**). Both sites are contained within Eskom-owned land.

Table 1.1 provides a summary of the properties associated with the proposed project. A comprehensive description of the key infrastructure components associated with the development of the general waste disposal site, as well as an overview of the alternatives assessed for the project is provided in **Chapter 2** of this EIA Report.

Table 1.1: Detailed description of the project site for the general waste disposal site

Province	Mpumalanga Province
District Municipality	Gert Sibande District Municipality
Local Municipality	Dr Pixley Ka Isaka Seme Local Municipality
Ward Number (s)	Ward 6
Nearest town(s)	Amersfoort (~13km south-west) and Volksrust (~40km north-northwest)
Affected Properties: Farm name(s), number(s) and portion numbers	Alternative A: Portion 6 of the Farm Witkoppies 81HS Alternative B: Portions 1 and 2 of the Farm Witkoppies 81HS
SG 21 Digit Code (s)	<ul style="list-style-type: none"> » Portion 1 of the Farm Witkoppies 81HS: TOHS0000000008100001 » Portion 2 of the Farm Witkoppies 81HS: TOHS0000000008100002 » Portion 6 of the Farm Witkoppies 81HS: TOHS0000000008100006
Current zoning	Industrial
Site Coordinates (centre of project site)	27°06'52.8"; S 29°46'20.7"E
Site Coordinates (corner points of project site)	Corner 1: 27° 6'4.34"S; 29°45'1.74"E Corner 2: 27° 6'7.62"S; 29°45'39.16"E Corner 3: 27° 6'4.05"S; 29°47'2.89"E Corner 4: 27° 6'12.40"S; 29°47'18.43"E Corner 5: 27° 7'12.12"S; 29°47'5.90"E Corner 6: 27° 7'32.55"S; 29°47'7.74"E Corner 7: 27° 7'41.35"S; 29°47'10.41"E Corner 8: 27° 7'45.04"S; 29°46'0.07"E Corner 9: 27° 7'40.92"S; 29°45'52.30"E Corner 10: 27° 7'11.47"S; 29°45'54.33"E Corner 11: 27° 6'30.29"S; 29°45'0.79"E
Alternative A Coordinates	Corner 1: 27° 7'3.96"S; 29°46'22.15"E Corner 2: 27° 7'3.85"S; 29°46'32.05"E Corner 3: 27° 7'10.55"S; 29°46'32.09"E Corner 4: 27° 7'10.52"S; 29°46'21.93"E
Alternative B Coordinates	Corner 1: 27° 7'16.70"S; 29°46'12.22"E Corner 2: 27° 7'12.67"S; 29°46'24.12"E Corner 3: 27° 7'18.92"S; 29°46'25.99"E Corner 4: 27° 7'23.99"S; 29°46'15.59"E

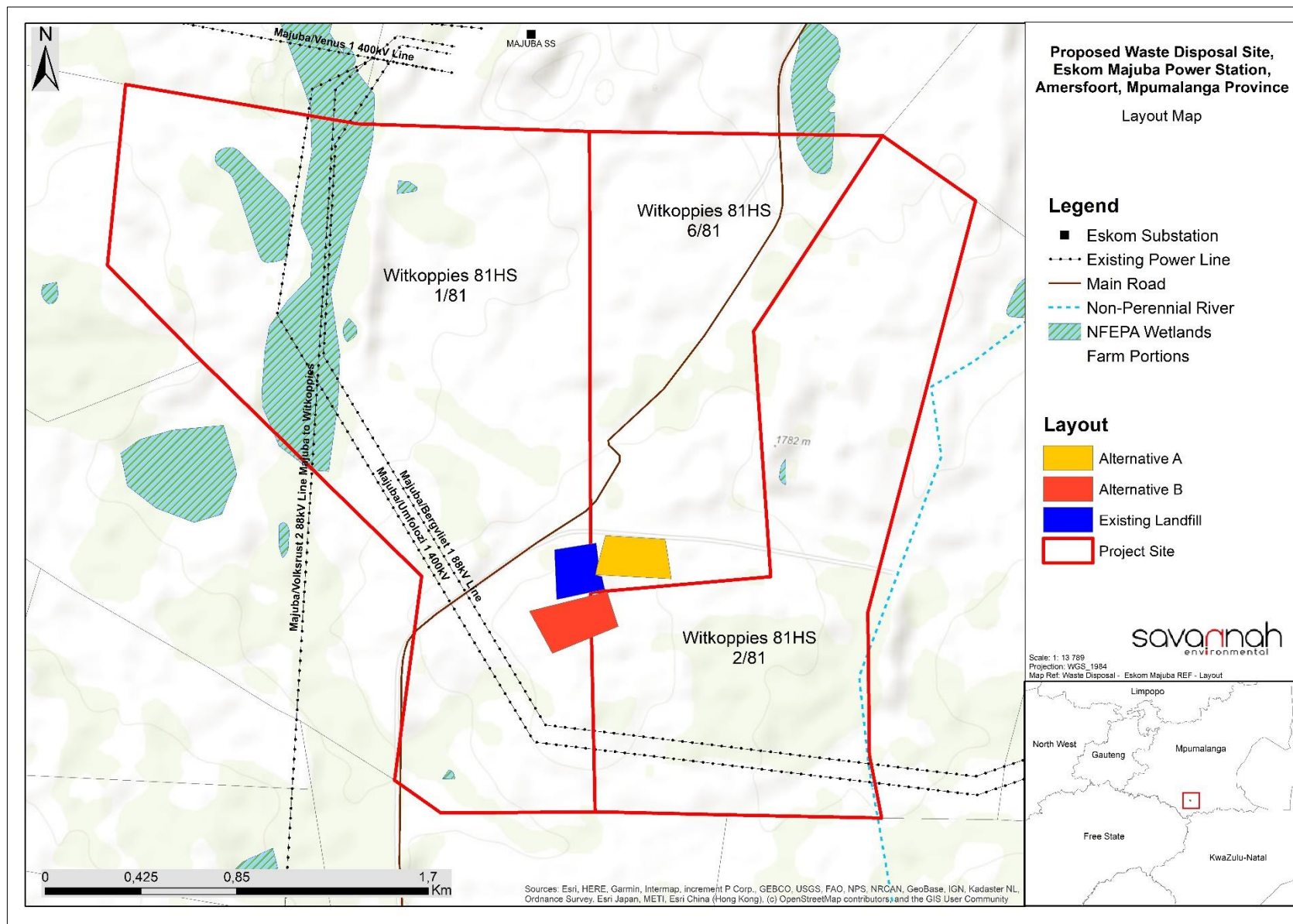


Figure 1.2: Existing, closed landfill site with the alternatives of the proposed new general waste disposal site.

1.4. Overview of the Scoping and Environmental Impact Assessment (S&EIA) Process

An EIA is an effective planning and decision-making tool for the project developer as it allows for the identification and management of potential environmental impacts. It provides the opportunity for the developer to be fore warned of potential environmental issues and allows for the resolution of issues reported on in the Scoping and EIA Reports as well as a dialogue with Interested and Affected Parties (I&APs). Comprehensive, independent environmental specialist studies are required in accordance with the EIA Regulations to provide the competent authority with sufficient information in order to make an informed decision. The EIA process being undertaken for the proposed general waste disposal site comprises two phases – i.e., Scoping and Impact Assessment – and involves the identification and assessment of environmental impacts through specialist studies, as well as public participation. The process followed in these two phases is as follows:

- » The **Scoping Phase** includes the identification and description of potential impacts associated with the proposed project through a desktop study and consultation with interested and affected parties and key stakeholders. This phase considers the broader project area in order to identify and delineate any environmental fatal flaws, no-go or sensitive areas, as well as project alternatives in order to determine which should be assessed in more detail in the EIA Phase. Following the public review period of the Scoping Report, this phase culminates in the submission of a final Scoping Report and Plan of Study for the EIA Phase to the competent authority for acceptance and approval to continue with the EIA Phase of the process. The Final Scoping Report and Plan of Study for the EIA Phase for the general waste disposal site was submitted to the DFFE on **11 January 2022**, and acceptance was received on **17 February 2022**, therefore marking the start of the EIA Phase. A request for an extension in terms of Regulation 3(7) of the EIA Regulations, 2014, as amended, was submitted to the DFFE on **10 March 2022**. Approval of the request for an extension was provided by the Department on **23 March 2022** wherein the prescribed timeframes for the project were extended by a period of 60 days such that the Final EIA Report be submitted to the DFFE 166 days after the acceptance of Scoping was received by the applicant (i.e., on or before **08 August 2022**).
- » The **EIA Phase** involves a detailed assessment of potentially significant positive and negative impacts (direct, indirect, and cumulative) identified in the Scoping Phase. This phase considers a proposed development footprint and includes detailed specialist investigations (including field surveys), consideration of feasible alternatives and public consultation. Recommendations of practical and achievable mitigation and management measures are included in an Environmental Management Programme (EMPr) considering all phases of the project. Following the public review period of the EIA Report and EMPr, this phase culminates in the submission of a Final EIA Report and EMPr to the competent authority for review and decision-making.

1.5. Details of the Environmental Assessment Practitioner and Expertise to conduct the S&EIA Process

In accordance with Regulation 12 of the EIA Regulations, 2014, as amended, Eskom had previously appointed BTW & Associates as the Independent Environmental Assessment Practitioner (EAP) to undertake the S&EIA process and prepare a Scoping and EIA Report in support of the proposed project.

The Scoping Report and Plan of Study for the Environmental Impact Assessment (EIA) prepared by BTW & Associates was submitted to the DFFE on **20 September 2019**. The Scoping Report was accepted and the Plan of Study for the EIA Phase approved by the DFFE on **04 November 2019**. Since acceptance of the

Scoping Report and approval of the Plan of Study for the EIA Phase by the DFFE in 2019, an EIA Report, inclusive of specialist reports and an EMPr, has not been submitted to DFFE for their consideration and decision-making.

As it has been over two (2) years since the date of acceptance of the Scoping Report, and no EIA Report, inclusive of specialist studies and an EMPr has been submitted to the Department, the S&EIA process for this project is being reinitiated and Eskom has now appointed Savannah Environmental (Pty) Ltd (Savannah Environmental) as the independent environmental consultant to undertake the S&EIA process for the general waste disposal site at the Eskom Majuba Power Station and its associated infrastructure. Neither Savannah Environmental nor any of its specialists are subsidiaries of/or are affiliated to Eskom. Furthermore, Savannah Environmental does not have any interests in secondary developments that may arise out of the authorisation of the proposed project.

Savannah Environmental is a leading provider of integrated environmental and social consulting, advisory and management services with considerable experience in the fields of environmental assessment and management. The company is wholly woman-owned (51% black woman-owned) and is rated as a Level 2 Broad-Based Black Economic Empowerment (B-BBEE) Contributor. The company was established in 2006 with a clear objective to provide services to the infrastructure development sector. Savannah Environmental benefits from the pooled resources, diverse skills and experience in the environmental field held by its team that has been actively involved in undertaking environmental studies for a wide variety of infrastructure development projects throughout South Africa and neighbouring countries. Strong competencies have been developed in project management of environmental processes, as well as strategic environmental assessment and compliance advice, and the assessment of environmental impacts, the identification of environmental management solutions and mitigation/risk minimising measures.

The Savannah Environmental team has considerable experience in environmental impact assessments and environmental management and has been actively involved in undertaking environmental studies for a wide variety of projects throughout South Africa.

The Savannah Environmental team comprises:

- » **Mmakoena Mmola**, the principal author of this EIA Report, holds a B.Sc. Honours in Geochemistry from the University of the Witwatersrand and 4 years of experience in the environmental management field. Her key focus is on undertaking environmental impact assessments, environmental permitting and authorisations, compliance auditing, public participation, and environmental management programmes. She is registered as a Professional Natural Scientist with the South African Council for Natural Scientific Professions (SACNASP), Registration Number: 126748 and an Environmental Assessment Practitioner with the Environmental Assessment Practitioners Association of South Africa, Number 2019/260.
- » **Jo-Anne Thomas**, the principal EAP on this project, is a registered EAP with the Environmental Assessment Practitioners Association of South Africa (EAPASA – 2019/726) and a Registered Natural Scientist with SACNASP (Registration number: 400024/00). She holds an M.Sc. in Botany from the University of the Witwatersrand. She provides technical input for projects in the environmental management field, specialising in Strategic Environmental Advice, Environmental Impact Assessment studies, environmental auditing and monitoring, environmental permitting, public participation,

Environmental Management Plans and Programmes, environmental policy, strategy and guideline formulation, and integrated environmental management. Her key focus is 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 (including client and authority liaison and management of specialist teams); 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.

- » **Nondumiso Bulunga** is a Social, GIS and Stakeholder Engagement Specialist at Savannah Environmental. Nondumiso has eight (8) years working experience in project management and facilitation in various industries such as environmental services field including but not limited to recycling, industrial, energy, mining, and agriculture. Working for small and large organisations, Nondumiso has gained exposure in research, collection of data, critical analysis, GIS, and environmental solutions. Nondumiso has worked on projects in South Africa and Malawi. Nondumiso is very well versed in the IFC Environmental and Social Performance Standards (including IFC PS 2012) and the associated Equator Principles, which have informed the approach and standard for projects regarding ESIA. Nondumiso is skilled at organising and driving effective project teams at a scale relevant to the project's requirements. She has technical experience and can quickly identify the most pertinent issues of a particular project whilst focussing on driving project success by rigorously implementing project management tools.

In order to adequately identify and assess potential environmental impacts associated with the proposed project, the following specialist sub-consultants have provided input into this EIA Report:

Specialist	Area of Expertise
Duncan McKenzie of Digital Earth (Pty) Ltd	Terrestrial Ecology (including flora and fauna)
Robert Palmer of Nepid Consultants CC	Wetlands
JA van Schalkwyk	Heritage (including archaeology)
Elize Butler of Banzai Environmental	Palaeontology
Nick Grobler of Airshed Planning Consultants	Air Quality
Paul Hansmeyer of Engeolab (Pty) Ltd	Geohydrology and Geotechnical
Clive Wilson of WSM Group	Engineering Design

Curricula Vitae (CVs) detailing Savannah Environmental team's expertise and relevant experience are provided in **Appendix A**.

CVs detailing the independent specialist consultants, including details of their expertise and relevant experience are provided in the respective specialist reports attached as **Appendices D - K** to this EIA Report.

CHAPTER 2: PROJECT DESCRIPTION

This chapter provides an overview of the project and alternatives proposed by Eskom Majuba Power Station. It should be noted that the project description presented in this chapter is subject to change to some extent based on the final design prior to implementation and other technical studies, the findings and recommendations of the EIA and supporting specialist studies; as well as licencing, permitting and legislative requirements.

2.1. Legal Requirements as per the EIA Regulations for the undertaking of an Environmental Impact Assessment Report, 2014 (as amended)

This chapter of the EIA Report includes the following information required in terms of Appendix 3: Scoping of Assessment and Content of Environmental Impact Assessment Reports:

Requirement	Relevant Section
3(1)(d) a description of the scope of the proposed activity including, (ii) a description of the associated structures and infrastructure related to the development.	A description of the activities to be undertaken with the development of the proposed project is included in section 2.2 to 2.6.
3(1)(g) a motivation for the preferred development footprint within the approved site as contemplated in the accepted scoping report.	The alternatives considered for the project are included in section 2.7.
3(1)(h) a full description of the process followed to reach the proposed development footprint within the approved site as contemplated in the accepted scoping report, including (i) details of the development footprint alternatives considered; (ix) is no alternative development footprints for the activity were investigated, the motivation for not considering such.	

2.2. Description of the Proposed Project

Eskom Majuba Power Station is proposing the development of a new general waste disposal site on the Farm Witkoppies 81HS, located approximately 13km southwest of Amersfoort and 40km north-northwest of Volksrust in the Dr Pixley Ka Isaka Seme Local Municipality, which forms part of the Gert Sibande District Municipality, in the Mpumalanga Province. The new general waste disposal site will be constructed adjacent to the existing, closed landfill site at the Eskom Majuba Power Station. Access to the site is possible via the N11, onto existing secondary roads that lead to the site.

A project site, with an extent of ~866ha has been identified by Eskom as a technically feasible site for the development of a new general waste disposal site. A development footprint of ~6ha has been identified within the project site by the proponent for the development. The 6ha will accommodate the actual landfill, together with the associated infrastructure that will be required for the operation of the site.

Infrastructure associated with the new general waste disposal site will include the following:

- » Fencing with appropriate signage.
- » An adequate access road (gravel or surfaced).
- » An access control gate.
- » A guard house with an ablution facility.
- » A conservancy tank connected to the ablution facility.
- » Covered parking facilities.
- » A designated area for parking and servicing of plant and machinery.
- » Sorting and storage facilities for recyclables.
- » Adequate water and electricity connection from the existing rising mains.
- » Stormwater drainage network and a stormwater evaporation pond for the stormwater entering the site through the waste body.
- » A leachate management system and a leachate evaporation pond.

A summary of the details and dimension of the planned infrastructure associated with the proposed general waste disposal site is provided in **Table 2.1**.

Table 0.1: Details or infrastructures proposed as part of the general waste disposal site

Infrastructure	Footprint and dimensions
<u>Capacity of landfill (all cells)</u>	<u>250 000m³</u> <u>Footprint: 30 525.7m² or 3ha</u>
<u>Leachate evaporation pond</u>	<u>Capacity: 100m³</u> <u>Footprint: 2 480m² or 0.248ha</u> <u>The leachate evaporation pond will be lined with a 200-micron HDPE liner and will be linked to the cells via a 250-diameter polyvinyl chloride (PVC) leachate drainage pipe.</u>
<u>Stormwater evaporation pond</u>	<u>Footprint: 1 085m² or 0.1085ha</u> <u>The stormwater evaporation pond will be lined with a 200-micron HDPE liner and will be linked to the cells via a 750-diameter polycarbonate (PC) stormwater pipe. Stormwater from the stormwater evaporation pond will be drained out via a 450-diameter stormwater outlet pipe.</u>
<u>Fencing</u>	<u>Up to 3m high</u>
<u>Roads</u>	<ul style="list-style-type: none"> » <u>The site can be accessed via an existing gravel road. The access road will be resurfaced (either gravel or surfaced) depending on the cost.</u> » <u>A 6m ring road is proposed around and general about 1.5m above the sloping landfill platform.</u>
<u>Other infrastructure (guardhouse; parking facility; plant parking, maintenance and wash bay; sorting and storage facilities for recyclables)</u>	<u>Footprint: ~2.5ha</u>

Two (2) alternative sites are being considered for establishment of the general waste disposal site, namely Alternative A, located on Portion 6 of the Farm Witkoppies 81HS and Alternative B, located on Portions 1 and 2 of the Farm Witkoppies 81HS (refer to **Figure 2.1**). Both sites are contained within Eskom-owned land. No other feasible alternatives were identified for the location of the waste disposal site.



Figure 2.1: Existing landfill site with the alternatives of the proposed new general waste disposal site.


2.3. Waste Streams Generated at the Majuba Power Station

The quantity of general waste generated at the Majuba Power Station is approximately 980 tons per annum. The proposed new general waste disposal site will have an expected lifespan of 45 years, similar to the productive life cycle of the power station.

Waste types generated at the Majuba Power Station to be disposed of at the new general waste disposal site are listed in **Table 2.1** below.

Table 2.1: Waste types generated at the Majuba Power Station to be disposed of at the new general waste disposal site

Hazardous waste	Non-hazardous waste	Total waste handled (tons per day)
<p>Most hazardous waste produced at the Majuba Power Station is removed by a registered waste carrier to appropriate landfill sites. No hazardous waste will be disposed of at the new general waste disposal site.</p>	<p>Organics</p> <ul style="list-style-type: none"> » Food waste » Garden waste <p>Paper</p> <ul style="list-style-type: none"> » Newspaper » Cardboard <p>Plastic</p> <ul style="list-style-type: none"> » PET bottles/containers » HDPE bottles/containers 	<ul style="list-style-type: none"> » The initial rate of disposal is estimated at 980 tons/year or 2.68 tons per day, not taking into account future, more progressive recycling initiatives. » Currently, there are approximately twenty (20) small recycling stations strategically positioned around the Majuba Power station, indicating the applicant's commitment to

Hazardous waste	Non-hazardous waste	Total waste handled (tons per day)
	<ul style="list-style-type: none"> » Film and bags » Expanded polystyrene » Other rigid plastic » Packaging <p><u>Glass</u></p> <ul style="list-style-type: none"> » Clear and coloured » Plate glass <p><u>Metal</u></p> <ul style="list-style-type: none"> » Aluminium beverage cans <p><u>Wood waste</u></p> <ul style="list-style-type: none"> » Pallets and other <p><u>Construction, Demolition and Land Clearing Waste</u></p> <ul style="list-style-type: none"> » Concrete » Solis, rocks, sand, etc. <p><u>Residue</u></p> <ul style="list-style-type: none"> » Dust » Fines and sorting residues <p><u>Tyres and other rubber waste</u></p> <p><u>Other not identified here</u></p>	<p>recycling. An example is shown below.</p>  <p>Figure 2.2: Recycling station at the Eskom Majuba Power Station</p> <ul style="list-style-type: none"> » Based on preliminary estimations, it is envisaged that up to 45% of the total waste may be recycled if dedicated resources are available, i.e., paper, plastic, glass, metal, and tyres. » A further 27% of the waste which consists of organic waste may be suitable for composting. <p>As there are no actual records of the various individual waste fractions, the above data is an estimation and can only be confirmed once the site is operational and adequate records are available. As a precaution, the landfill site is planned for the maximum capacity.</p> <p>Provision has been made in the planning for the sorting and collection of recyclable waste.</p>

2.4. Recovery, Reuse, Recycling, Treatment and Disposal Quantities

Table 2.2 below indicates the general waste types generated at the Majuba Power Station to be disposed of at the new general waste disposal site, as well as the quantities expected to be disposed of and salvaged annually. The individual hazardous waste quantities produced at the power station are not included in this table as no hazardous waste will be disposed of at the new general waste disposal site. The total waste generated at the power station as detailed in **Table 2.2** below does however consider both general and hazardous waste.

Table 2.2: General waste types and quantities expected to be disposed of and salvaged annually at the new general waste disposal site

	MAIN SOURCE (NAME OF COMPANY)	WASTE QUANTITIES		ON-SITE RECOVERY, REUSE RECYCLING TREATMENT OR DISPOSAL	OFFSITE RECOVERY, REUSE RECYCLING TREATMENT OR DISPOSAL	OFF-SITE DISPOSAL
		TONS/MONTH	m ³ /MONTH	Method and location	Method, location and contractor details	
1. ORGANICS						
Food waste	Majuba Power Station	16.40	19.2	Separation for potential composting at the Facility	None	None
Garden waste		6.15	96.1			
Percentage		27%	11.25%			
2. PAPER						
Newspaper	Majuba Power Station	8.20	34.6	Collection and sorting for recycling	Removal by contractor for recycling	None
Cardboard		6.15	205.0			
Percentage		17.67%	23.39%			
3. PLASTIC						
PET bottles/containers	Majuba Power Station	2.05	97.6	Collection and sorting for recycling	Removal by contractor for recycling	None
HDPE bottles/containers		2.05	146.4			
Film and bags		0.41	29.3			
Expanded polystyrene		2.05	157.7			
Other rigid plastic packaging		4.10	136.7			
Percentage		13.13%	55.42%			
4. GLASS						
Clear and coloured	Majuba Power Station	1.48	4.15	Collection and sorting for recycling	Removal by contractor for recycling	None
Plate glass		0.16	0.28			
Percentage		2%	0.43%			
5. METAL						
Aluminium beverage cans	Majuba Power Station	1.64	30.4	Collection and sorting for recycling	Removal by contractor for recycling	None
Percentage		2%	2.96%			
6. WOOD WASTE						
Pallets and other	Majuba Power Station	5.74	29.3	Disposal/Landfilling	None	None
Percentage		7%	2.86%			
7. CONSTRUCTION, DEMOLITION AND LAND CLEARING WASTE						
Concrete	Majuba Power Station	4.10	2.56	Disposal/Landfilling	None	None
Solids, rocks & sand, etc.		12.30	9.43			
Percentage		20%	1.17%			
8. RESIDUE						
Dust	Majuba Power Station	0.41	0.69	Disposal/Landfilling	None	None
Fines and Sorting		0.41	0.26			

	MAIN SOURCE (NAME OF COMPANY)	WASTE QUANTITIES		ON-SITE RECOVERY, REUSE RECYCLING TREATMENT OR DISPOSAL	OFFSITE RECOVERY, REUSE RECYCLING TREATMENT OR DISPOSAL	OFF-SITE DISPOSAL
		TONS/MONTH	m ³ /MONTH	Method and location	Method, location and contractor details	
Residues						
Percentage		1%	0.09%			
9. TYRES AND OTHER RUBBER						
Tyres and other rubber	Majuba Power Station	0.82	3.63	Collection and sorting for recycling	Removal by contractor for recycling	None
Percentage		1%	0.35%			
10. OTHER NOT IDENTIFIED						
Other not identified here	Majuba Power Station	1.64	-	Disposal/Landfilling	None	None
Percentage		2%	-			
Totals waste generated at the Power Station (general and hazardous waste total)		81.26 t/month	1 024.3 m³/month			
Total Percentage Recyclable		15.13%	78.81%			
Total Percentage to be Taken to Landfill Site		56%	15.37%			

2.5. Waste Minimisation Strategy

Waste minimisation, or source reduction, refers to the collective strategies of design and fabrication of products or services that minimise the amount of generated waste and/or reduce the toxicity of the resultant waste.

The quantity of general waste generated at the Majuba Power Station is approximately 980 tons per annum. Although Majuba Power Station embraces all aspects of the waste management hierarchy as required by the National Waste Management Strategy, a bigger percentage of waste produced must be disposed of at a landfill i.e., approximately 54% (food residues and building rubble) of the waste generated at the power station. Other waste such as paper, e-waste, garden waste, cans, plastics and cardboard is reused or recycled as much as possible.

Majuba currently has twenty (20) separation of waste from source stations (recycling stations to be renamed sorting and separation stations) strategically positioned around the power station. The concept design of the proposed general waste site makes provision for a waste separation facility where these activities will be concentrated prior to landfilling of the remaining waste.

2.6. Classification of the Facility in terms of Barrier Design and Chemical Characteristics of the Waste

While landfill classification was previously based on the type of waste, the size of the waste stream and potential for leachate generation (climate, etc), the new landfill classification method focusses on barrier design and the chemical characteristics of waste. According to the National Norms and Standards for

Disposal of Waste to Landfill (GN. R 636 of 2013) promulgated in terms of the NEM:WA, landfill sites can be classified into four categories based on the type of containment barrier, namely:

- » **Class A Landfill** – a landfill with a Class A containment barrier can accept Type 1 (high risk) waste and certain hazardous waste;
- » **Class B Landfill** – a landfill with a Class B containment barrier can accept Type 2 (moderate risk) waste;
- » **Class C Landfill** – a landfill with a Class C containment barrier can accept Type 3 (low risk) waste, can accept certain general wastes. Type 3 waste can also be disposed of at landfill sites with Class A and B containment barriers; and
- » **Class D Landfill** – a landfill with a Class D containment barrier can accept Type 4 (inert) waste as well as certain general wastes.

Since the proposed general waste disposal site will predominantly be accepting Type 2 waste, which is classified as moderate risk waste and therefore requires stricter liner requirements than Type 3 and 4 waste, the facility can be classified as a Class B Landfill in accordance with the National Norms and Standards for Disposal of Waste to Landfill (GG3678. GN R.636 of 23 August 2013).

2.7. Preliminary Plan and Design for the New General Waste Disposal Site

A preliminary plan and design for the new general waste disposal site has been prepared in accordance with the Norms and Standards for Disposal of Waste to Landfill (GG3678. GN R.636 of 23 August 2013) and the Minimum Requirements for Waste Disposal by Landfill (DWAf, 1998 2nd Edition) (refer to **Figure 2.2**). As per the preliminary plan and design (**Figure 2.2**), the new general waste disposal site will comprise four (4) cells, namely, Cell C1, Cell C2, Cell C3, and Cell C4, with Cell C4 further divided into three sub-cells, namely Cell C4a, Cell C4b and Cell C4c. Cells C1 to C4 will have a combined estimated capacity of 250 000m³ and will be landfilled in sequence and separated from unfilled areas by temporary internal berms that will be removed for reuse of the soil fill as landfilling is extended to cover the locations of the temporary internal berms.

The cells will be linked to a leachate evaporation pond via a 250-diameter polyvinyl chloride (PVC) leachate drainage pipe which will be utilised for the storage of leachate. The gate valve along this pipe will only be opened to allow the release of leachate into the leachate evaporation pond once waste placement has commenced in Cell C4c. The valve might also be temporarily opened at earlier stages if necessary to allow excess leachate on the Landfilling Platform to drain to the leachate evaporation pond to take advantage of its additional evaporation area to avoid the necessity to tanker leachate off site. The leachate collection pond will have a capacity of approximately 100m³ and will be lined with a 200-micron HDPE liner. The leachate pond will have adequate freeboard (to be determined based on the 1:100-year flood event rainfall figure) to ensure that it does not overflow during high rainfall events. A borehole will be established downslope of the leachate pond for groundwater contamination monitoring purposes. The leachate evaporation pond will have no outlet and therefore, leachate will be disposed of therefrom by evaporation or tankered off site.

The cells will also be linked to a stormwater attenuation pond via a 750-diameter polycarbonate (PC) stormwater pipe, the purpose of which will be to slow the flow of water to prevent downstream flooding and erosion. Potentially contaminated stormwater runoff from uncapped portions of the waste body and the ring road will be retained on the Landfill Platform to evaporate as for leachate. Concentrated, uncontaminated runoff from capped portion of the waste will drain into the stormwater attenuation pond during and shortly after rain and thereafter through the outlet or over the emergency spillway to the

adjacent existing road drain. In the absence of rainfall, the stormwater attenuation pond will remain empty. The rate of discharge will be limited by the relatively small diameter (450mm) of the outlet pipe from the pond, plus by temporary storage of excess volume therein. As with the leachate pond, the stormwater attenuation pond will be lined with a 200-micron HDPE liner.

Since the proposed general waste disposal site has been preliminarily classified as a G:C:B+ landfill in accordance with Minimum Requirements for Waste Disposal by Landfill (DWAF, 1998 2nd Edition) and a Class B Landfill in accordance with the National Norms and Standards for Disposal of Waste to Landfill (GG3678, GN R.636 of 23 August 2013), the facility will require stricter lining criteria. **Figure 2.3** below indicates the containment barrier engineering design requirements for a Class B Landfill. This liner requirement will be used in the design due to the proximity of the site to sensitive environmental features such as wetlands as per the fatal flaw analysis conducted for both Alternatives A and B (refer to **Tables 2.4 and 2.5**). Procurement of sufficient volumes of readily accessible clay that exhibits the necessary grading and low permeability properties required for the Compacted Clay Layer specified in **Figure 2.3** may be difficult or impractical close to the site. Geosynthetic Clay Liner¹ is consequently proposed as a permissible alternative. The necessary, impervious containment barrier will be placed over the entire Landfilling Platform at the outset before any waste placement commences.

Leachate that potentially leaks (if any) through the containment barrier will drain within the under-drainage layer down to the inlets of pipes under the low points of each cell and become evident where it discharges through the various leak detection walls.

Landfilling is proposed to be carried out in six (6) phases so as to provide, during each phase:

- » 6m wide ramps up the side of the waste body in Cells C1 and C2 that are not steeper than 1:6 to allow delivery of waste to the envisaged top thereof, which requires that Cells C1 and C2 cover the full width of the Landfilling Platform.
- » Sufficiently wide surface areas for storage and effective evaporation of leachate on the lower, eastern part of the Landfilling Platform, such that the area of exposed uncapped waste is never more than 1.45x such available evaporation area.
- » Adequate storage volume, also on the lower portion of the Landfilling Platform, to accommodate excess leachate during periods of greater rainfall and/or reduced evaporation.

It will be necessary after completion of Phase 4 to place an intermediate capping over the partial waste filling over Cells C3 and Cell C4a before proceeding to place waste over Cell C4b. Similarly, it will be necessary to subsequently place such intermediate capping over the partially filled Cell C4b before waste is placed in Cell C4c while leachate is released to and evaporated from the leachate evaporation pond. Requirements for either intermediate and/or final capping over the waste body are not stipulated in the National Norms and Standards for Disposal of Waste to Landfill published in 2013. Reference may however be made to the earlier Minimum Requirements for Waste Disposal by Landfill published in 2005, which recommend **Figure 2.4** below as appropriate final capping for G:S:B+ or G:C:B+ landfills, as it is taken to be applicable to the proposed new general waste disposal site.

The respective purposes of the layers stipulated in **Figure 2.4** are:

¹ Geosynthetic Clay Liner comprises a thin layer (a few millimetres thick) of dehydrated bentonite clay in powder form sandwiched between 2 sheets of synthetic, polyethylene geotextile, needle-punched to bind the opposing sheets together. Such Geosynthetic Clay Liner is rendered watertight when the bentonite clay becomes hydrated by contact with water.

- » Topsoil – growth of vegetation
- » Compacted clay layer – to limit infiltration and the consequent generation of leachate.
- » Geotextile – to avoid internal erosion of the capping soil down into the waste.

Procurement of sufficient volumes of readily accessible clay that exhibits the necessary grading and low permeability properties required for the Compacted Clay Layer specified in **Figure 2.4** may again be difficult or impractical close to the site. Geosynthetic Clay Liner is again consequently proposed as a permissible alternative as it can substitute for both the clay layer and the geotextiles as it can serve both purposes.

The general waste disposal site will also have recyclable waste unload and sort bins, recyclable waste sort and reload bins, an office, guardhouse, carports and a plant parking, maintenance and wash bay (refer to **Figure 2.2**).

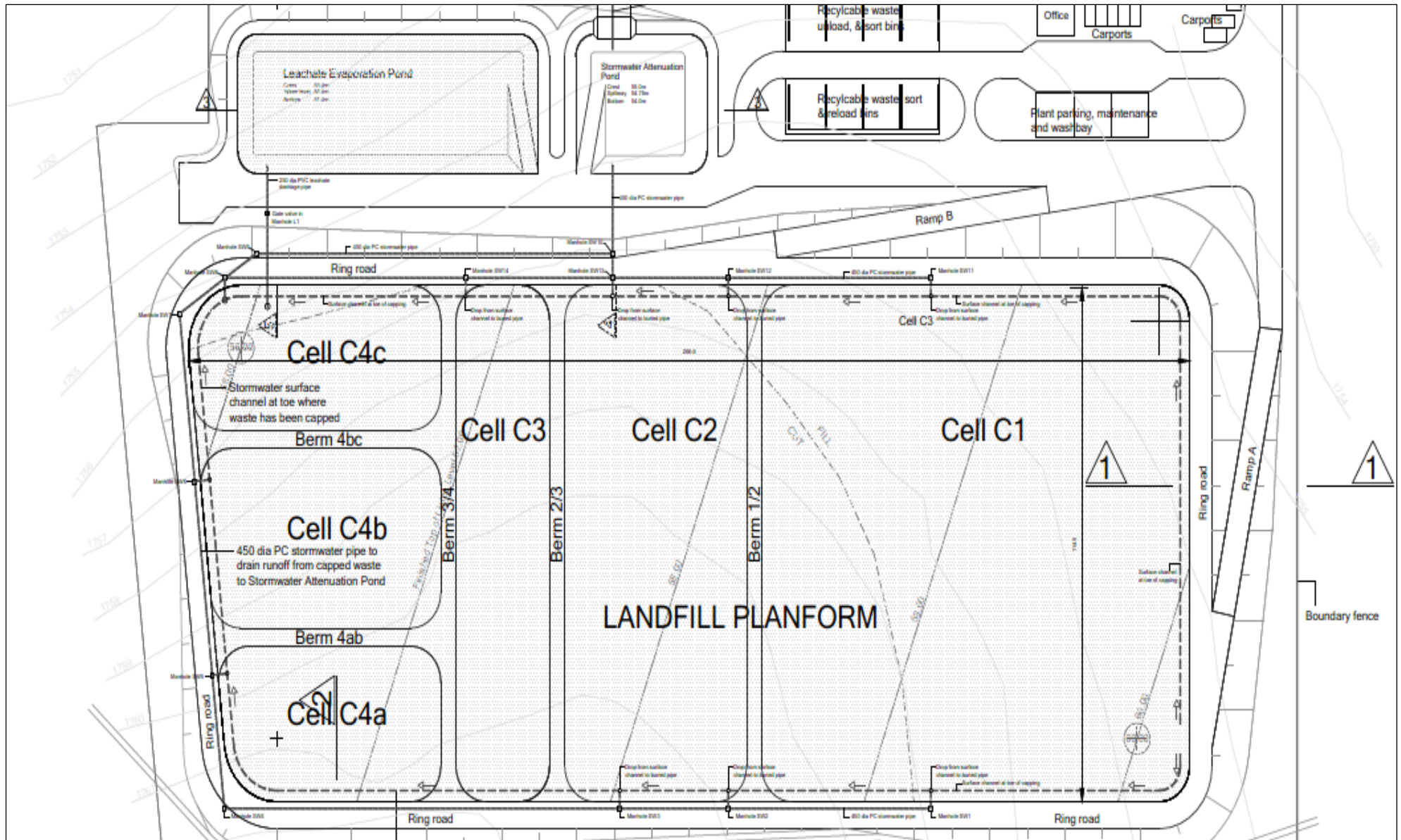


Figure 2.2: Preliminary general layout for the proposed new general waste disposal site

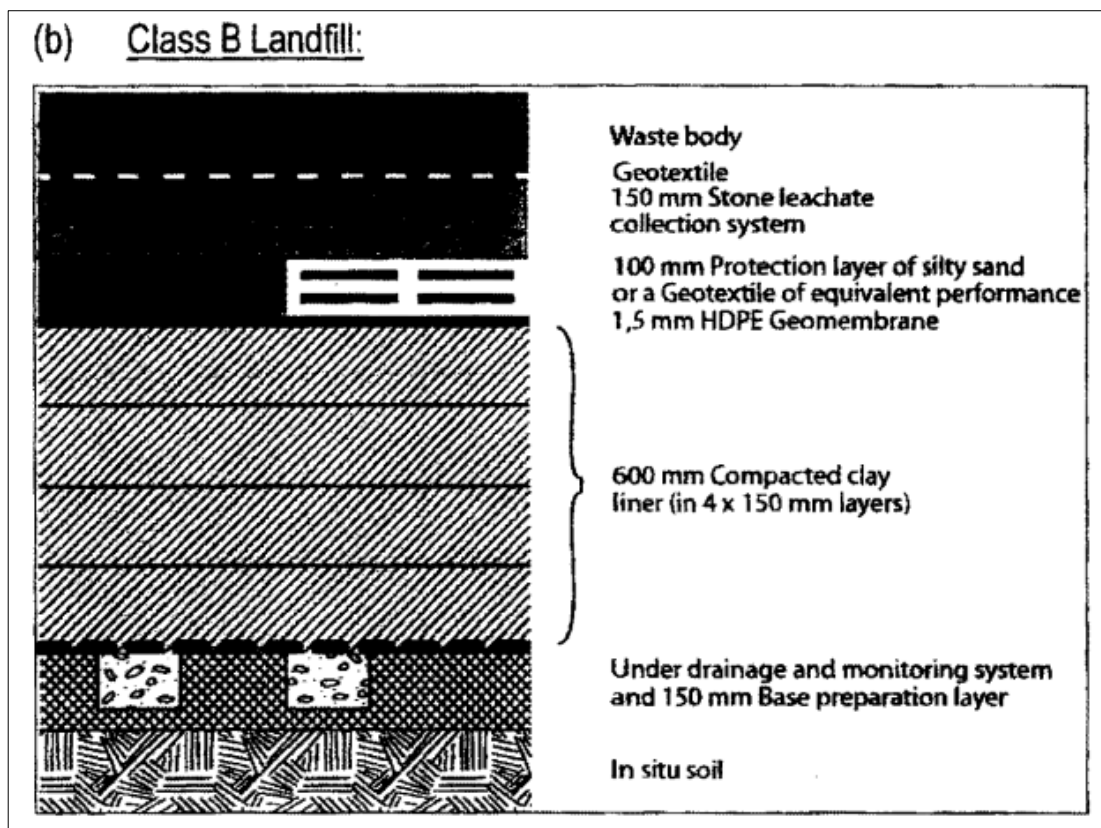


Figure 2.3: Liner requirements for a Class B Landfill site

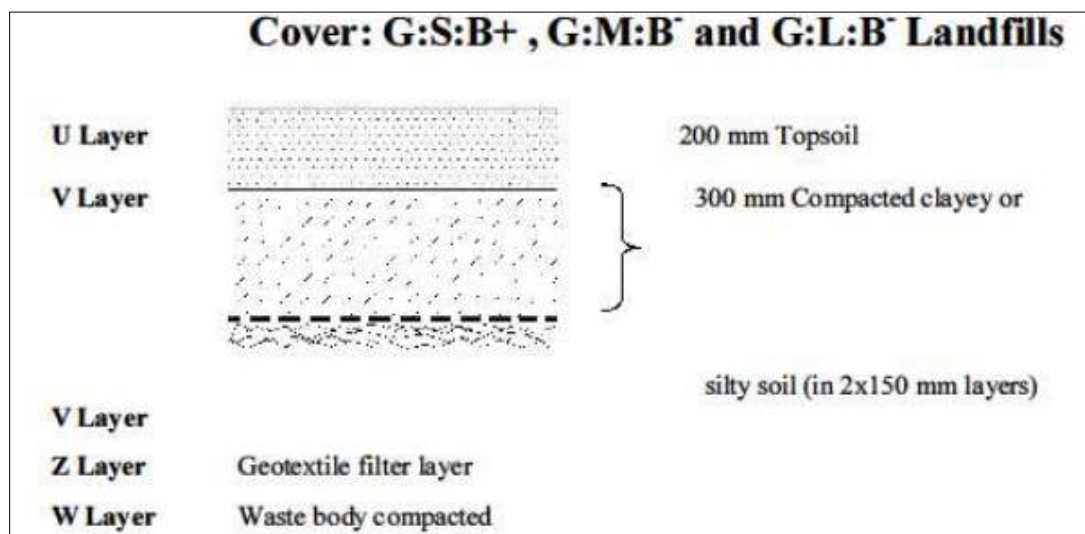


Figure 2.4: Appropriate final capping for G:S:B+ landfills

2.8. Services Required

2.8.1. Water Supply

During the construction and operation phases of the general waste disposal site, water will be required for consumption, sanitation, firefighting, and hygiene purposes. Potable water for the facility will be sourced from Majuba Power Station's potable water supply network. The water connection point is located approximately 1km from Alternative A, on the south-eastern side, and approximately 1.2km away from

Alternative B. The water demand required for the operation of the facility, specifically the guard house, personnel, dust suppression and cleaning, is estimated to be 11 460 l/day.

2.8.2. Electricity Supply

Electricity will be required for the storage facility and the security guard house and will be sourced from the nearest existing rising main, which is located approximately 500m from Alternative A and 700m from Alternative B.

2.8.3. Sanitation

During the construction phase, mobile chemical toilets will be provided. For the operation phase, an ablution facility to be established at the security guardhouse will be utilised. The average daily wastewater is estimated to be 85% of 1065l/day (905l/day) of the daily water demand by personnel and the guardhouse. A 160mm diameter gravity sewer line with manholes will be used to connect the ablution facility to a conservancy tank.

2.8.4. Waste Management

During the construction phase, waste generated at the site will be collected by a contractor and transported to the Middelburg Landfill Site, together with the general waste from the Majuba Power Station, for disposal.

2.9. Alternatives Considered during the EIA Process

In accordance with the requirements of Appendix 2 of the 2014 Environmental Impact Assessment (EIA) Regulations (GNR 326), reasonable and feasible alternatives including but not limited to site and technology alternatives, as well as the “do-nothing” alternative should be considered.

The DFFE Guideline for determining alternatives states that the key criteria for consideration when identifying alternatives are that they should be “practicable”, “feasible”, “relevant”, “reasonable” and “viable”. Essentially there are two types of alternatives:

- » Incrementally different (modifications) alternatives to the project.
- » Fundamentally (totally) different alternatives to the project.

In this instance, 'the project' refers to general waste disposal site and associated infrastructure proposed to be developed at the Majuba Power Station.

2.9.1 Consideration of Fundamentally Different Alternatives

Fundamentally different alternatives are usually assessed at a strategic level and, as a result, project specific EIAs are therefore limited in scope and ability to address fundamentally different alternatives. Eskom has determined that the most appropriate option to dispose of waste generated at the Majuba Power Station is the development of a dedicated landfill site within the power station boundaries. No feasible alternatives have been identified. Therefore, fundamentally different alternatives to the proposed project are not considered within this EIA process.

2.9.2 Consideration of Incrementally Different Alternatives

Incrementally different alternatives relate specifically to the project under investigation. "Alternatives", in relation to a proposed activity, means different ways of meeting the general purposes and requirements of the activity, which may include alternatives for:

- » The property on which, or location where the activity is proposed to be undertaken.
- » The type of activity to be undertaken.
- » The design or layout of the activity.
- » The technology to be used in the activity.
- » The operational aspects of the activity.

In addition, the option of not implementing the activity (i.e., the "do-nothing" alternative) must also be considered.

The sections below describe the incrementally different alternatives being considered as part of the general waste disposal site. Where no alternative is being considered, a motivation has been provided as required by the EIA Regulations, 2014.

2.10. Project Alternatives under Consideration for the General Waste Disposal Site

2.10.1. Location Alternatives

Two (2) technically feasible alternative sites have been identified by Eskom and are being considered for establishment of the general waste disposal site. Both sites are located within Eskom-owned property. Findings from the specialist assessments which were conducted in 2018 as part of the initial S&EIA process undertaken by BTW & Associates were considered through this S&EIA process in order to provide site specific information regarding the two alternatives.

Alternative A

Alternative A is located on Portion 6 of the Farm Witkoppies 81HS and to the east of the existing, closed landfill site. This site can easily be accessed via the existing gravel road and is located close to the water connection point and the existing rising main. Alternative A is located on a watershed, which is likely to result in water draining in different directions, therefore making onsite water management difficult. In addition, the site is located within close proximity to wetlands. The extent of these wetlands has been verified through the EIA Phase Aquatic Biodiversity Impact Assessment (refer to **Appendix E** of this EIA Report).

Alternative B

Alternative B is located on Portions 1 and 2 of the Farm Witkoppies 81HS and to the south of the existing, closed landfill site. Topsoil material from this site was previously utilised as cover material for capping the existing, closed landfill site. 60% of the site is located within a Critical Biodiversity Area. Alternative B is also located in close proximity to wetlands and will require the establishment of a new access road as it cannot be easily accessed using the existing gravel road. The site is located on a slope that is steeper than that of Alternative A.

A comparative assessment of the two alternative sites which details which option is preferred, acceptable, or fatally flawed (if any), including reasons therefore, from each specialist perspective has been undertaken as part of the EIA Phase and is included in Chapter 6 of this EIA Report.

2.10.2. Design and Layout Alternatives

The proposed project infrastructure will have a development footprint of approximately 6ha, to be located within the greater project site of approximately 866ha. The design and layout thereof are determined by the footprint, as well as the specific requirements of Majuba Power Station, the landowner. No feasible design or layout alternatives were identified for the proposed project.

2.10.3. Activity Alternatives

The majority of the general waste produced at the Majuba Power Station is recyclable as indicated in **Table 2.2**, and only a small quantity of the waste is required to be disposed of at a landfill site. As such, one activity alternative to the establishment of the new landfill site has been considered in this EIA Report and is discussed in detail below:

2.10.3.1. Non-recyclable general waste to be removed by the Dr Pixley Ka Isaka Seme Local Municipality for disposal at a nearby landfill site

According to the Integrated Development Plan (IDP) (2020/2021) for the Dr Pixley ka Isaka Seme Local Municipality, the municipality has four licensed waste disposal sites, each located in the towns of Volksrust, Amersfoort, Perdekop and Wakkerstroom. A description of each landfill site as per the IDP (2020/2021) is provided below:

Volksrust Waste Disposal Site:

The Volksrust waste disposal site is permitted in terms of Section 20 (1) of the Environment Conservation Act, 1989 (Act 73 of 1989). The site is operated by the municipality. Waste is disposed of over a wide-open area which is not in line with the license conditions. Cover material is not readily available, and no regular covering of waste is occurring as required in the license issued for the site.

Amersfoort Waste Disposal Site:

The Amersfoort waste disposal site is licensed in terms of Section 45 of the National Environmental Management: Waste Act (Act 59 of 2008), or any previous acts relating to licensing of such facilities. The waste disposal site is experiencing operational problems mainly due to insufficient funding, equipment and personnel shortage as well as interference by uncontrolled reclaiming activities on daily operations. The site is operated by the municipality. Waste is disposed of over a wide-open area which is not in line with the Minimum Requirements for Waste Disposal.

Perdekop Waste Disposal Site:

The Perdekop waste disposal site is licensed in terms of Section 45 of the National Environmental Management: Waste Act (Act 59 of 2008), or any previous acts relating to licensing of such facilities. The

Waste disposal site is experiencing operational problems mainly due to insufficient funding, equipment and personnel shortage. The site is operated by the municipality. The site has been filled almost to capacity with waste deposited in berms/cells. The site is not operated in accordance with the Minimum Requirements for Waste Disposal.

Wakkerstroom Waste Disposal Site:

The Wakkerstroom waste disposal site is licensed in terms of Section 45 of the National Environmental Management: Waste Act (Act 59 of 2008), or any previous acts relating to licensing of such facilities. The waste disposal site is experiencing operational problems mainly due to insufficient funding, equipment and personnel shortage. The site is operated by the municipality. Waste is disposed of over a wide-open area which is not in line with the Minimum Requirements for Waste Disposal.

The alternative of disposing non-recyclable general waste at one of the waste disposal sites in the Dr Pixley Ka Isaka Seme Local Municipality will be a viable and cost-effective option if an agreement between the Dr Pixley ka Isaka Seme Local Municipality and Eskom Majuba Power Station is reached. However, the alternative is not deemed feasible as the IDP (2020/2021) for the Dr Pixley ka Isaka Seme Local Municipality, states that all four waste disposal sites in the municipality are experiencing operational problems in varying degrees as a result of insufficient funding, equipment and personnel shortage, as well as interference by uncontrolled reclaiming activities on daily operations. Furthermore, many of these sites are not being operated in line with the Minimum Requirements of Waste Disposal, and as such, the disposal of Eskom Majuba Power Station's waste at non-compliant facilities would not only be a duty of care issue, but would place Eskom Majuba Power Station at risk from a cradle to grave management perspective.

2.10.4. Technology Alternatives

No technology alternatives for the general waste disposal site have been proposed by the project proponent.

2.10.5. The "Do-Nothing" Alternative

The 'do-nothing' alternative is the option of the project proponent not constructing the proposed facility. This would result in no environment or social impacts (positive or negative) as a result of the development of the proposed project. However, the benefits associated with the new general waste disposal site would also be foregone. This alternative is assessed in detail within Chapter 6 of this EIA Report.

CHAPTER 3: STRATEGIC CONTEXT AND POLICY AND NEED AND DESIRABILITY

This Chapter provides an overview of the policy and legislative context within which the development of a general waste disposal site such as that being considered in this report is proposed. It identifies environmental legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process which may be applicable to or have bearing on the proposed project. The need and desirability for the project is also detailed within this chapter.

3.1. Legal Requirements as per the EIA Regulations for the undertaking of an Environmental Impact Assessment Report, 2014 (as amended)

This chapter of the EIA Report includes the following information required in terms of Appendix 3: Scope of Assessment and Content of Environmental Impact Assessment Reports:

Requirement	Relevant Section
3(1)(e) a description of the policy and legislative context within which the development is located and how the proposed development complies with an responds to the legislation and policy context.	The policy and legislative context for the development of the general waste disposal site and associated infrastructure has been considered throughout this chapter on a national, provincial, and local level.
3(1)(f) a motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred development footprint within the approved site as contemplated in the accepted scoping report.	The need and desirability for the development of the proposed general waste disposal site is included in section 3.6.

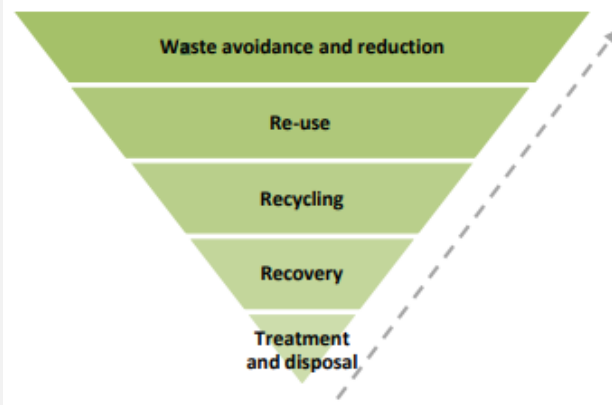
3.2. National policies and strategic documents

A brief review of the most relevant national legislation and policies is provided below in **Table 3.1**. The development of the general waste disposal site and associated infrastructure is considered to align with the aims of these policies, even where contributions to achieving the goals therein are only minor.

Table 3.1: Relevant national legislation and policies for the general waste disposal site

Relevant legislation or policy	Relevance to the general waste disposal site
Constitution of the Republic of South Africa, 1996	<p>Section 24 of the Constitution pertains specifically to the environment. It 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.</p> <p>The Constitution outlines the need to promote social and economic development. Section 24 of the Constitution therefore requires that development be conducted in such a manner that it does not infringe on an individual's environmental rights, health,</p>

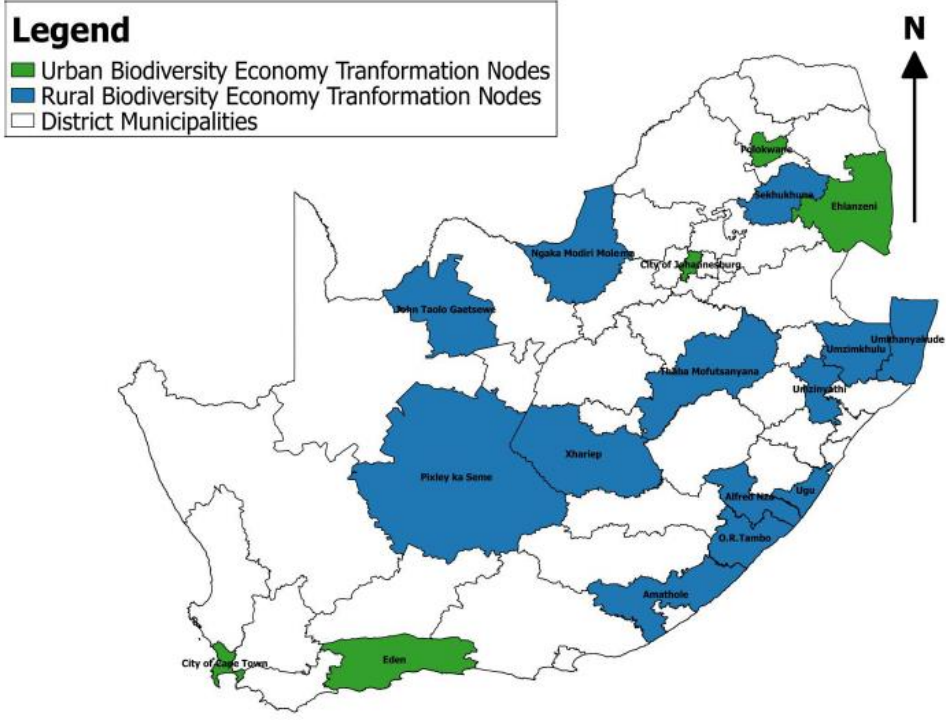
Relevant legislation or policy	Relevance to the general waste disposal site
	<p>or well-being. This is especially significant for previously disadvantaged individuals who are most at risk to environmental impacts.</p> <p>Therefore, anyone managing any aspect of waste must ensure that no harm is caused to people or the environment in the process. The undertaking of an EIA process for the proposed project in terms of the requirements of the EIA Regulations, 2014 (as amended) aims to minimise any impacts on the natural and social environment.</p>
<p>National Environmental Management Act (No. 107 of 1998) (NEMA)</p>	<p>The National Environmental Management Act (Act 107 of 1998) (NEMA) is South Africa's key piece of environmental legislation and sets the framework for environmental management in South Africa. The NEMA is founded on the principle that everyone has the right to an environment that is not harmful to their health or well-being as contained within the Bill of Rights.</p> <p>The national environmental management principles state that the social, economic, and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed, and evaluated, and decisions must be appropriate in light of such consideration and assessment.</p> <p>The need for responsible and informed decision-making by government on the acceptability of environmental impacts is therefore enshrined within the NEMA.</p>
<p>National Environmental Management: Waste Act (No. 59 of 2008)</p>	<p>The National Environmental Management: Waste Act (Act 59 of 2008) (NEM: WA) is the primary piece of legislation which regulates waste management in South Africa.</p> <p>The main objectives of the NEM: WA are as follows:</p> <ul style="list-style-type: none"> » Promote an integrated approach in dealing with waste which focuses on prevention, minimisation, and responsible disposal of waste. » Ensure that waste is properly managed in order to minimise its potential to cause damage to the socio-economic and bio-physical environments. » To build capacity and assist the South African industrial sector to properly manage waste by requiring provinces and municipalities to develop integrated waste management plans that are co-ordinated and aligned with the relevant integrated development plans and other plans and programmes of provincial and national government. » To provide guidance to regulatory authorities. » To assist the industrial sector in moving to improved waste management practices. » To provide for industry waste management plans at a national level for industries that cross provincial boundaries as well as at a provincial level for industry specific to a particular province. » To ensure that a National Waste Management Strategy is established within two years of the Act coming into effect, in order to realise the Republic's obligations in terms of relevant international agreements. » To ensure alignment of provincial and national waste management standards. » To promote the principles of reduce, re-use, recover, recycle. » To ensure responsible waste disposal. » To prevent pollution and ecological degradation. <p>The objectives of the NEM: WA promote the principles of the waste management hierarchy, which is an international and best practice waste management approach</p>

Relevant legislation or policy	Relevance to the general waste disposal site
	<p>that informs waste management in South Africa. The waste management hierarchy consists of options for waste management during the lifecycle of waste, arranged in descending order of priority. All stakeholders must apply the waste management hierarchy in making decisions on how to manage waste (Figure 3.1).</p>  <p>Figure 3.1: Waste Management Hierarchy (source: NWMS, 2018)</p> <p>Since promulgation of the NEM: WA, several regulations and standards regarding waste management have been developed to improve the waste management legal framework and governance.</p>
<p>List of Waste Management Activities (GN 921 OF 2013)</p>	<p>Government Notice (GN) 921, gazetted and effective from 29 November 2013, provides a list of waste management activities that have, or a likely to have, a detrimental effect on the environment. As per GN 921 of 2013, the following are three categories of listed waste management activities:</p> <ul style="list-style-type: none"> » Category A – a person who wishes to commence, undertake, or conduct a waste management activity listed under this Category must conduct a Basic Assessment Process as set out in the EIA Regulations. » Category B – a person who wishes to commence, undertake, or conduct a waste management activity under this Category must conduct a Scoping and Environmental Impact Reporting process as set out in the EIA Regulations. » Category C – a person who wishes to commence, undertake, or conduct a waste management activity listed under this Category must comply with the relevant requirements or standards determined by the Minister. <p>The proposed new general waste disposal site triggers waste management activities listed in terms of Category B of GN 921 of 2013 and therefore, a Waste Management Licence is required for the construction and operation of this facility in terms of the NEM:WA. This application must be supported by a Scoping & EIA process as contemplated in the EIA Regulations, 2014, as amended.</p>
<p>Waste Classification and Management Regulations (GN. R 634 of 2013).</p>	<p>The purpose of the Waste Classification and Management Regulations (GN. R 634 of 2013) promulgated in terms of the NEM:WA is to:</p> <ul style="list-style-type: none"> » Regulate the classification and management of waste in a manner which supports and implements the provisions of the Act. » Establish a mechanism and procedure for the listing of waste management activities that do not require a Waste Management Licence. » Prescribe requirements for the disposal of waste to landfill.

Relevant legislation or policy	Relevance to the general waste disposal site
	<ul style="list-style-type: none"> » Prescribe requirements and timeframes for the management of certain wastes. » Prescribe general duties of waste generators, transporters and managers. <p>General waste does not require classification in terms of Regulation 4(1) of GN. R 634 of 2013.</p>
<p>Norms and Standards for the Assessment of Waste for Landfill Disposal (GN. R 635 of 2013)</p>	<p>The Norms and Standards for the Assessment of Waste for Landfill Disposal (GN. R 635 of 2013) prescribe the requirements for the assessment of waste prior to disposal to landfill in terms of Regulation 8(1)(a) of the Regulations.</p> <p>General waste does require assessment in terms of Regulation 8(1)(a) of GN. R 635 of 2013.</p>
<p>Norms and Standards for Disposal of Waste to Landfill (GN. R 636 of 2013)</p>	<p>The National Norms and Standards for Disposal of Waste to Landfill (GN. R 636 of 2013) promulgated in terms of the NEM:WA specify the minimum engineering design requirements for landfill containment barriers. According to these Norms and Standards, landfill sites can be classified into four categories based on the type of landfill containment barrier required, namely:</p> <ul style="list-style-type: none"> » Class A Landfill – a landfill with a Class A containment barrier can accept Type 1 (high risk) waste and certain hazardous waste. » Class B Landfill – a landfill with a Class B containment barrier can accept Type 2 (moderate risk) waste. » Class C Landfill – a landfill with a Class C containment barrier can accept Type 3 (low risk) waste, including certain general wastes. Type 3 waste can also be disposed of at landfill sites with Class A and V containment barriers. » Class D Landfill – a landfill with a Class D containment barrier can accept Type 4 (inert) waste as well as certain general wastes. <p>The proposed facility is classified as a Class B Landfill in accordance with the National Norms and Standard Disposal of Waste to Landfill.</p>
<p>National Waste Management Strategy (NWMS, 2018)</p>	<p>The National Waste Management Strategy (NWMS) is a legislative requirement of the NEM: WA. The overall purpose of the NWMS is to give effect to the objectives of the NEM:WA, and as such it seeks to ensure that the responsibility for waste management is properly allocated. The 8 strategic goals of the NWMS are as follows:</p> <ul style="list-style-type: none"> » Goal 1: Promote waste minimisation, re-use, recycling, and recovery of waste. » Goal 2: Ensure the effective and efficient delivery of waste services. » Goal 3: Grow the contribution of the waste sector to the green economy. » Goal 4: Ensure that people are aware of the impact of waste on their health, wellbeing, and the environment. » Goal 5: Achieve integrated waste management planning. » Goal 6: Ensure sound budgeting and financial management for waste services. » Goal 7: Provide measures to remediate contaminated land. » Goal 8: Establish effective compliance with and enforcement of the Waste Act.
<p>The White Paper on Integrated Pollution and Waste Management for South Africa, 2000</p>	<p>The White Paper places emphasis on preventative strategies which aim to minimise waste and prevent pollution. The White Paper recognises the crucial role which the private sector and civil society plays, along with the government to ensure sustainable and effective pollution and waste management in South Africa. One of the fundamental approaches of this policy is to prevent pollution, minimise waste, and to control and remediate impacts. According to the White Paper, management of waste will be implemented in a holistic and integrated manner, and will extend</p>

Relevant legislation or policy	Relevance to the general waste disposal site
	<p>over the entire waste cycle, from “cradle to grave”, including the generation, storage, collection, transportation, treatment, and final disposal of waste.</p> <p>Through implementation of the White Paper, the government aims to:</p> <ul style="list-style-type: none"> » Encourage the prevention and minimisation of waste generation and thus pollution at source. » Encourage the management and minimisation of the impact of unavoidable waste from its generation to its final disposal. » Ensure the integrity and sustained “fitness for use” of all environmental media, i.e., air, water and land. » Ensure that any pollution of the environment is remediated by holding the responsible parties accountable. » Ensure environmental justice by integrating environmental considerations with the social, political and development needs and rights of all sectors, communities, and individuals. » Prosecute non-compliance with authorisations and legislation.
<p>National Development Plan (NDP), 2030</p>	<p>The National Development Plan (NDP) 2030 offers a long-term perspective. It defines a desired destination and identifies the role different sectors of society need to play in reaching that goal. The NDP aims to eliminate poverty and reduce inequality by 2030. According to the plan, South Africa can realise these goals by drawing on the energies of its people, growing an inclusive economy, building capabilities, enhancing the capacity of the state, and promoting leadership and partnerships throughout society.</p> <p>The importance of stimulating business activity close to dense townships has been highlighted in the NDP to encourage job creation in areas in which unemployment is prevalent.</p> <p>The proposed new general waste disposal site will provide employment opportunities which will assist in addressing poverty issues.</p>
<p>National Biodiversity Economy Strategy (NBES) (March 2016)</p>	<p>The biodiversity economy of South Africa encompasses the businesses and economic activities that either directly depend on biodiversity for their core business or that contribute to conservation of biodiversity through their activities. The commercial wildlife and the bioprospecting industries of South Africa provide cornerstones for the biodiversity economy and are the focus of this strategy.</p> <p>Both the wildlife and bioprospecting sub-sectors of the biodiversity economy have already demonstrated the potential for significant future development and growth. In the study commissioned on the situational analysis of the biodiversity economy, the contribution of the biodiversity economy to the national economy can be measured in terms of Gross Domestic Product (GDP), with the wildlife and bioprospecting industries contributing approximately R3 billion to GDP in 2013. Growth in the wildlife and bioprospecting industries can make a significant impact on the national economy, while contributing to national imperatives such as job creation, rural development and conservation of our natural resources.</p> <p>The Wildlife Industry value chain is centred on game and wildlife farming/ranching activities that relate to the stocking, trading, breeding, and hunting of game, and all the services and goods required to support this value chain. The key drivers of this value chain include domestic hunters, international hunters and a growing retail</p>

Relevant legislation or policy	Relevance to the general waste disposal site
	<p>market demand for wildlife products such as game meat and taxidermy products. This sector is therefore characterised by an interesting combination of agriculture, eco-tourism and conservation characteristics.</p> <p>Over the period 2008-2013, the total Wildlife Industry market grew by more than 14% per year. This growth comprised an average annual growth exceeding 6% in domestic hunting, a decrease in international hunting, and an exponential growth in live auction sales. It is considered likely that the consolidated Wildlife Industry has the potential to experience a weighted average annual growth rate of between 4 %-14 % per year up to 2030.</p> <p>In order for the wildlife and bioprospecting sub-sectors of the biodiversity economy to achieve its full potential, a strategic partnership between the state, private sector and communities is required. To this end, a National Biodiversity Economy Strategy (NBES) is required to guide the sustainable growth of the wildlife and bioprospecting industries and to provide a basis for addressing constraints to growth, ensuring sustainability, identifying clear stakeholder's responsibilities and monitoring progress of the Enabling Actions.</p> <p>The Vision of NBES is to optimise the total economic benefits of the wildlife and bioprospecting industries through its sustainable use, in line with the Vision of the Department of Environmental Affairs. The purpose of NBES is to provide a 14-year national coordination, leadership and guidance to the development and growth of the biodiversity economy.</p> <p>NBES has set an industry growth goal stating that by 2030, the South African biodiversity economy will achieve an average annualised GDP growth rate of 10% per annum. This envisioned growth curve extends into the year 2030 and is aligned to the efforts of the country's National Development Plan, Vision 2030. The NBES seeks to contribute to the transformation of the biodiversity economy in South Africa through inclusive economic opportunities, reflected by a sector which is equitable - equitable access to resources, equitable and fair processes and procedures and equitable in distribution of resources (i.e., business, human, financial, indigenous species, land, water) in the market.</p> <p>To address these transformation NBES imperatives, NBES has the principles of:</p> <ul style="list-style-type: none"> » Conservation of biodiversity and ecological infrastructure » Sustainable use of indigenous resources » Fair and equitable beneficiation » Socio-economic sustainability » Incentive driven compliance to regulation » Ethical practices » Improving quality and standards of products. <p>The NBES provides the opportunity to redistribute South Africa's indigenous biological/genetic resources in an equitable manner, across various income categories and settlement areas of the country. The NBES has prioritised nodes in the country for biodiversity economy transformation (BET), referred to as BET nodes. NBES prioritises 18 BET nodes, 13 rural and 5 urban districts across the nine provinces of the country,</p>

Relevant legislation or policy	Relevance to the general waste disposal site
	<p>with communities having been prioritised for development of small and medium size enterprises and community-based initiatives which sustainably use of indigenous biological and/or genetic resources. The municipality within which the Project is proposed is not identified as a priority area.</p> 

3.3. Provincial policies and strategic documents

A brief review of the most relevant provincial policies is provided below in **Table 3.2**. The proposed development is considered to align with the aims of these policies, even if contributions to achieving the goals therein are only minor.

Table 3.2: Relevant provincial policies for the general waste disposal site

Relevant policy	Relevance to the general waste disposal site
Mpumalanga Provincial Growth and Development Strategy (2004 – 2014)	<p>The Mpumalanga Provincial Growth and Development Strategy (PGDS) 2004-2014 is the fundamental policy framework for the Mpumalanga Provincial Government. As a policy framework it sets the tone and pace for growth and development in the province. The new PGDS addresses the key and most fundamental issues of development spanning the social, economic and the political environment and was developed for the purpose of aligning the policies and strategies of all spheres of Government. The province has identified six priority areas of intervention. These priority areas have been identified primarily based on the social, economic and developmental needs of the province, namely:</p> <p>» Economic Development:</p>

Relevant policy	Relevance to the general waste disposal site
	<ul style="list-style-type: none"> * Enhance provincial economic development to improve the quality of life for all * Prioritise the advancement of the second economy to address poverty and unemployment » Development Infrastructure: <ul style="list-style-type: none"> * The development of multi-faceted infrastructure to address basic needs and improve the quality of life » Social Development: <ul style="list-style-type: none"> * Attain high levels of social development that will ensure a well-educated citizenry that is healthy, safe and has access to sufficient recreational facilities » Sustainable Environmental Development: <ul style="list-style-type: none"> * To ensure sustainable development and environmental management » Good Governance: <ul style="list-style-type: none"> * Enhance and develop the institutional capacity of the public sector to ensure effective and efficient service delivery * Promote and enhance cooperative governance for integrated service delivery * Promote a culture of accountability and transparency in the public sector * Improved integrated service deliver through innovative and proactive practices * Strengthening of social partnership and community participation in development and service delivery » Human Resource Development: <ul style="list-style-type: none"> * Invest in people's skills to promote service delivery, economic growth and development * To position higher education institutions to meet the skills demand of the province * Improve access to and ensure quality education <p>The Mpumalanga PGDS emphasises the provinces priorities, some of which are aligned with the proposed development such as the need for economic development, addressing poverty, unemployment and human resource development. The proposed development will contribute towards economic growth; provide employment opportunities as well as skills development through the construction and operation phases of the development.</p>
<p>Mpumalanga Economic Growth and Development Path (2011)</p>	<p>The Mpumalanga Economic Growth and Development Path (MEGDP) is informed by the National Economic Growth Path. According to the MEGDP, the Mpumalanga Province is committed to increasing local economic development and job creation in the agricultural, industrial, manufacturing, green economy, tourism, and mining sectors. The focal point of the Economic Growth and Development Path is the creation of appropriate labour absorbing jobs which will have a positive direct, indirect, and induced effects on the Provincial economy and the living standards of its people.</p>

Relevant policy	Relevance to the general waste disposal site
	<p>The primary objective of the MEGDP is to grow the economy of the province; balance growth and development in order to creates jobs, reduce poverty and inequality, and improve the socio-economic conditions of the province.</p> <p>The development of the general waste disposal site and associated infrastructure will assist in job creation and poverty reduction.</p>
Mpumalanga Biodiversity Sector Plan (2014)	<p>The Mpumalanga Biodiversity Sector Plan (MBSP) is a guideline which is part of a wider set of national biodiversity planning tools and initiatives that are designed for national legislation and policy. It also guides as a spatial tool to inform permissible land uses that support biodiversity and ecological processes. The MBSP contains various classes of environmental features of conservation value, such as protected areas; irreplaceable areas etc.</p> <p>Mapping of critical biodiversity areas is also provided in this document. According to the map of terrestrial critical biodiversity areas contained in the MBSP, the Mpumalanga Province comprises five areas, namely, protected areas, critical biodiversity areas (optimal and irreplaceable), ecological support areas, other natural areas, and moderately or heavily modified areas.</p> <p>Of the alternative locations proposed for the development of the general waste disposal site, Alternative A is situated within a critical biodiversity area, specifically CBA1 (Irreplaceable).</p>

3.4. Local policies and strategic documents

The local tiers of government relevant to the proposed general waste disposal site are the Dr Pixley Ka Isaka Seme Local Municipality and the Gert Sibande District Municipality. Instruments and/or policies at both the district and local level contain objectives which align with the development of the general waste disposal site. These include, economic growth, job creation, community upliftment and poverty alleviation.

A brief review of the most relevant local policies is provided below in **Table 3.3**. The proposed development is considered to align with the aims of these policies, even if contributions to achieving the goals therein are only minor.

Table 3.3: Relevant local policies for the general waste disposal site

Relevant policy	Relevance to the general waste disposal site
Gert Sibande District Municipality Integrated Development Plan (IDP) (2020 – 2021)	<p>The vision of the Gert Sibande District Municipality (GSDM) is to be “a community driven district of excellence and development” and the mission of the district is “to support and coordinate our local municipalities to provide excellent services and development”.</p> <p>The IDP identifies a number of strategic objectives for the GSDM, which the district plans to achieve to meet each strategic goal. Of relevant to this project is the municipality's objective to facilitate economic growth and development.</p>

Relevant policy	Relevance to the general waste disposal site
	<p>The IDP also identifies issues within the GSDM which have been raised by the community and of relevance to the proposed project is job creation.</p> <p>The development of the general waste disposal site and associated infrastructure will to a certain extent promote economic development in the GSDM, thereby assisting to address some of the challenges faced by the district municipality, particularly unemployment.</p>
<p>Gert Sibande District Municipality Spatial Development Framework (2014)</p>	<p>The Spatial Development Framework notes that the vision for the GSDM is "striving to excel in good governance and quality infrastructure". The mission statement that underpins the vision refers to:</p> <ul style="list-style-type: none"> » Municipal infrastructure development. » Economic and tourism promotion. » Community and stakeholder participation » Efficient systems and administration. » Human development. <p>According to the 2011 census date, the level of employment in the GSDM is 38.9% and the poverty rate increased from 43.6% in 1996 to 48.6% in 2010. The issues of unemployment and poverty in the district can, to a certain extent, be addressed by job creation linked to the new general waste disposal site.</p>
<p>Dr Pixley Ka Isaka Seme Local Municipality Integrated Development Plan (IDP) (2020 – 2021)</p>	<p>The vision of the Dr Pixley Ka Isaka Seme Local Municipality (DPKISLM) is to become "a credible, customer friendly and well development municipality". The mission is "<i>to deliver quality services in accordance with the integrated development plan. This will be achieved through community participation, skilled and motivated staff, rapid economic development and a tourism friendly environment</i>".</p> <p>The DPKISLM has a number of development priorities for the 5-year term. Of relevance to the project are the enhancement of local economic development and waste management. In addition to the development priorities, the local municipality also identified a number of strategic goals aligned to the development priorities. Of relevance to the project are the reduction of unemployment and the improvement of waste management.</p> <p>The development of the new general waste disposal site will contribute towards improving waste management. Although the site will be for exclusive use by the Majuba Power Station, the project will reduce strain on the Middelburg Landfill site, making the capacity available for other users. The project will also assist in enhancing local</p>

Relevant policy	Relevance to the general waste disposal site
	economic development through job creation, skills development, as well as supplier and enterprise development.

3.5. Conclusion

Based on the above review, it can be concluded that the proposed project is in alignment with the local and provincial developmental policies and spatial frameworks.

3.6. Need and Desirability of the Proposed Waste Disposal Facility

Appendix 3 of the 2014 EIA Regulations requires that an EIA Report include a motivation for the need and desirability of a proposed development, including the need and desirability of the activity in the context of the preferred location and relevant policy and legislation. The need and desirability of a development needs to consider whether it is the right time and right place for locating the type of land-use/activity being proposed. Need and desirability is therefore equated to the wise use of land and should be able to answer the question of what the most sustainable use of land is.

This section of the report provides an overview of the anticipated suitability of the proposed project being developed at the preferred project location. Potential impacts associated with the project are described and assessed in Chapter 6 of this EIA Report.

3.6.1. Need and Desirability of the General Waste Disposal Site

General waste produced at the Majuba Power Station is currently transported to and disposed of at the Middelburg Landfill Site, which is located approximately 180km from the Majuba Power Station. It is too costly for Majuba Power Station to transport and dispose of their general waste at the Middelburg Landfill Site and as such, there is a need for a new general waste disposal site closer to the power station in order to limit costs.

The proposed development will have the following benefits:

- » Provide a long-term sustainable waste management strategy for Eskom at Majuba Power Station.
- » Advance economical disposal of waste for Majuba Power Station due to minimised distance to the waste disposal facility. This will eliminate costs associated with disposal at other landfill sites.
- » Create employment for skilled and semi-skilled people during the construction and operation of the proposed general waste disposal site.

The development of the new general waste disposal site will also contribute towards achieving the objectives of the NEM:WA and the NWMS through the responsible disposal of waste and ensuring that waste at the Majuba Power Station is properly managed in order to minimise its potential to cause damage to the socio-economic and bio-physical environments.

It is important to also consider the potential impacts and benefits that the proposed project may have for the affected site and surrounding area from both a biodiversity sustainability perspective and a socio-economic perspective. Therefore, it has been imperative for the assessment undertaken for the project to consider this project not only from a policy (national, provincial and local level) perspective, but also from

a biodiversity and socio-economic perspective. The aim of this process has been to ensure a balance between these three spheres and the key chapters of this report (Chapters 6 to 7) draw on both the positive and negative consequences of the proposed development, as well as the potential for impacts to be compounded through the development of the project and its associated infrastructure in proximity to other similar developments (i.e., cumulative impact).

3.6.2. Receptiveness of the proposed project site to development of the General Waste Disposal Site

The project proponent has identified the preferred site within Eskom Majuba Power Station due to:

- » It being located within Eskom-owned property.
- » It being in close proximity to a water connection point and existing rising main for potable water and electricity supply during the construction and operation phases.

Based on the consideration of various technical aspects explored in the sections below, the selected site was deemed suitable for the project.

Extent of the site: The general waste disposal site and its associated infrastructure requires an area of land approximately 6ha in extent. The affected properties are approximately 866ha in extent in total, which is sufficient to accommodate the proposed project while still allowing for the avoidance of environmental sensitivities.

Site access: Access to the site is possible via the N11, onto existing secondary roads that lead to the site.

Current land use considerations: The property is located within Majuba Power Station and is zoned for industrial use. The proposed development is therefore considered to be compatible with the surrounding land use.

CHAPTER 4: APPROACH TO UNDERTAKING THE S&EIA PROCESS

In terms of the 2014 EIA Regulations (GNR 326) and Listing Notices 1 to 3 (GNR 327, 325 and 324), and the List of Waste Management Activities (GNR 921) published in terms of the National Environmental Management: Waste Act (No. 58 of 2002) (NEM:WA), the construction and operation of the new general waste disposal site and associated infrastructure is a listed activity requiring Environmental Authorisation (EA) and a Waste Management Licence (WML), and is required to be supported by a full Scoping and EIA (S&EIA) process.

An EIA process refers to the process undertaken in accordance with the requirements of the 2014 EIA Regulations (GNR 326), as amended, which involves the identification and assessment of direct, indirect, and cumulative environmental impacts associated with a proposed project or activity. The EIA process comprises two main phases: i.e., **Scoping** and **EIA Phase**, and is illustrated in **Figure 4.1**. Public participation forms an important component of the process and is undertaken throughout both phases.



Figure 4.1: The Phases of an Environmental Impact Assessment (EIA) Process

4.1. Legal Requirements as per the EIA Regulations for the undertaking of an Environmental Impact Assessment Report, 2014 (as amended)

This chapter includes the following information required in terms of Appendix 3: Scope of Assessment and Content of Environmental Impact Assessment Reports:

Requirement	Relevant Section
3(1)(d) a description of the scope of the proposed activity, including (i) all listed and specified activities triggered and being applied for; and (ii) a description of the associated structures and infrastructure related to the development.	All relevant listed activities triggered by the development of the general waste disposal site and a description of the activities which form part of the development have been included in section 4.2 and Table 4.1 and 4.2 .
3(1)(e) a description of the policy and legislative context within which the development is located and an	The specific environmental legislation and policies applicable to the development are considered in Table 4.5 .

Requirement	Relevant Section
explanation of how the proposed development complies with and responds to the legislation and policy context.	
3(1)(h)(ii) details of the public participation process undertaken in terms of Regulation 41 of the Regulations, including copies of the supporting documents and inputs.	The details of the public participation process undertaken as part of the S&EIA process for the general waste disposal site have been described and are included in section 4.4.2 and copies of the supporting documents and inputs are included in Appendix C .
3(1)(h)(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them.	The main issues raised through the undertaking of the public participation process, including consultation with I&APs, are included in the Comments and Responses Report in Appendix C .
3(1)(h)(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks.	The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives are included in section 4.6 .

4.2. Relevant Legislative Permitting Requirements

The legislative permitting requirements applicable to the new general waste disposal site, as identified at this stage in the process and considered within this S&EIA process, are described in more detail under the respective sub-headings.

4.2.1 National Environmental Management Act (No. 107 of 1998) (NEMA)

The NEMA is South Africa's key piece of national environmental legislation that provides for the authorisation of certain controlled activities known as "listed activities". In terms of Section 24(1) of the NEMA, the potential impact on the environment associated with listed activities must be considered, investigated, assessed, and reported on to the Competent Authority (the decision-maker) charged by NEMA with granting of the relevant Environmental Authorisation (EA). Since Eskom Majuba Power Station (i.e., the applicant) is a state-owned-company (SOC), the Department of Forestry, Fisheries and the Environment (DFFE) has been identified as the Competent Authority (CA) in terms of Section 24C(2) of the NEMA. The Provincial Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs is the Commenting Authority on the project.

The need to comply with the requirements of the EIA Regulations published under NEMA ensures that developers are provided the opportunity to consider the potential environmental impacts of their activities early in the project development process, and also allows for an assessment to be made as to whether environmental impacts can be avoided, minimised or mitigated to acceptable levels. Comprehensive, independent environmental studies are required to be undertaken in accordance with the EIA Regulations to provide the CA with sufficient information in order for an informed decision to be taken regarding the Application for EA.

The S&EIA process being conducted for the general waste disposal site is undertaken in accordance with Section 24(5) of the NEMA, which defines the procedure to be followed in applying for EA, and requires that the potential consequences for, or impacts of, listed or specified activities on the environment be considered, investigated, assessed, and reported on to the CA. Listed Activities are activities identified in

terms of Section 24 of the NEMA which are likely to have a detrimental effect on the environment, and which may not commence without an EA from the CA subject to the completion of an environmental assessment process (either a Basic Assessment (BA) or full S&EIA).

Table 4.1 details the listed activities in terms of the EIA Regulations, 2014 (as amended) that apply to the general waste disposal site, and for which an application for EA has been submitted to the DFFE. The table also includes a description of the specific project activities that relate to the applicable listed activities.

Table 4.2: Listed activities as per the EIA Regulations that are triggered by the general waste disposal site²

Notice Number	Activity Number	Description of listed activity
Listing Notice 1 (GNR 327) 08 December 2014 (as amended on 07 April 2017)	19	The infilling or depositing of any material of more than 10 cubic meters into, or the dredging, excavation, removal or moving of soil, sand shells, shell grit, pebbles or rock of more than 10 cubic meters from a watercourse. <i>There are a number of wetland features, specifically seepage wetlands, and drainage lines present within the 500m regulated area of the development footprint. During the construction phase, more than 10 cubic metres of rock will be removed from the water features for the development of the new waste disposal site and its associated infrastructure.</i>
Listing Notice 1 (GNR 327) 08 December 2014 (as amended on 07 April 2017)	27	The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation. <i>The new waste disposal site will require the clearance of an area of ~6ha (equivalent to the development footprint) of indigenous vegetation.</i>
Listing Notice 3 (GNR 325) 08 December 2014 (as amended on 07 April 2017)	4(f)(i)(bb)(ee)(gg)	The development of a road wider than 4 metres with a reserve less than 13.5 metres. f. Mpumalanga i. Outside urban areas: (bb) National Protected Area Expansion Strategy Focus areas. (ee) Critical biodiversity areas identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans. (gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve, excluding disturbed areas, where such areas comprise indigenous vegetation. <i>The project will include the establishment of an access road up to 4m in width for Alternative B. The project site is located within the Mpumalanga Province, outside of urban areas. The site (both Alternatives A and B) falls within National Protected Area Expansion Strategy Focus areas. A portion of the site (both Alternatives A and B) falls within a Critical Biodiversity Area in terms of the Mpumalanga Biodiversity Sector Plan. The site also falls within 5 kilometres from other protected areas identified</i>

² Although the proposed development only triggers Listing Notice 1 and 3 activities in terms of the National Environmental Management EIA Regulations, 2014, as amended, this application requires a S&EIR process as it triggers Category B waste management listed activities in terms of the the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM:WA), and the List of Waste Management Activities (GNR 921).

Notice Number	Activity Number	Description of listed activity
		in terms of NEMPAA as the Eskom Majuba Power Station has a declared Nature Reserve.
Listing Notice 3 (GNR 325) 08 December 2014 (as amended on 07 April 2017)	12(f) (ii)	The clearance of an area of 300m ² or more of indigenous vegetation within: f. Mpumalanga ii. Critical biodiversity areas identified in bioregional plans. The development of the waste disposal site will require clearance of ~6ha (equivalent to the development footprint) of indigenous vegetation. A portion of the site (both alternatives Alternative A and B) falls within a Critical Biodiversity Area in terms of the Mpumalanga Biodiversity Sector Plan.

4.2.2 List of Waste Management Activities (GNR 921) published in terms of the National Environmental Management: Waste Act (No. 58 of 2002) (NEM:WA)

In terms of the listed activities defined under the National Environmental Management: Waste Act (GNR 921), the following 'listed activities' are triggered by the development of the general waste disposal site, and for which a Waste Management License (WML) has been applied.

Table 4.2: Listed activities identified in terms of the Listed Activities (GNR921) published under NEM:WA on 29 November 2013 (as amended by GG 37604 dated 2 May 2014 and GG 39020 dated 24 July 2015)

Notice Number	Activity Number	Description of listed activity
GN 921 of 29 November 2013, as amended	Category B 8	The disposal of general waste to land covering an area in excess of 200m ² and with a total capacity exceeding 25 000 tons. The new waste disposal site will be established on land covering an area in excess of 200m². The disposal site will comprise four (4) cells. The total capacity of the landfill will be 250 000m³.
GN 921 of 29 November 2013, as amended	Category B 10	The construction of a facility for a waste management activity listed in Category B. The proposed project will entail the construction of a waste disposal site for the following waste management activity: Activity 8 of Category B.

The applicant will register for the storage of waste on site and comply with the National Norms and Standards for the Storage of Waste, GN926, dated 29 November 2013, as per the DFFE's comment on the draft Scoping Report.

4.2.3 National Water Act (No. 36 of 1998) (NWA)

In accordance with the provisions of the National Water Act (No. 36 of 1998) (NWA), all water uses must be licensed with the CA (i.e., the Regional Department of Water and Sanitation (DWS) or the relevant Catchment Management Agency (CMA)). Water use is defined broadly, and includes taking and storing water, activities which reduce stream flow, waste discharges and disposals, controlled activities (activities

which impact detrimentally on a water resource), altering a watercourse, removing water found underground for certain purposes, and recreation.

Table 4.3 contains Water Uses associated with the proposed project and identified in terms of the NWA which require licensing either in the form of a General Authorisation (GA), or in the form of a Water Use License (WUL). The table also includes a description of those project activities which relate to the applicable Water Uses.

Table 4.3: List of Water Uses published under Section 21 of NWA, as amended.

Notice No.	Activity No.	Description of Water Use
NWA (No. 36 of 1998)	Section 21 (c)	Impeding or diverting the flow of water in a watercourse <i>The development footprint considered for the establishment of the general waste disposal site is associated with the presence of seasonal and permanent wetlands. Activities pertaining to the establishment of the general waste disposal site might encroach on the wetlands which may lead to an impediment and diversion of the flow in the watercourses. The alternative sites are within the Regulated area of the season and permanent wetlands (i.e., within 500m), which would also trigger this water use.</i>
NWA (No. 36 of 1998)	Section 21 (g)	Disposing of waste in a manner which may detrimentally impact on a water resource. <i>Leachate from the site will be collected and contained in a leachate evaporation pond.</i>
NWA (No. 36 of 1998)	Section 21 (i)	Altering the bed, banks, course or characteristics of a watercourse. <i>The development footprint considered for the establishment of the general waste disposal site is associated with the presence of seasonal and permanent wetlands. Activities pertaining to the establishment of the general waste disposal site might encroach on the wetlands which may lead to the altering of the characteristics of the watercourses. The alternative sites are within the Regulated area of the seasonal and permanent wetlands (i.e., within 500m), which would also trigger this water use.</i>

The collection and containment of leachate in a leachate evaporation pond requires a water use authorisation. In the event that the flow of water in the watercourses is affected and the bed, banks or course characteristics are altered then a water use authorisation would be required. The alternative sites are within the Regulated area of the seasonal and permanent wetlands (i.e., within 500m), which would also trigger a water use. This will need to be in accordance with the requirements of the Regulations Regarding the Procedural Requirements for Water Use License Applications and Appeals (GN R267), or a GA registered in accordance with the requirements of Revision of General Authorisation. The process of applying for a water use authorisation is currently underway.

4.2.4 National Heritage Resources Act (No. 25 of 1999) (NHRA)

The National Heritage Resources Act (No. 25 of 1999) (NHRA) provides an integrated system which allows for the management of national heritage resources, and to empower civil society to conserve heritage resources for future generations. Section 38 of NHRA provides a list of activities which potentially require the undertaking of a Heritage Impact Assessment.

Section 38: Heritage Resources Management

- 1). *Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as –*
- a. *the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;*
 - b. *the construction of a bridge or similar structure exceeding 50m in length;*
 - c. *any development or other activity which will change the character of a site –*
 - i). *exceeding 5 000m² in extent; or*
 - ii). *involving three or more existing erven or subdivisions thereof; or*
 - iii). *involving three or more erven or divisions thereof which have been consolidated within the past five years; or*
 - iv). *the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority.*

Must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

In terms of Section 38(8), approval from the heritage authority is not required if an evaluation of the impact of such development on heritage resources is required in terms of any other legislation (such as NEMA), provided that the consenting authority ensures that the evaluation of impacts fulfils the requirements of the relevant heritage resources authority in terms of Section 38(3) and any comments and recommendations of the relevant resources authority with regard to such development have been taken into account prior to the granting of the consent. However, should heritage resources of significance be affected by the proposed development, a permit is required to be obtained prior to disturbing or destroying such resources as per the requirements of Section 48 of the NHRA, and the South African Heritage Resources Agency (SAHRA) Permit Regulations (GNR 668).

4.3 Overview of the Scoping Phase

The development of the general waste disposal site requires EA in terms of the 2014 EIA Regulations (GNR 326) and Listing Notices 1 to 3 (GNR 327, 325 and 324), and a Waste Management Licence (WML) in terms of the List of Waste Management Activities (GNR 921) published in terms of the National Environmental Management: Waste Act (No. 58 of 2002) (NEM:WA) from the DFFE, subject to the completion of a full S&EIA process, as prescribed in Regulations 21 to 24 of the 2014 EIA Regulations (GNR 326), as amended. The need for a full S&EIA process to be conducted in support of the application for EA and a WML is based on listed activities triggered which are contained within Category B of the of List of Waste Management Activities (GNR 921).

The final Scoping Report submitted to the DFFE on **11 January 2022** and subsequently accepted on **17 February 2022** documented the evaluation of potential environmental impacts of the general waste disposal site. The Scoping Phase was conducted in accordance with the requirements of the 2014 EIA Regulations (GNR 326), as amended, and therefore aimed to:

- » Identify and evaluate potential environmental (biophysical and social) impacts and benefits of all phases of the proposed development (including design, construction, operation, and decommissioning) within the broader project site and development footprint alternatives through a review of existing baseline data, including specialist studies which were undertaken within the development footprint alternatives.
- » Identify potentially sensitive environmental features and areas within the development footprint alternatives in order to inform the preliminary design process of the general waste disposal site.
- » Define the scope of studies to be undertaken during the EIA process.
- » Provide the authorities with sufficient information in order to make a decision regarding the scope of issues to be addressed in the EIA Phase, as well as regarding the scope and extent of specialist studies that will be required to be undertaken.

Within this context, the objectives of the Scoping Phase were to, through a consultative process:

- » Identify the policies and legislation relevant to the project.
- » Motivate the need and desirability of the proposed project, including the need and desirability of the activity in the context of the preferred project location.
- » Identify and confirm feasible alternatives for the project.
- » Identify and described potential impacts associated with the undertaking of the identified activities and proposed technology.
- » Identify areas of high sensitivity to be avoided by the project infrastructure.
- » Identify and list key issues associated with the project to be addressed during the EIA Phase through further detailed study and ground-truthing.
- » Agree on the level of assessment, including the methodology to be applied, the expertise required, and the extent of further consultation to be undertaken in the EIA Phase of the process, with the aim of determining the extent of impacts associated with the activities through the life cycle of the project (i.e., construction, operation, and decommissioning).
- » Identify suitable measures to avoid, manage or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

Key tasks undertaken within the Scoping Phase included:

- » Consultation with relevant decision-making and regulating authorities (at National, Provincial and Local levels).
- » Submission of the completed Integrated Application for EA to the CA (i.e., the DFFE) in terms of Regulations 5 and 16 of the 2014 EIA Regulations (GNR 326), as amended.
- » Undertaking a public participation process in accordance with Chapter 6 of GNR326, and the Department of Environmental Affairs (2017) Public Participation guidelines in terms of NEMA EIA Regulations (hereinafter referred to as "the Guidelines") in order to obtain comments on and identify issues and concerns associated with the proposed project.
- » Undertaking of independent specialist studies in accordance with Appendix 6 of the EIA Regulations, 2014 (GNR326), as amended. The specialist studies that informed that Scoping Report were

- commissioned prior to the date of publication of the specialist protocols, specifically the plant and animal species protocols, in the Government Gazette (Government Notice 1150 of 30 October 2020).
- » Preparation of a Scoping Report and Plan of Study for the EIA in accordance with the requirements of Appendix 2 of the 2014 EIA Regulations (GNR 326).
 - » Provision of a 30-day public and authority review period for the Scoping Report.
 - » Preparation of a Comments and Response (C&R) Report detailing all comments raised by I&APs and responses provided as part of the Scoping Phase.
 - » Submission of a Final Scoping Report, including a Plan of Study for the EIA, to the DFFE for review, acceptance on **11 January 2022**.

Table 4.4 provides a summary of the public participation process undertaken during the Scoping Phase.

Table 4.4: Summary of the Public Participation Process undertaken during the Scoping Phase

Activity	Date
Announcement of the EIA process and the availability of the Scoping Report for a 30-day review and comment period, including details on how to access the Scoping Report via the online stakeholder engagement platform, in one local newspaper: » Volksrust Recorder Newspaper (English advertisement)	12 November 2021
Distribution of process notification letters announcing the EIA process, inviting I&APs to register on the project database, and the availability of the Scoping Report for a 30-day review and comment period. These letters were distributed to Organs of State, Government Departments, Ward Councillors, landowners within the surrounding area (including neighbouring landowners), registered I&APs and key stakeholder groups.	12 November 2021
Placement of site notices at the project site, including placement of further notices in the towns of Volksrust and Perdekop.	03 November 2021
30-day review and comment period of the Scoping Report.	Friday, 12 November 2021 to Monday, 13 December 2021
Virtual meetings through the use of virtual platforms as determined through discussions with the relevant stakeholder group: » Landowners. » Authorities and key stakeholders (including Organs of State, local municipality and official representatives of community-based organisations). » Where an I&AP does not have access to a computer and/or internet to participate in a virtual meeting telephonic discussions (including WhatsApp video call) will be set-up and minuted for inclusion. The preferred language of the I&AP has been considered when setting up these discussions.	No virtual meetings were held during the 30-day review and comment period of the Scoping Report as none were requested by I&APs or stakeholders. Virtual meetings will be held during the 30-day review and comment period of the EIA Report, during the EIA Phase.
On-going consultation (i.e., telephone liaison; e-mail communication) with all I&APs.	Throughout the EIA process

Acceptance of the Scoping Report and approval of the Plan of Study for the EIA Phase was received on **17 February 2022**, marking the start of the EIA Phase (refer to **Appendix B**). Additional Information requested by the DFFE in the acceptance of the Scoping Report and the location of the requested information in this EIA Report is detailed in **Table 4.5**.

Table 4.5: DFFE requirements and response/ reference to section in the EIA Report

DFFE Requirement for EIA	Response/ Location in this EIA Report
<p>(a) Listed Activities (i) The EIAR must provide an assessment of the impacts and mitigation measures for each of the listed activities applied for.</p>	<p>An assessment of impacts and recommended mitigation measures are included in this EIA Report (refer to Chapter 6).</p>
<p>(ii) The listed activities represented in the EIAR and the application form must be the same and correct.</p>	<p>An Integrated Application for EA and WML was submitted with the draft Scoping Report to the DFFE on 12 November 2022. The application form has been updated and is submitted with this draft EIA Report. The listed activities applied for in the application form submitted are the same as those included in this EIA Report.</p>
<p>(iii) The EIAR must assess the correct sub listed activity for each listed activity applied for.</p>	<p>An Integrated Application for EA and WML was submitted with the draft Scoping Report to the DFFE on 12 November 2022. The application form has been updated and is submitted with this draft EIA Report. The EIA Report assess the correct sub listed activities for each listed activity applied for (refer to Section 4.2.1, Table 4.1 and Section 4.2.2, Table 4.2).</p>
<p>(b) Public Participation (i) Please ensure that comments from all relevant stakeholders are submitted to the Department with the EIAR.</p>	<p>All comments received to date have been included within the Comments and Responses Report (Appendix C8). Where comments have not been obtained, proof that attempts were made to obtain comments have been included in Appendix C4 and Appendix C5.</p> <p>The database detailing registered I&APs is included as Appendix C1 to the EIA Report.</p>
<p>(ii) Please ensure that all issues raised and comments received during the circulation of the draft EIAR from registered I&APs and organs of state which have jurisdiction in respect of the proposed activity are adequately addressed in the final EIAR. Proof of correspondence with the various stakeholders must be included in the final EIAR. Should you be unable to obtain comments, proof should be submitted to the Department of the attempts that were made to obtain comments.</p>	<p>Comments received during the 30-day review and comment period of the draft EIA Report will be captured and addressed in the Comments and Responses Report (Appendix C8) to be submitted with the final EIA Report to the DFFE for decision-making. Proof of correspondence with the various stakeholders will be included in the final EIA Report in Appendix C4 and Appendix C5. Where comments have not been obtained, proof that attempts were made to obtain comments will be included in Appendix C4 and Appendix C5.</p>
<p>(iii) A Comments and Response trail report (C&R) must be submitted with the final EIAR. The C&R report must incorporate all comments for this development. The C&R report must be a separate document from the main report and the format must be in the table format as indicated in Appendix 1 of this comments letter. Please refrain from summarising comments made by I&APs. All comments from I&APs must be copied verbatim and responded to clearly. Please note that a response such as "noted" is not regarded as an adequate response to I&AP's comments.</p>	<p>All comments received during the Scoping Phase, and the 30-day review and comment period of the draft EIA Report, including those of the DFFE, will be included within the Comments and Responses Report (to be included as Appendix C8 to the final EIA Report). All comments received from I&APs to date have been copied verbatim and responded to clearly (refer to Appendix C8). Comments received during the 30-day review and comment period of the draft EIA Report will also be copied verbatim and responded to clearly within the Comments and Responses Report to be submitted with the final EIA Report.</p>

DFFE Requirement for EIA	Response/ Location in this EIA Report
<p>(iv) Comments from I&APs must not be split and arranged into categories. Comments from each submission must be responded to individually.</p>	<p>Comments received from I&APs to date on the project have not been split and arranged in categories, and comments from each submission have been responded to individually (refer to Appendix C8).</p>
<p>(v) The Public Participation Process must be conducted in terms of Regulation 39, 40, 41, 42, 43 & 44 of the EIA Regulations, 2014, as amended.</p>	<p>The public participation process to date has been conducted in terms of Regulation 39, 40, 41, 42, 43 and 44 of the EIA Regulations 2014, as amended (GNR 326). Details of the public participation process undertaken to date is included in detail in Chapter 4 of the EIAR.</p>
<p>(vi) The EAP is requested to contact the Department to make the necessary arrangements to conduct a site inspection prior to the submission of the final EIAR.</p>	<p>Necessary arrangements to conduct a site inspection prior to submission of the final EIAR will be made with the Department during the 30-day draft EIAR comment and review period.</p>
<p>(c) Alternatives (i) The proposed project must be investigated further as it is indicated that most of the general waste produced at Majuba power station is recyclable and only a small quantity is required for disposal. The alternatives for the proposed development must be assessed further in the final EIA process report to include a detailed description of each alternative, disadvantages, and motivation for the preferred alternatives on why it is preferred.</p>	<p>An overview of the various alternatives (i.e., property/location alternatives, design and layout alternatives, activity alternatives, technology alternatives and the 'do-nothing' alternative) considered for the general waste disposal site is included in Chapter 2 of the EIA Report.</p>
<p>(ii) The applicant must ensure that information requirements in appendix 1 below is included in the environmental impact report.</p>	<ol style="list-style-type: none"> 1. An Integrated Application for EA and WML was submitted with the draft Scoping Report to the DFFE on 12 November 2021. The application form has been updated and is submitted with this draft EIA Report. 2. The proposed waste disposal site will only be accepting general waste. General waste does not require classification in terms of Regulation 4(1) of GN. R 634 of 2013. 3. A geohydrological study has been undertaken as part of the proposed project and is attached as Appendix F to the EIA Report. 4. A stormwater management plan has been prepared for the project and is included as an appendix to the EMP, which is attached as Appendix N to the EIA Report. 5. A Wetland Delineation and Aquatic Biodiversity Assessment has been undertaken as part of the proposed project and is attached as Appendix E to the EIA Report. The assessment includes all the information requirements listed in appendix 1 of the DFFE's scoping acceptance letter. 6. An engineering design report has been prepared for the proposed project which includes liner layers specified and drawing signed by a professional engineer.
<p>(d) Layout and Sensitivity Maps (i) The EIAR must provide the four corner coordinate points for the proposed development site (note that if the site has numerous bend points, at each bend point</p>	<p>The EIA Report includes coordinate points of the proposed project site as well as the four corner coordinates of the two alternative footprint areas (Alternative A and Alternative B) (refer to Chapter 1, Table 1.1)</p>

DFFE Requirement for EIA	Response/ Location in this EIA Report
<p>coordinates must be provided) as well as the start, middle and end point of all linear activities.</p> <p>(ii) A copy of the final preferred layout map. All available biodiversity information must be used in the finalisation of the layout map. Existing infrastructure must be used as far as possible e.g., roads. The layout map must indicate the following:</p> <ul style="list-style-type: none"> » The laydown area footprint; » Internal roads indicating width (construction period width and operation period width) and with numbered sections between the other site elements which they serve (to make commenting on sections possible); » Wetlands, drainage lines, rivers, stream and water crossing of roads and cables indicating the type of bridging structures that will be used; » The location of sensitive environmental features on site e.g. CBAs, heritage sites, wetlands, drainage lines etc. that will be affected by the proposed project and its associated infrastructure; and » All "no-go" areas. » An environmental sensitivity map indicating environmental sensitive areas and features identified during the assessment process. 	<p>A layout map indicating the infrastructure proposed as part of this project is included in Chapter 2, Figure 2.2 of the EIA Report and within the Design Report attached to this EIA Report as Appendix K.</p> <p>An Environmental Sensitivity Map indicating all environmentally sensitive features and no-go areas is included as Figure 7.1 under Chapter 7, and Appendix O.</p>
<p>(e) Specialist Assessments</p> <p>(i) The EAP must ensure that the terms of reference for all the identified specialist studies must include the following:</p> <ul style="list-style-type: none"> » A detailed description of the study's methodology; indication of the locations and descriptions of the development footprint, and all other associated infrastructures that they have assessed and are recommending for authorisations. 	<p>The identified specialist studies include a detailed description of the methodology followed as well as an indication of the location and description of the development and all other associated infrastructure.</p>
<ul style="list-style-type: none"> » Provide a detailed description of all limitations to the studies. All specialist studies must be conducted in the right season and providing that as a limitation will not be allowed. 	<p>The specialist studies provide a detailed description of the limitations to the studies.</p>
<ul style="list-style-type: none"> » Please note that the Department considers a 'no-go' area, as an area where no development of any infrastructure is allowed; therefore, no development of associated infrastructure including access roads is allowed in the 'no-go' areas. Should the specialist definition of 'no-go' area differ from the Department's definition; this must be clearly indicated. The specialist must also indicate the 'no-go' area's buffer if applicable. 	<p>The Department's definition of no-go area is noted. The specialist's definition of 'no-go' areas is the same as that of the Department and some 'no-go' areas, including their associated buffer areas, have been recommended by the specialists and will be considered by the project developer.</p>
<ul style="list-style-type: none"> » All specialist studies must be final, and provide detailed/practical mitigation measures for the preferred alternative and recommendations, and 	<p>The attached specialist studies (refer to Appendix D - K) are final and include an assessment of the identified</p>

DFFE Requirement for EIA	Response/ Location in this EIA Report							
<p>must not recommend further studies to be completed post EA.</p>	<p>potential impacts, as well as practical mitigation measures for the preferred alternative.</p>							
<p>» Should a specialist recommend specific mitigation measures, these must be clearly indicated.</p>	<p>The mitigation measures proposed by the specialists are included in Chapter 6 of the EIA Report, as well as the project EMPr which is attached as Appendix N to the EIA Report.</p>							
<p>» Regarding cumulative impacts:</p> <ul style="list-style-type: none"> o Clearly defined cumulative impacts and where possible the size of the identified impact must be quantified and indicated, i.e. hectares of cumulatively transformed land. o A detailed process flow to indicate how the specialist's recommendations, mitigation measures and conclusions from the various similar developments in the area were taken into consideration in the assessment of cumulative impacts and when the conclusion and mitigation measures were drafted for this project o Identified cumulative impacts associated with the proposed development must be rated with the significance rating methodology used in the process. o The significance rating must also inform the need and desirability of the proposed development. o A cumulative impact environmental statement on whether the proposed development must proceed. 	<p>The footprint of likely future development, such as the proposed power station expansion and proposed solar facility at the Majuba Power Station, are within the power station security fence boundary, and these areas are already impacted and partially transformed. Future developments beyond the power station security fence boundary are unknown. The landcover within the broader project site comprises extensive areas of cultivation, but most of these areas are no longer cultivated and are currently lying fallow. This suggests that areas under cultivation in the area have declined significantly over the years. This trend is likely to continue and have positive implications for biodiversity. The area to be occupied by the proposed general waste disposal site and associated infrastructure is small compared to the areas of cultivated land that are likely to become fallow over time, and this trend could offset any negative cumulative impacts of the proposed general waste disposal site on biodiversity.</p> <p>An evaluation of potential cumulative impacts is included in Chapter 6 of the EIA Report.</p>							
<p>(ii) Should the appointed specialists specify contradicting recommendations, the EAP must clearly indicate the most reasonable recommendation and substantiate this with defensible reasons; and where necessary, include further expertise advice.</p>	<p>This comment is noted and is considered by the EAP within this EIA Report.</p>							
<p>(iii) The following Specialist Assessments will form part of the EIAR:</p> <table border="1"> <tbody> <tr> <td>Specialist Study</td> </tr> <tr> <td>Wetland Delineation and Biodiversity Assessment</td> </tr> <tr> <td>Heritage Impact Assessment</td> </tr> <tr> <td>Palaeontological Impact Assessment</td> </tr> <tr> <td>Geotechnical and Geohydrological Impact Assessment</td> </tr> <tr> <td>Air Quality Impact Assessment</td> </tr> <tr> <td>Detailed Civil Engineering Design Report</td> </tr> </tbody> </table>	Specialist Study	Wetland Delineation and Biodiversity Assessment	Heritage Impact Assessment	Palaeontological Impact Assessment	Geotechnical and Geohydrological Impact Assessment	Air Quality Impact Assessment	Detailed Civil Engineering Design Report	<p>All specialist assessments listed in the table form part of this EIA Report (refer to Appendix D – K). It should be noted that although the approved Plan of Study for the EIA Phase had included a Geotechnical Assessment as one of the studies to be undertaken in the EIA Phase based on the fact that the Geotechnical Assessment undertaken in 2018 had recommended that additional test pitting to assess the capping and liner material reserves observed on the other property not far from the proposed landfill be undertaken, further geotechnical investigations as part of the EIA Phase were ultimately not deemed necessary.</p> <p>This is because the design report recommends a geosynthetic clay liner as a permissible alternative for a clay layer since it can substitute for both the clay layer and</p>
Specialist Study								
Wetland Delineation and Biodiversity Assessment								
Heritage Impact Assessment								
Palaeontological Impact Assessment								
Geotechnical and Geohydrological Impact Assessment								
Air Quality Impact Assessment								
Detailed Civil Engineering Design Report								

DFFE Requirement for EIA	Response/ Location in this EIA Report
	the geotextile as it can serve both purposes. The 2018 Geotechnical Assessment has therefore been updated to exclude the above recommendation and is attached to this EIA Report as Appendix G .
(f) General (i) The EIAR must provide the technical details for the proposed facility in a table format as well as their description and/or dimensions.	The EIA Report includes technical details of the proposed facility (refer to Chapter 2).
(ii) Details of the future plans for the site and infrastructure after decommissioning in 20-30 years and the possibility of upgrading the proposed infrastructure to more advanced technologies must be indicated.	The proposed general waste disposal site will remain operational for as long as Majuba Power Station remains operational.
(iii) Should a Water Use License be required, proof of application for a license needs to be submitted.	The collection and containment of leachate in a leachate evaporation pond requires a water use authorisation. In the event that the flow of water in the watercourses is affected and the bed, banks or course characteristics are altered then a water use authorisation would be required. The alternative sites are within the Regulated area of the seasonal and permanent wetlands (i.e., within 500m), which would also trigger a water use. This application process will need to be undertaken in accordance with the requirements of the Regulations Regarding the Procedural Requirements for Water Use License Applications and Appeals (GN R267), or a GA registered in accordance with the requirements of Revision of General Authorisation. The process of applying for a water use authorisation is currently underway.
(iv) The EAP must provide landowner consent for all farm portions affected by the proposed project, whether the project component is linear or not, i.e. all farm portions where the access road, solar panels and associated infrastructure is to be located.	Landowner consent for the farm portions affected by the proposed project is not required as the property is owned by the applicant.
(v) A construction and operational phase EMP that includes mitigation and monitoring measures must be submitted with the final EIAR.	A construction and operational phase EMP that includes mitigation and monitoring measures as been included as Appendix N to the EIAR. The EMP will be updated as relevant following the 30-day draft EIAR comment and review period, and submitted with the final EIAR.

4.4. Overview of the EIA Phase

As per the EIA Regulations (GNR 326), the objectives of the EIA Phase are to, through a consultative process:

- » Determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context.
- » Describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the development footprint on the approved site as contemplated in the accepted Scoping Report.
- » Identify the location of the development footprint within the approved site as contemplated in the accepted Scoping Report based on an impact and risk assessment process inclusive of cumulative

impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment.

- » Determine the:
 - * Nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and
 - * Degree to which these impacts:
 - Can be reversed;
 - May cause irreplaceable loss of resources; and
 - Can be avoided, managed or mitigated.
- » Identify the most ideal development footprint for the activity within the development area as contemplated in the accepted Scoping Report based on the lowest level of environmental sensitivity identified during the assessment.
- » Identify, assess, and rank the impacts the activity will impose on the development footprint on the approved site as contemplated in the accepted Scoping Report through the life of the activity.
- » Identify suitable measures to avoid, manage or mitigate identified impacts.
- » Identify residual risks that need to be managed and monitored.

This EIA Report assesses potential positive and negative, direct, indirect, and cumulative impacts associated with all phases of the project life cycle including pre-construction, construction, operation and decommissioning. In this regard the EIA Report aims to provide the relevant authorities with sufficient information to make an informed decision regarding the proposed project.

The following subsections outline the activities within the EIA process that have been undertaken to date.

4.4.1. Authority Consultation and Application for Authorisation in terms of the 2014 EIA Regulations (as amended) and a WML in terms of the List of Waste Management Activities (GNR 921)

In terms of Section 24C(2) of the NEMA and Section 43(1) of the NEMWA, the Minister, i.e., the DFFE, is the competent authority and/or the licensing authority where a waste management activity is undertaken by an organ of state. As the project is proposed within the Mpumalanga Province, the Mpumalanga Department Agriculture, Rural Development, Land and Environmental Affairs is the provincial commenting authority for the project. Consultation with these authorities, as well as other relevant Organs of State has been undertaken throughout the S&EIA Process. To date, this consultation has included the following:

- » Submitting a Public Participation Plan to the DFFE via email for approval on **14 October 2021**. Following submission of the Public Participation Plan, the DFFE provided approval of the submitted plan via email on **19 October 2021**.
- » Submission of the application form for Integrated EA, WML and the draft Scoping Report to the DFFE via the DFFE Novell Filr System on **12 November 2021**.
- » Submission of the final Scoping Report on **11 January 2022**.
- » Receipt of acceptance of the Scoping Report and approval of the Plan of Study for the EIA Phase on **17 February 2022**.
- » A request for an extension in terms of Regulation 3(7) of the EIA Regulations, 2014, as amended, was submitted to the DFFE on **10 March 2022**. Approval of the request for an extension was provided by the Department on **23 March 2022** wherein the prescribed timeframes for the project were extended by a period of 60 days such that the Final EIA Report be submitted to the DFFE 166 days after the acceptance of Scoping was received by the applicant (i.e., on or before **08 August 2022**).

The following steps have been undertaken as part of the EIA Phase of the process:

- » Make the draft EIA Report available for a 30-day public and authority review and comment period from **01 July 2022 to 01 August 2022**.
- » Notification and consultation with stakeholders, I&APs and Organs of State that may have jurisdiction over the project, including provincial and local government departments, and State-Owned Enterprises.
- » Incorporating comments received during the 30-day public review and comment period into the final EIA Report.
- » Submission of the final EIA Report to DFFE for decision making.

The submissions, as listed above, were undertaken electronically, as required by the DFFE. A record of all authority correspondence undertaken during the Scoping Phase and within the EIA Phase is included in **Appendix B, Appendix C4 and Appendix C5**.

4.4.2. Public Participation Process

Public participation is an essential and regulatory requirement for an EA process and is guided by Regulations 41 to 44 of the EIA Regulations, 2014 (GN R326), as amended. The purpose of public participation is clearly outlined in Regulation 40 of the EIA Regulations, 2014 (GN R326, as amended, and is being followed for this proposed project.

The sharing of information forms the basis of the public participation process and offers the opportunity for I&APs to become actively involved in the EIA process from the outset. The public participation process is designed to provide sufficient and accessible information to I&APs in an objective manner. The public participation process affords I&APs opportunities to provide input into and receive information regarding the EIA process in the following ways:

During the Scoping Phase:

- » Provide an opportunity to submit comments regarding the project.
- » Assist in identifying reasonable and feasible alternatives, where required.
- » Contribute relevant local information and knowledge to the environmental assessment.
- » Allow registered I&APs to verify that their comments have been recorded, considered, and addressed, where applicable, in the environmental investigations.
- » Foster trust and co-operation.
- » Generate a sense of joint responsibility and ownership of the environment.
- » Comment on the findings of the Scoping Phase results.
- » Identify issues of concern and suggestions for enhanced benefits.

During the EIA Phase:

- » Contribute relevant local information and knowledge to the environmental assessment.
- » Verify that issues have been considered in the environmental investigations as far as possible as identified within the Scoping Phase.
- » Comment on the findings of the environmental assessments.
- » Attend a Focus Group Meeting to be conducted for the project.

During the **decision-making phase**:

- » To advise I&APs of the outcome of the competent authority's decision, and how and by when the decision can be appealed.

The Public Participation process therefore aims to ensure that:

- » Information containing all relevant facts in respect of the application is made available to potential stakeholders and I&APs for their review.
- » The information presented during the public participation process is presented in such a manner, i.e., local language and technical issues, that it avoids the possible alienation of the public and other issues which could prevent them from participating.
- » Public participation is facilitated in such a manner that I&APs are provided with a reasonable opportunity to comment on the project.
- » A variety of mechanisms are provided to I&APs to correspond and submit their comments i.e. fax, post, email, telephone, text message (SMS and WhatsApp).
- » An adequate review period is provided for I&APs to comment on the findings of the Scoping and EIA Reports.

The following sections detail the tasks undertaken as part of the public participation process within the EIA Phase.

i. Advertisements and Notifications

The availability of the EIA Report for review and comment was announced to the Organs of State, potentially affected and adjacent landowners, tenants and occupiers, and the general public via the following:

- » Notification letter distributed to all registered parties advising them of the availability of the EIA Report for review on comment on **01 July 2022**.
- » An advertisement announcing the availability of and inviting comment on the EIA Report in the Ilanga Newspaper (English advertisement) on **30 June 2022**. A copy of the newspaper advert as sent to the newspaper is included in Appendix C3 of the EIA Report. The advert tear sheet will be included in the final EIA Report as **Appendix C3**.
- » The EIA Report was made available for review and comment by I&APs for a 30-day period from **01 July 2022 to 01 August 2022**. The EIA Report was made available on the Savannah Environmental website (<https://www.savannahsa.com/public-documents/waste/>) and all registered I&APs were notified of the availability on **01 July 2022**. I&APs were encouraged to review the EIA Report and submit written comment. The EIA Report was circulated to Organs of State via electronic transfer (Dropbox, WeTransfer, etc), or CD and/or hardcopy as per individual request. Evidence of distribution of the EIA Report is included in the final EIA Report as **Appendix C4** and **Appendix C5**.

ii. Public Involvement and Consultation

In order to accommodate the varying needs of stakeholders and I&APs within the surrounding area, as well as capture their views, comments, issues and concerns regarding the project, various opportunities were provided to I&APs to note their comments and issues. I&APs were consulted through the following means:

- » Opportunity to review the EIA Report for a 30-day review and comment period from **01 July 2022 to 01 August 2022**.

- » Comments received during this review period have been captured within a Comments and Responses Report (**Appendix C8**), which is included within the final EIA Report.
- » Focus group meetings: Virtual focus group meetings were held with key government departments, stakeholders and landowners during the 30-day review and comment period of the EIA Report:
 - A focus group meeting with local and district municipalities was held on 27 July 2022 at 09h00.
 - A focus group meeting with officials/organs of state was held on 27 July 2022 at 10h30.
 - A focus group meeting with keys stakeholders was held on 27 July 2022 at 12h00.

The purpose of the above focus group meetings was to provide an overview of the findings of the EIA studies in order to facilitate comments on the EIA process and EIA Report, as well as to record any issues or concerns raised by stakeholders regarding the project. The minutes of these meetings are included in the final EIA Report as **Appendix C7**.

- » A community meeting was held at the Perdekop Community Hall on 28 July 2022 at 10h00. The minutes of the community meeting are included in the final EIA Report as Appendix C7.
- » Telephonic consultation sessions.
- » Written, faxed or e-mail correspondence.

Table 4.6: Public involvement for the general waste disposal site during EIA Phase

Activity	Date
Advertising of the availability of the EIA Report for a 30-day review and comment period in the Ilanga Newspaper (English advertisement).	30 June 2022
Distribution of notification letters announcing the availability of the EIA Report for a 30-day review and comment period. These letters were distributed to Organs of State, Government Departments, Ward Councillors, landowners within the surrounding area (including neighbouring landowners), registered I&APs and key stakeholder groups.	01 July 2022
30-day review and comment period of the EIA Report.	Friday, 01 July 2022 to Monday, 01 August 2022
Virtual meetings through the use of virtual platforms as determined through discussions with the relevant stakeholder group: <ul style="list-style-type: none"> » Landowners » Authorities and key stakeholders (including Organs of State, local municipality and official representatives of community-based organisations). » Where an I&AP does not have access to a computer and/or internet to participate in a virtual meeting telephonic discussions (including WhatsApp video call) will be set-up and minuted for inclusion. The preferred language of the I&AP has been considered when setting up these discussions. Direct in-person consultation will only take place upon request or where deemed necessary to ensure adequate opportunity for participation and comment.	» Focus group meetings: Virtual focus group meetings <u>were</u> held with key government departments, stakeholders and landowners during the 30-day review and comment period of the EIA Report: <ul style="list-style-type: none"> ○ <u>A focus group meeting with local and district municipalities was held on 27 July 2022 at 09h00.</u> ○ <u>A focus group meeting with officials/organs of state was held on 27 July 2022 at 10h30.</u> ○ <u>A focus group meeting with keys stakeholders was held on 27 July 2022 at 12h00.</u> » <u>A community meeting was held at the Perdekop Community Hall on 28 July 2022 at 10h00.</u>
On-going consultation (i.e., telephone liaison; e-mail communication) with all I&APs.	Throughout the EIA process

iii. Registered I&APs entitled to Comment on the EIA Report

- 43.(1) A registered I&AP is entitled to comment, in writing, on all reports or plans submitted to such party during the public participation process contemplated in these Regulations and to bring to the attention of the proponent or applicant any issues which that party believes may be of significance to the consideration of the application, provided that the interested and affected party discloses any direct business, financial, personal or other interest which that party may have in the approval or refusal of the application.
- (2) In order to give effect to section 24O of the Act, any State department that administers a law relating to a matter affecting the environment must be requested, subject to regulation 7(2), to comment within 30 days.
- 44.(1) The applicant must ensure that the comments of interested and affected parties are recorded in reports and plans and that such written comments, including responses to such comments and records of meetings, are attached to the reports and plans that are submitted to the competent authority in terms of these Regulations.
- (2) Where a person desires but is unable to access written comments as contemplated in subregulation (1) due to –
- (a) A lack of skills to read or write;
 - (b) Disability; or
 - (c) Any other disadvantage;
- Reasonable alternative methods of recording comments must be provided for.

I&APs registered on the database were notified by means of a notification letter of the release of the EIA Report for a 30-day review and comment period, invited to provide comment on the EIA Report, and informed of the manner in which, and timeframe within which such comment must be made. The report was made available in soft copies to I&APs in accordance with the approved PP Plan. No hard copies of the report were made available for review and comment.

The EIA Report was made available on the Savannah Environmental website (i.e., online stakeholder engagement platform) (<https://www.savannahsa.com/public-documents/waste/>). A notification letter to all registered parties was distributed at the commencement of the 30-day review and comment period, on **Friday, 01 July 2022**. Where I&APs were not able to provide written comments (including SMS and WhatsApp), other means of consultation, such as telephonic discussions and discussions at the focus group meetings and community meeting held during the 30-day review and comment period were used.

All comments raised as part of the discussions and written comments submitted during the 30-day review and comment period have been recorded and included in **Appendix C6** of the EIA Report.

iv. Identification and Recording of Comments

Comments raised by I&APs to have been included into a Comments and Responses (C&R) Report. The C&R Report includes detailed responses from members of the EIA project team and/or the project proponent to the issues and comments raised. The C&R Report has been updated with all comments received during the 30-day review and comment period of the EIA Report and is included as **Appendix C8** in this Final EIA Report submitted to the DFFE for decision-making.

Notes of all the telephonic discussions, virtual meetings, and the community meeting conducted during the 30-day review and comment period of the EIA Report are included in **Appendix C7** of this Final EIA Report.

4.5. Outcomes of the DFFE Web-Based Screening Tool

In terms of GN R960 (promulgated on 5 July 2019) and Regulation 16(1)(b)(v) of the 2014 EIA Regulations (as amended), the submission of a Screening Report generated from the national web based environmental screening tool is compulsory for the submission of applications in terms of Regulations 19 and 21 of the EIA Regulations.

The requirement for the submission of a Screening Report (included as **Appendix M** of the EIA Report) for the general waste disposal site is applicable as it triggers Regulation 19 of the EIA Regulations, 2014, as amended. **Table 4.6** provides a summary of the specialist assessments identified in terms of the screening tool and responses to each assessment from the project team considering the development footprint under consideration.

Table 4.6: Sensitivity ratings from the DFFE's web-based online Screening Tool associated with the development of the general waste disposal site

Specialist Assessment	Sensitivity Rating as per the Screening Tool (relating to the need for the study)		Project Team Response
	Alternative A	Alternative B	
Soils and Agricultural Potential Assessment	Medium	Medium	A Wetland Delineation and Aquatic Biodiversity Impact Assessment and a Terrestrial Biodiversity Impact Assessment which also provide details of the soils identified within the project site, have been undertaken for the general waste disposal site (refer to Appendix D and E).
Archaeological and Cultural Heritage Assessment	Low	Low	A Heritage Impact Assessment has been undertaken for the general waste disposal site (refer to Appendix H).
Palaeontological Assessment	High	Medium	A Palaeontological Impact Assessment has been undertaken for the general waste disposal site (refer to Appendix I).
Terrestrial Biodiversity Assessment	Very high	Very high	A Terrestrial Biodiversity Impact Assessment has been undertaken for the general waste disposal site (refer to Appendix D).
Aquatic Biodiversity Assessment	Very high	Very high	A Wetland Delineation and Aquatic Biodiversity Impact Assessment has been undertaken for the general waste disposal site (refer to Appendix E).
Civil Aviation Assessment	High	High	The Civil Aviation Authority will be consulted throughout the EIA process to obtain input.
Defence Assessment	Low	Low	The project site is not located within close proximity of any military base.
Animal Species Assessment	Medium	Medium	A Terrestrial Biodiversity Impact Assessment (including fauna) has been undertaken for the general waste disposal site (refer to Appendix D).
Plant Species Assessment	Medium	Medium	A Terrestrial Biodiversity Impact Assessment (including flora) has been undertaken for the general waste disposal site (refer to Appendix D).

Specialist Assessment	Sensitivity Rating as per the Screening Tool (relating to the need for the study)		Project Team Response
	Alternative A	Alternative B	
Air Quality Assessment	The screening report does not indicate a rating for this theme		An Air Quality Impact Assessment has been undertaken for the general waste disposal site (refer to Appendix J).
Geotechnical and Geohydrological Assessment	The screening report does not indicate a rating for this theme.		Reports considering the Geotechnical and Geohydrological aspects of the site proposed for the development of the general waste disposal site have been undertaken and are included in the EIA Report as Appendix F and G .
Engineering Design Report	The screening report does not indicate a rating for this theme		An engineering design report has been prepared and is included as Appendix K to the EIA Report.

4.5. Assessment of Issues Identified throughout the EIA Process

Based on the outcomes of the Scoping Phase evaluation of the project, the following studies, with the exception of the Geotechnical Assessment (for the reasons detailed in Table 4.5), were identified as requiring detailed assessment. The specialist consultants involved in the assessment of these impacts are indicated in **Table 4.7** below.

Table 4.7: Specialist studies undertaken as part of the EIA Phase

Specialist	Specialist Study	Appendix
Duncan McKenzie of Digital Earth (Pty) Ltd	Terrestrial Biodiversity Impact Assessment (including flora and fauna)	Appendix D
Robert Palmer of Nepid Consultants CC	Wetland Delineation and Aquatic Biodiversity Impact Assessment	Appendix E
Paul Hansmeyer of Engeolab (Pty) Ltd	Geohydrological Assessment	Appendix F
	Geotechnical Investigation	Appendix G
JA van Schalkwyk	Heritage Impact Assessment	Appendix H
Elize Butler of Banzai Environmental	Palaeontological Impact Assessment	Appendix I
Nick Grobler of Airshed Planning Consultants	Air Quality Impact Assessment	Appendix J
Clive Wilson of WSM Group	Engineering Design Report	Appendix K

Specialist studies considered direct and indirect environmental impacts associated with the development of all components of the facility. Identified impacts are assessed in terms of the following criteria:

- » The **nature**, a description of what causes the effect, what will be affected, and how it will be affected
- » The **extent**, wherein it is indicated whether the impact will be local (limited to the immediate area or site of development), regional, national or international. A score of between 1 and 5 is assigned as appropriate (with a score of 1 being low and a score of 5 being high)
- » The **duration**, wherein it is indicated whether:
 - * The lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1
 - * The lifetime of the impact will be of a short duration (2–5 years) - assigned a score of 2
 - * Medium-term (5–15 years) – assigned a score of 3
 - * Long term (> 15 years) - assigned a score of 4

- * Permanent - assigned a score of 5
- » The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
 - * 0 is small and will have no effect on the environment
 - * 2 is minor and will not result in an impact on processes
 - * 4 is low and will cause a slight impact on processes
 - * 6 is moderate and will result in processes continuing but in a modified way
 - * 8 is high (processes are altered to the extent that they temporarily cease)
 - * 10 is very high and results in complete destruction of patterns and permanent cessation of processes
- » The **probability of occurrence**, which describes the likelihood of the impact actually occurring. Probability is estimated on a scale, and a score assigned:
 - * Assigned a score of 1–5, where 1 is very improbable (probably will not happen)
 - * Assigned a score of 2 is improbable (some possibility, but low likelihood)
 - * Assigned a score of 3 is probable (distinct possibility)
 - * Assigned a score of 4 is highly probable (most likely)
 - * Assigned a score of 5 is definite (impact will occur regardless of any prevention measures)
- » The **significance**, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high
- » The **status**, which is described as either positive, negative or neutral
- » The degree to which the impact can be reversed
- » The degree to which the impact may cause irreplaceable loss of resources
- » The degree to which the impact can be mitigated

The **significance** is determined by combining the criteria in the following formula:

$$S = (E+D+M) P; \text{ where}$$

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The **significance weightings** for each potential impact are as follows:

- » **< 30 points:** Low (i.e. where this impact would not have a direct influence on the decision to develop in the area)
- » **30-60 points:** Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated)
- » **60 points:** High (i.e. where the impact must have an influence on the decision process to develop in the area)

Specialist studies also considered cumulative impacts associated with similar developments within the broader project site. The purpose of the cumulative assessment is to test if such impacts are relevant to the proposed project in the proposed location (i.e., whether the addition of the proposed project in the area will increase the impact). In this regard, specialist studies considered whether the construction of the proposed development will result in:

- » Unacceptable risk
- » Unacceptable loss
- » Complete or whole-scale changes to the environment or sense of place
- » Unacceptable increase in impact

A conclusion regarding whether the proposed development will result in any unacceptable loss or impact considering all the projects proposed in the area is included in the respective specialist reports.

As the project developer has the responsibility to avoid or minimise impacts and plan for their management (in terms of the requirements of NEMA and the 2014 EIA Regulations (GNR 326)), the mitigation of significant impacts is discussed. Assessment of impacts with mitigation is made in order to demonstrate the effectiveness of the proposed mitigation measures. An EMPr that includes all the mitigation measures recommended by the specialists for the management of significant impacts is included as **Appendix N** to this EIA Report.

4.6. Assumptions and Limitations of the EIA Process

The following assumptions and limitations are applicable to the EIA process for the general waste disposal site:

- » All information provided by the developer and I&APs to the environmental team was correct and valid at the time it was provided.
- » It is assumed that the project site identified represents a technically suitable site for the establishment of the general waste disposal site and associated infrastructure (i.e., based on the surrounding land use, access to the site, access to infrastructure etc.)
- » The 6ha development footprint (the area that will be affected during the operation phase) will include the footprint for the general waste disposal site and associated infrastructure.
- » Conclusions of the specialist studies undertaken, and this overall impact assessment assume that any potential impacts on the environment associated with the proposed development will be avoided, mitigated, or offset in accordance with the relevant recommendations made.

Refer to the specialist studies contained in **Appendices D - K** for limitations specific to the independent specialist studies.

4.8. Legislation and Guidelines that have informed the preparation of this EIA Report

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

- » National Environmental Management Act (Act No. 107 of 1998).
- » EIA Regulations of December 2014, published under Chapter 5 of NEMA (as amended).
- » Department of Environmental Affairs (2017), Public Participation guidelines in terms of NEMA EIA Regulations.
- » Department of Environmental Affairs (2017), Integrated Environmental Management Guideline: Guideline on Need and Desirability.
- » Procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for environmental authorisation; and

- » International guidelines – the Equator Principles, the IFC Performance Standards, the Sustainable Development Goals, World Bank Environmental and Social Framework, and the and World Bank Group Environmental, Health, and Safety Guidelines (EHS Guidelines).

Several other Acts, standards or guidelines have also informed the project process and the impacts assessed in this EIA Report. A review of legislative requirements applicable to the proposed project as identified at this stage in the process is provided in **Table 4.8**.

Table 4.8: Relevant legislative permitting requirements applicable to the general waste disposal site

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
National Legislation			
Constitution of the Republic of South Africa (No. 108 of 1996)	<p>In terms of Section 24, the State has an obligation to give effect to the environmental right. The environmental right states that:</p> <p><i>“Everyone has the right –</i></p> <ul style="list-style-type: none"> » <i>To an environment that is not harmful to their health or well-being, and</i> » <i>To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:</i> <ul style="list-style-type: none"> * <i>Prevent pollution and ecological degradation,</i> * <i>Promote conservation, and</i> * <i>Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.”</i> 	Applicable to all authorities	There are no permitting requirements associated with this Act. The application of the Environmental Right however implies that environmental impacts associated with proposed developments are considered separately and cumulatively. It is also important to note that the “right to an environment clause” includes the notion that justifiable economic and social development should be promoted, through the use of natural resources and ecologically sustainable development.
National Environmental Management Act (No. 107 of 1998) (NEMA)	<p>The 2014 EIA Regulations have been promulgated in terms of Chapter 5 of NEMA. Listed activities which may not commence without EA are identified within the Listing Notices (GNR 327, GNR 325 and GNR 324) which form part of these Regulations (GNR 326).</p> <p>In terms of Section 24(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 of the relevant environmental authorisation.</p> <p>Considering the capacity of the proposed Angora Wind Farm (i.e., contracted capacity of 140MW) and the triggering of Activity 1 of Listing Notice 2 (GNR 325), a full</p>	<p>DFFE – Competent Authority</p> <p>Mpumalanga DARDLEA – Commenting Authority</p>	The listed activities requiring Environmental Authorisation in terms of the EIA Regulations, 2014, triggered by the proposed project have been identified and are being assessed as part of the EIA process currently underway for the project. The EIA process will culminate in the submission of a Final EIA Report (this report) to the DFFE for review and decision-making.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
<p>National Environmental Management Act (No 107 of 1998) (NEMA)</p>	<p>Scoping and EIA process is required in support of the Application for EA.</p> <p>In terms of the “Duty of Care and Remediation of Environmental Damage” provision in Section 28(1) of NEMA every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment.</p> <p>In terms of NEMA, it is 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>DFFE Mpumalanga DARDLEA</p>	<p>While no permitting or licensing requirements arise directly by virtue of the proposed project, this section finds application through the consideration of potential cumulative, direct, and indirect impacts. It will continue to apply throughout the life cycle of the project.</p>
<p>Environment Conservation Act (No. 73 of 1989) (ECA)</p>	<p>The Noise Control Regulations in terms of Section 25 of the ECA contain regulations applicable for the control of noise in the Provinces of Limpopo, North West, Mpumalanga, Northern Cape, Eastern Cape, and KwaZulu-Natal Provinces.</p> <p>The Noise Control Regulations cover the powers of a local authority, general prohibitions, prohibitions of disturbing noise, prohibitions of noise nuisance, use of measuring instruments, exemptions, attachments, and penalties.</p> <p>In terms of the Noise Control Regulations, no person shall make, produce, or cause a disturbing noise, or allow it to be made, produced or caused by any person, machine, device or apparatus or any combination thereof (Regulation 04).</p>	<p>DFFE Mpumalanga DARDLEA Dr Pixley Ka Isaka Seme Local Municipality</p>	<p>Noise impacts are expected to be associated with the project's construction phase. Considering the project area's location in relation to residential areas, and provided that appropriate mitigation measures are implemented, construction noise is unlikely to present a significant intrusion to the local community. There is therefore no requirement for a noise permit in terms of this legislation.</p>
<p>National Environmental Management: Waste Act (No. 59 of 2008) (NEM:WA)</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>DFFE – Hazardous Waste Mpumalanga DARDLEA</p>	<p>The development of the proposed general waste disposal site triggers waste management activities listed under Category</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<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>In terms of the Regulations published in terms of NEM:WA (GNR 921, a BA or EIA 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>– General Waste</p>	<p>B of GNR 921, and as such a Waste Management Licence is required to be obtained. The application for WML is required to be supported by a Scoping and EIA process.</p>
<p>National Water Act (No. 36 of 1998) (NWA)</p>	<p>A water use listed under Section 21 of the NWA must be licensed with the Regional DWS, unless it is listed in Schedule 1 of the NWA (i.e., is an existing lawful use), is permissible under a GA, or if a responsible authority waives the need for a licence.</p> <p>Water use is defined broadly, and includes consumptive and non-consumptive water uses, taking and storing water, activities which reduce stream flow, waste discharges and</p>	<p>Regional Department of Water and Sanitation</p>	<p>Seasonal and permanent wetlands are present within 80m and 320m of the proposed landfill site, respectively, as identified in the Wetland Delineation and Aquatic Biodiversity Impact Assessment. In addition, leachate from the site will be collected and contained in a leachate pond. As a result, a water use authorisation for the project will be required</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>disposals, controlled activities (activities which impact detrimentally on a water resource), altering a watercourse, removing water found underground for certain purposes, and recreation.</p> <p>Consumptive water uses may include taking water from a water resource (Section 21(a)) and storing water (Section 21(b)).</p> <p>Non-consumptive water uses may include impeding or diverting of flow in a water course (Section 21(c)), and altering of bed, banks or characteristics of a watercourse (Section 21(i)).</p>		<p>from the DWS. The process of applying for a water use authorisation is currently underway.</p>
<p>Minerals and Petroleum Resources Development Act (No. 28 of 2002) (MPRDA)</p>	<p>In accordance with the provisions of the MPRDA a mining permit is required in accordance with Section 27(6) of the Act where a mineral in question is to be mined, including the mining of materials from a borrow pit.</p> <p>Section 53 of the MPRDA states that any person who intends to use the surface of any land in any way which may be contrary to any object of the Act, or which is likely to impede any such object must apply to the Minister for approval in the prescribed manner.</p>	<p>Department of Mineral Resources and Energy (DMRE)</p>	<p>Any person who wishes to apply for a mining permit in accordance with Section 27(6) must simultaneously apply for an Environmental Authorisation in terms of NEMA. No borrow pits are expected to be required for the construction of the project, and as a result, a mining permit or EA in this regard is not required to be obtained.</p> <p>In terms of Section 53 of the MPRDA, approval is required from the Minister of Mineral Resources and Energy to ensure that the proposed development does not sterilise a mineral resource that might occur on site.</p>
<p>National Environmental Management: Air Quality Act (No. 39 of 2004) (NEM:AQA)</p>	<p>The National Dust Control Regulations (GNR 827) published under Section 32 of NEM:AQA prescribe the general measures for the control of dust in all areas, and provide a standard for acceptable dustfall rates for residential and non-residential areas.</p>	<p>Mpumalanga DARDLEA / Gert Sibande District Municipality</p>	<p>In the event that the project results in the generation of excessive levels of dust, the possibility could exist that a dustfall monitoring programme would be required for the project, in which case dustfall monitoring results from the dustfall monitoring programme would need to be included in a</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>In accordance with the Regulations (GNR 827) any person who conducts any activity in such a way as to give rise to dust in quantities and concentrations that may exceed the dustfall standard set out in Regulation 03 must, upon receipt of a notice from the air quality officer, implement a dustfall monitoring programme.</p> <p>Any person who has exceeded the dustfall standard set out in Regulation 03 must, within three months after submission of the dustfall monitoring report, develop and submit a dust management plan to the air quality officer for approval.</p>		<p>dust monitoring report, and a dust management plan would need to be developed.</p> <p>There is already a dust management plan and dust monitoring activities in place at the Majuba Power Station site, within which the general waste disposal site is proposed, which can be applied to this project, Therefore, the development of a new dust management plan is not required.</p>
<p>National Heritage Resources Act (No. 25 of 1999) (NHRA)</p>	<p>Section 07 of the NHRA stipulates assessment criteria and categories of heritage resources according to their significance.</p> <p>Section 35 of the NHRA provides for the protection of all archaeological and palaeontological sites, and meteorites.</p> <p>Section 36 of the NHRA provides for the conservation and care of cemeteries and graves by SAHRA where this is not the responsibility of any other authority.</p> <p>Section 38 of the NHRA lists activities which require developers or any person who intends to undertake a listed activity to notify the responsible heritage resources authority and furnish it with details regarding the location, nature, and extent of the proposed development.</p> <p>Section 44 of the NHRA 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.</p>	<p>South African Heritage Resources Agency (SAHRA)</p> <p>Mpumalanga Provincial Heritage Resource Authority</p>	<p>A Heritage Impact Assessment has been undertaken for the proposed project. From the Assessment, no sites, features or objects of cultural historic significance were identified in the study area that would be impacted on by the proposed project.</p> <p>Should a heritage resource be impacted upon, a permit may be required from SAHRA or Mpumalanga Provincial Heritage Resource Authority in accordance with Section 48 of the NHRA, and the SAHRA Permit Regulations (GN R668).</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
<p>National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA)</p>	<p>Section 53 of NEM:BA provides for the Minister to identify any process or activity in such a listed ecosystem as a threatening process.</p> <p>Three government notices have been published in terms of Section 56(1) of NEM:BA as follows:</p> <ul style="list-style-type: none"> » Commencement of TOPS Regulations, 2007 (GNR 150). » Lists of critically endangered, vulnerable and protected species (GNR 151). » TOPS Regulations (GNR 152). <p>It provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), and 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 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 (NEM:BA: National list of ecosystems that are threatened and in need of protection, (Government Gazette 37596, GNR 324), 29 April 2014).</p>	<p>DFFE</p> <p>Mpumalanga DARDLEA</p>	<p>Under NEM:BA, a permit would be required for any activity that is of a nature that may negatively impact on the survival of a listed protected species.</p> <p>A Terrestrial Biodiversity Impact Assessment has been undertaken as part of the EIA process. No protected plant species which require a permit under NEM:BA were identified within the project site.</p> <p>According to the assessment, several potentially occurring fauna and avifauna species are protected under the NEM:BA, namely:</p> <p>Mammal species</p> <ul style="list-style-type: none"> » Black-footed Cat » Serval » Oribi » Aardvark » Leopard » Brown Hyaena <p>Birds:</p> <ul style="list-style-type: none"> » Grey Crowned Crane <p>None of the above listed mammal and avifauna species were confirmed during the fieldwork. However, if encountered during the project development, a permit would be required to impact on or relocate these.</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
<p>National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA)</p>	<p>Chapter 5 of NEM:BA pertains to alien and invasive species, and states that a person may not carry out a restricted activity involving a specimen of an alien species without a permit issued in terms of Chapter 7 of NEM:BA, and that a permit may only be issued after a prescribed assessment of risks and potential impacts on biodiversity is carried out.</p> <p>Applicable, and exempted alien and invasive species are contained within the Alien and Invasive Species List (GNR 864).</p>	<p>DFFE Mpumalanga DARDLEA</p>	<p>A Terrestrial Biodiversity Impact Assessment was undertaken as part of the EIA process. Twenty-four (24) alien plant species were recorded within the study area during the field work, six (6) of which are listed as being invasive under the National Environmental Management: Biodiversity Act (Act No. 10 of 2004, NEMBA) Alien and Invasive Species Lists, 2016.</p>
<p>Conservation of Agricultural Resources Act (No. 43 of 1983) (CARA)</p>	<p>Section 05 of CARA provides for the prohibition of the spreading of weeds.</p> <p>Regulation 15 of GN R1048 published under CARA provides for the classification of categories of weeds and invader plants, and restrictions in terms of where these species may occur.</p> <p>Regulation 15E of GN R1048 published under CARA provides requirement and methods to implement control measures for different categories of alien and invasive plant species.</p>	<p>Department of Agriculture, Land Reform and Rural Development (DALRD)</p>	<p>CARA will find application throughout the life cycle of the project. In this regard, soil erosion prevention and soil conservation strategies need to be developed and implemented. In addition, a weed control and management plan must be implemented.</p> <p>In terms of Regulation 15E (GN R1048) where Category 1, 2 or 3 plants occur a land user is required to control such plants by means of one or more of the following methods:</p> <ul style="list-style-type: none"> » Uprooting, felling, cutting or burning. » Treatment with a weed killer that is registered for use in connection with such plants in accordance with the directions for the use of such a weed killer. » Biological control carried out in accordance with the stipulations of the Agricultural Pests Act (No. 36 of 1983), the ECA and any other applicable legislation. » Any other method of treatment recognised by the executive officer that

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
			<p>has as its object the control of plants concerned, subject to the provisions of sub-regulation 4.</p> <p>» A combination of one or more of the methods prescribed, save that biological control reserves and areas where biological control agents are effective shall not be disturbed by other control methods to the extent that the agents are destroyed or become ineffective.</p>
<p>National Forests Act (No. 84 of 1998) (NFA)</p>	<p>According to this Act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. Notice of the List of Protected Tree Species under the National Forests Act (No. 84 of 1998) was published in GNR 734.</p> <p>The prohibitions provide that "no 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>DFFE</p>	<p>A licence is required for the removal of protected trees. It is therefore necessary to conduct a survey that will determine the number and relevant details pertaining to protected tree species present in the development footprint for the submission of relevant permits to authorities prior to the disturbance of these individuals.</p> <p>The Biodiversity and Wetland Impact Assessment included a site visit, which allowed for the identification of protected trees that may require a license in terms of the NFA within the project site.</p> <p>No tree species which require a permit under this Act were recorded within the project site.</p>
<p>National Veld and Forest Fire Act (No. 101 of 1998) (NVFFA)</p>	<p>Chapter 4 of the NVFFA places a duty on owners to prepare and maintain firebreaks, the procedure in this regard, and the role of adjoining owners and the fire protection association. Provision is also made for the making of firebreaks on the international boundary of the Republic of South Africa. The applicant must ensure that firebreaks are</p>	<p>DFFE</p>	<p>While no permitting or licensing requirements arise from this legislation, this Act will be applicable during the construction and operation of the general waste disposal site, in terms of the preparation and maintenance of firebreaks, and the need to provide</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>wide and long enough to have a reasonable chance of preventing a veldfire from spreading to or from neighbouring land, it does not cause soil erosion, and it is reasonably free of inflammable material capable of carrying a veldfire across it.</p> <p>Chapter 5 of the Act places a duty on all owners to acquire equipment and have available personnel to fight fires. Every owner on whose land a veldfire may start or burn or from whose land it may spread must have such equipment, protective clothing and trained personnel for extinguishing fires, and ensure that in his or her absence responsible persons are present on or near his or her land who, in the event of fire, will extinguish the fire or assist in doing so, and take all reasonable steps to alert the owners of adjoining land and the relevant fire protection association, if any.</p>		<p>appropriate equipment and trained personnel for firefighting purposes.</p>
<p>Hazardous Substances Act (No. 15 of 1973) (HAS)</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> <ul style="list-style-type: none"> » Group I and II: Any substance or mixture of a substance that might by reason of its toxic, 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>Department of Health (DoH)</p>	<p>It is necessary to identify and list all Group I, II, III, and IV hazardous substances that may be on site and in what operational context they are used, stored, or handled. If applicable, a license would be required to be obtained from the DoH.</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>The use, conveyance, or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate license being in force.</p>		
Provincial Policies / Legislation			
<p>Mpumalanga Nature Conservation Act (No. 10 of 1998) (MNCA)</p>	<p>This Act makes provision with respect to nature conservation in the Mpumalanga province. It provides for, among other things, protection of wildlife, hunting, fisheries, protection of endangered fauna and flora as listed in the Convention on international Trade in Endangered Species of Wild Fauna and Flora, the control of harmful animals, freshwater pollution, and enforcement.</p>	<p>Mpumalanga DARDLEA</p>	<p>A Terrestrial Biodiversity Assessment Impact has been undertaken as part of the EIA process. According to the assessment, several potentially occurring fauna species are protected under the MNCA, namely:</p> <p>Mammal species:</p> <ul style="list-style-type: none"> » African Clawless Otter » Southern African Hedgehog » Spotted-necked Otter » Aardwolf » Grey Rhebok » Steenbok » Southern Mountain Reedbuck <p>However, none of the above mammal species were confirmed during fieldwork. However, if encountered during the project development, a permit would be required to impact on or relocate these.</p> <p>Should individuals of these species be impacted directly by the proposed facility, a permit from Mpumalanga DARDLEA for their removal/relocation will need to be applied for.</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
			No plant species protected under the MNCA were recorded during the field work. However, if any are encountered during the project development, a permit would be required to impact on or relocate these.

4.8.1. The Equator Principles 4 (October 2020)

The Equator Principles (EPs) 4 constitute a financial industry benchmark used for determining, assessing, and managing a project's environmental and social risks. The EPs are primarily intended to provide a minimum standard for due diligence to support responsible risk decision-making. The EPs are applicable to large infrastructure projects and apply globally to all industry sectors.

Such an assessment should propose measures to minimise, mitigate, and offset adverse impacts. In terms of the EPs, South Africa is a non-designated country, and as such, the assessment process for projects located in South Africa evaluates compliance with the applicable IFC Performance Standards on Environmental and Social Sustainability, and Environmental Health and Safety (EHS) Guidelines.

The new general waste disposal site is currently being assessed in accordance with the requirements of the EIA Regulations, 2014, as amended (GN R326), published in terms of Section 24(5) of the National Environmental Management Act (No. 107 of 1998) (NEMA), which is South Africa's national legislation providing for the authorisation of certain controlled activities. Through this assessment, all potential social and environmental risks are identified and assessed, and appropriate mitigation measures proposed.

4.8.2. International Finance Corporation (IFC) Performance Standards and Environmental and Social Sustainability (January 2012)

The International Finance Corporation's (IFC) Performance Standards (PSs) on Environmental and Social Sustainability were developed by the IFC and were last updated on 1 January 2012.

Performance Standard 1 requires that a process of environmental and social assessment be conducted, and an ESMS appropriate to the nature and scale of the project, and commensurate with the level of its environmental and social risks and impacts, be established and maintained. The above-mentioned standard is the overarching standard to which all the other standards relate. Performance Standard 2 through to 8 establish specific requirements to avoid, reduce, mitigate, or compensate for impacts on people and the environment, and to improve conditions where appropriate. While all relevant social and environmental risks and potential impacts should be considered as part of the assessment, the standards 2 and 8 describe potential social and environmental impacts that require particular attention specifically within emerging markets. Where social or environmental impacts are anticipated, the developer is required to manage them through its ESMS consistent with Performance Standard 1.

Given the nature of the proposed project, it is anticipated (at this stage of the process) that Performance Standards 1, 2, 3, 4, and 8 may be applicable to the project.

4.8.3. The IFC Environmental Health and Safety (EHS) Guidelines

The IFC EHS Guidelines are technical reference documents with general and industry specific examples of Good International Industry Practice (GIIP). The following IFC EHS Guidelines have relevance to the proposed project:

- » IFC EHS General Guidelines
- » IFC EHS Guidelines for Waste Management Facilities

The General EHS Guidelines are designed to be used together with the relevant Industry Sector EHS Guidelines. The application of the General EHS Guidelines should be tailored to the hazards and risks associated with a project and should take into consideration site-specific variables which may be applicable, such as host country context, assimilative capacity of the environment, and other project factors. In instances where host country regulations differ from the standards presented in the EHS Guidelines, whichever is the more stringent of the two in this regard should be applied.

The General EHS Guidelines include consideration of the following:

- » Environmental:
 - * Air Emissions and Ambient Air Quality
 - * Energy Conservation
 - * Wastewater and Ambient Water Quality
 - * Water Conservation
 - * Hazardous Materials Management
 - * Waste Management
 - * Noise
 - * Contaminated Land
- » Occupational Health and Safety:
 - * General Facility Design and Operation
 - * Communication and Training
 - * Physical Hazards
 - * Chemical Hazards
 - * Biological Hazards
 - * Radiological Hazards
 - * Personal Protective Equipment (PPE)
 - * Special Hazard Environments
 - * Monitoring
- » Community Health and Safety:
 - * Water Quality and Availability
 - * Structural Safety of Project Infrastructure
 - * Life and Fire Safety (L&FS)
 - * Traffic Safety
 - * Transport of Hazardous Materials
 - * Disease Prevention
 - * Emergency Preparedness and Response
- » Construction and Decommissioning:
 - * Environment
 - * Occupational Health & Safety
 - * Community Health & Safety

4.8.4. The IFC Environmental Health and Safety (EHS) Guidelines for Waste Management Facilities

The IFC Environmental Health and Safety Guidelines for Waste Management Facilities cover the most common methods of waste management, namely, waste collection and transport, waste receipt, unloading, processing, storage, landfill disposal, physico-chemical and biological treatment, as well as

incineration projects. These guidelines do not however cover other activities such as the management of radioactive wastes, co-incineration at combustion plants, or deep well injection.

The IFC Environmental Health and Safety Guidelines for Waste Management Facilities are meant for the design, construction and operation of facilities for the management of hazardous and non-hazardous wastes. The guidelines incorporate the general provisions of the World Bank policies for cultural properties, indigenous peoples, involuntary resettlement, biodiversity, water resources management and wildlands.

CHAPTER 5: DESCRIPTION OF THE RECEIVING ENVIRONMENT

This chapter provides a description of the local environment that may be affected by the development of the general waste disposal site and associated infrastructure. This information is provided in order to assist the reader in understanding the possible effects of the project on the environment within which it is proposed to be developed. Aspects of the biophysical, social, and economic environment that could be directly or indirectly affected by, or could affect, the proposed project have been described. This information has been sourced from existing information available for the area as well as collected field data by the specialist consultants to provide the context within which this S&EIA process is being conducted.

5.1 Legal Requirements as per the EIA Regulations for the undertaking of an Environmental Impact Assessment Report, 2014 (as amended)

This chapter includes the following information required in terms of Appendix 3: Scope of Assessment and Content Environmental Impact Assessment Reports:

Requirement	Relevant Section
3(1)(h)(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects.	The environmental attributes associated with the development of the general waste disposal site are included as a whole within this chapter. The environmental attributes that are described within this chapter include the following:
	The regional setting within which the project site is located is included in section 5.2 .
	The climatic conditions of the area within which the project site is located have been included in section 5.3 .
	The biophysical characteristics of the project site and the surrounding areas are described in section 5.4 . These include topography and terrain, geology, soils, groundwater, biodiversity (i.e., ecology, including flora and fauna), and aquatic features (including wetlands) of the area to be affected by the development of the proposed general waste disposal site.
	The heritage and cultural aspects (including archaeology and palaeontology) have been included in section 5.5 .
	A description of the air quality conditions of the area within which the project site is located has been included in section 5.6 .
	The social context within which the project site is located is described in section 5.7 .

A more detailed description of each aspect of the affected environment is included within the specialist reports (refer to **Appendix D – K**).

5.2. Regional Setting: Description of the Broader Study Area

The new general waste disposal site is proposed to be located within the Majuba Power Station property boundary, approximately 13km southwest of Amersfoort and 40km north-northwest of Volksrust, within

jurisdiction of the Dr Pixley Ka Isaka Seme Local Municipality, which forms part of the Gert Sibande District Municipality in the Mpumalanga Province. Access to the site is possible via the N11, onto existing secondary roads that lead to the site. Two (2) alternative sites are being considered for establishment of the general waste disposal site, namely Alternative A, located on Portion 6 of the Farm Witkoppies 81HS and Alternative B, located on Portions 1 and 2 of the Farm Witkoppies 81HS. Both sites are contained within Eskom-owned land.

The Mpumalanga Province, within which the project site is located, is the second-smallest province in South Africa and is located in the north-eastern part of the country, bordering Swaziland and Mozambique (Mpumalanga Spatial Development Framework, 2018). The Mpumalanga province covers an area of 76 495km² and has a population of 4 335 964, making it one of the most populous provinces in South Africa (Mpumalanga Spatial Development Framework, 2018). Mpumalanga is known for its mining, manufacturing, forestry, and service sectors. The Maputo Corridor, which links Mpumalanga with Gauteng and Maputo in Mozambique, harbours extensive potential in terms of economic development and growth for the region (Mpumalanga Spatial Development Framework, 2018). The Mpumalanga Province comprises three district municipalities, namely, Ehlanzeni, Gert Sibande and Nkangala (refer to **Figure 5.1**) – which contain seventeen local municipalities collectively, with the project site being located within the Gert Sibande District Municipality.

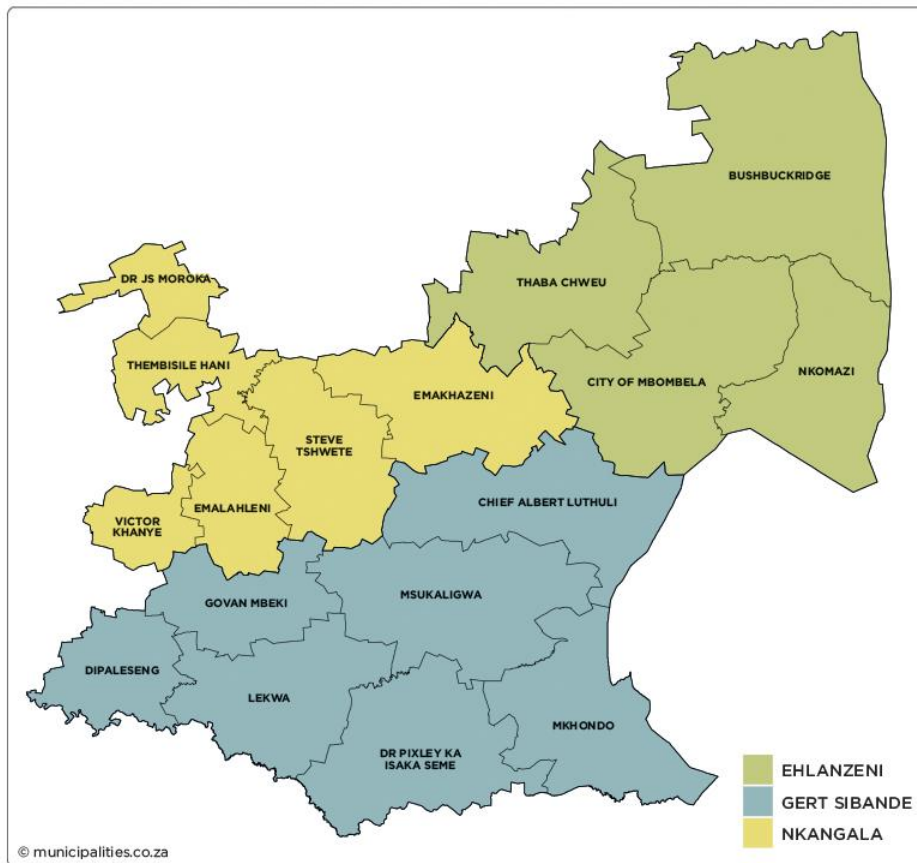


Figure 5.1: District municipalities of the Mpumalanga Province (Source: Municipalities of South Africa).

The Gert Sibande District Municipality is a Category C municipality bordered by the Ehlanzeni and Nkangala District Municipalities to the north, KwaZulu-Natal and the Free State to the south, Swaziland to the east, and Gauteng to the west. It is the largest of the three districts in the Mpumalanga Province, making up almost half of its geographical area. The Gert Sibande District Municipality comprises seven local municipalities, namely,

Govan Mbeki, Chief Albert Luthuli, Msukaligwa, Dipaleseng, Mkhondo, Lekwa and Dr Pixley ka Isaka Seme (refer to **Figure 5.2**). According to Stats SA (2016 Community Survey), Gert Sibande's population increased from 1 043 194 in 2011 to 1 135 409 people in 2016. This makes the district the smallest district in terms of population amongst the three districts in the Province. The economy of the Gert Sibande District Municipality is driven by manufacturing, agriculture, transport, trade, community services, construction, electricity, finance and mining.



Figure 5.2: Local municipalities of the Gert Sibande District Municipality (Source: Municipalities of South Africa).

The broader project site for the establishment of the general waste disposal site and associated infrastructure is located in the Dr Pixley Ka Isaka Seme Local Municipality. The Dr Pixley Ka Isaka Seme Local Municipality is a Category B municipality situated within the Gert Sibande District in the Mpumalanga Province. It is bordered by Msukaligwa Local Municipality in the north, the Free State and KwaZulu-Natal Provinces in the south, Mkhondo Local Municipality in the east, and Lekwa Local Municipality in the west. The Dr Pixley Ka Isaka Seme Local Municipality comprises 11 wards and covers a geographical area of 5 227km². The economy of the municipality is driven by agriculture, trade, community services, construction, finance, manufacturing, transport, utilities and mining.

5.3. Climatic Conditions

The project site is located within the Highveld Climatic Region, which is characterised by cold, dry winters and moderate to wet summers. Rainfall in the area is mainly in the summer between October to March, with little rainfall in the winter. The greatest rainfall occurs in December and the lowest in June. Average rainfall in the area is approximately 950 mm per year.

The average temperature recorded at the Eskom Majuba Air Quality Monitoring Station (AQMS) over the 2016 to 2019 period was 15.4°C, with the lowest temperature recorded in June (-4.13°C) and the highest temperature recorded in October (33.2°C).

The monthly average diurnal temperature profile for the 2016 to 2019 period is shown in **Figure 5.3**. Temperatures reach a maximum between 14:00 and 16:00 in the afternoon and a minimum between 6:00 and 8:00 in the morning (i.e., just before sunrise).

During the day the wind is predominantly from the west, with a secondary component from the east, with fairly strong wind speeds and little calms. During the night the wind field shifts to be mainly from the east and southeast. The wind is generally stronger during the day with more frequent calms during the night.

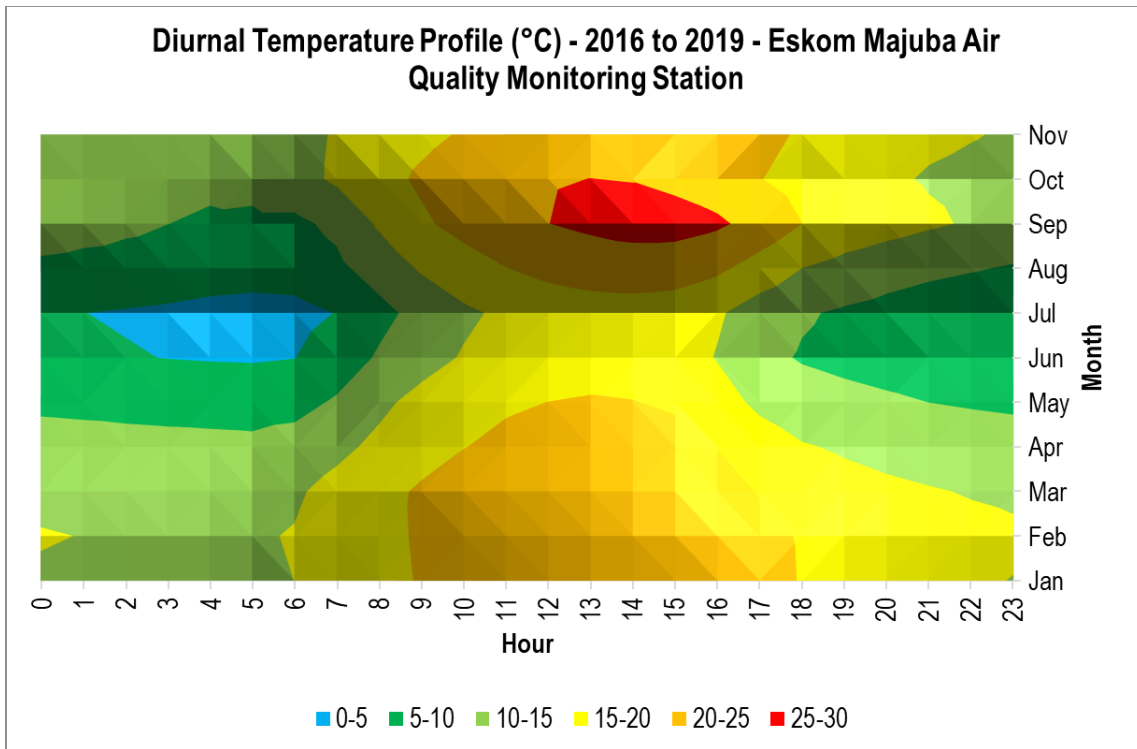


Figure 5.3: Monthly average diurnal temperature profile as recorded at the Eskom Majuba AQMS.

5.4. Biophysical Characteristics of the Study Area

5.4.1 Topographical Profile

The topography of the project site comprises moderately undulating plains, with elevation ranging between 1 738 and 1 777 metres above sea level (masl) (refer to **Figure 5.4**). The topography of the area surrounding the site where the new general waste disposal site is proposed has been modified by the construction of the existing closed, landfill site, the existing gravel road, as well as the construction of the Majuba Power Station and associated infrastructure to the north thereof.



Figure 5.4: Elevation profile of the project site (Source: Google Earth).

5.4.2 Geology and Soils

5.4.2.1 Geology

The geology of the project site is depicted in **Figure 5.5** below. The project site is primarily underlain by Jurassic dolerite (Jd, red), while surrounding areas are underlain by potentially fossiliferous sedimentary rocks of the Early Permian Volksrust Formation (Pvo, orange) (Ecca Group, Karoo Supergroup). However, recent Shape files (Council for Geosciences, Pretoria) indicate that the proposed waste disposal site is entirely underlain by the Volksrust Formation (Ecca Group, Karoo Supergroup).

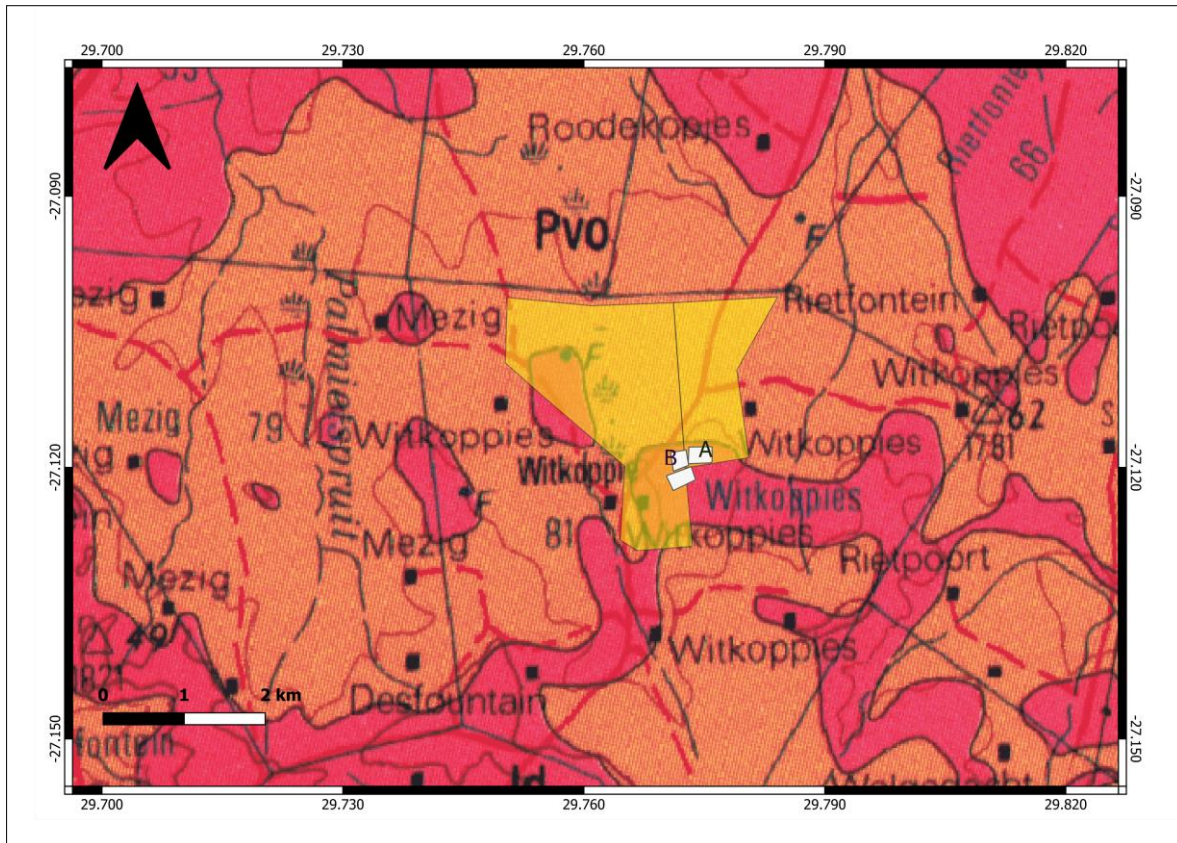


Figure 5.5: Extract from the 1:250 000 Geological Map 2728 Frankfort (Muntingh1987) indicating the project site.

5.4.2.1 Soil Profile

The project site comprises two soil forms, namely Kronstad and Rensburg soil forms (refer to **Figure 5.6**). The Kroonstad soil form is characterised by an Orthic A-horizon, grey, low chroma colours, with or without mottling, and is found in areas of semi-permanent wetness. This soil form covers most of the project site, and is wet, deep, and uniform along the catena, with no significant changes in colour or texture between crests and valley bottoms. The Kroonstad soil form is largely impermeable when wet and as such, infiltration of rain is low and runoff of is high. The Rensburg soil form, which is a vertic, hydromorphic soil, is characterised by a vertic A-horizon and is underlain by glued subsoil. This soil form is mostly confined to the permanent seepage wetland and the south-eastern boundary of the project site. However, localised areas with gilgai, indicative of seasonal saturation, are also present at other sections of the project site.



Figure 5.6: Soil profiles ((A&B) Rensburg Soil Formation; (C&D) Kroonstad Soil Formation).

A geotechnical study was undertaken as part of the S&EIA process in order to determine the suitability of the site for the development of a general waste disposal site. Of particular importance is the availability of suitable capping material (i.e., soil) for rehabilitation of the general waste disposal site.

As part of the geotechnical study, nine test pits were excavated on Alternative A and the existing, closed landfill site using a CAT 422E tractor-loader-backhoe to refusal depths ranging between 0.5 and 2.6m below existing ground level (refer to **Figure 5.7**). Test pits deeper than 1.5m were profiled from surface for safety reasons. The nine soil samples collected from the test pits were submitted to a laboratory for testing in order to confirm the in-situ assessments of moisture, grading, plasticity, consistency, structure and to ascertain the engineering properties of each horizon.

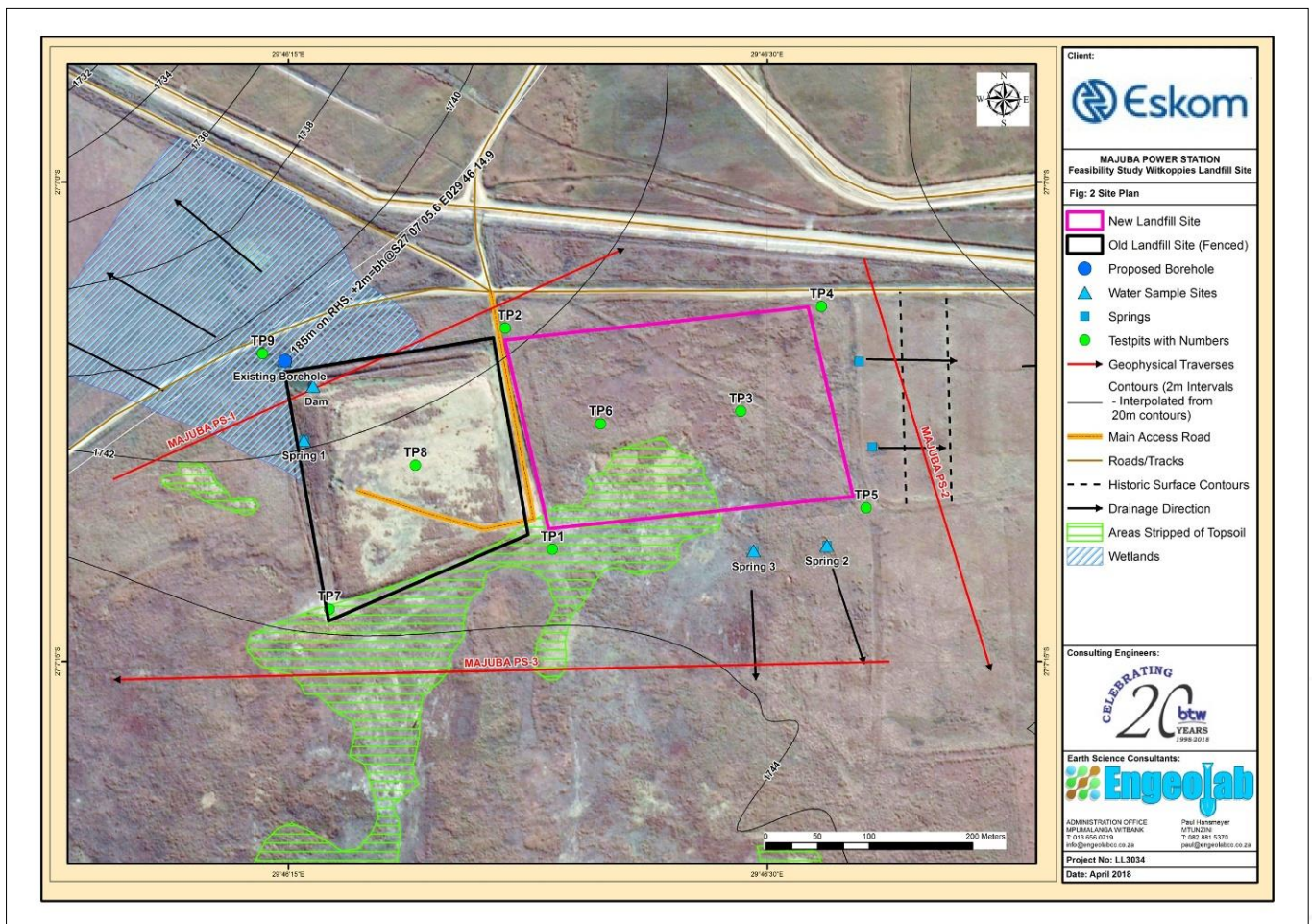


Figure 5.7: Site plan showing the location of the nine test pits.

Table 5.1 below indicates a description of the soil profile for Alternative A.

Table 5.1: Soil profile for Alternative A (Source: Engeolab, 2018)

SOIL PROFILE FOR THE NEW GENERAL WASTE DISPOSAL FACILITY		
AVERAGE DEPTH (m-m)	ORIGIN	DESCRIPTION
SAMPLE RESULTS FOR TP01		
0.00-0.30	Clayey Sand	Moist, dark brown, loose, intact with grass roots; transported Topsoil
0.30-0.40	Sandy Clay	Moist, light beige, firm, intact, with angular and tubular shale fragments, transporter Soils

SOIL PROFILE FOR THE NEW GENERAL WASTE DISPOSAL FACILITY		
AVERAGE DEPTH (m-m)	ORIGIN	DESCRIPTION
0.40 – 0.50	Clayey Sand derived from in-situ decomposed Dolerite	Moist, dark-khaki-brown, medium dense, intact, coarse surgery textured
SAMPLE RESULTS FOR TP02		
0.00-0.70	Sandy clay with grass roots; Hillwash	Moist, dark brown, firm, intact
0.70 – 0.90	Clay derived from in-situ decomposed Shale	Moist, beige streaked yellowish-orange, firm to stiff, intact
0.90 -1.00	Very soft rock shale	Light beige-streaked orange with some relict fracture surface and bedding planes
SAMPLE RESULTS FOR TP03		
0.00 -0.30	Clayey Sand, Hillwash	Moist, dark brown to greyish-black, medium dense and intact
0.30-1.00	Clayey Sand derived from in-situ decomposed Dolerite	Moist, dark-khaki-brown, medium dense, intact, coarse surgery textured
1.00 – 2.10	Decomposed to highly weathered amygdaloidal Dolerite	Dark khaki-brown with ivory specks, close to medium fractured with zones of spheroidal gravels in a sugary textured matrix
2.10 -2.20	Less weathered Dolerite than above	
SAMPLE RESULTS FOR TP04		
0.00 – 0.30	Sandy Clay; Hillwash	Moist, dark greyish-brown, firm and intact
0.30 – 0.80	Shale and clay	Abundant orange-brown partially slaked flakey shale, tubular shale gravels in a matrix of moist and dull grey clay
0.80-1.20	Soft Rock Shale	Dull grey, highly weathered, thinly bedded and close to medium jointed
1.20	Weathered Shale	Refusal on dull grey slightly
SAMPLE RESULTS FOR TP05		
0.00 – 0.30	Sandy Clay with grass roots; Hillwash	Moist, dark greyish-brown, firm and intact
0.30 -0.90	Clayey Sand derived from in-situ decomposed amygdaloidal Dolerite	Moist, Khaki-brown speckled ivory, loose to medium dense, sugary textured
0.90 – 2.10	Amygdaloidal Dolerite	Brown speckled ivory, medium weathered, medium fractured, highly weathered, and very soft.
2.10	Dolerite	Refusal on brown stained, medium fractured and slightly weathered.
SAMPLE RESULTS FOR TP06		
0.00 – 0.40	Sandy Clay with grass roots; Hillwash	Moist, dark greyish-brown, firm, intact,
0.40 – 0.90	Clayey Sand derived from in-situ decomposed Dolerite	Moist, Khaki-brown, medium dense, intact and coarse surgery textured.

SOIL PROFILE FOR THE NEW GENERAL WASTE DISPOSAL FACILITY		
AVERAGE DEPTH (m-m)	ORIGIN	DESCRIPTION
0.90- 1.80	Amygdaloidal Dolerite	Brown speckled ivory, medium weathered, medium fractured and highly weathered very soft
1.80	Dolerite	Less weathered

Notes for TP01: No seepage; Refusal on fractured dolerite
 Notes for TP02: No seepage; Sampled as DS2A 0.1-0.9 m (refer to the feasibility study)
 Notes for TP03: No seepage
 Notes for TP04: Point seepage at 1.2 m; sampled as: DS4A 0.3m – 0.8m (refer to the feasibility study)
 Notes for TP05: Ponding in base of test; sampled as follows: DS5A at 0.1m – 0.3m; DS5B 0.3m-0.9m; DS5C 0.9m – 2.1m.
 Notes for TP06: No seepage; sampled as DS6A at 0.4m – 0.9.

5.4.2.2 Excavatability and Foundation Type

The average excavation depth on the proposed general waste disposal site (Alternative A) is 1.3m. An estimated total of 65 130m³ of soft excavatable material and some 15 000m³ should be available for construction/backfilling/capping purposes. No boulder excavation is envisaged on site and hard rock excavation can be expected at Tractor-Loader-Backhoe (TLB) refusal depth.

It is assumed that the proposed landfill site will be excavated to bedrock level which is present at an average depth of 1.3m. The foundation materials, both shale and dolerite bedrock, are regarded as competent or stronger than fill materials and are therefore not subject to adverse pore pressure or adverse geological structures.

The excavation refusal depths presented in **Figure 5.8** indicate a deeper excavation trend along the ridge and to the south-east which should be taken into account with the future investigation/planning of the site.

5.4.2.3 Clay Liner and Capping Material

Site soils suitable for clay liner application and capping material required at the proposed landfill are present on site but not in sufficient quantities. Additional material will have to be obtained elsewhere. Several alternative sites have been identified in close proximity to the site. Other options include the use of soil/ash mixes, geosynthetic clay liners or soil enhancement by mixing the on-site materials with bentonite or resins. The latter is very expensive and requires extensive laboratory testing to determine the required mixture to achieve the necessary permeability requirements to ensure consistent mixing, moisturising and placing.

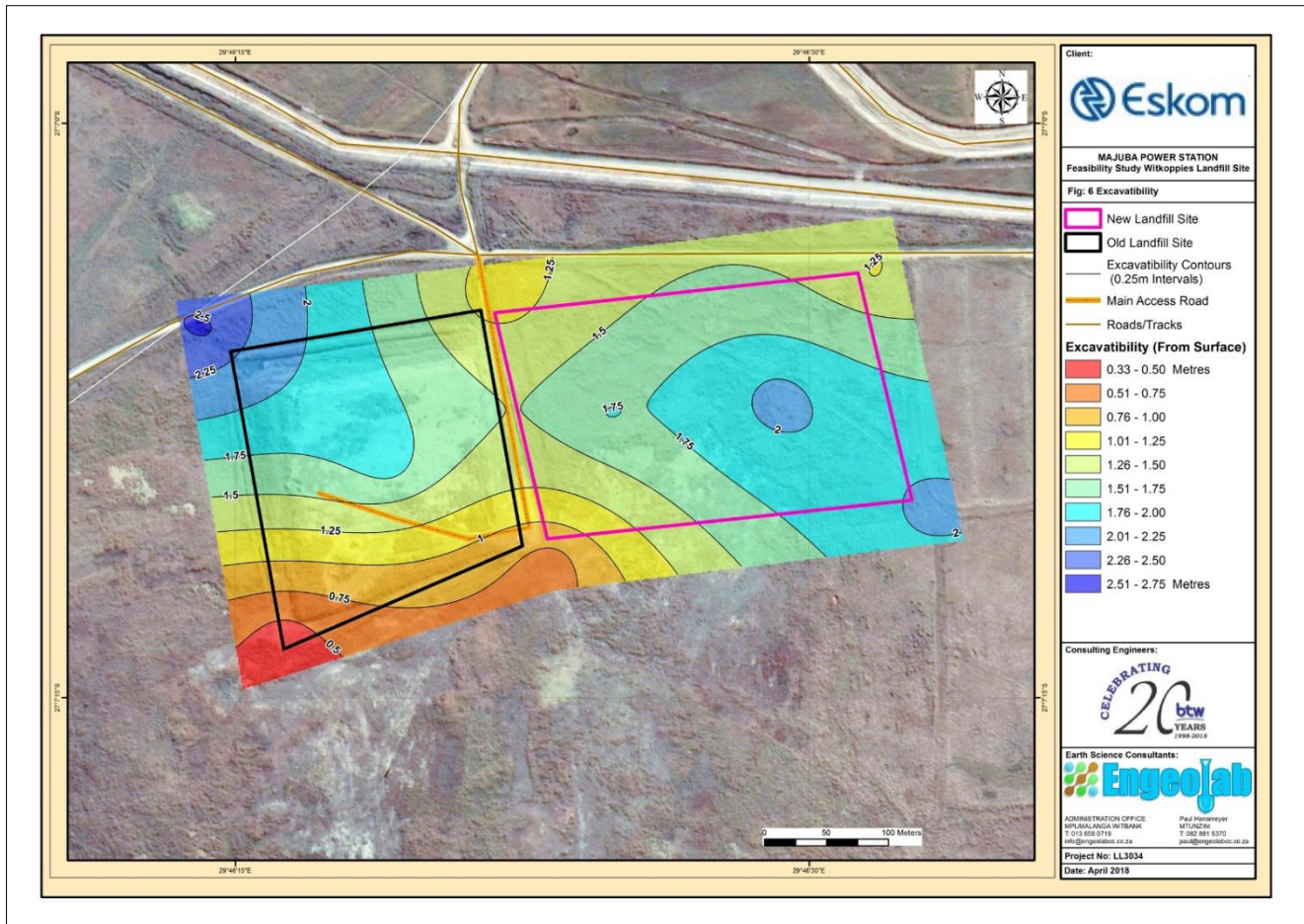


Figure 5.8: Excavatability of the site (Alternative A).

5.4.3 Land Use

The project site comprises disturbed grassland, most of which appears to have been cultivated in the past, but not for at least ten years. As such, the area is classified as “*virgin soil with indigenous vegetation*” in terms of the National Environmental Management Act (No. 107 of 1998) EIA Regulations, 2014, as amended. There is an existing, closed landfill located adjacent to both Alternatives A and B. A network of unpaved roads associated with the operation of the Majuba Power Station is also present within the project site.

5.4.4 Ecological Profile of the Study Area and Development Area

5.4.4.1 Broad-Scale Vegetation Patterns

The study area is situated within the Mesic Highveld Grassland Bioregion in the Grassland Biome. This is the second largest biome in South Africa, occupying 27.9% of the surface area (Mucina & Rutherford 2006). White (1983) considers the interior grasslands of South Africa to fall within the Kalahari – Highveld Regional Transition Zone. This Zone separates the Zambezi and Karoo-Namib Regional Centres of Endemism and runs diagonally across Africa from 13° south in southern Angola to 33° south in the Eastern Cape Province of South Africa.

The project site within which the development footprint for the general waste disposal site and associated infrastructure will be located is mapped as falling within the Amersfoort Highveld Clay Grassland as illustrated in **Figure 5.9**.

Amersfoort Highveld Clay Grassland

The Amersfoort Highveld Clay Grassland occurs in the Mpumalanga and KwaZulu-Natal provinces. This vegetation unit extends in a north-south band from just south of Ermelo, down through Amersfoort to the Memel area in the south. The Amersfoort Highveld Clay Grassland comprises undulating grassland plains with small, scattered portions of dolerite outcrops in areas. It also comprises a short, closed grassland cover, largely dominated by a dense *Themeda trianda* sward, often severely grazed to form a short lawn.

Amersfoort Highveld Clay Grassland occurs on vertic soils in a strip from just south of Ermelo in Mpumalanga, through Amersfoort, and to the Memel area in the Free State in the south at an elevation of between 1 580 and 1 860 mamsl. Amersfoort Highveld Clay Grassland originally covered about 280 000ha, of which 35% has been transformed, mostly through agriculture, mining and urbanisation. Despite it being considered Hardly Protected, it has a provincial ecosystem status of Least Concern.

Amersfoort Highveld Clay Grassland is not listed as a Threatened Ecosystem (Notice 1002 of Government Gazette 34809, 9 December 2011). The Amersfoort Highveld Clay Grassland is considered vulnerable. The conservation target for this unit is 27% but none is protected. Some 25% of the unit is transformed, predominantly by cultivation (22%). The area is not suited to afforestation. Silver and black wattle (*Acacia* species), and *Salix babylonica* invade drainage lines, the erosion potential is however very low.

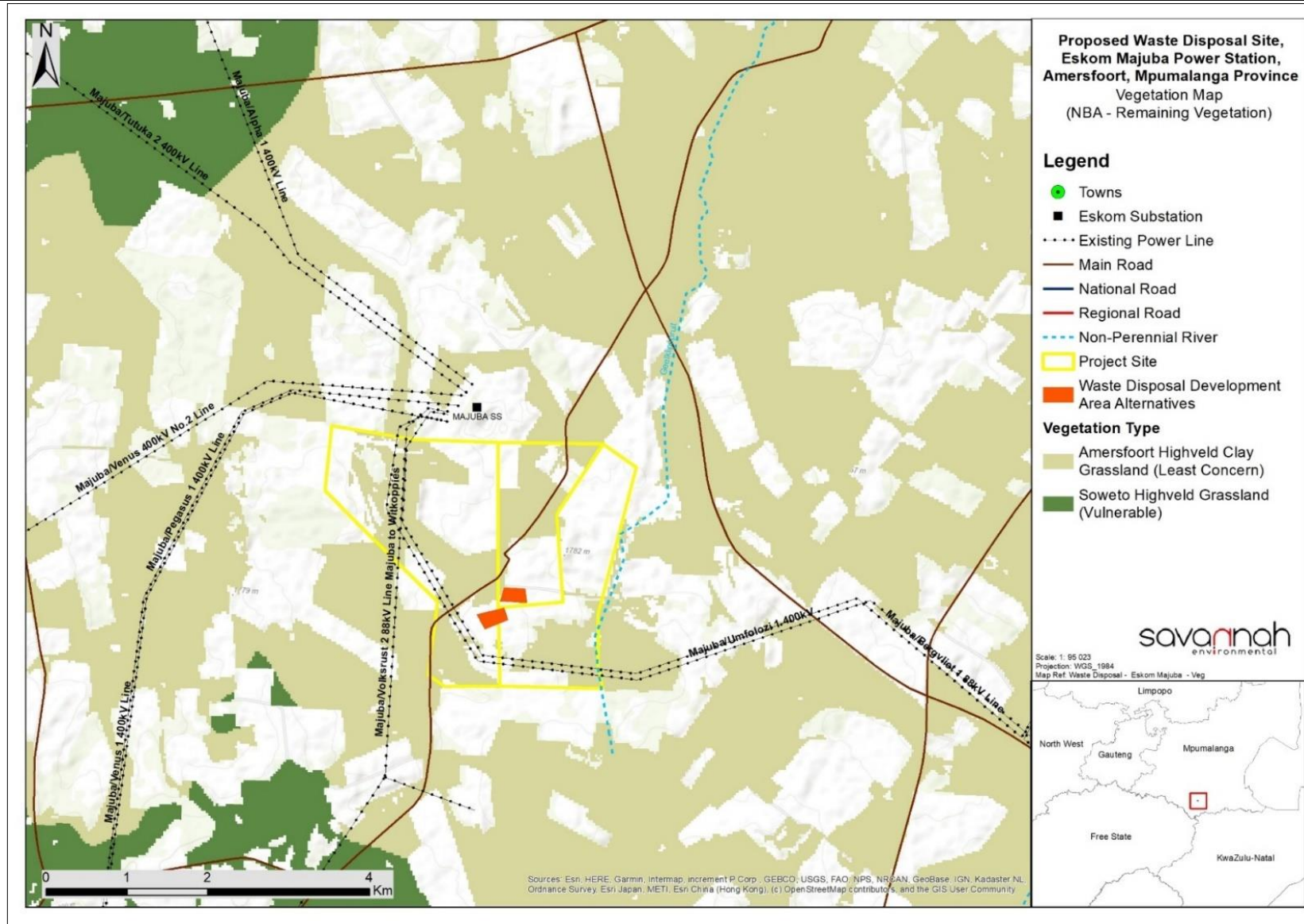


Figure 5.9: National vegetation map for the study area showing that the site for the general waste disposal site and associated infrastructure falls within the Amersfoort Highveld Clay Grassland.

5.4.4.2 Fine-Scale Vegetation Patterns

The South African National Biodiversity Institute's (SANBI) Botanical Database of Southern Africa (BODATSA) lists 298 plant species from 59 families for a 20km radius of the project site. This list excludes species recorded from the Escarpment grasslands around Wakkerstroom to the east of the project site, which would not be relevant. Due to the small size and disturbed conditions within the project site, only 86 plant species from 26 families were recorded during the March 2022 fieldwork, representing 29% of the BODATSA total. The true plant species diversity of the project site is likely to be slightly higher, particularly with regard to herbaceous species, which are often more conspicuous early in the wet season. The full list of plant species confirmed to occur in the project site during the fieldwork is provided in Appendix 1 of the Terrestrial Biodiversity Impact Assessment (refer to **Appendix D**). The dominant plant families are the Asteraceae (26 spp.) and Poaceae (24 spp.).

Two untransformed vegetation communities were identified within the project site on the basis of distinctive vegetation structure (grassland, woodland, thicket, etc.), floristic composition (dominant and diagnostic species) and position in the landscape (mid-slopes, terrace, crest, etc.). These communities are described in detail below (alien plant species are indicated by an asterisk). Representative photographs of these communities are presented in **Figure 5.10**, and they are spatially presented in **Figure 5.11**.

***Aristida congesta* – *Heteropogon contortus* Short Grassland**

This vegetation community occurs in scattered pockets throughout the development footprint alternatives, but particularly within Alternative B (refer to **Figure 5.11**). *Aristida congesta* – *Heteropogon contortus* Short Grassland covers approximately 5.5ha, which represents 47% of the total area surveyed. Vegetation structure can best be described as Low Closed Grassland (refer to **Figure 5.11**). The community contains high disturbance levels from historical bulk earthworks, overgrazing, alien plant infestation and dumping of rubble.

This community is dominated by grasses, including *Aristida congesta* subsp. *barbicollis*, *A. adscensionis*, *Heteropogon contortus*, *Eragrostis chloromelas*, *E. plana* and *Sporobolus africanus*. Herbaceous plants are fairly diverse and dominated by *Acalypha angustata*, *Hermannia transvaalensis*, *H. depressa*, *Hilliardiella aristata*, *H. oligocephala*, *Helichrysum caespitium*, *H. pilosellum*, *Selago densiflora* and *Berkheya radula*. Geophytes include *Hypoxis obtusa* and *Ledebouria ovatifolia*, and the dwarf shrub *Seriphium plumosum* is found singly throughout.

A total of 80 plant species, or 93% of the total species list, was recorded from Short Grassland, the higher of the two communities present. Species fidelity is high, with 55 species (69%) being restricted to this community.

***Hyparrhenia hirta* Secondary Grassland**

This community covers 6.1ha of the development footprint alternatives, or 53%. It occurs over most of the development footprint alternatives, but particularly in Alternative A (**Error! Reference source not found.** to **Figure 5.11**). Vegetation structure can best be described as High Closed Grassland (**Error! Reference source not found.** to **Figure 5.10**). Historical anthropogenic disturbances such as those associated with historical ploughing, overgrazing and cattle trampling have resulted in a disturbed ecological state in this community.

The robust grass *Hyparrhenia hirta* strongly dominates this community, outcompeting most other plant species and growing in monospecific stands across the study area. Less frequent grasses include *Cynodon dactylon*, *Sporobolus africanus*, *S. pyramidalis*, *Eragrostis curvula*, *E. plana* and *Aristida congesta* subsp. *barbicollis*. Herbs

are mostly represented by pioneer and alien species, such as *Cirsium vulgare*, *Hibiscus trionum*, *Plantago lanceolata*, *Verbena bonariensis*, *Cosmos bipinnatus* and *Oenothera rosea*.

A total of 31 plant species, or 36% of the total species list, was recorded from Secondary Grassland. Sixteen of these (or 52%) are alien species, highlighting the disturbed nature of this community. Species fidelity is low, with only six species (19%) being restricted to this community.

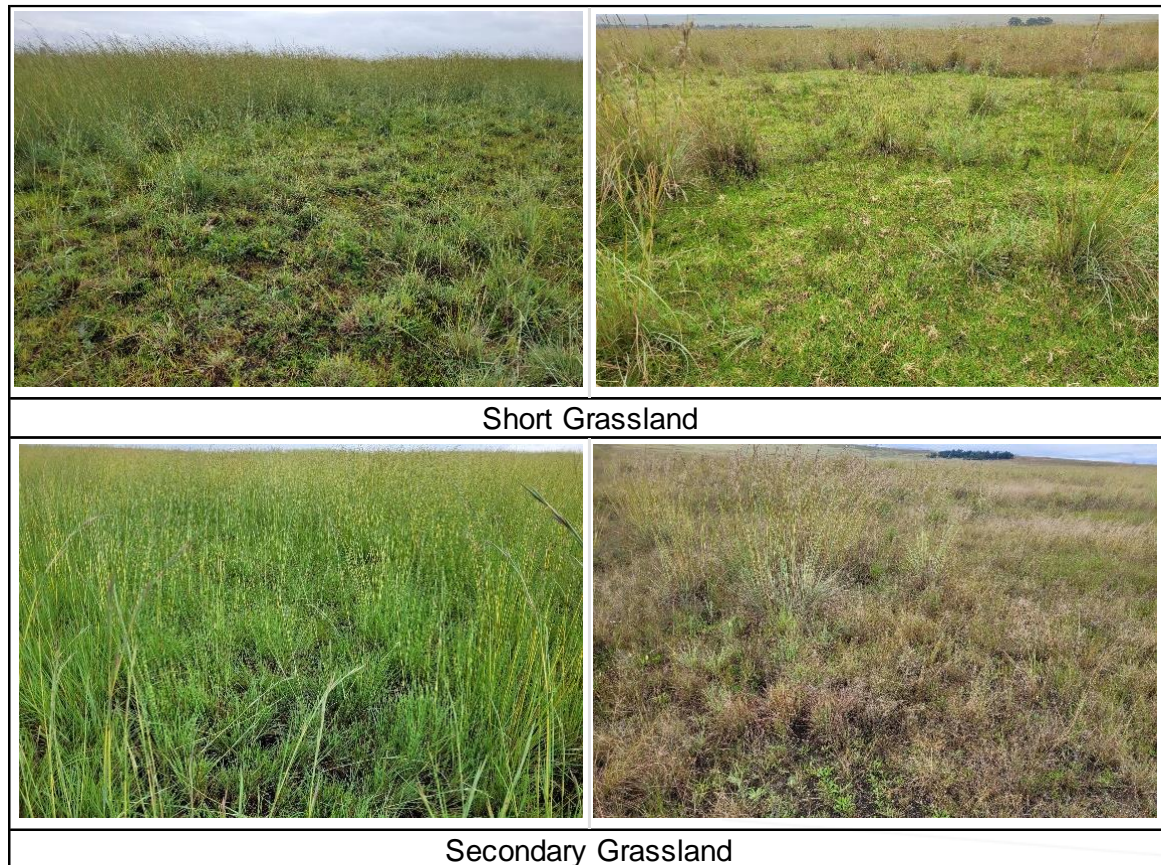


Figure 5.10: Photographs of vegetation communities present within the development footprint alternatives.



Figure 5.11: Spatial presentation of vegetation communities located within the development footprint alternatives.

5.4.4.3 Conservation Important Plant Species

The project site is situated within a region that has a low to moderate concentration of species of conservation concern (SCC), with an estimated twelve (12) plant species with a threat status of near threatened (NT) or higher having either been recorded from within the QDGS 2729 BB or surrounding grids with similar habitat or are widespread in the Highveld and are likely to occur within the general vicinity of the study area (refer to **Table 5.2**). None of these species were confirmed during fieldwork due to the disturbed state of the development footprint alternatives, the small size of potentially suitable habitat present, and regional scarcity or lack of suitable habitat.

Table 5.2: Potentially occurring plant species of conservation concern

Species	Red Data Status	Habitat Preference	Optimal Survey Time	Likelihood of Occurrence	Justification
Family Aizoaceae					
<i>Khadia alticola</i>	Rare	Montane grassland in shallow, sandy, humus-rich soil pockets and crevices between rock plates above 2000 m	Throughout the year (even when sterile)	Very Low	Unsuitable habitat and altitude, none located during fieldwork
Family Amaryllidaceae					
<i>Nerine gracilis</i>	VU	Undulating grasslands in damp areas	Nov-April (flowering time)	Low	No suitable habitat present
<i>Nerine platypetala</i>	VU	Montane grassland, margins of permanently moist vleis and levees of riverbanks	Nov-April (flowering time)	Low	No suitable habitat present
Family Apocynaceae					
<i>Aspidoglossum xanthosphaerum</i>	VU	Montane grassland, marshy sites, 1800 m	Nov-April (flowering time)	Low	None located during fieldwork, no suitable habitat present
<i>Pachycarpus suaveolens</i>	VU	Short or annually burnt grasslands, 1400-2000 mamsl	Nov-April (flowering time)	Very Low	Very rare species and only known from eight localities. Habitat

Species	Red Data Status	Habitat Preference	Optimal Survey Time	Likelihood of Occurrence	Justification
					present is degraded.
<i>Miraglossum davyi</i>	VU	Escarpment grassland	Nov-April (flowering time)	Low	No suitable habitat present
Family Asphodelaceae					
<i>Kniphofia typhoides</i>	NT	Low lying wetlands and seasonally wet areas in climax <i>Themeda triandra</i> grasslands on heavy black clay soils	Nov-April (flowering time)	Very Low	No suitable habitat present
Family Asteraceae					
<i>Cineraria austrotransvaalensis</i>	NT	Amongst rocks on steep hills and ridges, at the edge of thick bush or under trees on a range of rock types: quartzite, dolomite and shale, 1400-1700 m.	Throughout the year (even when sterile)	Very Low	No suitable habitat present
Family Crassulaceae					
Sensitive Species 851	VU	Occurs in shallow vleis and marshes in high altitude montane grassland.	Throughout the year (even when sterile)	Very Low	No suitable habitat present
Family Hyacinthaceae					
<i>Merwillia plumbea</i>	NT	Montane Mistbelt and Ngongoni grassland, rocky areas on steep, well drained slopes	Nov-April (flowering time)	Very Low	None located during fieldwork
Family Iridaceae					
<i>Gladiolus malvinus</i>	VU	Dolerite outcrops in	Nov-April (flowering time)	Low	Unsuitable altitude, no suitable

Species	Red Data Status	Habitat Preference	Optimal Survey Time	Likelihood of Occurrence	Justification
		grassland, around 2000 m			habitat present
<i>Gladiolus robertsoniae</i>	NT	Dolerite outcrops in grassland; also seeps and streambanks	Nov-April (flowering time)	Low	No suitable habitat present
NT - Near Threatened					
VU - Vulnerable					

5.4.4.4 Protected Plant and Tree Species

During the field survey undertaken in March 2022, no tree species protected in terms of the National Forest Act (No. 84 of 1998) were recorded within the development footprint alternatives. Furthermore, no plant species protected under the NEM:BA and the MNCA were identified within the development footprint alternatives.

5.4.4.5 Alien Species

Twenty-four (24) alien plant species were recorded from within the development footprint alternatives during the fieldwork, six (6) of which are listed as being invasive under the National Environmental Management: Biodiversity Act (Act No. 10 of 2004, NEMBA) Alien and Invasive Species Lists, 2016 (refer to Appendix 1 of the Terrestrial Biodiversity Impact Assessment which is attached as **Appendix D** to this EIA Report). This highlights the severity of infestation within the development footprint alternatives.

5.4.4.6 Conservation Areas

There is only one formerly declared conservation area near the proposed project site, namely, the Nature Reserve located within the Majuba Power Station property boundary. Other conservation areas close to the site are the Rietvaal Conservancy, which is located ~24km to the north-northeast of the project site and Wakkerstroom Wetland Nature Reserve, located ~44km south-east of the project site.

5.4.4.7 Critical Biodiversity Areas

Alternative A is situated within an area classified as Heavily or Moderately Modified and Critical Biodiversity Area (CBA) Irreplaceable by the Mpumalanga Biodiversity Sector Plan (MBSP) (refer to **Figure 5.12**).

Alternative B is mostly situated within an area classified as CBA Irreplaceable by the MBSP, with the eastern section of the site being situated within an area classified as Heavily or Moderately Modified (refer to **Figure 5.12**). CBA Irreplaceable areas are areas that are the most important in Mpumalanga for meeting biodiversity targets outside of formally protected areas and for conserving critical biodiversity ecosystems. CBA areas should be maintained in a natural state with no further loss of natural habitat. The desired management objective in these areas is conservation management which includes, for example, low-intensity livestock or

game farming. Any development should be carried out under the provisions of the National Environmental Management Act (NEMA, Act 107 of 1998). However, this area is ecologically compromised by various anthropogenic factors, including historical dumping of rubble, overgrazing and invasion by alien plants, and should be excluded from the macro-scale CBA assessment.

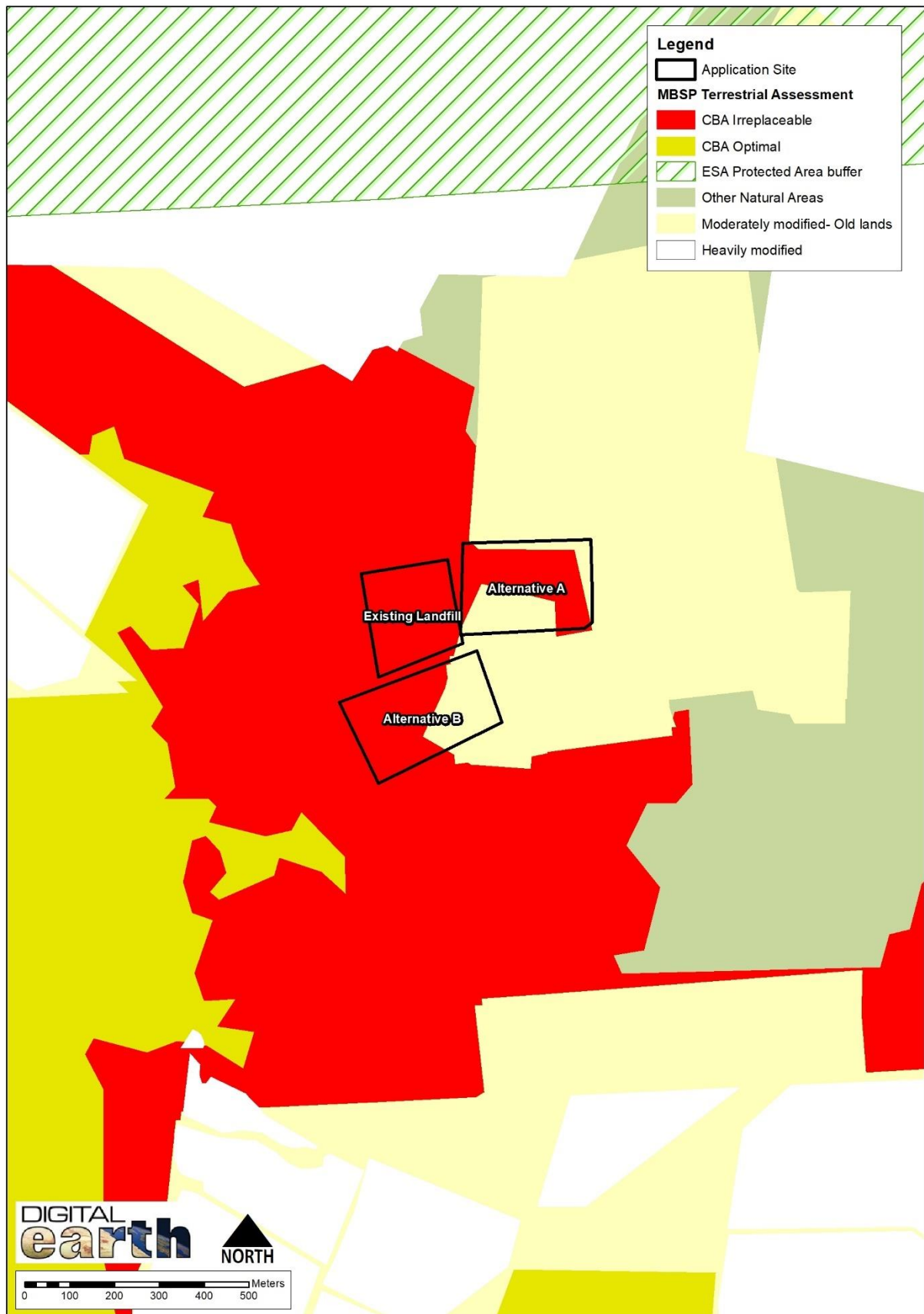


Figure 5.12: Mpumalanga Biodiversity Sector Plan Assessment of the development footprint alternatives.

5.4.4.8 Faunal Communities of Conservation Concern

Mammals

Confirmed Species

Only two (2) native mammals were confirmed during the fieldwork, namely Scrub Hare *Lepus saxatilis* and Cape Porcupine *Hystrix africaeaustralis*. The partial skeleton of either a Serval or subadult Caracal *Caracal caracal* was also located, but too few teeth were present for a specific identification.

Species of Conservation Concern

An estimated twenty-two (22) conservation-important mammals potentially occur in the general area surrounding the project site. Several cave-roosting bat species of conservation concern are likely to occur overhead, but these species are only likely to feed over the site because of the shortage of suitable roosting sites and have been excluded from this assessment. Of the twenty-two (22) potentially occurring species, nineteen (19) are considered to be SCC, with ten considered threatened. None were located during the fieldwork despite intensive searching. Only NT mammal species potentially occur within the development footprint alternatives, namely, Serval *Leptailurus serval* and Southern African Hedgehog *Atelerix frontalis*.

Protected Species

Several potentially occurring species are protected under either the MNCA or the NEM:BA ToPS (refer to **Table 5.3**). However, none of these were confirmed during fieldwork.

Table 5.3: Potentially occurring fauna species protected either under the MNCA or the NEM:BA ToPS

Common Name	Scientific Name	Red Data	Protected	VMUS Record for 2729 BB	SABAP2 Reporting Rate for 2729 BB	Likelihood of Occurrence
MAMMALS						
African Clawless Otter	<i>Aonyx capensis</i>	NT	MNCA	X		Very Low
Southern African Hedgehog	<i>Atelerix frontalis</i>	NT	MNCA			Moderate
Black-footed Cat	<i>Felis nigripes</i>	VU	NEMBA (PR)			Very Low
Spotted-necked Otter	<i>Hydrictis maculicollis</i>	VU	MNCA			Very Low
Serval	<i>Leptailurus serval</i>	NT	NEMBA (PR)	X		High
Oribi	<i>Ourebia ourebi</i>	EN	NEMBA (EN)	X		Very Low
Aardvark	<i>Orycteropus afer</i>		NEMBA (PR)			Low
Leopard	<i>Panthera pardus</i>	VU	NEMBA (PR)			Very Low
Brown Hyaena	<i>Parahyaena brunnea</i>	NT	NEMBA (PR)			Low
Grey Rhebok	<i>Pelea capreolus</i>	NT	MNCA			Low
Aardwolf	<i>Proteles cristatus</i>		MNCA			Low
Steenbok	<i>Raphicerus campestris</i>		MNCA			Moderate
Southern Mountain Reedbuck	<i>Redunca fulvorufula</i>	EN	MNCA			Low

Avifauna

The project site is situated between two Important Bird & Biodiversity Areas (IBAs), namely the Grasslands IBA to the south and the Amersfoort – Bethal – Carolina District IBA to the north. Both are Global IBAs under Criteria A1, A2, A3, A4i, ii, iii. These two IBAs support globally important populations of threatened birds such as Rudd's Lark *Heteromira ruddi*, Botha's Lark *Spizocorys fringillaris*, Yellow-breasted Pipit *Anthus chloris*, Southern Bald Ibis *Geronticus calvus*, African Grass Owl *Tyto alba* and White-winged Flufftail *Sarothrura ayresi*

Local Avifauna Assemblages

A total of thirty-five (35) bird species, or 35% of the pentad list, was confirmed from within or immediately adjacent to the actual habitats represented in the project site during fieldwork and are listed in Appendix 2 of the Terrestrial Biodiversity Impact Assessment which is attached as **Appendix D** to the EIA Report.

Species of Conservation Concern

The grasslands of far south-western Mpumalanga support a high number of bird SCC, with twenty-two (22) species potentially occurring within the general area around the project site (refer to Appendix 3 of the Terrestrial Biodiversity Impact Assessment which is attached as **Appendix D** to the EIA Report). Thirteen (13) of these are threatened, with the remaining assessed as NT. No threatened or NT species were recorded during fieldwork, and only two of the potentially occurring SCC potentially occurs within the study area on a regular basis, namely, Southern Bald Ibis *Geronticus calvus* and Lanner Falcon *Falco biarmicus*.

Protected Species

With the exception of most gamebirds, waterfowl and problem birds, most bird species are protected in Mpumalanga under the MNCA. Four (4) potentially occurring species are protected under NEM:BA ToPS, namely, Southern Bald Ibis, Grey Crowned Crane, Blue Crane and Denham's Bustard.

Herpetofauna

Confirmed Species

No reptile species were recorded during the fieldwork. Cold and wet conditions were encountered during the survey which are not conducive to locating reptiles. However, this is not seen as a limiting factor as the only potentially occurring threatened reptile excavates fairly large burrows which are easily located. No frogs were recorded during the fieldwork, and very few are expected to occur due to the lack of surface water within the project site.

Species of Conservation Concern and Protected Species

Two (2) reptile species have the potential to occur in the project site, namely, Giant Girdled Lizard and Spotted Shovel-nosed Frog. Of the potentially occurring species, only one (1) reptile SCC potentially occurs within the project area, namely Giant Girdled Lizard *Smaug giganteus*. Although this species is confirmed from the QDGS 2729 BB and occurs within the Majuba Nature Reserve and from the nearby farm Rietpoort 83 HS, none were located within the development footprint alternatives despite intensive searching. This large species excavates distinctive burrows which were searched for during fieldwork, but none were located. The likelihood of it being present in the development footprint alternatives is therefore Low.

One potentially occurring frog species is assessed as vulnerable (VU), namely Spotted Shovel-nosed Frog *Hemisus guttatus*. The likelihood of occurrence is Low, as it prefers escarpment habitats that are found further to the south around Volksrust and Wakkerstroom.

No reptile species protected under the MNCA and NEM:BA ToPS were identified within the development footprint alternatives.

5.4.4.9 Aquatic Profile of the Project Site and Development Footprint Alternatives

The proposed project site is located in the upper reaches of the Geelklipspruit Catchment, a tributary of the Vaal River, within Quaternary Catchment C11J, in the Upper Vaal Water Management Area (refer to **Figure 5.13**).

The development footprint alternatives are located on a watershed between two sub-catchments and as such, water on the site will run in three possible directions as follows (refer to **Figure 5.14**):

- » **West** – Runoff from the western portion of the development footprint alternatives flows west towards an unnamed tributary of the Geelklipspruit. The gradient between the watershed and the western boundary of the project site is estimated at around 0.0467, which is classified as “gentle”. The existing, closed landfill site is also located on this side of the watershed, and runoff from the landfill has been formalised into two primary drainage lines that run along the outer boundary of the landfill and converge in a small pollution control dam.
- » **South** - The direction of surface flow from the southern portion of Alternative B is not known for certain but would appear to drain southwards into an unnamed tributary of the Geelklipspruit, the same as above. The gradient between the southern boundary of Alternative B and nearest wetland is 0.0138, which is classified as “very gentle”.
- » **East** - Surface flow from the eastern portion of the development footprint alternatives flows east towards the upper reaches of the main Geelklipspruit. The gradient between the watershed and the eastern boundary of the Study Area is estimated at around 0.039, which is classified as “gentle”.

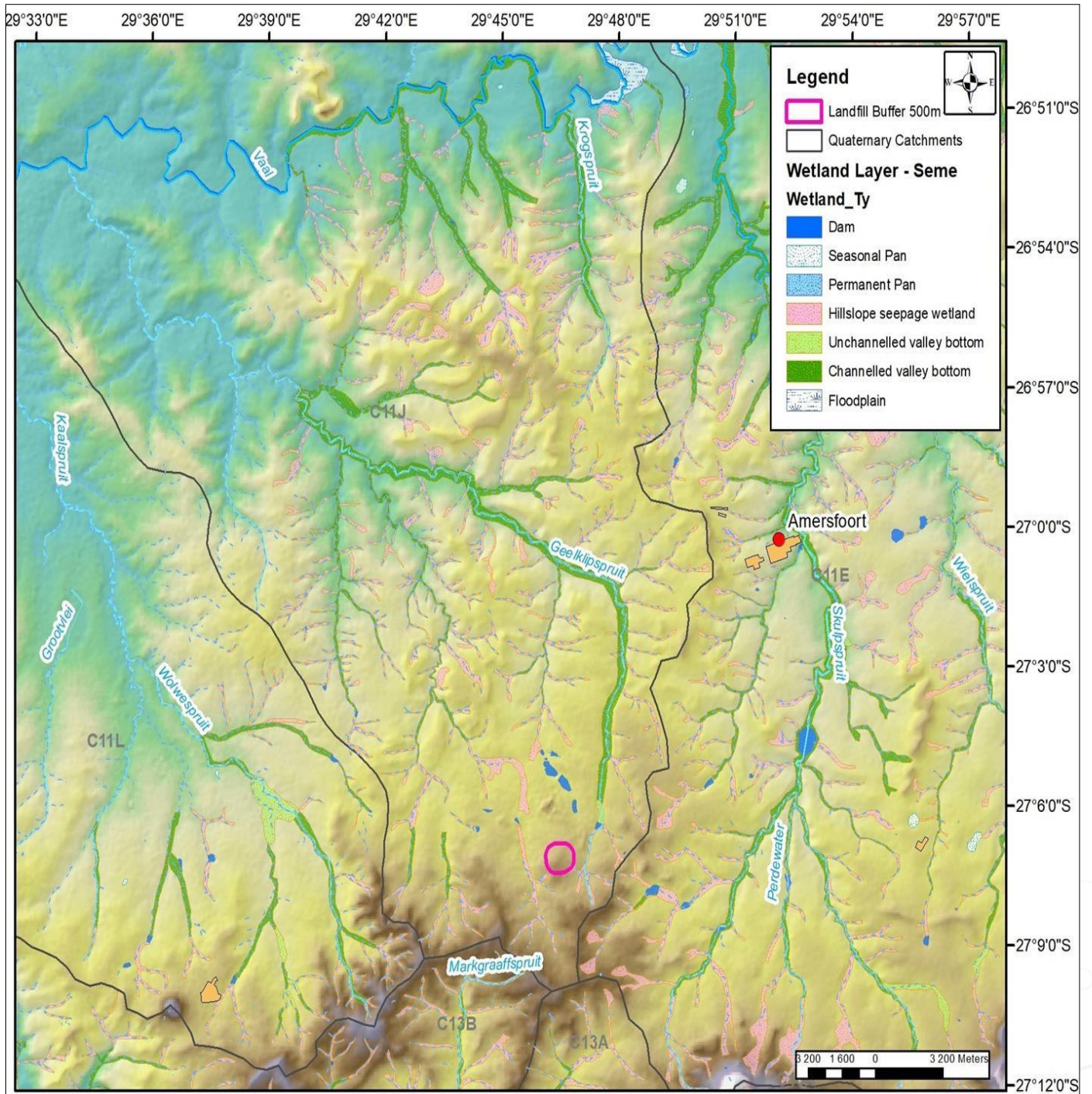


Figure 5.13: Project locality map indicating the various quaternary catchments, mainstream rivers, and non-perennial water courses.

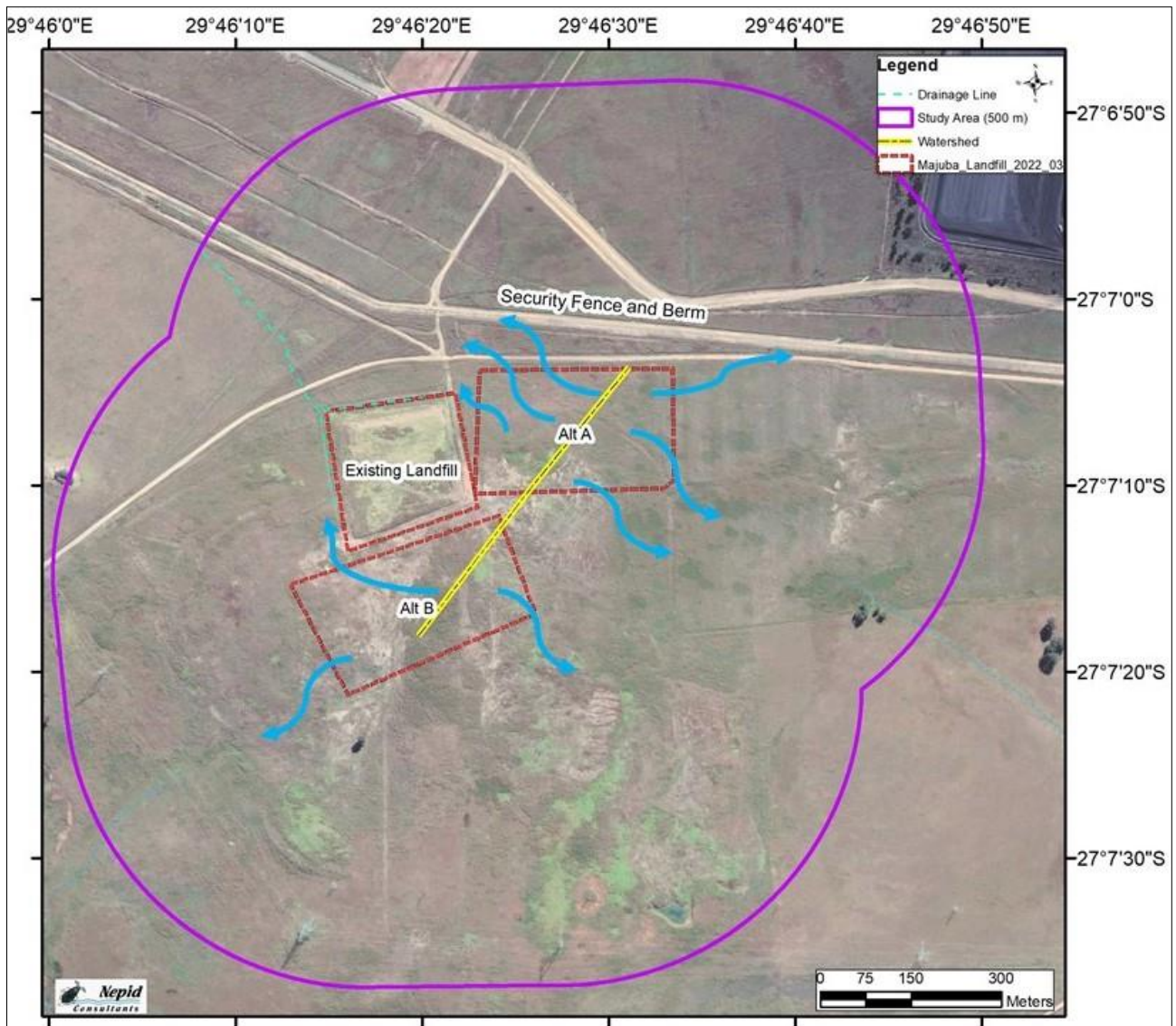


Figure 5.14: Local drainage within the 500m study boundary.

The project site is located within a National Freshwater Priority Area for rivers. The site is not located within or near a Strategic Water Source Areas. No information was available on the Ecological Importance and Sensitivity of aquatic ecosystems as the area falls outside areas that have been rated as such by the DWS. However, the Present Ecological State of the upper reaches of the Geelklipspruit (Reach C11J-01968), which borders the project site to the east, but outside the likely Area of Influence of the proposed development, was assessed at a desktop level in 1999 as *Moderately Modified (Category C)*. The Ecological Importance of this reach was rated as *High*, and Ecological Sensitivity was rated as *Moderate*.

The Mpumalanga Biodiversity Sector Plan Freshwater Assessment classifies the Study area as an *ecological Support Area (ESA): Important sub-catchment* (refer to **Figure 5.15**). The desired management objective for all ESAs is "to maintain the land in a near-natural and ecologically functional state, even if some loss of ecosystem composition or structure takes place"

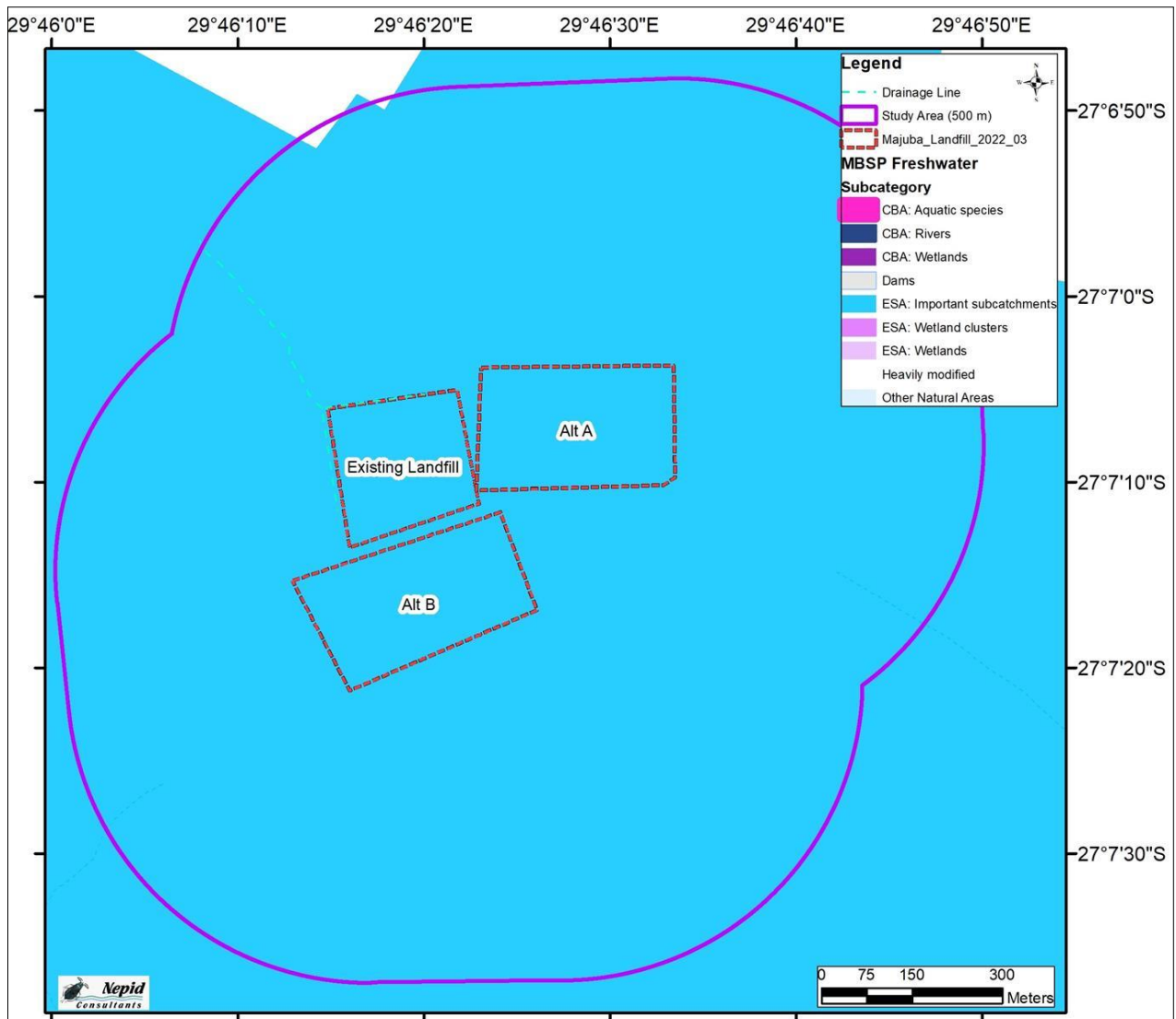


Figure 5.15: Map showing the development footprint alternatives as falling within ESA: Important sub-catchments.

Numerous hillslope seepage wetlands, which cover ~17% of the 500m study boundary, were identified, with areas of seasonal and permanent saturation (refer to **Figure 5.16**). A 30m buffer has been recommended around these wetland features.

- » **Seasonal seepage wetlands** – the area surrounding the proposed general waste disposal site alternatives comprises a complex mosaic of seasonally saturated hillslope seepage wetlands of viable sizes, ranging from 0.01 to 1.9ha. The distance between the proposed general waste disposal site and the nearest seasonal wetland is 38m (refer to **Figure 5.16**). The hydrological regime of these areas is characterised by seasonal saturation, with short periods of inundation during storm events. Plant species diversity within the seasonal seepage wetlands is high, with a total of fifty-one (51) species identified during the field survey undertaken in March 2018, of which 14 were alien. These wetlands were characterised by the herbs *Monopsis decipiens* and *Sebaea sedoides*. The comparatively high diversity of plants is unusual for wetlands and reflects a complex mosaic of wetlands of different sizes and different patterns of inundation and saturation.

- » **Permanent seepage wetlands** – Two permanently saturated hillslope seepage wetland were found to be located in the south-eastern portion of the 500m study boundary. The vegetation was characterised by the sedges *Juncus exsertus* and *Cyperus nitidus*. A total of twenty-five (25) species of plant (26% of the total list) was recorded, of which 10 (40%) were alien. The two permanent wetlands were located as follows:
- ~290 m south-east of Alternative A at their nearest points; and
 - ~190 m south-west of Alternative B at their nearest points



Figure 5.16: Delineated wetlands in relation to the development footprint alternatives, with buffers and the 500m regulated WULA zone (arrows indicate direction of surface flow)

Aquatic habitats in the seepage wetlands comprised mostly seasonally saturated areas with clay substrate characterised by a high diversity of wetland facultative herbs and grasses, and two smaller areas of permanently saturated clays characterised by wetland obligate sedges, herbs and grasses. The diversity of wetland indicator species within the regulated area was high, with a total of sixty-five (65) wetland plant species recorded, of which forty-seven (47) are classified as facultative wetland species, and eighteen (18) are classified as obligate wetland species. No migratory aquatic species were recorded or expected within the regulated area. Furthermore, aquatic ecosystems within the regulated area are unlikely to be an important corridor because of the location of the development footprint alternatives on a watershed.

The Present Ecological State (PES) of the seasonal seepage wetlands within the regulated area in March 2018 was rated as Moderately Modified (Category C), while that of the permanent (natural) seepage wetlands was rated as Largely Natural (Category B). The Ecological Importance and Sensitivity (EIS) of seasonal and permanent seepage wetlands in the regulated area was rated as Low. Details of the assessment of the PES and EIS are presented in the Wetland Delineation and Aquatic Biodiversity Impact Assessment included as **Appendix E** to the EIA Report.

5.4.4.10 Geohydrology

A geohydrological assessment, was conducted across the project site during May 2022. The fieldwork comprised water sampling of open water resources within a 1km radius of the site at five locations, drilling of three monitor boreholes and yield testing thereof, and analyses of borehole water samples by a South African National Accreditation System (SANAS) accredited water laboratory. The geohydrological assessment is therefore based on field observations, profiling of borehole drill chips, water samples analyses of nine waste samples, as well as yield testing of three monitor boreholes. The results of the geohydrological assessment are presented below.

Drilling of Three Monitor Boreholes

Three monitor boreholes were drilled as part of the geohydrological assessment. The drill sites were selected where access was possible and where geophysical anomalies were prominent. The drilling results are summarised in **Table 5.4**.

Table 5.4: Drilling results

Borehole No.	Borehole Depth (m)	Water Strike Depth (m)	Blow Yield (l/h)	Static Water Level (m)
BH2	20	7.0	400	3.7
BH3	20	Dry	N/A	17.5
BH4	20	13.0	720	4.4

Yield Testing of Three Monitor Boreholes

Using a submersible pump capable of pumping small volumes of water, the yields of the boreholes BH2, BH3 and BH4 were tested (refer to **Table 5.5**). The yield tests were carried out in accordance with SANS 10299-4:2003: PART 4 – Test-pumping of Water Boreholes. The data was captured and analysed using Theiss and Cooper methods. Copies of the field test data and analyses are attached as Appendix B of the Geohydrological Assessment which is attached as **Appendix F** to the EIA Report.

Table 5.5: Yield testing data and recommendations

Borehole No.	Blow Yield (l/h)	Static Water Level (m)	Recommended Pumping yield (l/h)
BH 2	400	3.7	To low yield
BH 3	Dry	17,5 (after 24 hrs)	Dry borehole
BH 4	720	4,4	720

Historic Geophysical Surveys

Three geophysical traverses were conducted alongside the proposed landfill site during the geotechnical survey carried out in 2018 (refer to **Appendix G** of the EIA Report). Two prominent electro-magnetic anomalies were recorded on Traverses Majuba PS-1 and PS-3 which were carried out parallel to each other and were used as a guide to locate the drilling positions of monitor boreholes BH2, BH3 and BH4.

Historic Borehole and Spring Census

Five hillslope seepage wetlands were recorded on the site and another hillslope seepage along the toe of the closed landfill site. A 44.2m deep monitor borehole (BH1) with a static water level recorded at 9.7m below ngl located near a small leachate dam on the north-western corner of the closed landfill site was also inspected and vital information recorded.

Aquifer, Groundwater Phreatic Surface and Seasonal Fluctuations

The water strike depths, blow yields, phreatic surface and general groundwater flow direction have been established. The phreatic surface is at an average depth of 4m below surface and seemingly emulates the topography in a NNE direction towards Majuba Power Station with a low groundwater gradient of some < 0.5%. A summary of the water strikes, blow yield and static water levels is presented in **Table 5.6**. As indicated, the static water level of the historic borehole BH1 has receded by 5.1m over the last four years. Seasonal fluctuations of monitor boreholes BH2, BH3 and BH4 are unknown but will be able to be measured within six months and compared with BH1's recorded variation.

Table 5.6: Summary of groundwater morphology

BH No.	Blow Yield (l/h)	Static Water Level (m) with Dates	Water Strike Depth (m)
BH 1	unknown	9.7 (2018) 14.8 (2022)	Unknown
BH 2	400	3.7 (2022)	7,0
BH 3	Dry	17.5 (2022) After 24 hrs	Dry borehole
BH 4	720	4.4 (2022)	13

Aquifer Characteristics

Aquifers are to be classified in terms of their existing and/or potential value as a resource, and hence their sensitivity to pollution. The criteria for classification are potential yield, significance, and water quality.

- » **Potential Yield:** The yield range for BH1 is unknown. However, the three most recently drilled boreholes recorded yields ranging from dry to <1l/s. The potential application of BH2, BH3 and BH4 is for stock watering only and in terms of aquifer classification, these monitor boreholes comply with a 'Low' type of aquifer.

- » **Aquifer Significance:** The potential significance of the site aquifer is assessed as being an insignificant yielding aquifer which will never be utilised except for monitoring purposes in accordance with the following criteria

Water Sampling and Laboratory Analyses

- » **History Sampling (2018)** – Three of the hillslope seepage wetlands, a single monitor borehole and a small leachate dam were sampled and analysed during the geotechnical investigation carried out in 2018 – refer to **Appendix F** of the EIA Report for the Geotechnical Assessment.
- » **Recent Sampling (2022):** Nine water samples were taken – five from surrounding surface water impoundments (mainly small excavations) and four from the monitor boreholes where BH1 is historical.

The five surface water samples were submitted for analyses to Integral Laboratories (Pty) Ltd, a SANAS accredited water laboratory located in Empangeni. A summary of the laboratory test results is included in **Table 5.7** and copies of the laboratory tests are attached as Appendix C to the Geohydrological Assessment which is attached as **Appendix F** to the EIA Report.

Table 5.7: Summary of laboratory test data

Sample Identification			S4 (Marshy) - 10H58	S5 (Dam) - 11h09	S7 (Dam) - 11h25	S8 (Dam) - 10h01	S9 (Spring) - 09h37	Existing Mon BH - 1	Prop Mon BH - 2	Prop Mon BH - 3	Prop Mon BH - 4
Lab / Sample No. & Date Tested			KW-22-97868 (13/05/2022)	KW-22-97869 (13/05/2022)	KW-22-97870 (13/05/2022)	KW-22-97871 (13/05/2022)	KW-22-97872 (13/05/2022)	KW-22-98166 (19/05/2022)	KW-22-98167 (19/05/2022)	KW-22-98168 (19/05/2022)	KW-22-98169 (19/05/2022)
Parameter	Unit	Method	Result	Result	Result	Result	Result	Result	Result	Result	Result
Aluminium as Al3+	µg/L	M38	100	100	100	100	100	100	100	100	100
Ammonia as N	mg/L	M32	0.2	0.2	0.2	0.2	0.2	0.56	0.2	0.21	0.2
Arsenic as As	µg/L	M16	3	3	3	3	3	3	3	198	3
Boron as B	µg/L	M16	100	100	100	100	100	100	100	100	100
Cadmium as Cd	µg/L	M16	1	1	1	1	1	1	1	1	1
Chemical Oxygen Demand (Unfiltered)	mg/L		106	60	39	29	69	28	241	34	70
Chromium as Cr	µg/L	M16	5	5	5	5	5	5	5	5	5
Chromium as Cr6+	µg/L	M44	3	3	3	3	3	3	3	3	3
Copper as Cu	µg/L	M16	20	20	20	20	20	20	20	20	20
Cyanide as CN-	µg/L	M55	10	10	27	8	13	10	10	10	10
Dissolved Organic Carbon	mg/L	M20	21.4	12.3	4.68	4.57	5.09	2.62	3.12	1.16	1.06
Dissolved Oxygen	mg/L	M57	7.62	7.77	8.28	8.29	8.48	5.97	6.59	6.2	6.69
E. coli	MPN/100mL	M9	10	1	72	44	12	0	68	0	8
Electrical Conductivity @ 25°C	mS/m	M4	56.8	51.2	31.2	45	56.7	118	63.6	29	60.8

Sample Identification			S4 (Marshy) - 10H58	S5 (Dam) - 11h09	S7 (Dam) - 11h25	S8 (Dam) - 10h01	S9 (Spring) - 09h37	Existing Mon BH - 1	Prop Mon BH - 2	Prop Mon BH - 3	Prop Mon BH - 4
Lab / Sample No. & Date Tested			KW-22-97868 (13/05/2022)	KW-22-97869 (13/05/2022)	KW-22-97870 (13/05/2022)	KW-22-97871 (13/05/2022)	KW-22-97872 (13/05/2022)	KW-22-98166 (19/05/2022)	KW-22-98167 (19/05/2022)	KW-22-98168 (19/05/2022)	KW-22-98169 (19/05/2022)
Parameter	Unit	Method	Result	Result	Result	Result	Result	Result	Result	Result	Result
Fats, Oils & Grease	mg/L		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Fluoride as F-	mg/L	M32	0.53	0.5	0.5	0.5	0.5	0.5	0.5	1.42	1.28
Free Chlorine	mg/L	On Site	0.52	0.47	0.1	0.1	0.12	0.25	0.05	0.05	0.1
Lead as Pb	µg/L	M16	2	2	2	2	2	2	2	2	2
Manganese as Mn	µg/L	M70	922	84	88	39	91	109	74	10	178
Mercury as Hg	µg/L	M16	1	1	1	1	1	1	1	1	1
Nickel as Ni	µg/L	M16	5	5	5	5	5	5	5	5	5
Orthophosphate as P	mg/L	M32	1	1	1	1	1	1	1	1	1
Oxygen Absorbed	mg/L	M73	24.5	5.9	6.2	6.4	17.7	6.4	24.1	5.7	24.5
pH @ 25°C	pH units	M6	7.19	7.5	7.38	7.93	7.99	7.28	7.8	8.64	7.62
Phenols	µg/L	M34	10	10	10	10	10	10	10	10	10
Potassium as K	mg/L	M18	7.59	17.7	2.41	6.57	4.25	2.57	2.39	10.4	3.13
Selenium as Se	µg/L	M16	20	20	20	20	20	20	20	20	20
Sodium as Na	mg/L	M18	29.2	13.2	16.8	18.5	36.2	65.3	98.3	19	35.7
Somatic Coliphages	Count/10mL	M39	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Sulphide (as S)	mg/L	M18	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Temperature	°C		20	20	20	20	20	22	22	22	22

Sample Identification			S4 (Marshy) - 10H58	S5 (Dam) - 11h09	S7 (Dam) - 11h25	S8 (Dam) - 10h01	S9 (Spring) - 09h37	Existing Mon BH - 1	Prop Mon BH - 2	Prop Mon BH - 3	Prop Mon BH - 4
Lab / Sample No. & Date Tested			KW-22-97868 (13/05/2022)	KW-22-97869 (13/05/2022)	KW-22-97870 (13/05/2022)	KW-22-97871 (13/05/2022)	KW-22-97872 (13/05/2022)	KW-22-98166 (19/05/2022)	KW-22-98167 (19/05/2022)	KW-22-98168 (19/05/2022)	KW-22-98169 (19/05/2022)
Parameter	Unit	Method	Result	Result	Result	Result	Result	Result	Result	Result	Result
Total Sus-pended Solids	mg/L	M8	92	5	7	9	6	20	2128	26	212
Zinc as Zn	mg/L	M16	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05

The Chemical Oxygen Demand (COD) and E. coli concentrations of the historical borehole (BH1), the more recently drilled monitor boreholes (BH2, BH3 & BH4) and five surface water sites were used to indicate that except for BH2 with its high COD value (241mg/l), the site and immediate surroundings are seemingly unpolluted (refer to **Table 5.8**).

In terms of drinking water quality, all the samples submitted inclusive of the historical borehole BH1 comply with Class 1 type water (SANS 241:2015) – the only exception being the high Arsenic concentration of BH3 which is deemed unsuitable for human consumption.

Table 5.8: Water quality ITO COD and E. coli

SAMPLE ID	S4	S5	S7	S8	S9	BH1	BH2	BH3	BH4
OD (mg/l)	106	60	39	29	69	28	241	34	70
E. coli (MPN/ml)	10	1	72	44	12	0	68	0	8

Historic data is inadequate and could therefore not be used to compare with the more recent data to assess the impact of the landfill has had on the groundwater quality and will have to be used as future background information.

5.5. Heritage Profile (including archaeology and Palaeontology)

5.5.1 Cultural Landscape (Broad-Scale)

The cultural landscape quality of the region consists of a rural area in which human occupation is made up of limited Stone Age occupation. This was followed much later by Nguni-speaking agro-pastoralists that settled in the larger region. They were soon followed by a colonial component, which gave rise to the development of small villages and towns that dot the larger landscape. The final transformation was brought about by the development of infrastructure in the region, such as roads and railway lines and the development of a large number of mines.

Stone Age

No information regarding Stone Age habitation in the area is available. This may be due to the fact it is unlikely that Stone Age people would have occupied the area as it would have been too cold, and no shelters or caves exist locally that could be used as shelter. Further to this, no systematic survey of the area has been undertaken and as such, no sites have been reported.

Iron Age

Iron Age people started to settle in southern Africa c. AD 300, with one of the oldest known sites at Silver Leaves, located southeast of Tzaneen dating to AD 270. However, Iron Age occupation of the eastern highveld area (including the project site) only started after the 1500s. Some sites dating to the Late Iron Age are known to exist to the north, south and west of the project site. A number of changes took place in the 16th century, with the climate becoming warmer and wetter, creating conditions that allowed Late Iron Age (LIA) farmers to occupy areas previously unsuitable for occupation, for example, the treeless plains of the Free State and North West Province.

Historic Period

By the early 19th century, white settlers took up farms. An investigation of the Title Deeds of most of the farms in the region indicates that they were surveyed as early as the 1860s, implying that they would have been occupied by colonists since then. Many farmsteads in the region were destroyed during the Anglo Boer War. As a result, most structures date to the period after that. The architecture of these farmsteads can be described as eclectic as they were built and added to as required over a period of time. In some cases, outbuildings would be in the same style as the main house, if they date to the same period. However, they tend to vary considerably in style and materials used.

5.5.2 Site Specific Review

From a review of old topographic maps and aerial photographs (refer to **Figure 5.18**), it was determined that the larger region was used mostly for agriculture (grazing and cultivation), with a random scatter of what is interpreted as few farmsteads and a larger number of farm labourer homesteads. From the maps and aerial photographs, it seems as if one such homestead was located in what is now the existing, closed landfill site. No information regarding this feature or what happened to it could be found.

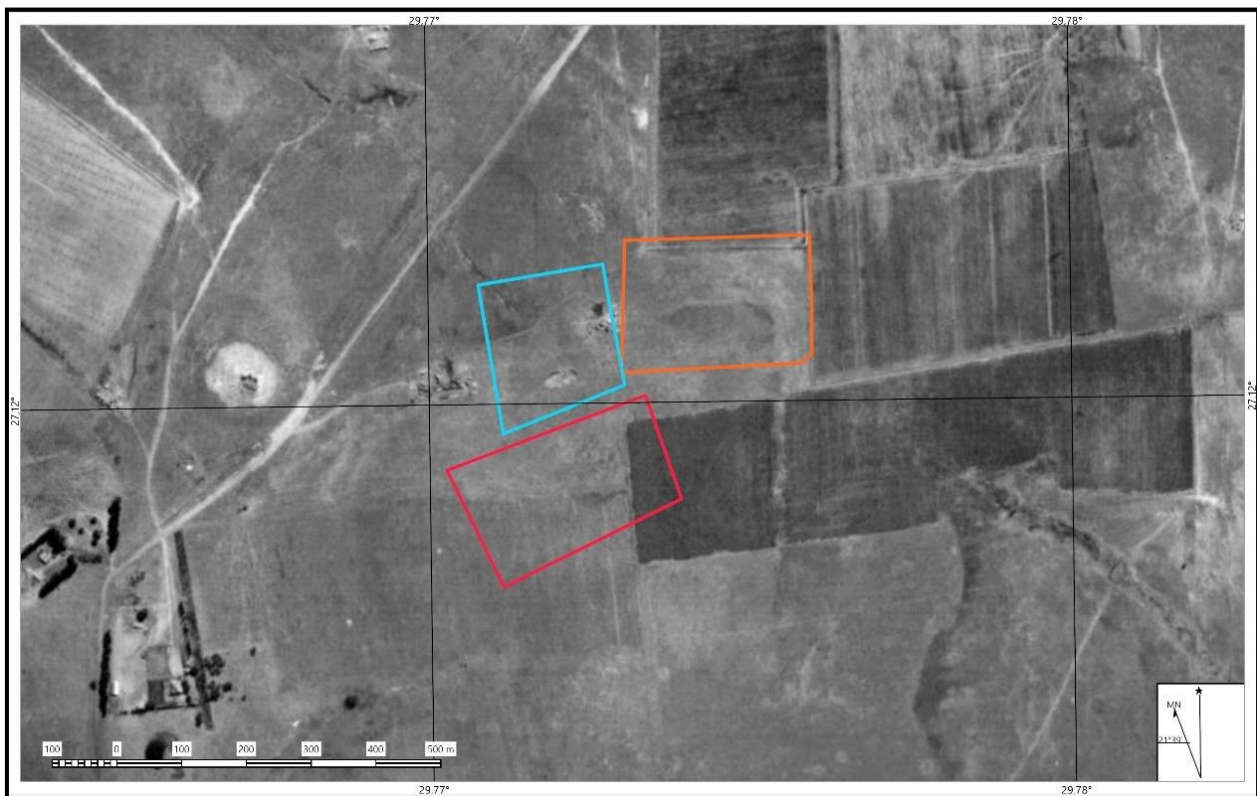


Figure 5.17: The development footprint alternatives on the 1957 version of the aerial photograph

5.5.3 Survey Results

A field survey was conducted on 03 April 2018 according to generally accepted archaeological practices, and was aimed at locating possible sites, objects, and structures of archaeological significance within the project site and development footprint. The field survey identified no sites, features or objects of archaeological significance within the project site and development footprint alternatives dating to the Stone Age, Iron Age and Historic Period.

5.5.4 Palaeontology

The proposed Waste Disposal Site is primarily underlain by Jurassic dolerite (Jd, red) while surrounding areas are underlain by potentially fossiliferous sedimentary rocks of the Early Permian Volksrust Formation (Pvo, orange) (Ecca Group, Karoo Supergroup). However, recent Shape files (Council for Geosciences, Pretoria) indicate that the proposed waste disposal site is entirely underlain by the Volksrust Formation (Ecca Group, Karoo Supergroup).

The Volksrust Formation forms part of the sixteen (16) Formations of the Ecca Group. The Volksrust formation is mostly an argillaceous (contains clay) unit which interfingers with the underlying Vryheid Formation and overlying Beaufort Group. North of Bloemfontein (about 120 km), the Formation is about 380 m thick, gradually thinning to about 250 m in the east and 100 m in the north of the basin. This formation comprises of black to grey silty shale. Reworked soils and sediments of silt and sandstone lenses are usually thin towards the upper and lower boundaries. The upper and lower margins of this formation probably have been deposited in lagoonal to lacustrine and shallow coastal embayment environments. Carbonate and thin phosphate beds as well as concretions are common in this Formation. The Volksrust formation probably represents a transgressive open shelf series which basically consists of mud deposited from suspension. This could be attributed to the large lateral extent as well as the thickness and fine-grained lithology.

Kent (1980) noted that this formation contains significant fossils, but they are rarely recorded. The formation is characterised by the occurrence of plant fossils (*Phyllothea australis*; *Raniganjia kilburnensis*; *Schizoneura africana*; *Glossopteris spp.*), and represents the glossopterids, cordaitaleans and possibly other seed ferns (Bamford 2003; Claassen, 2014). This Formation is also known for its low diversity trace fossil assemblage (Tavener-Smith, et al., 1988) and various organic microfossils. Macrofaunal remains include various insects (Ponomarenko and Mostovski, 2005; Van Dijk, 1981). The first reported discovery of the bivalve, *Megadesmus* in Africa is described from the Late Permian Volksrust Shale Formation, in the north-eastern Karoo Basin (Cairncross, et al, 2005).

Dolerite outcrops are of no palaeontological significance since these are high temperature igneous rocks. Dolerite outcrops in the area have altered the local sediments of the Volksrust Formation thermally and therefore reduce the potential of palaeontological heritage in these sediments.

According to the South African Heritage Resources Information System (SAHRIS) database, the Palaeontological Sensitivity of Jurassic dolerite is zero as it is igneous in origin and does not contain fossils while that of the Volksrust Formation is High (refer to **Figure 5.18**). Numerous impact assessment of the area has been conducted over the years with several site investigations and no fossils were found on the Majuba Footprint. Although fossil heritage in this area is uncommon, fossil finds would be significant if uncovered.

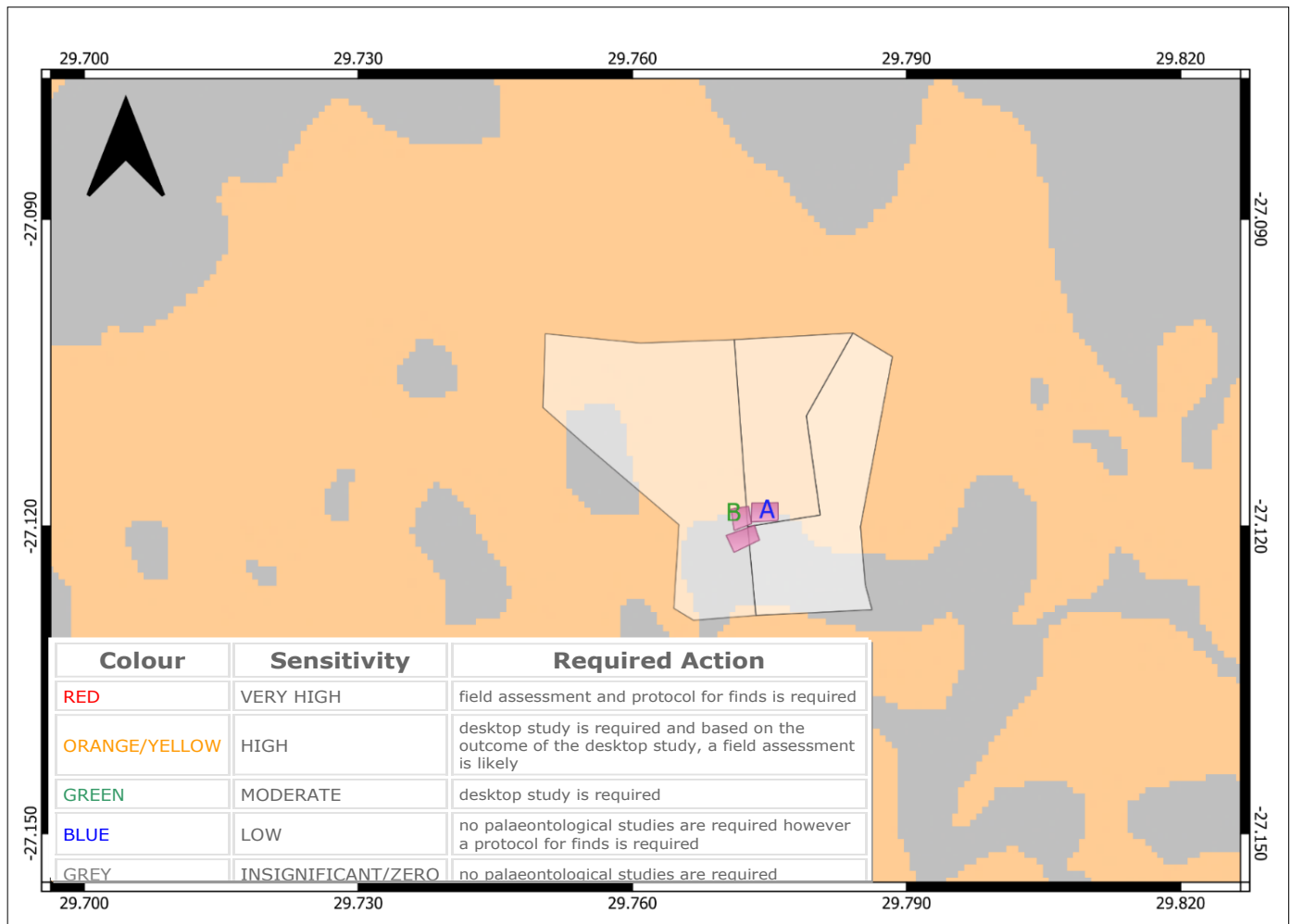


Figure 5.18: The palaeontological sensitivity of the proposed general waste disposal site as per the palaeosensitivity map from the SAHRIS database.

5.6. Air Quality Profile

5.6.1 Sensitive Receptors

Sensitive receptors within a 10km radius of the proposed project site include isolated farmsteads to the west and southeast of the landfill site as shown in **Figure 5.19**. The closest schools, clinics and residential areas to the landfill are located in the towns of Amersfoort, 15 km to the northeast, and Volksrust, 30 km to the southeast.

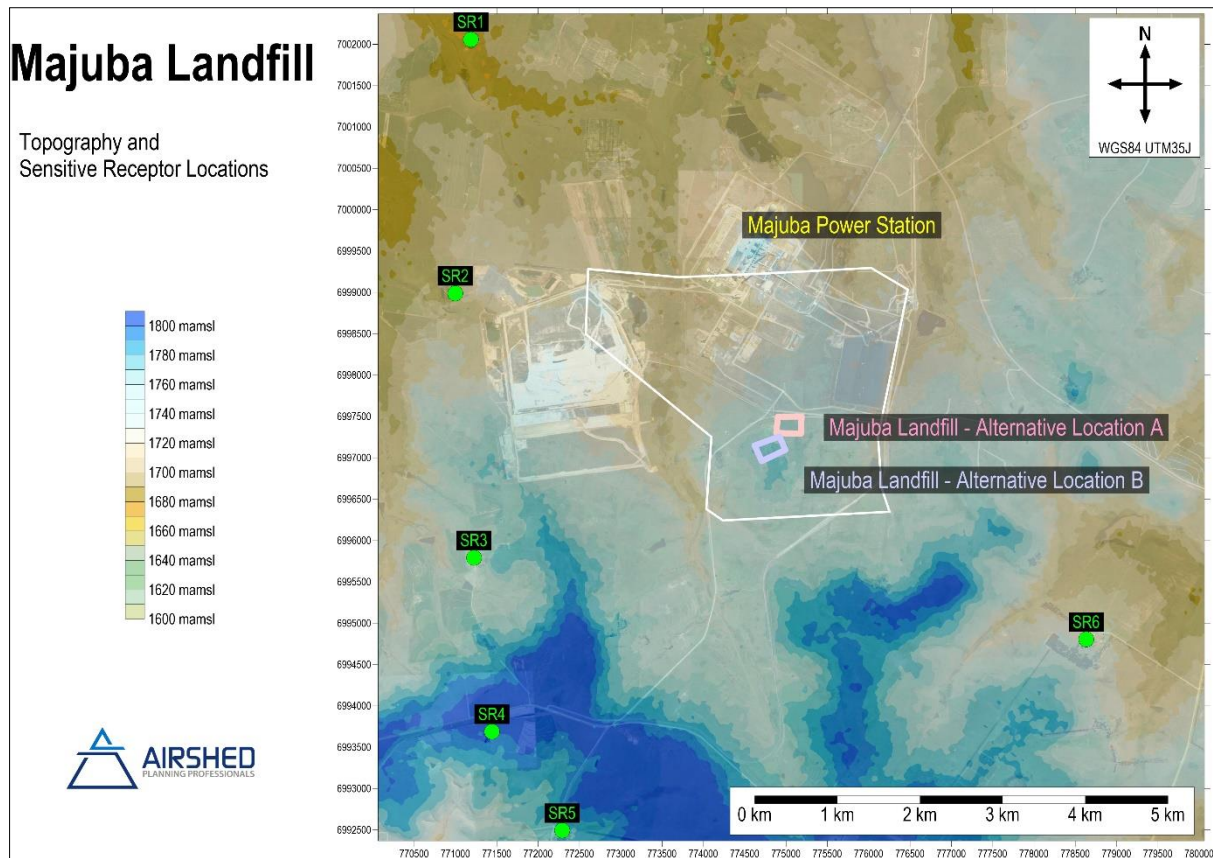


Figure 5.19: Sensitive receptors within 10km of the project site.

5.6.2 Baseline Air Quality Monitoring Data

In the evaluation of baseline air quality, reference was made to air quality monitoring data recorded at the Eskom Majuba AQMS, located approximately 2.5km to the east-northeast of the proposed landfill location, for the period 2016 to 2019, as well as dust fallout rates recorded at the four closest dust fallout sampling locations to the proposed landfill site during 2021 (refer to **Figure 5.20**).

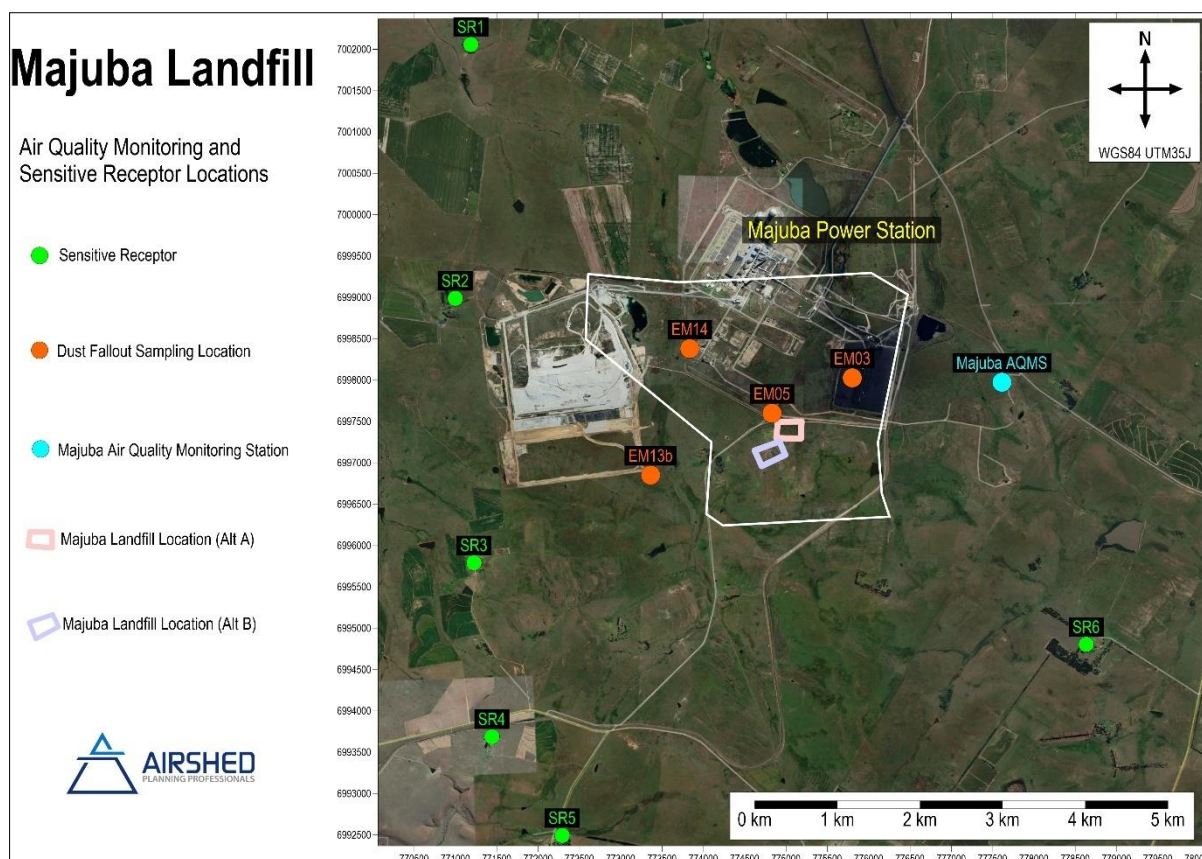


Figure 5.20: Air quality monitoring locations.

Annual average SO₂ and NO₂ concentrations measured at the Eskom Majuba AQMS were in compliance with the SA NAAQS from 2016 to 2019, but annual average PM₁₀ concentrations exceeded the annual average limit value of 40 µg/m³ in 2018 and PM_{2.5} concentrations exceeded the annual average limit value of 20 µg/m³ for PM_{2.5} in 2019.

No PM₁₀ and PM_{2.5} measurement data was available for 2020 and 2021, but it is likely that particulate concentrations in the study area are elevated and the addition of any particulate emission sources in the area could lead to non-compliance with the NAAQS (refer to **Table 5.9**).

Table 5.9: Annual average pollutant concentrations at the Eskom Majuba AQMS

Year	Annual Average Concentration			
Pollutant	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)
2016	23.7	17.9	27.3	-
2017	16.5	5.0	11.2	-
2018	26.0	14.5	43.4	15.5
2019	22.1	9.2	-	22.4

Sampled monthly average dust fallout rates were generally low during the wet summer months between December and March, with significantly higher dust fallout rates reported during the dry months between May and September. The highest dust fallout rates were recorded at EM14 during May and July 2021. At the sampling location closest to the proposed landfill site (EM05), only one exceedance of the SA NDCR limit value for non-residential areas was recorded during July 2021 (refer to **Figure 5.21**).

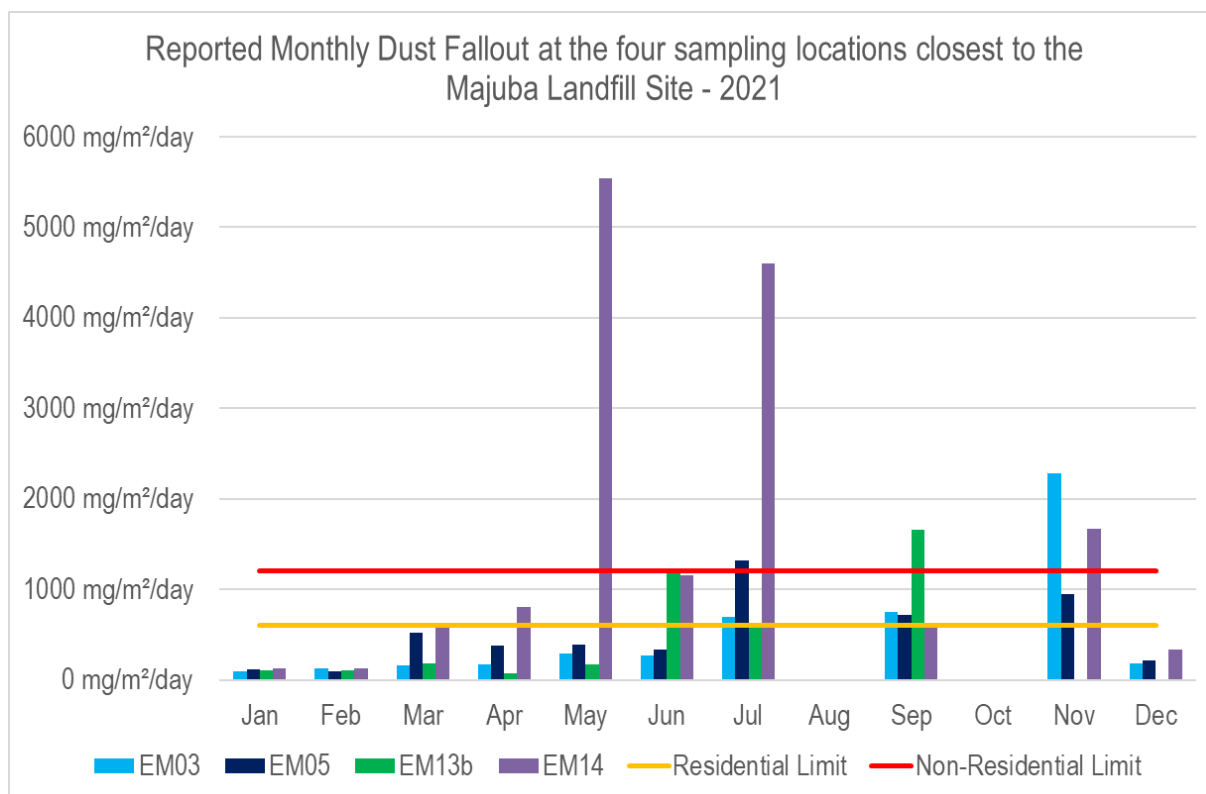


Figure 5.22: Sample dust fallout rates – 2021.

5.7. Socio – Economic Context

The proposed general waste disposal site is located within the Dr Pixley Ka Isaka Seme Local Municipality, which is classified as a Category B municipality. According to Stats SA (2016 Community Survey), Dr Pixley Ka Isaka Seme Local Municipality's population increased from 83 235 people in 2011 to 85 395 people in 2016, which represents a 0.6% population growth rate. The population number for 2019 is estimated at 86 941 people. Population growth projections indicate that by 2030, the municipality's population would have grown to ~92 855 people given the historic population growth per annum (Dr Pixley Ka Isaka Seme Local Municipality IDP, 2020/2021).

Youth population (15 – 34 years) forms 35.9% of the total population. According to the 2016 Community Survey, females make up 52.3% of the population, while males make up 47.7% of the population (Dr Pixley Ka Isaka Seme Local Municipality IDP, 2020/2021).

Table 5.10 below provides a socio-economic profile of the Dr Pixley Ka Isaka Seme Local Municipality.

Table 5.10: Socio-economic profile of the Dr Pixley Ka Isaka Seme Local Municipality (Census 2011, Statistics SA)

Population of Dr Pixley Ka Seme Local Municipality	83 235
Population Growth Ratio	0.3%
Population density	16 persons/km ²
Unemployment rate	36.1%
Youth unemployment rate	45.1%
Non-Schooling 20+	19.3%

Higher Education aged 20+	7.3%
Matric aged 20+	24.7%
Number of households	19 838
Number of Agricultural households	7 120
Average household size	4.1
Female headed households	45.1%
Formal dwellings	76.8%
Housing owned/paying off	40%
Flush toilet connected to sewerage	62.5%
Weekly refuse removal	62%
Piped water inside dwelling	38.9%
Electricity for lighting	85.2%

The Dr Pixley Ka Isaka Seme Local Municipality includes the following major disestablished urban areas or towns:

- » Amersfoort;
- » Ezamokuhle;
- » Perdekop;
- » Siyazenzela;
- » Volksrust;
- » Vukuzakhe;
- » Wakkerstroom;
- » Esizameleni; and
- » Daggakraal.

Volksrust is the main town of the Dr Pixley Ka Isaka Seme Local Municipality. Volksrust, together with Vukuzakhe form the largest urban settlement areas within the municipal area. These two areas are located in the southern portion of the municipal area of jurisdiction with other urban areas such as Amersfoort, located to the north, and Wakkerstroom to the east. Agriculture, forestry, tourism, and mining are the main industries in the local municipality. The chief activities in the Volksrust area include maize, sorghum, and fruit production, as well as cattle and sheep farming; tourism is a growing sector where game viewing and bird watching are popular. Volksrust also hosts one of the two district hospitals within the Dr Pixley Ka Isaka Seme Local Municipality, namely, the Amajuba Hospital. The second district hospital in the local municipality, i.e., Elsie Ballot Hospital, is located in Amersfoort.

According to StatsSA 2011, Volksrust has a total population of 24 281 people and comprises 6 461 households. Females make up 53% of the total population while males make up only 47%.

CHAPTER 6: ASSESSMENT OF IMPACTS

This chapter provides an assessment of the significance of the positive and negative environmental impacts (direct, indirect and cumulative) expected to be associated with the proposed project. This assessment has considered the construction and operation of a general waste disposal site, including its associated infrastructure, within a development footprint of approximately 6ha in extent within the Eskom Majuba Power Station property. Two alternative sites have been considered. The main infrastructure associated with the general waste disposal site will include the following:

- » Fencing with appropriate signage.
- » An adequate access road (gravel or surfaced).
- » An access control gate.
- » A guard house with an ablution facility.
- » A conservancy tank connected to the ablution facility.
- » Covered parking facilities.
- » A designated area for parking and servicing of plant and machinery.
- » Sorting and storage facilities for recyclables.
- » Adequate water and electricity connection from the existing rising mains.
- » Stormwater drainage network and a stormwater evaporation pond for the stormwater entering the site through the waste body.
- » A leachate management system and a leachate evaporation pond.

The full extent of the project site was considered through the S&EIA process by the independent specialists and the EAP. A development footprint for the general waste disposal site and its associated infrastructure within the project site was proposed by the project developer. The specialist assessments undertaken as part of the S&EIA process identified sensitive features in the form of flora, fauna, and wetland features within the project site and development footprint through the review of existing information, desktop evaluations and detailed field surveys. A layout for the general waste disposal site was designed which can be located within either one of the development footprint alternatives (i.e., Alternatives A and B) (refer to **Figure 6.1**).

The sections which follow provide a summary of the specialist input for each field of study in terms of the impacts which are expected to occur, the significance of the impacts, the opportunity for mitigation of the impacts to an acceptable level and the appropriate mitigation measures recommended for the reduction of the impact significance. Therefore, these impacts are not considered separately within this chapter. This section of the report must be read together with the detailed specialist studies contained in **Appendix D to K**.

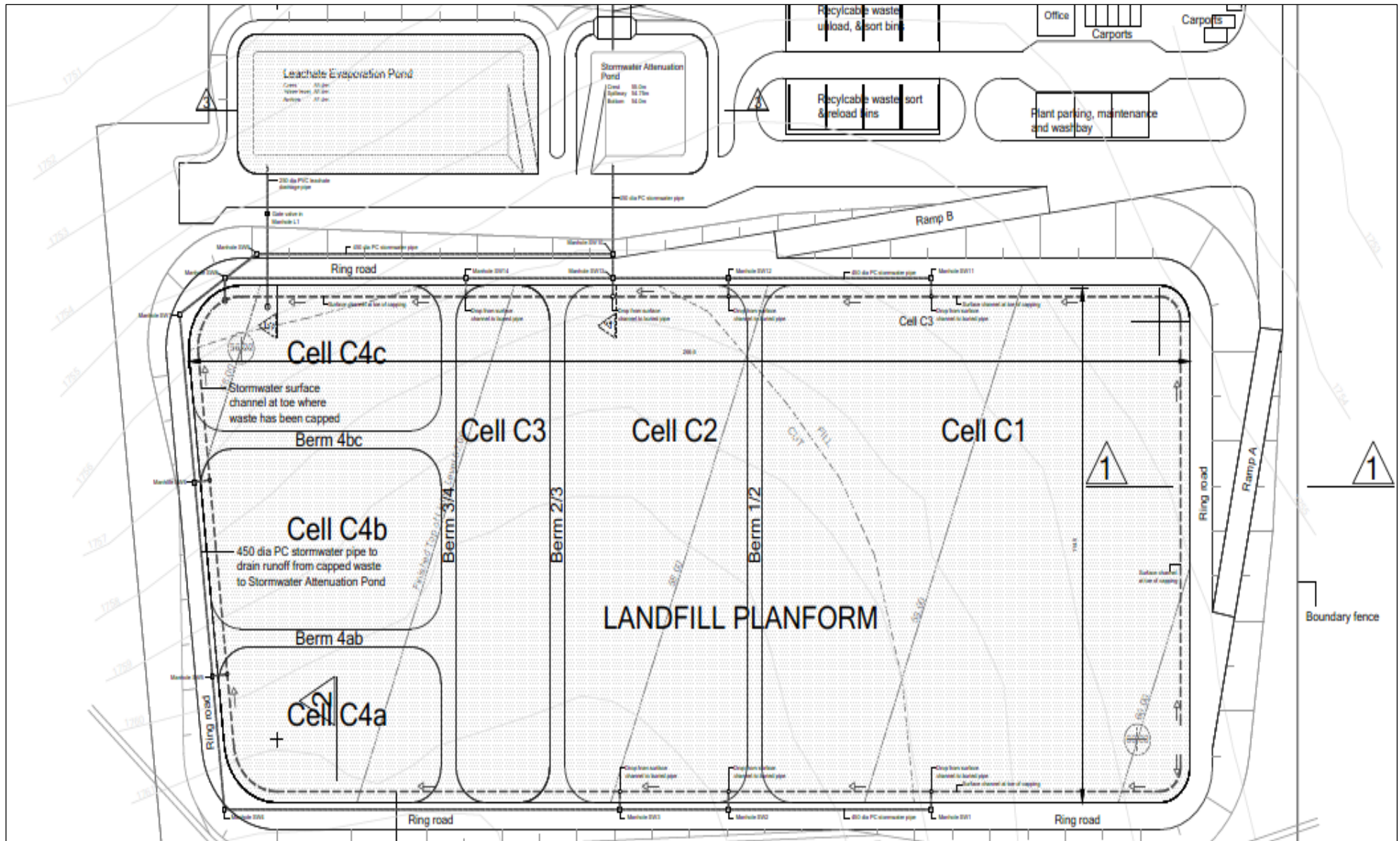


Figure 6.1: Layout considered for the new general waste disposal site at the Eskom Majuba Power Station

6.1. Legal Requirements as per the EIA Regulations for the undertaking of an Environmental Impact Assessment Report, 2014 (as amended)

This chapter of the EIA Report includes the following information required in terms of the EIA Regulations, 2014 - Appendix 3: Scope of Assessment and Content of Environmental Impact Assessment Reports:

Requirement	Relevant Section
3(1)(h)(v) the impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts (aa) can be reversed, (bb) may cause irreplaceable loss of resources, and (cc) can be avoided, managed or mitigated.	The impacts and risks associated with the development of the general waste disposal site, including the nature, significance, consequence, extent, duration and probability of the impacts and the degree to which the impact can be reversed and cause an irreplaceable loss of resources are included in sections 6.3 – 6.8.
3(1)(h)(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects	The positive and negative impacts associated with the development of the general waste disposal site are included in sections 6.3 – 6.8.
3(1)(h)(viii) the possible mitigation measures that could be applied and the level of residual risk.	The mitigation measures that can be applied to the impacts associated with the general waste disposal site are included in sections 6.3 – 6.8.
3(1)(i) a full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred development footprint on the approved site as contemplated in the accepted scoping report through the life of the activity, including (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.	A description of all environmental impacts identified for the general waste disposal site during the EIA process, and the extent to which the impact significance can be reduced through the implementation of the recommended mitigation measures provided by the specialists are included in sections 6.3 – 6.8.
3(1)(j) an assessment of each identified potentially significant impact and risk, including (i) cumulative impacts, (ii) the nature, significance and consequences of the impact and risk, (iii) the extent and duration of the impact and risk, (iv) the probability of the impact and risk occurring, (v) the degree to which the impact and risk can be reversed, (vi) the degree to which the impact and risk may cause irreplaceable loss of resources and, (vii) the degree to which the impact and risk can be avoided, managed or mitigated.	An assessment of each impact (direct, indirect and cumulative) associated with the development of the general waste disposal site, including the nature and significance, the extent and duration, the probability, the reversibility, and the potential loss of irreplaceable resources, as well as the degree to which the significance of the impacts can be mitigated are included in section 6.9.
3(1)(m) based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management outcomes for the development through inclusion in the EMPr as well as for inclusion as conditions of authorisation.	Mitigation measures recommended by the various specialists for the reduction of the impact significance are included in sections 6.3 – 6.8.

6.2. Quantification of Areas of Disturbance on the Site

Site-specific impacts associated with the construction and operation of the general waste disposal site relate to the direct loss of vegetation and species of special concern, disturbance of animals, loss of habitat, impacts on soils, water resources (surface and groundwater) and ambient air quality. The project development footprint being assessed for the new general waste disposal site at the Eskom Majuba Power Station requires an area of approximately 6ha (equivalent to ~0.70% of the project site). Supporting infrastructure included within the 6ha area includes an access road, fencing, an access control gate, guardhouse, parking facilities, an area of parking and servicing of plant and machinery, sorting and storage facilities for recyclables, a stormwater evaporation pond and a leachate evaporation pond.

6.3. Potential Impacts on Terrestrial Biodiversity (Flora and Fauna)

The development of the general waste disposal site is likely to result in a variety of impacts on terrestrial biodiversity associated largely with the disturbance, loss and transformation of vegetation and faunal habitat. Potential impacts and the relative significance of the impacts are summarised below (refer to **Appendix D** for more details).

6.3.1. Results of the Terrestrial Biodiversity Impact Assessment

The project site within which the development footprint for the general waste disposal site and associated infrastructure will be located is mapped as falling within the Amersfoort Highveld Clay Grassland, which is considered Vulnerable, but is not listed as a Threatened Ecosystem according to Notice 1002 of Government Gazette 34809, 9 December 2011.

The DFFE Environmental Screening Tool indicates that the development footprint alternatives have a High Animal Theme, Medium Plant Theme and Very High Terrestrial Biodiversity Theme. The main drivers of these assessments are several potentially occurring threatened and NT plant and animal species as well as parts of the area being assessed as CBA: Irreplaceable in the MBSP. However, due to the high disturbance levels and degraded habitats observed on site, very few are likely to occur. The macro-scale assessment of the conservation importance of natural vegetation in Mpumalanga does not allow for small discrepancies where vegetation is disturbed or degraded, such as is present within the development footprint alternatives. A re-assessment, using a finer scale, may well result in a revision of the CBA assessment. However, a greater portion of Alternative A falls outside this classification and within Heavily or Moderately Modified areas and is the more ecologically compromised site of the two.

Two vegetation communities were identified within the development footprint alternatives, namely Short Grassland, which dominates Alternative B, and Secondary Grassland, which dominates Alternative A. The Site Ecological Importance for Short Grassland is Medium, while that of Secondary Grassland is Low (refer to **Figure 6.1**). Clearing for construction of the landfill will result in the destruction of 6ha of historically disturbed natural vegetation.

No threatened or NT plants or animals were confirmed during fieldwork, and very few are likely to occur due to the very high disturbance levels present.

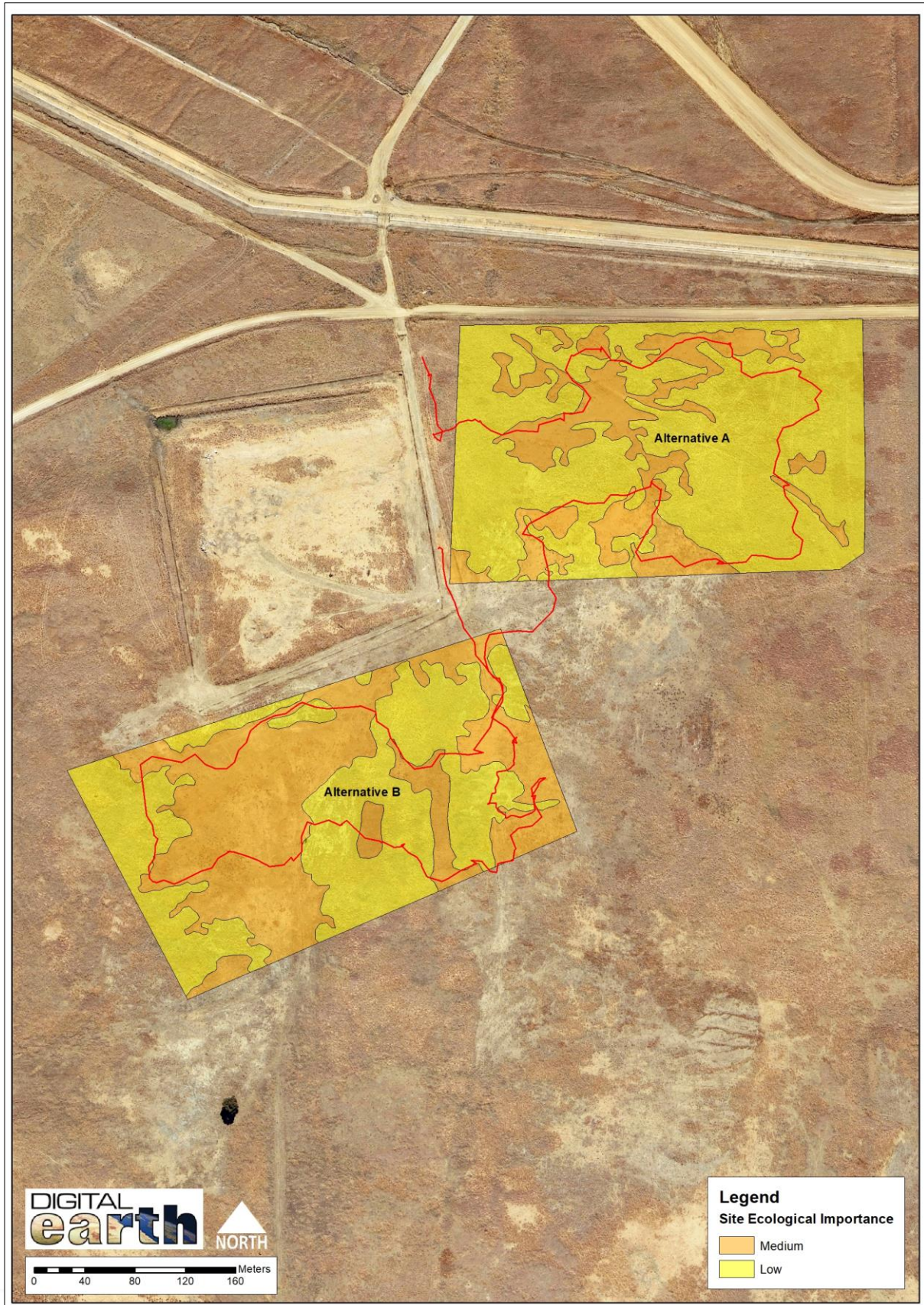


Figure 6.1: Site Ecological Importance of the vegetation communities identified in within the development footprint alternatives (note: the red line represents the survey footprint).

6.3.2. Description of Impacts on Terrestrial Biodiversity

Direct and indirect impacts associated with the construction, operation and decommissioning phases of the proposed general waste disposal site on terrestrial biodiversity include the following:

- » Loss of habitat with a very high terrestrial biodiversity theme (as per the DFFE Screening Tool), CBA: Irreplaceable conservation status and medium Site Ecological Importance.
- » Invasion of natural habitat by alien plants.
- » Potential of soil erosion.
- » Potential release of pollutants and dispersal of waste, resulting on potential harm to birds and mammals that may scavenge the site.
- » Increase on poaching activities.

6.3.3. Impact tables summarising the significance of impacts on terrestrial biodiversity during construction, operation and decommissioning (with and without mitigation)

Nature: Loss of Habitat with a Very High Terrestrial Biodiversity Theme, CBA: Irreplaceable Conservation Status and Medium Site Ecological Importance				
The development footprint alternatives are situated within an area assessed as having Very High Terrestrial Biodiversity Theme within the Environmental Screening Tool of the DFFE. Additionally, portions of the development footprint alternatives are situated within an area assessed as CBA: Irreplaceable in the MBSP, most of which is mapped within Alternative B. The Short Grassland community has also been assessed as having Medium Site Ecological Importance. According to SANBI's 2020 guidelines, impacts in these areas should be minimised. The total area spatial extent of this community in Alternative A is 1.5ha and 3ha in Alternative B.				
	Alternative A		Alternative B	
	Without mitigation	With mitigation	Without mitigation	With mitigation
Extent	Local (2)	Site (1)	Local (2)	Site (1)
Duration	Permanent (5)	Very short (1)	Permanent (5)	Permanent (5)
Magnitude	Moderate (6)	Low (4)	Moderate (6)	Moderate (6)
Probability	Highly Probable (4)	Improbable (2)	Highly Probable (4)	Probable (3)
Significance	Medium (52)	Low (12)	Medium (52)	Medium (36)
Status	Negative	Negative	Negative	Negative
Reversibility	Low	Medium	Low	Medium
Irreplaceable loss of resources?	Yes	Yes	Yes	Yes
Can impacts be mitigated?	Yes	-	Yes	-
Mitigation Measures:				
<ul style="list-style-type: none"> » It is recommended that Alternative A be selected for development and Alternative B be left undeveloped. Application of this measure is likely to reduce the impact significance to Low. » To improve the ecological integrity of Alternative B and offset the destruction of vegetation in Alternative A, an integrated management plan should be compiled for this area. This will include alien plant control and adequate grazing / burning principles. » An independent Environmental Compliance Officer (ECO) must be appointed by the developer to monitor compliance with the Environmental Authorisation during construction. The ECO must be appointed prior to commencement of construction and be involved in all aspects of project planning that can influence environmental conditions on the site. Where possible, the ECO must attend relevant project meetings, conduct inspections to assess compliance with the Environmental Authorisation and relevant Health and Safety regulations, and be responsible for providing feedback on potential environmental problems associated with construction. 				

- » Bulk clearing of vegetation should be restricted to the dry months between April and September as much as reasonably possible.
 - » The landfill site must be adequately fenced off to prevent access to surrounding untransformed vegetation.
- Residual Risks:*
- » The residual risk of site preparation on destruction of sensitive habitats is rated with high confidence as Low.

Nature: Invasion of natural habitat by alien plants

A total of 24 alien plant species were located within the study area during fieldwork, six of which are declared alien invasives. Additional invasion is highly likely as construction activities could introduce seeds which may thrive in bare soil resulting from construction activities. The significance of this impact is therefore Medium but, with the implementation of appropriate mitigation, the significance could be reduced to Low.

	Alternative A		Alternative B	
	Without mitigation	With mitigation	Without mitigation	With mitigation
Extent	Local (2)	Site (1)	Local (2)	Site (1)
Duration	Long-term (4)	Short-term (2)	Long-term (4)	Short-term (2)
Magnitude	Moderate (6)	Low (4)	Moderate (6)	Low (4)
Probability	High Probable (4)	Improbable (2)	High Probable (4)	Improbable (2)
Significance	Medium (48)	Low (14)	Medium (48)	Low (14)
Status	Negative	Negative	Negative	Negative
Reversibility	Low	High	Low	High
Irreplaceable loss of resources?	No	No	No	No
Can impacts be mitigated?	Yes	-	Yes	-

Mitigation Measures:

- » To comply with the National Environmental Management: Biodiversity Act (Act No. 10 of 2004), all listed invasive exotic plants as indicated in Appendix 1 of the Terrestrial Biodiversity Impact Assessment should be targeted and controlled. This is especially relevant to the many alien invasive tree and shrub species present, and may require the compilation of an alien plant control plan.
- » It is recommended that all woody alien plants within a 200 m radius of the site be immediately destroyed using appropriate techniques.
- » An independent ECO must be appointed by the developer to monitor compliance with the Environmental Authorisation during construction. The ECO must be appointed prior to commencement of construction and be involved in all aspects of project planning that can influence environmental conditions on the site. Where possible, the ECO must attend relevant project meetings, conduct inspections to assess compliance with the Environmental Authorisation and relevant Health and Safety regulations, and be responsible for providing feedback on potential environmental problems associated with construction.
- » It is important that weed control, if involving herbicides, be managed correctly to reduce the impact on the adjacent natural vegetation. Regular inspections should be made to determine if any additional alien plants have established.
- » Bulk clearing of vegetation should be restricted to the dry months between April and September as much as reasonably possible.

Residual Risks:

- » The residual risk of invasion from alien plants is rated with high confidence as **Low**.

Nature: Potential of soil erosion

Rain and sediment runoff from loose and bare soil around the construction site is likely to result in some erosion and downstream sedimentation. Although the pre-mitigation impact of this is Low, consideration must be given to the

timing of clearing activities. Clearing during the dry season and the careful and correct implementation of a re-vegetation and soil erosion plan will reduce the significance of this impact.

	Alternative A		Alternative B	
	Without mitigation	With mitigation	Without mitigation	With mitigation
Extent	Local (2)	Site (1)	Local (2)	Site (1)
Duration	Medium-term (3)	Short-term (2)	Medium-term (3)	Short-term (2)
Magnitude	Minor (2)	Small (0)	Minor (2)	Small (0)
Probability	Probable (3)	Improbable (2)	Probable (3)	Improbable (2)
Significance	Low (21)	Low (6)	Low (21)	Low (6)
Status	Negative	Negative	Negative	Negative
Reversibility	High	High	High	High
Irreplaceable loss of resources?	No	No	No	No
Can impacts be mitigated?	Yes	-	Yes	-

Mitigation Measures:

- » It is recommended that vegetation clearing be conducted in the dry months between April and September, prior to the onset of the rains. The seasonal arrival of the rain season subsequent to construction will then allow for the natural re-vegetation of bare areas, from the seedbank within the soil.
- » All existing and proposed roads should contain adequate stormwater drainage and erosion control measures.
- » An independent ECO must be appointed by the developer to monitor compliance with the Environmental Authorisation during construction. The ECO must be appointed prior to commencement of construction and be involved in all aspects of project planning that can influence environmental conditions on the site. Where possible, the ECO must attend relevant project meetings, conduct inspections to assess compliance with the Environmental Authorisation and relevant Health and Safety regulations, and be responsible for providing feedback on potential environmental problems associated with construction.

Residual Risks:

- » The residual risk of erosion is rated with high confidence as **Low**.

Nature: Potential release of pollutants and dispersal of waste

Due to the presence of vertic soils within the study area, the risk of leaching of rainwater through the landfill into the surrounding soil is low. However, gusts of wind may lift light plastics into the air to be deposited some distances away, and birds and mammals may scavenge in the site, exposing them to potentially harmful waste and sharp objects. The pre-mitigation impact of this is Medium. However, the impact can be reduced to Low with the implementation of suitable mitigation measures.

	Alternative A		Alternative B	
	Without mitigation	With mitigation	Without mitigation	With mitigation
Extent	Regional (3)	Site (1)	Regional (3)	Site (1)
Duration	Long (4)	Short (2)	Long (4)	Short (2)
Magnitude	High (8)	Minor (2)	High (8)	Small (0)
Probability	High Probable (4)	Improbable (2)	High Probable (4)	Improbable (2)
Significance	Medium (60)	Low (10)	Medium (60)	Low (6)
Status	Negative	Negative	Negative	Negative
Reversibility	High	High	High	High
Irreplaceable loss of resources?	No	No	No	No
Can impacts be mitigated?	Yes	-	Yes	-

Mitigation Measures:

<ul style="list-style-type: none"> » A sturdy, mammal-proof fence of at least 3 m in height should be constructed around the perimeter of the site to prevent unwanted access from small mammals, cattle and people as well as prevent plastics from being blown out. This fence must be regularly inspected for damage or forced entry. » Waste should periodically be covered with layers of soil obtained from an authorised borrow pit to allow for physical and chemical stability of the waste and create a sustainable future land use or ecological function. » An independent ECO must be appointed by the developer to monitor compliance with the Environmental Authorisation during construction. The ECO must be appointed prior to commencement of construction and be involved in all aspects of project planning that can influence environmental conditions on the site. Where possible, the ECO must attend relevant project meetings, conduct inspections to assess compliance with the Environmental Authorisation and relevant Health and Safety regulations, and be responsible for providing feedback on potential environmental problems associated with construction.
<p>Residual Risks:</p> <ul style="list-style-type: none"> » The residual risk of dispersal of waste is rated with high confidence as Low.

Nature: Increase in poaching activities				
Unsupervised construction workers may participate in small-scale poaching through setting snares or traps for bushmeat. Medicinal plants may also be harvested for muthi. Due to the relative lack of target species and no access controls, mitigation measures are redundant. However, due to the paucity of fauna, the impact is likely to be Low.				
	Alternative A		Alternative B	
	Without mitigation	With mitigation	Without mitigation	With mitigation
Extent	Local (2)	Local (2)	Local (2)	Local (2)
Duration	Long (4)	Long (4)	Long (4)	Long (4)
Magnitude	Minor (2)	Minor (2)	Minor (2)	Small (0)
Probability	Probable (3)	Probable (3)	Probable (3)	Probable (3)
Significance	Low (24)	Low (24)	Low (24)	Low (24)
Status	Negative	Negative	Negative	Negative
Reversibility	Moderate	Moderate	Moderate	Moderate
Irreplaceable loss of resources?	No	No	No	No
Can impacts be mitigated?	No	-	No	-
Mitigation Measures:				
» Due to the area surrounding the proposed landfill site appearing to be accessible to the general public, no appropriate mitigation measures can be made. The pre and post mitigation ratings remain Low.				
Residual Risks:				
» The residual risk of poaching is rated with high confidence as Low .				

6.3.4. Comparative Assessment of Alternative and Alternative B

A summary of the preferred alternative and the reasons thereof is presented below.

GENERAL WASTE DISPOSAL SITE AT THE ESKOM MAJUBA POWER STATION		
Alternative	Preference	Reasons
Alternative A	Preferred	The Site Ecological Importance of the Short Grassland vegetation community, which dominates Alternative B, is Medium, while that of Secondary Grassland, which dominates Alternative A, is Low.
Alternative B	Acceptable	The Site Ecological Importance of the Short Grassland vegetation community, which dominates Alternative B, is Medium, while that of Secondary Grassland, which dominates Alternative A, is Low.

6.3.5. Overall Result

The proposed general waste disposal site will have impacts of medium to low significance on terrestrial biodiversity. All impacts can be reduced to low significance following the implementation of mitigation measures. Provided the recommendations suggested in the Terrestrial Biodiversity Impact Assessment are followed, and the developer complies with all relevant legislation pertaining to the development activities (such as the NEMA and NEMBA), there is no objection to the proposed development from an ecological perspective. Alternative A is preferred, while Alternative B is considered acceptable.

6.4. Potential Impacts on Wetlands and Aquatic Biodiversity

The development of the general waste disposal site is likely to result in a variety of impacts from an aquatic biodiversity perspective. Potential impacts and the relative significance of the impacts are summarised below (refer to **Appendix D** for more details).

6.4.1. Results of the Wetland Delineation and Aquatic Biodiversity Impact Assessment

The proposed project site is located in the upper reaches of the Geelklispruit Catchment, a tributary of the Vaal River, within Quaternary Catchment C11J, in the Upper Vaal Water Management Area. The site is located within a National Freshwater Priority Area for rivers, but not within or near Strategic Water Source Areas. The Mpumalanga Biodiversity Sector Plan Freshwater Assessment classifies the study area as an *Ecological Support Area (ESA): Important sub-catchment*. Numerous hillslope seepage wetlands, which cover ~17% of the 500m study boundary, were identified, with areas of seasonal and permanent saturation. The closest seasonal wetlands are some 80 m from the nearest proposed landfill, while the closest permanent wetland is some 320 m from the nearest proposed landfill. A 30m buffer has been recommended around these wetland features (refer to **Figure 6.2**). The aim of the buffer zone is to maintain the ecological integrity and functioning of the Seepage Wetlands by minimising indirect impacts that could be associated with the proposed landfill. A buffer zone of 30 m is recommended because:

- » Soils in and around the wetland have low permeability which means that ingress is low and runoff is high, so a wide buffer zone is appropriate.
- » The slope of the surrounding topography is gentle but has been observed to be sufficient to generate significant surface runoff during storm events, so a wide buffer zone is appropriate.
- » The Present Ecological State of the Seasonal Wetlands is Moderately Modified (Category C), while that of the Permanent Seepage Wetlands is Largely Natural (Category B), so a wide buffer zone is appropriate;
- » Wetland boundaries within the potential Areas of Indirect Impact are considered accurate to within 15 m, so a wide buffer zone is appropriate.
- » The wetlands remain functionally intact and provide important ecological goods and services, including biodiversity support, grazing for cattle, and nutrient assimilation, so a wide buffer is appropriate so as to protect these services.
- » Vegetation cover in and around the landfill is generally sparse, and this is likely to be more so after fire, so a wide buffer zone is appropriate.

There are no aquatic habitats within the two proposed footprint areas, so the proposed development will have no direct impacts on aquatic biodiversity.

Soils within the proposed development area comprise gleyic soils of the Kroonstad Soil Formation, and these are suited to landfill development because they have a high clay content, low permeability and good buffering capacity.

The potential development footprint is located in an area that has been disturbed by what appears to be historical cultivation and removal of topsoil for the existing, decommissioned landfill. Examination of available imagery suggests that the Present Ecological State of aquatic ecosystems within the potential Area of Indirect Influence in March 2018 appeared to have improved, despite surrounding development. The improvement is attributed to reduced cultivation in the area. The positive impacts of declining cultivation on aquatic biodiversity in the area over time are likely to override the negative impacts of the proposed landfill and other planned developments, as the later have a small footprint compared to areas under cultivation. The proposed development is not expected to impact measurably on any threatened aquatic species.



Figure 6.2: Delineation of aquatic ecosystems within the 500m regulated area of the development footprint alternatives

6.4.2. Description of Impacts on Wetlands and Aquatic Biodiversity

Direct and indirect impacts associated with the construction and operation phases of the proposed general waste disposal site on wetlands and aquatic biodiversity include the following:

- » Siltation of downstream watercourses due to mobilisation of sediments during stormwater events, leading to negative impacts on aquatic biodiversity.
- » Impact of seepage and stormwater runoff from landfill on water quality.
- » Erosion due to stormwater runoff from landfill and impact on wetland habitats.

6.4.3. Impact tables summarising the significance of impacts on wetlands and aquatic biodiversity during construction and operation (with and without mitigation)

Construction Phase

Nature: Impact of site preparation on siltation of aquatic habitats				
Bulk earthworks and vegetation clearing associated with the proposed landfill and associated access road are likely to mobilise sediments during storm events during construction, and this could increase siltation of downstream watercourses, and in doing so, impact negatively on aquatic biodiversity.				
	Alternative A		Alternative B	
	Without mitigation	With mitigation	Without mitigation	With mitigation
Extent	Local (2)	Site (1)	Local (2)	Site (1)
Duration	Long-term (5)	Medium-term (3)	Long-term (5)	Medium-term (3)
Magnitude	Moderate (6)	Low (4)	Moderate (6)	Low (4)
Probability	Highly Probable (4)	Probable (3)	Highly Probable (4)	Probable (3)
Significance	Medium (52)	Low (24)	Medium (52)	Low (24)
Status	Negative	Negative	Negative	Negative
Reversibility	Medium	Medium	Medium	Medium
Irreplaceable loss of resources?	No	No	No	No
Can impacts be mitigated?	Yes	-	Yes	-
Mitigation Measures:				
Planning Phase				
<ul style="list-style-type: none"> » Wetland Buffer Zone. A buffer zone of no development within 30 m from the outer edge of the Seepage Wetland is recommended, as shown in Figure 6.2. » Stormwater Management Plan. A Stormwater Management Plan must be developed for the proposed development and the associated access road. The design of the stormwater system must aim to reduce risks of sediment transport and water quality deterioration by: <ul style="list-style-type: none"> o Design and operation to ensure zero seepage of leachate into the receiving watercourse. o Separation of clean and dirty stormwater runoff. o Clean stormwater runoff from the proposed landfill must be managed to avoid elevated peak flows from impacting on watercourses. High water velocity greatly increases the erosion risk so drains that convey such water should contain energy brakes, such as lining with stones, concrete, grass or gabions to reduce the water velocity and therefore erosion. o Use of multiple smaller discharges rather than a few large discharges. o Dirty stormwater must be captured by inner perimeter drains and contained in a leachates sump or sumps with sufficient capacity to hold runoff 1:100 year flood event. 				

- Appropriate diversion of stormwater runoff from existing and proposed access to avoid siltation of watercourses.
- Retention ponds, where appropriate, to reduce the magnitude of stormwater flows.
- Swales, where appropriate, to improve the quality of seepage water.

Construction Phase

- » **Environmental Compliance Officer (ECO).** An independent ECO must be appointed by the developer to monitor compliance with the Environmental Authorisation (EA) during construction. The ECO must be appointed prior to commencement of construction and be involved in all aspects of project planning that can influence environmental conditions on the site. Where possible, the ECO must attend relevant project meetings, conduct inspections to assess compliance with the EA and relevant Health and Safety regulations, and be responsible for providing feedback on potential environmental problems associated with construction; and
- » **Construction Schedule.** Bulk clearing of vegetation should be restricted to the dry months between April and September.

Residual Risks:

- » The residual risk of site preparation on siltation of aquatic habitats is rated with high confidence as **Low**.

Operation Phase

Nature: Impact of seepage and stormwater runoff from landfill on water quality

Seepage of polluted leachate and runoff of polluted stormwater from the proposed landfill could impact negatively on the quality of surface water in receiving watercourses for the duration of the Operational Phase, and this could lead to a reduction in aquatic biodiversity.

	Alternative A		Alternative B	
	Without mitigation	With mitigation	Without mitigation	With mitigation
Extent	Local (2)	Site (1)	Local (2)	Site (1)
Duration	Long-term (5)	Long-term (5)	Long-term (5)	Long-term (5)
Magnitude	High (8)	Low (4)	High (8)	Low (4)
Probability	Highly Probable (4)	Probable (3)	Highly Probable (4)	Probable (3)
Significance	Medium (60)	Medium (30)	Medium (60)	Medium (30)
Status	Negative	Negative	Negative	Negative
Reversibility	Medium	Medium	Medium	Medium
Irreplaceable loss of resources?	No	No	No	No
Can impacts be mitigated?	Yes	-	Yes	-

Mitigation Measures:

- » **Wetland Buffer Zone.** A buffer zone of no development within 30 m from the outer edge of the Seepage Wetland is recommended, as shown in **Figure 6.2**.
- » **Stormwater Management Plan.** A Stormwater Management Plan must be developed for the proposed development and the associated access road. The design of the stormwater system must aim to reduce risks of sediment transport and water quality deterioration by:
 - Design and operation to ensure zero seepage of leachate into the receiving watercourse.
 - Separation of clean and dirty stormwater runoff.
 - Clean stormwater runoff from the proposed landfill must be managed to avoid elevated peak flows from impacting on watercourses. High water velocity greatly increases the erosion risk so drains that convey such water should contain energy brakes, such as lining with stones, concrete, grass or gabions to reduce the water velocity and therefore erosion.
 - Use of multiple smaller discharges rather than a few large discharges.

<ul style="list-style-type: none"> o Dirty stormwater must be captured by inner perimeter drains and contained in a leachate sump or sumps with sufficient capacity to hold runoff 1:100 year flood event. o Appropriate diversion of stormwater runoff from existing and proposed access to avoid siltation of watercourses. o Retention ponds, where appropriate, to reduce the magnitude of stormwater flows. o Swales, where appropriate, to improve the quality of seepage water. <p>» National Norms and Standards for the Storage of Waste. The National Norms and Standards for the Storage of Waste, as promulgated in Government Notice 926 on 29th November 2013, must be adhered to.</p> <p>» Minimum Requirements for Waste Disposal. The minimum requirements for waste disposal (DWAf 2005b), should be adhered to.</p> <p>» Leachate Management. All leachate must be directed to the Leachate Evaporation Pond. All leachate must be considered as hazardous and disposed of accordingly. Appropriate methods of disposal of leachate are detailed by Schoeman <i>et al.</i> (2003). Leachate with low salinity (<50 g/l) should be treated using reverse osmosis (Schoeman <i>et al.</i> 2003). Leachate with high salinity (>50 g/l) should be pre-treated with adsorbents, absorbents (ash), or flocculants prior to electro dialysis desalination, followed by reverse osmosis (Schoeman <i>et al.</i> 2003). Discharge of untreated leachate from the disposal site shall not be allowed.</p> <p>» Dirty Stormwater Management. All dirty stormwater must be directed to the Stormwater Evaporation Pond. All dirty stormwater must be considered as hazardous and disposed of accordingly.</p>
<p>Residual Risks:</p> <p>» The residual risk of water quality deterioration caused by the proposed development on aquatic biodiversity is rated, with moderate confidence, as Low.</p>

<p>Nature: Impact of stormwater runoff from landfill on erosion of wetland habitats</p> <p>The proposed landfill will alter the patterns and intensity of surface runoff, and this is likely to increase the risks of head-cut erosion in receiving watercourses. Low levels of head-cut erosion were observed in seasonal seepage wetlands downslope of the existing landfill during the baseline survey in March 2018. The erosion is attributed to increased magnitude of stormwater runoff from the landfill and access roads.</p>				
	Alternative A		Alternative B	
	Without mitigation	With mitigation	Without mitigation	With mitigation
Extent	Site (1)	Site (1)	Site (1)	Site (1)
Duration	Permanent (5)	Permanent (5)	Permanent (5)	Permanent (5)
Magnitude	Low (4)	Minor (2)	Low (4)	Minor (2)
Probability	Highly Probable (4)	Improbable (2)	Highly Probable (4)	Improbable (2)
Significance	Medium (40)	Low (16)	Medium (40)	Low (16)
Status	Negative	Negative	Negative	Negative
Reversibility	Irreversible	Irreversible	Irreversible	Irreversible
Irreplaceable loss of resources?	No	No	No	No
Can impacts be mitigated?	Yes	-	Yes	-
<p>Mitigation Measures:</p> <p>» Location. The location of the two proposed landfill options on a watershed between two sub-catchments significantly reduces the intensity of runoff.</p> <p>» Wetland Buffer Zone. A buffer zone of no development within 30 m from the outer edge of the Seepage Wetland is recommended, as shown in Figure 6.2.</p>				

<p>» Stormwater Management Plan. A Stormwater Management Plan must be developed for the proposed development and the associated access road. The design of the stormwater system must aim to reduce risks of sediment transport and water quality deterioration by:</p> <ul style="list-style-type: none"> ○ Design and operation to ensure zero seepage of leachate into the receiving watercourse. ○ Separation of clean and dirty stormwater runoff. ○ Clean stormwater runoff from the proposed landfill must be managed to avoid elevated peak flows from impacting on watercourses. High water velocity greatly increases the erosion risk so drains that convey such water should contain energy brakes, such as lining with stones, concrete, grass or gabions to reduce the water velocity and therefore erosion. ○ Use of multiple smaller discharges rather than a few large discharges. ○ Dirty stormwater must be captured by inner perimeter drains and contained in a leachate sump or sumps with sufficient capacity to hold runoff 1:100 year flood event. ○ Appropriate diversion of stormwater runoff from existing and proposed access to avoid siltation of watercourses. ○ Retention ponds, where appropriate, to reduce the magnitude of stormwater flows. ○ Swales, where appropriate, to improve the quality of seepage water.
<p>Residual Risks:</p> <p>» The residual risk of stormwater runoff on erosion of wetland habitats is rated with moderate confidence as Low.</p>

6.4.4. Comparative Assessment of Alternative A and Alternative B

A summary of the preferred alternative and the reasons thereof is presented below.

GENERAL WASTE DISPOSAL SITE AT THE ESKOM MAJUBA POWER STATION		
Alternative	Preference	Reasons
Alternative A	Acceptable	This site will have no direct impacts on aquatic biodiversity and the residual impacts and risks to aquatic ecosystems are Low . Furthermore, there is no measurable difference between the two alternatives in terms of potential impacts on aquatic biodiversity.
Alternative B	Acceptable	This site will have no direct impacts on aquatic biodiversity and the residual impacts and risks to aquatic ecosystems are Low . Furthermore, there is no measurable difference between the two alternatives in terms of potential impacts on aquatic biodiversity.

6.4.5. Overall Result

The proposed general waste disposal site will have impacts of medium to low significance on aquatic biodiversity. All impacts, with the exception of impacts on water quality due to seepage and stormwater runoff from the landfill, can be reduced to low significance following the implementation of mitigation measures. There is no preference in terms of alternatives considered. Authorisation of either of the two proposed waste disposal site alternatives in terms of risks to aquatic biodiversity is recommended on the grounds that:

- » **Aquatic Habitats.** There are no aquatic habitats within the two proposed footprint areas, so the proposed development will have no direct impacts on aquatic biodiversity. The closest seasonal wetlands are some 80 m from the nearest proposed landfill, while the closest permanent wetland is some 320 m from the nearest proposed landfill.
- » **Soils.** Soils within the proposed development area comprise gleyic soils of the Kroonstad Soil Formation, and these are suited to landfill development because they have a high clay content, low permeability and good buffering capacity.

- » **Present Ecological State.** The potential development footprint is located in an area that has been disturbed by what appears to be historical cultivation and removal of topsoil for the existing, decommissioned landfill. Examination of available imagery suggests that the Present Ecological State of aquatic ecosystems within the potential Area of Indirect Influence in March 2018 appeared to have improved, despite surrounding development. The improvement is attributed to reduced cultivation in the area. The positive impacts of declining cultivation on aquatic biodiversity in the area over time are likely to override the negative impacts of the proposed landfill and other planned developments, as the later have a small footprint compared to areas under cultivation.
- » **Ecological Connectivity.** The proposed development is not expected to impact longitudinal or lateral ecological connectivity, or the migration of aquatic species, because the proposed landfill is located on the watershed between two sub-catchments.
- » **Ecological Importance and Sensitivity.** The proposed development is not expected to impact measurably on any threatened aquatic species.
- » **Mitigation.** most of the negative impacts of the proposed development on ecological functions can be avoided or mitigated through careful design and operation.
- » **Hydrological Functions.** The proposed development could impact local hydraulic conditions and this may impact on hydrological functions in terms of elevated magnitude of stormwater, but any such impacts are likely to be localised and can be managed with appropriate Stormwater Management.
- » **Sediment Transport.** The proposed development could increase sediment transport, especially during construction. However, the potential impacts on sediment transport are likely to be localised and can be minimised through appropriate scheduling, and managed with appropriate Stormwater Management.
- » **Water Quality.** Surface and groundwater quality deterioration associated with the proposed development is the main potential issue of concern with respect to potential impacts on aquatic ecosystems. While of concern, these can be monitored and managed.
- » **Water Users and Uses.** The proposed developments are not expected to have measurable impacts on other water users or uses.
- » **Key Ecosystem Services.** The proposed development is not expected to impact measurably on ecosystem services.

The two proposed development options will have no direct impacts on aquatic ecosystems and as such, there was no justification for a management plan for alien invasive vegetation with respect to aquatic ecosystems. An alien invasive management plan is included in the Specialist Report on Terrestrial Biodiversity. There was also no justification for a wetland offset as the two proposed development options will have no direct impacts on aquatic ecosystems. Furthermore, potential indirect impacts can be managed, and the two proposed development options are unlikely to have measurable impacts on aquatic ecosystems.

6.5. Potential Impacts on Geohydrology

Potential impacts on groundwater resources and the relative significance of the impacts associated with the development of the general waste disposal site are summarised below (refer to **Appendix F**).

6.5.1. Results of the Geohydrological Impact Assessment

The water quality of the nine (9) sampling points scattered around the site are, with the exception of one data point (i.e., BH2), currently indicative of an unpolluted water regime.

The landfill site is characterised by an aquifer of low significance and can only be used for monitoring purposes, confirming the fact that the site is not located in an area characterised by aquifers with a potentially strategic value. Furthermore, the surrounding area is seemingly devoid of groundwater boreholes and stock watering is not an issue as there is sufficient surface sources available.

6.5.2. Description of the Impacts on Groundwater Resources

The primary impact on groundwater resources as a result of the general waste disposal site is the contamination of groundwater resources due to spillages and leaks from the landfill.

6.5.3. Impact tables summarising the significance of impacts on groundwater resources during construction (with and without mitigation)

Construction Phase

Nature: Groundwater contamination.				
	Alternative A		Alternative B	
	Without mitigation	With mitigation	Without mitigation	With mitigation
Extent	Local (2)	Site (1)	Local (2)	Site (1)
Duration	Short (1)	Very Short (1)	Short (1)	Very Short (1)
Magnitude	Minor (2)	Small (0)	Moderate (6)	Low (4)
Probability	Probable (3)	Improbable (2)	Probable (3)	Probable (3)
Significance	Medium (40)	Low (20)	Medium (40)	Medium (40)
Status	Negative	Negative	Negative	Negative
Reversibility	Low	Medium	Low	Low
Irreplaceable loss of resources?	No	No	No	No
Can impacts be mitigated?	Yes	-	Yes	-
Mitigation Measures:				
<ul style="list-style-type: none"> » Implement groundwater monitoring programme. » Clean-up protocols in the case of spillages must be adhered to. » Excavate to down to 3m depth only to safeguard the phreatic surface. » Overburden soil must be stockpiled for re-use as interlayer material. » A clay liner must be installed. » Ensure adequate lining and drainage systems are installed. » All areas that have been stripped must be rehabilitated. » Good drainage and stormwater control must be implemented. 				

Operation Phase

Nature: Groundwater contamination.				
	Alternative A		Alternative B	
	Without mitigation	With mitigation	Without mitigation	With mitigation
Extent	Local (2)	Site (1)	Local (2)	Site (1)
Duration	Medium (3)	Short (3)	Medium (3)	Short (3)
Magnitude	Moderate (6)	Low (4)	Moderate (6)	Low (4)
Probability	Highly Probable (4)	Improbable (2)	Highly Probable (4)	Probable (3)

	Alternative A		Alternative B	
	Without mitigation	With mitigation	Without mitigation	With mitigation
Significance	Medium (40)	Low (20)	Medium (40)	Low (20)
Status	Negative	Negative	Negative	Negative
Reversibility	Low	Medium	Low	Low
Irreplaceable loss of resources?	yes	No	yes	No
Can impacts be mitigated?	Yes	-	Yes	-
Mitigation Measures:				
<ul style="list-style-type: none"> » Implement a groundwater monitoring programme. » Clean-up protocols in the case of spillages must be adhered to. » Implement inter layering with soil lenses. » Good drainage and stormwater control must be implemented. » Ensure surface run-off is contained and treated before disposal. » A clay liner must be installed. » Ensure adequate lining and drainage systems are installed. 				

Closure and Decommissioning Phase

Nature: Groundwater contamination.				
	Alternative A		Alternative B	
	Without mitigation	With mitigation	Without mitigation	With mitigation
Extent	Local (2)	Site (1)	Local (2)	Site (1)
Duration	Permanent (5)	Very Short (1)	Permanent (5)	Very Short (1)
Magnitude	Moderate (6)	Low (4)	Moderate (6)	Moderate (6)
Probability	Highly Probable (4)	Improbable (2)	Highly Probable (4)	Probable (3)
Significance	Medium (40)	Low (20)	Medium (40)	Medium (40)
Status	Negative	Negative	Negative	Negative
Reversibility	Low	Medium	Low	Medium
Irreplaceable loss of resources?	Yes	No	Yes	No
Can impacts be mitigated?	Yes	-	Yes	-
Mitigation Measures:				
<ul style="list-style-type: none"> » Ensure adequate lining and drainage systems as well as leachate pits are installed. » Ensure that surface run-off is contained and treated before disposal. » Adequate storm water measures must be implemented. » Groundwater monitoring must be undertaken to ensure early detection of pollution. » Capping material must be grassed over. 				

6.5.4. Comparative Assessment of Alternative A and Alternative B

A summary of the preferred alternative and the reasons thereof is presented below.

GENERAL WASTE DISPOSAL SITE AT THE ESKOM MAJUBA POWER STATION		
Alternative Site	Preference	Reasons
Alternative A	Preferred	The uppermost spring-line is some 9m below the crest of the proposed site and the 3m deep excavation for the landfill is sufficiently shallow to prevent interference with the phreatic line; sufficient interlayer and capping material available on site; mitigation measures will reduce risk of contamination between low and medium.

Alternative B	Fatally Flawed	This site intersects the spring line and is partially stripped of cover soils required for interlayering and capping; pollution of groundwater sources is highly probable over the long term.
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6.5.5. Overall Result

The proposed general waste disposal site will have impacts of medium to low significance on groundwater resources. All impacts can be reduced to low significance following the implementation of mitigation measures. Alternative A is preferred while Alternative B is considered to be fatally flawed from a groundwater perspective; reason being that Alternative B intersects the spring line and is partially stripped of cover soils required for interlayering and capping and as such, pollution of groundwater sources is highly probable over the long term on this site. Given the potential hydrogeological impacts, the development of Alternative A can only be viable if the mitigation measures are implemented and adhered to. Groundwater monitoring is imperative and necessary in order to detect groundwater contamination before impacting nearby receptors. From a groundwater perspective, it is the specialist's opinion that the project can be authorised for Alternative A, provided the recommended mitigation measures are implemented and adhered to.

6.6. Potential Impacts on Archaeological Heritage Resources

Potential impacts on heritage resources and the relative significance of the impacts associated with the development of the general waste disposal site are summarised below (refer to **Appendix H**).

6.6.1. Results of the Archaeological Heritage Impact Assessment

The cultural landscape quality of the region consists of a rural area in which human occupation is made up of limited Stone Age occupation. This was followed much later by Nguni-speaking agro-pastoralists that settled in the larger region. They were soon followed by a colonial component, which gave rise to the development of small villages and towns that dot the larger landscape. The final transformation was brought about by the development of infrastructure in the region, such as roads and railway lines and the development of a large number of mines.

A field survey was conducted on 03 April 2018 according to generally accepted archaeological practices, and was aimed at locating possible sites, objects, and structures of archaeological significance within the project site and development footprint. The field survey identified no sites, features or objects of archaeological significance within the project site and development footprint alternatives dating to the Stone Age, Iron Age and Historic Period.

6.6.2. Description of Impacts on Heritage Resources

As no sites, features or objects of archaeological, cultural or historic significance have been identified in the project area, there would be no impact as a result of the proposed development.

6.6.3. Impact tables summarising the significance of impacts on heritage resources during construction (with and without mitigation)

Nature: As no sites, features or objects of cultural historic significance have been identified in the project area, there would be no impact as a result of the proposed development.				
	Alternative A		Alternative B	
	Without mitigation	With mitigation	Without mitigation	With mitigation
Extent	Local (1)	Local (1)	Local (1)	Local (1)
Duration	Very short (1)	Very short (1)	Very short (1)	Very short (1)
Magnitude	Minor (2)	Minor (2)	Minor (2)	Minor (2)
Probability	Very improbable (1)	Very Improbable (1)	Very improbable (1)	Very improbable (1)
Significance	Low (4)	Low (4)	Low (4)	Low (4)
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	High	High	High	High
Irreplaceable loss of resources?	No	No	No	No
Can impacts be mitigated?	N/A		N/A	
Mitigation Measures:				
» As no sites, features or objects of cultural significance were identified, no mitigation measures are proposed. However, it is proposed that the following condition be included in the EA issued for the project: <ul style="list-style-type: none"> o Should archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made. 				
Residual impacts:				
» None.				

6.6.4. Comparative Assessment of Alternative A and Alternative B

A summary of the preferred alternative and the reasons thereof is presented below.

GENERAL WASTE DISPOSAL SITE AT THE ESKOM MAJUBA POWER STATION		
Alternative	Preference	Reasons
Alternative A	Acceptable	No sites, features or objects of cultural significance were identified to occur in this alternative.
Alternative B	Acceptable	No sites, features or objects of cultural significance were identified to occur in this alternative.

6.6.5. Overall Result

As no sites, features or objects of cultural historic significance have been identified in the project area, there would be no impact as a result of the proposed development regardless of the development footprint alternative selected. From a heritage point of view, it is recommended that the proposed project be allowed to continue on acceptance of the conditions proposed for inclusion in the project's EMPr.

6.7. Potential Impacts on Palaeontological Resources

Potential impacts on palaeontological resources and the relative significance of the impacts associated with the development of the general waste disposal site are summarised below (refer to **Appendix I**).

6.7.1. Results of the Palaeontological Impact Assessment

The proposed development footprint alternatives are primarily underlain by Jurassic dolerite while surrounding areas are underlain by potentially fossiliferous sedimentary rocks of the Early Permian Volksrust Formation (Ecca Group, Karoo Supergroup). However, recent Shape files updates (Council for Geosciences, Pretoria) indicate that the proposed waste disposal site is entirely underlain by the Volksrust Formation (Ecca Group, Karoo Supergroup). According to the PalaeoMap on the South African Heritage Resources Information System (SAHRIS) database, the palaeontological sensitivity of Jurassic dolerite is zero as it is igneous in origin and does not contain fossils while that of the Volksrust Formation is High (refer to **Figure 6.3**).

Numerous impact assessments of the area have been conducted over the years with several site investigations - no fossils heritage was uncovered on the Majuba footprint. Although fossil heritage in this area is uncommon, fossil finds would be significant if found.

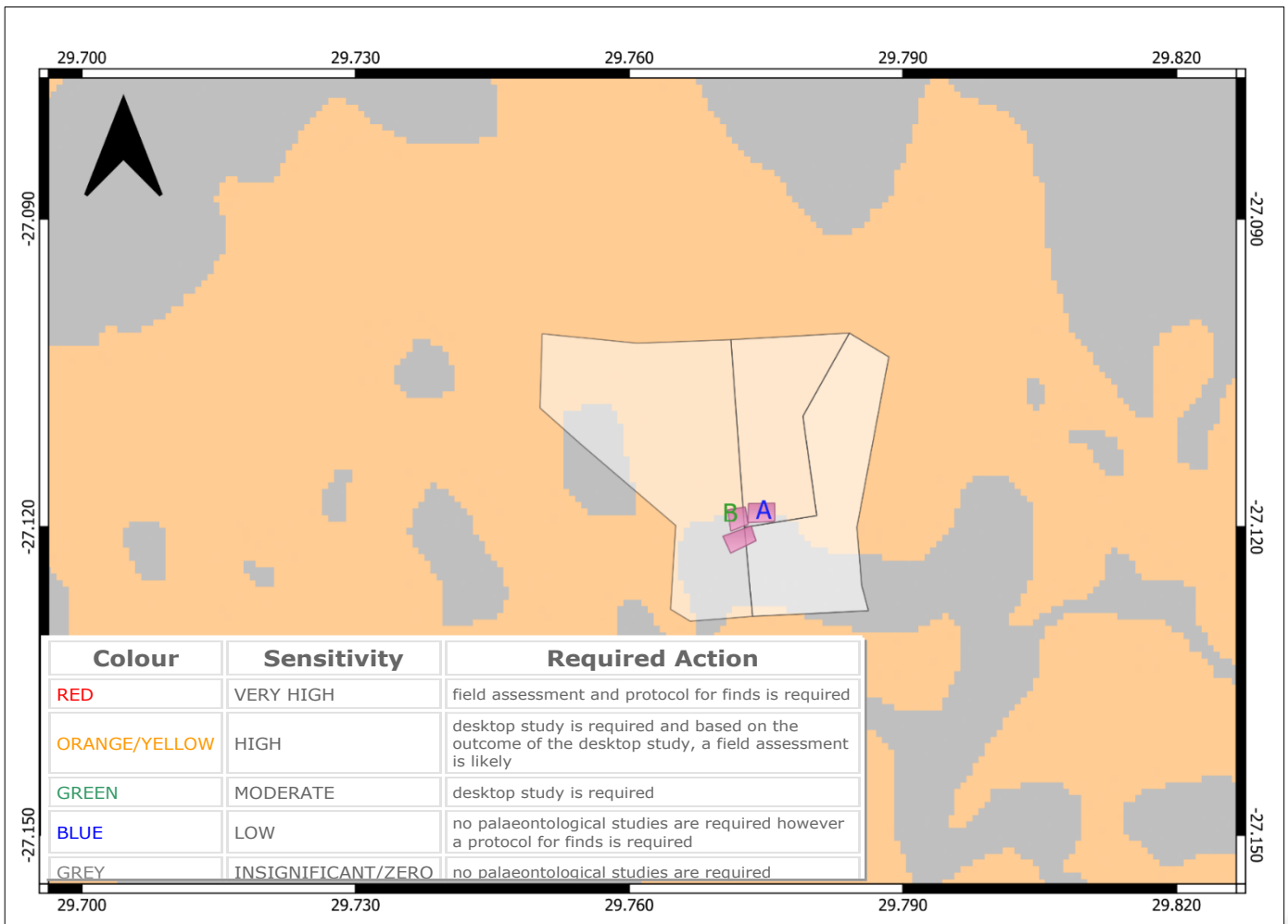


Figure 6.3: Extract of the 1 in 250 000 SAHRIS PalaeoMap map (Council of Geosciences). Location of the proposed development footprint alternatives and the existing, closed landfill is indicated pink.

6.7.2. Description of Impacts on Palaeontological Resources

The excavations and clearing of vegetation during the construction phase of the proposed general waste disposal site and associated infrastructure will consist of digging into the superficial sediment cover as well as underlying deeper bedrock. These excavations will change the existing topography and may possibly destroy or even permanently close-in fossils at or below the ground surface. These fossils will then be lost for research. Impacts on palaeontological heritage are only likely to happen within the construction phase. No impacts are expected to occur during the operation phase or decommissioning phase.

6.7.3. Impact tables summarising the significance of impacts on heritage resources during construction (with and without mitigation)

Nature: Destruction and loss of fossil heritage				
	Alternative A		Alternative B	
	Without mitigation	With mitigation	Without mitigation	With mitigation
Extent	Local (1)	Local (1)	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)	Permanent (5)	Permanent (5)
Magnitude	High (8)	High (8)	High (8)	High (8)
Probability	Highly Probable (4)	Improbable (2)	Highly Probable (4)	Improbable (2)
Significance	Medium (56)	Low (28)	Medium (56)	Low (28)
Status (positive or negative)	Negative	Neutral	Negative	Neutral
Reversibility	Irreversible	Irreversible	Irreversible	Irreversible
Irreplaceable loss of resources?	Yes	Yes	Yes	Yes
Can impacts be mitigated?	Yes		Yes	

Mitigation Measures:

- » If a chance find is made the person responsible for the find must immediately stop working and all work that could impact that finding must cease in the immediate vicinity of the find.
- » The person who made the find must immediately report the find to his/her direct supervisor which in turn must report the find to his/her manager and the Environmental Control Officer (ECO) or site manager. The ECO or site manager must report the find to the relevant Heritage Agency (South African Heritage Research Agency, SAHRA). (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za). The information to the Heritage Agency must include photographs of the find, from various angles, as well as the GPS co-ordinates.
- » A preliminary report must be submitted to the Heritage Agency within 24 hours of the find and must include the following: 1) date of the find; 2) a description of the discovery and a 3) description of the fossil and its context (depth and position of the fossil), GPS co-ordinates.
- » Photographs (the more the better) of the discovery must be of high quality, in focus, accompanied by a scale. It is also important to have photographs of the vertical section (side) where the fossil was found.
- » Upon receipt of the preliminary report, the Heritage Agency will inform the ECO (or site manager) whether a rescue excavation or rescue collection by a palaeontologist is necessary.
- » The site must be secured to protect it from any further damage. No attempt should be made to remove material from their environment. The exposed finds must be stabilized and covered by a plastic sheet or sand bags. The Heritage agency will also be able to advise on the most suitable method of protection of the find.
- » In the event that the fossil cannot be stabilized, the fossil may be collected with extreme care by the ECO (or site manager). Fossils finds must be stored in tissue paper and in an appropriate box while due care must be taken to remove all fossil material from the rescue site.
- » Once Heritage Agency has issued the written authorization, the developer may continue with the development on the affected area.

» The ECO will close off the chance find procedure and would be required to implement any requirements issued by the Authority and to add it to the operational management plan.
Residual Risk:
» Loss of fossil heritage.

6.7.4. Comparative Assessment of Alternative A and Alternative B

A summary of the preferred alternative and the reasons thereof is presented below.

GENERAL WASTE DISPOSAL SITE AT THE ESKOM MAJUBA POWER STATION		
Alternative	Preference	Reasons
Alternative A	Acceptable	Same Geology and thus same Palaeontology
Alternative B	Acceptable	Same Geology and thus same Palaeontology

6.7.5. Overall Result

The proposed general waste disposal site will have an impact of medium significance on fossil heritage which can be reduced to low significance following the implementation of mitigation measures. As the geology and palaeontology of the proposed development footprint alternatives is similar, there would be no preferences on the grounds of palaeontological fossil heritage for any specific alternative under consideration. An overall low palaeontological sensitivity is allocated to the development footprint. It is therefore considered that the proposed development is deemed appropriate and will not lead to detrimental impacts on the palaeontological reserves of the area. It is consequently recommended that no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required pending the discovery of newly discovered fossils.

6.8. Assessment of Impacts on Air Quality

Impacts on air quality associated with the development are expected to occur during the construction and operational phases. Potential impacts and the relative significance of impacts are summarised below (refer to **Appendix J** for mor details).

6.8.1. Results of the Air Quality Impact Assessment

Sensitive receptors within a 10km radius of the proposed project site include isolated farmsteads to the west and southeast of the landfill as shown in **Figure 6.4**. The closest schools, clinics and residential areas to the landfill are located in the towns of Amersfoort, 15 km to the northeast, and Volksrust, 30 km to the southeast.

The establishment of a comprehensive emissions inventory formed the basis for the air quality impact assessment for the proposed general waste disposal site on the receiving environment. The emissions inventory included gaseous as well as particulate emissions.

In the estimation of gaseous emissions from the working faces and covered portions of the landfill, the United Kingdom (UK) Environmental Agency's Gassim model was used. Landfill gas emissions from the working surfaces of the general waste disposal site were calculated for approximately 100 years from the start of operations. To illustrate the typical profile of landfill gas generation surface emission rates from working surfaces, reference is made to total landfill gas generation emissions as estimated through the application

of Gassim (refer to **Figure 6.5**). The first year of operation was 2023, with each of the cells modelled with an approximate 5 years of operation before the cell is capped, for a total of 45 years of operation. Landfill gas emissions from the general waste disposal site gradually increase to reach a maximum during the operation of the last cell, when the maximum amount of waste is in place, whereafter it gradually decreases after closure of the landfill.

Decomposition of the compacted waste continues after the landfill is closed and capped, but since no more waste is deposited, the decomposable material becomes gradually less and less, resulting in a gradual decrease in the amount of landfill gas generated. Therefore, the maximum landfill gas generation (and emission) rate occurs just as, or very soon after, the maximum amount of waste is in place.

While landfill gas generation gradually decreases as the decomposable material is depleted, the “tail” of the LFG generation is quite long, with landfill gas generation only nearing zero after about 100 years. This has been annotated in **Figure 6.5** below.

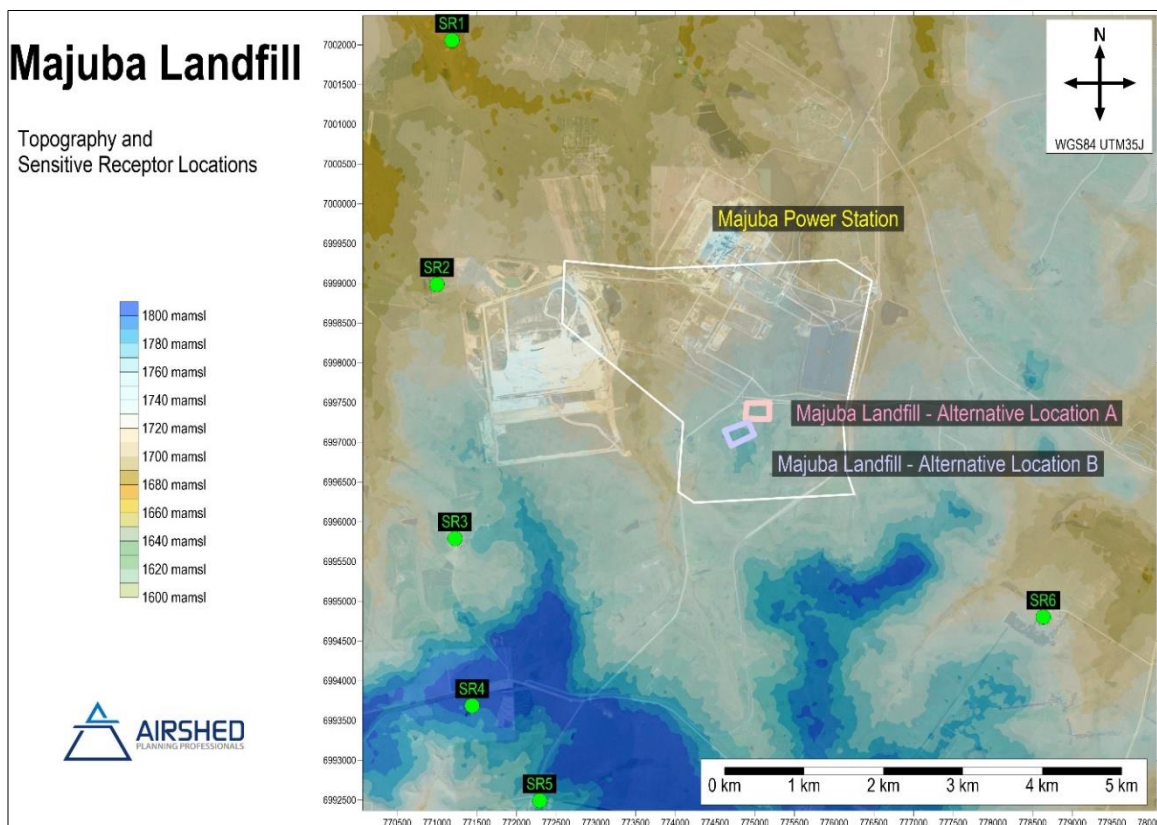


Figure 6.4: Sensitive receptors within 10km of the project site.

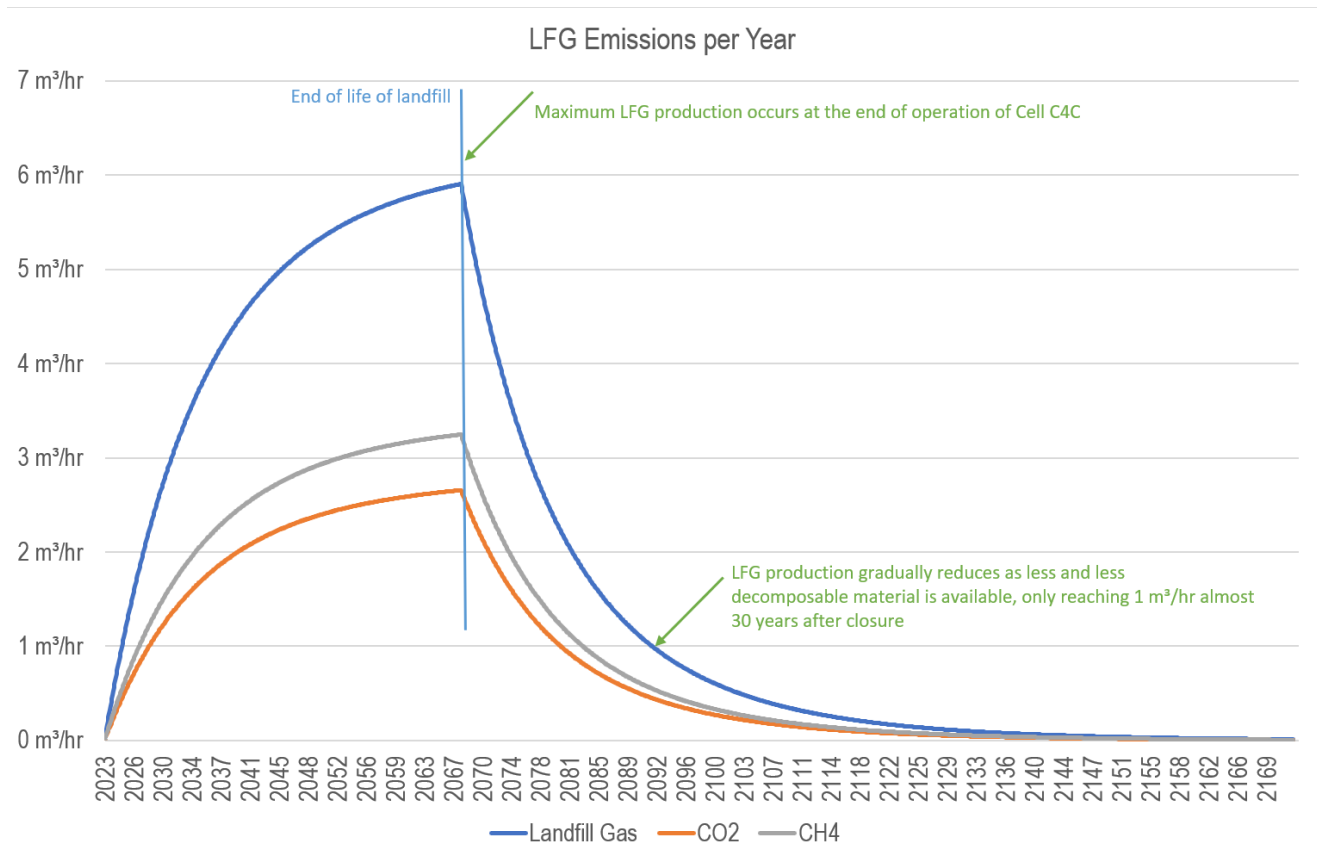


Figure 6.5: Estimated surface bulk landfill gas emission rate

In terms of greenhouse gas emissions, over its lifetime, the general waste disposal site estimated to result in a lifetime total of 2 030 tonnes of CO₂ and 740 tonnes of CH₄ emissions. Annual greenhouse gas emissions are expected to reach a maximum during the operation of the last cell. The maximum annual greenhouse gas emissions were estimated at 42.7 tonnes of CO₂/annum and 15.6 tonnes of CH₄ per annum.

The total emission rate of fugitive dust emissions was estimated as 6.92 tonnes per annum of Total Suspended Particulates (TSP), 1.81 tonnes per annum of PM₁₀ and 0.12 tonnes per annum of PM_{2.5}.

Simulated PM₁₀, PM_{2.5} and benzene concentrations are in compliance with the SA National Ambient Air Quality Standards (NAAQS) for all areas outside the landfill site, and negligible for all areas outside the property boundary and at all sensitive receptor locations. Simulated dust fallout rates due to the operation of the general waste disposal site are below the SA National Dust Control Regulation (NDCR) limits for all areas outside the landfill site, and negligible at all areas outside the property boundary, including at all sensitive receptor locations.

The combined hazard index for all non-carcinogenic pollutant emissions from the general waste disposal site is below 0.1 for all areas outside the landfill site for all pollutants considered. What this means is that none of the pollutants modelled result in concentrations more than 10% of the relevant international standards and guidelines for any areas outside the landfill site.

The simulated cancer risk for all areas outside the property boundary, including at all sensitive receptor location, is negligible (less than 1:1 000 000 000 or one in a billion increased risk) Simulated concentrations of

all odorous compounds considered were below 10% of the odour detection threshold for all areas, including within the landfill site.

6.8.2. Description of Potential Air Quality Impacts

The following key issues have been identified and assessed during the air quality impact assessment:

- » Impact of particulate emissions on ambient PM₁₀ and PM_{2.5} concentrations and dust fallout rates.
- » Impact of landfill gas generation on health, odour and cancer risk.

6.8.3. Impact tables summarising the significance of impacts on air quality during construction and operation (with and without mitigation)

Construction Phase

Nature: Impact of particulate emissions on ambient PM₁₀ and PM_{2.5} concentrations and dust fallout rates.		
Alternative A and Alternative B		
	Without mitigation	With mitigation
Extent	Site (1)	Site (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Minor (2)	Small (0)
Probability	Probable (3)	Probable (3)
Significance	Low (21)	Low (15)
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation Measures:		
<ul style="list-style-type: none"> » To minimise wind erosion emissions, exposed areas should be revegetated/rehabilitated as soon as possible. » Mitigation measures such as water sprays be employed on unpaved road surfaces and to exposed areas when periods of high wind speeds are anticipated. 		
Residual Risks:		
<ul style="list-style-type: none"> » Wind erosion from exposed areas could result in dust emissions post closure if areas are not adequately rehabilitated 		

Operation Phase

Nature: Impact of landfill gas generation on health, odour and cancer risk.		
Alternative A and Alternative B		
	Without mitigation	With mitigation
Extent	Site (1)	Site (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Minor (2)	Small (0)
Probability	Probable (3)	Probable (3)
Significance	Low (21)	Low (15)
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation Measures:		

<ul style="list-style-type: none"> » To minimise LFG emissions and the impact thereof on the receiving environment, inactive areas should be capped with the final cap as soon as possible. » A complaints register should be kept on site and complaints should be proactively acted upon to minimise similar future impacts on the nearby communities. » It is recommended that once-off H₂S sampling, using passive diffusive samplers, be conducted on the western and eastern edges of the landfill site to confirm dispersion modelling results. Since the generation of H₂S is expected to increase with time, it is recommended that this sampling be conducted after 5 years of operation, i.e., when the first cell is capped, and filling of the second cell starts. » It is recommended that the existing dust fallout monitoring network at the Majuba Power Station be extended to include a sampling location to the south of the landfill site.
<p>Residual Risks:</p> <ul style="list-style-type: none"> » The landfill will continue to generate LFG post closure.

6.8.4. Comparative Assessment of Alternative A and Alternative B

A summary of the preferred alternative and the reasons thereof is presented below.

GENERAL WASTE DISPOSAL SITE AT THE ESKOM MAJUBA POWER STATION		
Alternative	Preference	Reasons
Alternative A	Acceptable	From an air quality perspective, there is no preferred choice between Alternative A and Alternative B, as both options will result in a low impact on ambient air quality outside the landfill site and a negligible impact on ambient air quality at all sensitive receptor locations.
Alternative B	Acceptable	

6.8.5. Overall Result

The proposed general waste disposal site has a simulated low impact on air quality, including health impacts, cancer risk and odour impacts at all areas outside the landfill site, with a negligible impact at all identified sensitive receptor locations. There is no preference in terms of alternative considered. From an air quality perspective, it is the opinion of the specialist that the project be authorised subject to implementation of the following recommendations:

- » To minimise landfill gas emissions and the impact thereof on the receiving environment, inactive areas should be capped with the final cap as soon as possible.
- » To minimise wind erosion emissions, exposed areas should be revegetated/rehabilitated as soon as possible.
- » It is recommended that the existing dust fallout monitoring network at the Majuba Power Station be extended to include a sampling location to the south of the landfill site.
- » It is recommended that once-off H₂S sampling, using passive diffusive samplers, be conducted on the western and eastern edges of the landfill site to confirm dispersion modelling results. Since the generation of H₂S is expected to increase with time, it is recommended that this sampling be conducted after 5 years of operation, i.e. when the first cell is capped and filling of the second cell starts.
- » It is recommended that dust suppression measures, such as water sprays, be employed on unpaved road surfaces and to exposed areas when periods of high wind speeds are anticipated.
- » A complaints register should be kept on site and complaints should be proactively acted upon to minimise similar future impacts on the nearby communities.

Furthermore, from an air quality perspective, there is no need to mitigate or measure post-closure methane emissions, as emissions and their resultant impacts will be insignificant (with the exception of greenhouse gas impacts, which could be more significant). The landfill designers will need to stipulate if there are any management / monitoring measures to prevent methane build-up which could lead to fires or explosions.

6.9. Assessment of Potential Cumulative Impacts Associated with the Project

The preceding impact assessment sections have reported on the assessment of impacts associated with the general waste disposal site largely in isolation (from other similar developments). This section assesses the potential for the impacts associated with the project to become more significant when considered in combination with other known or proposed industrial developments within the area.

Cumulative impacts, in relation to an activity, refer to 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. For cumulative effects analysis to help the decision-maker and inform interested parties, it must be limited to effects that can be evaluated meaningfully (DEAT, 2004).

Cumulative effects are commonly understood as the impacts which combine from different projects, and which result in significant change, which is larger than the sum of all the impacts (DEAT, 2004). The complicating factor is that the projects that need to be considered are from past, present and reasonably foreseeable future development. Cumulative effects can be characterised according to the pathway they follow. One pathway could be the persistent additions from one process. Another pathway could be the compounding effect from one or more processes. Cumulative effects can therefore occur when impacts are:

- » Additive (incremental).
- » Interactive.
- » Sequential.

Canter and Sadler (1997) describe a three-step process for addressing cumulative effects in an EIA process:

- » Delineating potential sources of cumulative change (i.e., using GIS to map the relevant similar land uses in close proximity to one another).
- » Identifying the pathways of possible change (i.e., direct impacts).
- » Indirect, non-linear processes (i.e., indirect impacts).
- » Classification of resultant cumulative changes (i.e. residual impacts).

Figure 6.6 provides an indication of the proposed general waste disposal site in relation to known proposed and operating similar or diverse activities within the vicinity of the proposed general waste disposal site.

The assessment of cumulative impacts is based on information currently available and considers impacts from similar industrial developments in the vicinity of the waste disposal site. The following potential impacts are considered:

- » Cumulative impacts on terrestrial biodiversity (including flora and fauna)
- » Cumulative impacts on delineated wetlands and aquatic biodiversity.

- » Cumulative impacts on groundwater resources.
- » Cumulative impacts on heritage resources.
- » Cumulative impacts on palaeontological heritage.
- » Cumulative impacts on air quality.

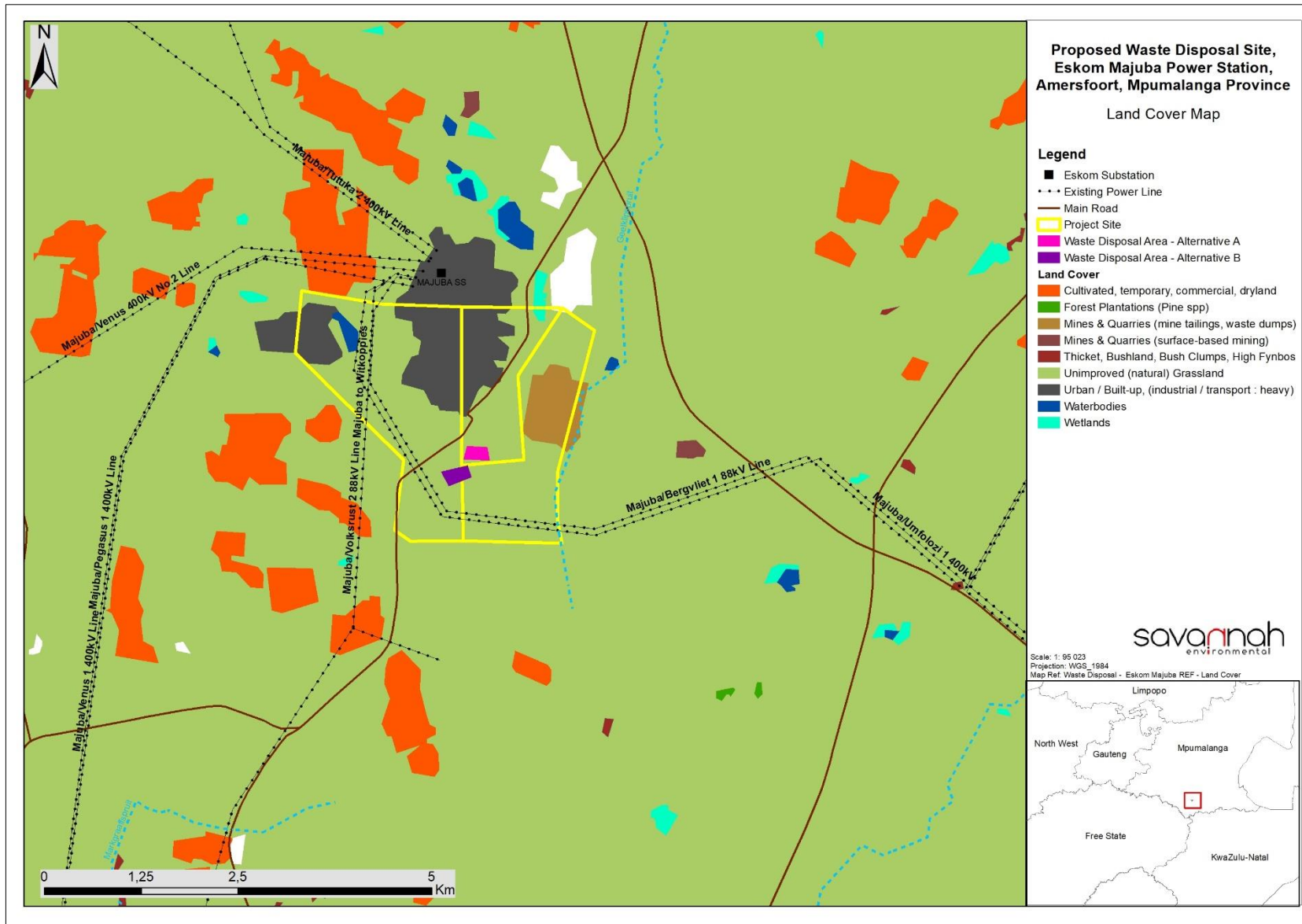


Figure 6.6: Land uses within the vicinity of the proposed general waste disposal site

6.9.1. Cumulative Impacts on Terrestrial Biodiversity (including flora and fauna)

<p>Nature: According to Savannah (2015), there are proposed plans for the expansion of the Eskom Majuba Power Station, as well as development of a solar energy facility. Cumulative impacts of the proposed landfill and the proposed future developments on terrestrial biodiversity are likely to arise from:</p> <ul style="list-style-type: none"> » Destruction of vegetation assessed as having Medium Ecological Importance, being situated within a CBA and in an area assessed as having Very High Terrestrial Biodiversity Importance. » Increased alien plant infestation, erosion and poaching associated with construction at the proposed development. 		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Site (1)	Local (2)
Duration	Medium (3)	Long (4)
Magnitude	Minor (2)	Low (4)
Probability	Improbable (2)	Improbable (2)
Significance	Low (12)	Low (20)
Status (positive or negative)	Negative	Negative
Reversibility	Medium	Low
Irreplaceable loss of resources?	No	Yes
Can impacts be mitigated?	Yes	Yes
Confidence in findings: Low		
Mitigation Measures:		
<ul style="list-style-type: none"> » Select Alternative A for development. » Contain waste to the landfill site and exclude cattle and people from the site. » Implement alien plant and erosion control measures 		

6.9.2. Cumulative Impacts on Delineated Wetlands and Aquatic Biodiversity

<p>Nature: Future developments in the area are not known for certain, but there are plans for possible expansion of the Eskom Majuba Power Station, as well as development of a solar energy facility (Savannah 2015). Cumulative impacts of the proposed landfill and the proposed future developments on aquatic biodiversity are likely to arise from:</p> <ul style="list-style-type: none"> » Deterioration of surface water quality associated with seepage and stormwater runoff from the proposed landfill. » Increased erosion associated with increased hardening of surface and diversion of stormwater flows. <p>The footprint of likely future developments, such as the proposed power station expansion and proposed solar facility, are within the power station security fence boundary, and these areas are already impacted and partially transformed. Future developments beyond the power station security fence boundary are unknown, but examination of the 1:50 000 scale topographical map (undated) for the area indicates extensive areas of cultivation. Most of the areas that were formerly cultivated and are currently lying fallow. This suggests that there has been a decline in the cultivation over the years. This trend is likely to continue and have positive implications for aquatic biodiversity. The area of the proposed landfill is small compared to the areas of cultivated lands that are likely to become fallow over time, and this trend could offset any negative cumulative impacts of the proposed landfill on aquatic biodiversity.</p>		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Site (1)	Local (2)
Duration	Medium-term (3)	Long-term (5)

Magnitude	Minor (2)	Low (4)
Probability	Improbable (2)	Improbable (2)
Significance	Low (12)	Low (22)
Status (positive or negative)	Negative	Negative
Reversibility	Medium	Low
Irreplaceable loss of resources?	No	Yes
Can impacts be mitigated?	Yes	Yes
Confidence in findings: Low.		
Mitigation Measures:		
» Manage and monitor stormwater runoff.		

6.9.3. Cumulative Impact on Groundwater Resources

Nature: Groundwater Contamination.		
	Overall Impact of the proposed project considered in isolation	Cumulative impact of the project in the area
Extent	Site (1)	Local (2)
Duration	Permanent (4)	Permanent (5)
Magnitude	Low (4)	Low (4)
Probability	Improbable (2)	Improbable (2)
Significance	Low (20)	Low (20)
Status	Negative	Negative
Reversibility	Medium	Low
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation Measures:		
<ul style="list-style-type: none"> » Implement groundwater monitoring programme to ensure early detection of pollution. » Clean-up protocols in the case of spillages must be adhered to. » Implement inter layering with soil lenses. » Good drainage and stormwater control must be implemented. » Top soils must be be stockpiled for re-use. » Ensure adequate lining and drainage systems as well as leachate pits/dams are installed. » Ensure surface run-off is contained and treated before disposal. » Capping material must be be grassed over. 		

6.9.4. Cumulative Impact on Heritage Resources

Nature: As no sites, features or objects of cultural historic significance have been identified in the project area, the cumulative impact as a result of the proposed development would be insignificant.		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Low (1)	Low (1)
Duration	Short (2)	Short (2)
Magnitude	Minor (2)	Minor (2)
Probability	Very improbable (1)	Very improbable (1)
Significance	Low (5)	Low (5)
Status (positive or negative)	Negative	Negative
Reversibility	High	Low
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	N/A	N/A

Mitigation Measures:

- » For the current study, as no sites, features or objects of cultural significance were identified, no mitigation measures are proposed. Heritage resources are sparsely distributed on the wider landscape with highly significant (Grade 1) sites being rare. Because of the low likelihood of finding further significant heritage resources in the area of the proposed for development and the generally low density of sites in the wider landscape, the overall impacts to heritage are expected to be of generally low significance and therefore, not mitigation measures are proposed.

6.9.5. Cumulative Impact on Palaeontological Heritage

Nature: Loss of fossil heritage.		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Low (1)	Low (1)
Duration	Medium-term (3)	Long-term (4)
Magnitude	Minor (2)	Low (4)
Probability	Improbable (2)	Probable (3)
Significance	Low (12)	Low (27)
Status (positive or negative)	Negative	Negative
Reversibility	High	Low
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	Yes
Confidence in findings: High.		
Mitigation Measures:		
<ul style="list-style-type: none"> » If a chance find is made the person responsible for the find must immediately stop working and all work that could impact that finding must cease in the immediate vicinity of the find. » The person who made the find must immediately report the find to his/her direct supervisor which in turn must report the find to his/her manager and the ECO or site manager. The ECO or site manager must report the find to the relevant Heritage Agency (South African Heritage Research Agency, SAHRA). (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za). The information to the Heritage Agency must include photographs of the find, from various angles, as well as the GPS co-ordinates. » A preliminary report must be submitted to the Heritage Agency within 24 hours of the find and must include the following: 1) date of the find; 2) a description of the discovery and a 3) description of the fossil and its context (depth and position of the fossil), GPS co-ordinates. » Photographs (the more the better) of the discovery must be of high quality, in focus, accompanied by a scale. It is also important to have photographs of the vertical section (side) where the fossil was found. » Upon receipt of the preliminary report, the Heritage Agency will inform the ECO (or site manager) whether a rescue excavation or rescue collection by a palaeontologist is necessary. » The site must be secured to protect it from any further damage. No attempt should be made to remove material from their environment. The exposed finds must be stabilized and covered by a plastic sheet or sand bags. The Heritage agency will also be able to advise on the most suitable method of protection of the find. » In the event that the fossil cannot be stabilized the fossil may be collected with extreme care by the ECO (or site manager). Fossils finds must be stored in tissue paper and in an appropriate box while due care must be taken to remove all fossil material from the rescue site. » Once Heritage Agency has issued the written authorization, the developer may continue with the development on the affected area. The ECO will close off the chance find procedure and would be required to implement any requirements issued by the Authority and to add it to the operational management plan 		

6.9.6. Cumulative Impact on Air Quality

Nature: Impact of particulate emissions on ambient PM ₁₀ and PM _{2.5} concentrations and dust fallout rates.		
Alternative A and Alternative B		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Site (1)	Site (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Minor (2)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	Low (21)	Low (21)
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	Yes
Confidence in findings: High.		
Mitigation Measures:		
<ul style="list-style-type: none"> » To minimise wind erosion emissions, exposed areas should be revegetated/rehabilitated as soon as possible. » Mitigation measures such as water sprays be employed on unpaved road surfaces and to exposed areas when periods of high wind speeds are anticipated. 		

Nature: Impact of landfill gas generation on health, odour and cancer risk.		
Alternative A and Alternative B		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Site (1)	Site (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Minor (2)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	Low (21)	Low (21)
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	Yes
Confidence in findings: High.		
Mitigation:		
<ul style="list-style-type: none"> » To minimise LFG emissions and the impact thereof on the receiving environment, inactive areas should be capped with the final cap as soon as possible. » A complaints register should be kept on site and complaints should be proactively acted upon to minimise similar future impacts on the nearby communities. » It is recommended that once-off H₂S sampling, using passive diffusive samplers, be conducted on the western and eastern edges of the landfill site to confirm dispersion modelling results. Since the generation of H₂S is expected to increase with time, it is recommended that this sampling be conducted when the first cell is capped and filling of the second cell starts. » It is recommended that the existing dust fallout monitoring network at the Majuba Power Station be extended to include a sampling location to the south of the landfill site. 		

6.9.7. Conclusion on Cumulative Impacts

Cumulative impacts are expected to occur with the development of the general waste disposal site during all phases of the project life cycle. The main aim for the assessment of cumulative impacts is to test and determine whether the development will be acceptable within the landscape proposed for the development, and whether the loss, from an environmental and social perspective, will be acceptable without whole-scale change.

The assessment of the cumulative impacts was undertaken through the consideration of impacts in isolation and compared to the cumulative impacts of the proposed general waste disposal site and other industrial developments at a scale by each specialist.

The significance of the cumulative impacts associated with the proposed project is low. A summary of the cumulative impacts as assessed in **Section 6.9** is included in **Table 6.1** below.

Table 6.1: Summary of the results of the cumulative impact assessment

Specialist assessment	Overall significance of impact of the proposed project considered in isolation	Cumulative significance of impact of the project and other projects in the area
Terrestrial Biodiversity	Low	Low
Wetland Delineation and Aquatic Biodiversity	Low	Low
Geohydrology	Low	Low
Heritage	Low	Low
Palaeontology	Low	Low
Air Quality	Low	Low

Based on the specialist cumulative assessment and findings, the development of the proposed facility, and other similar land uses within the vicinity of the proposed project, it can be concluded that cumulative impacts will be of low significance. There are no impacts or risks identified as unacceptable with the development of the general waste disposal site when considered together with other developments within the surrounding area. In addition, no impacts which will result in a whole-scale change are expected.

The limited potential for cumulative impacts and risks makes the location of this project within the identified site a desirable location for the proposed project, provided that environmental impacts are mitigated to suitable standards as recommended within this EIA Report.

6.10. Assessment of the 'Do-Nothing' Alternative

The 'do-nothing' alternative is the option of the project proponent not constructing and operating the proposed general waste disposal site.

6.10.1. Impacted anticipated with the implementation of the 'do-nothing' alternative

The 'do-nothing' alternative would entail the Majuba Power Station not receiving an EA and WML for the construction and operation of the general waste disposal site. This would mean that no impact to terrestrial and aquatic biodiversity, groundwater quality, palaeontological heritage and air quality resulting

from the construction and operation of the proposed general waste disposal site. From the specialist studies undertaken, no environmental fatal flaws were identified to be associated with the general waste disposal site. It was concluded that all impacts associated with the project can be mitigated to acceptable levels.

Implementation of the 'do nothing' alternative would mean that Majuba Power Station would continue disposing their general waste at the Middelburg Landfill Site, which would imply an opportunity lost in terms of job creation, skills development and associated economic business opportunities for the local economy associated with the construction and operation of the new general waste disposal site. Not constructing the proposed general waste disposal site at the Majuba Power Station would also mean that the Majuba Power Station would have to continue disposing their general waste at the Middelburg Landfill Site, which is costly given that the site is located approximately 180km from Majuba Power Station. This option would also result in the strain on the Middelburg Landfill Site not being reduced and additional capacity not being made available for other users as Majuba Power Station would continue disposing their general waste at the site.

The impacts of the 'do nothing' alternative are expected to outweigh the impacts associated with the implementation of the project. The 'do-nothing' alternative is therefore not preferred and not proposed to be implemented for the development of the general waste disposal site.

CHAPTER 7: CONCLUSIONS AND RECOMMENDATIONS

A new general waste disposal site and associated infrastructure is proposed on a site adjacent to the existing, closed landfill at the Eskom Majuba Power Station, approximately 13km southwest of Amersfoort and 40km north-northwest of Volksrust, within jurisdiction of the Dr Pixley Ka Isaka Seme Local Municipality, which forms part of the Gert Sibande District Municipality in the Mpumalanga Province. Access to the site is possible via the N11, onto existing secondary roads that lead to the site.

Two (2) alternative sites are being considered for establishment of the general waste disposal site, namely Alternative A, located on Portion 6 of the Farm Witkoppies 81HS and Alternative B, located on Portions 1 and 2 of the Farm Witkoppies 81HS. Both sites are contained within Eskom-owned land.

A project site, with an extent of ~866ha has been identified by Eskom Majuba Power Station as a technically feasible site for the development of a new general waste disposal site adjacent to their existing, closed landfill site. A development footprint of ~6ha has been identified within the project site by the proponent for the development. The 6ha will accommodate the actual landfill, together with the associated infrastructure that will be required for the operation of the site. Infrastructure associated with the new general waste disposal site will include the following:

- » Fencing with appropriate signage.
- » An adequate access road (gravel or surfaced).
- » An access control gate.
- » A guard house with an ablution facility.
- » A conservancy tank connected to the ablution facility.
- » Covered parking facilities.
- » A designated area for parking and servicing of plant and machinery.
- » Sorting and storage facilities for recyclables.
- » Adequate water and electricity connection from the existing rising mains.
- » Stormwater drainage network and a stormwater evaporation pond for the stormwater entering the site through the waste body.
- » A leachate management system and a leachate evaporation pond.

7.1. Legal Requirements as per the EIA Regulations for the undertaking of an Environmental Impact Assessment Report, 2014 (as amended)

This chapter of the EIA Report includes the following information required in terms of Appendix 3: Scope of Assessment and Content of the Environmental Impact Assessment Reports.

Requirement	Relevant Section
3(1)(k) where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report.	A summary of the findings of the specialist studies undertaken for the proposed general waste disposal site has been included in section 7.1 .
3(1)(l) an environmental impact statement which contains (i) a summary of the key findings of the environmental impact assessment; (ii) a map at an appropriate scale which	An environmental impact statement containing the key findings of the environmental impacts of the general waste disposal site has been included as

Requirement	Relevant Section
superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred development footprint on the approved site as contemplated in the accepted scoping report; and (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.	section 7.4. Sensitive environmental features located within the development area and its surrounds are in Figure 7.1 . A summary of the positive and negative impacts associated with zero waste recovery plant has been included in section 7.2.
3(1)(h)(x) a concluding statement indicating the location of the preferred alternative development footprint within the approved site as contemplated in the accepted scoping report.	A concluding statement indicating the preferred alternatives and the preferred location of the activity is included in section 7.4.
3(1)(o) any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation.	All conditions required to be included in the EA of the general waste disposal site have been included in section 7.5.
3(1)(q) a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation.	A reasoned opinion as to whether the proposed project should be authorised has been included in section 7.5.

7.2. Evaluation of the General Waste Disposal Site

The preceding chapters of this report together with the specialist studies contained within **Appendices D-K** provide a detailed assessment of the potential impacts that may result from the development of the proposed general waste disposal site. This chapter concludes the environmental assessment of the proposed project by providing a summary of the results and conclusions of the assessment of the development footprint alternatives. In so doing, it draws on the information gathered as part of the EIA process, the knowledge gained by the environmental specialists and the EAP and presents a combined and informed opinion of the environmental impacts associated with the project.

No environmental fatal flaws were identified in the detailed specialist assessments conducted. It is recommended that mitigation measures be implemented to reduce impacts to acceptable levels. The potential environmental impacts associated with the general waste disposal site identified and assessed through the EIA process include:

- » Impacts on terrestrial biodiversity (including flora and fauna).
- » Impacts on delineated wetlands and aquatic biodiversity.
- » Impacts on groundwater resources.
- » Impacts on heritage resources.
- » Impacts on palaeontological heritage.
- » Impacts on air quality.

7.2.1. Impacts on Terrestrial Biodiversity (including flora and fauna)

The project site within which the development footprint for the general waste disposal site and associated infrastructure will be located is mapped as falling within the Amersfoort Highveld Clay Grassland, which is considered Vulnerable, but is not listed as a Threatened Ecosystem according to Notice 1002 of Government Gazette 34809, 9 December 2011.

The DFFE Environmental Screening Tool indicates that the development footprint alternatives have a High Animal Theme, Medium Plant Theme and Very High Terrestrial Biodiversity Theme. The main drivers of these assessments are several potentially occurring threatened and NT plant and animal species as well as the area being assessed as CBA: Irreplaceable in the MBSP. However, due to the high disturbance levels and degraded habitats, very few are likely to occur. The macro-scale assessment of the conservation importance of natural vegetation in Mpumalanga does not allow for small discrepancies where vegetation is disturbed or degraded, such as is present within the development footprint alternatives. A re-assessment, using a finer scale, may well result in a revision of the CBA assessment. However, a greater portion of Alternative A falls outside this classification and within Heavily or Moderately Modified areas and is the more ecologically compromised site of the two.

Two vegetation communities were identified within the development footprint alternatives, namely Short Grassland, which dominates Alternative B, and Secondary Grassland, which dominates Alternative A. The Site Ecological Importance for Short Grassland is Medium, while that of Secondary Grassland is Low. Clearing for construction of the landfill will result in the destruction of 6ha of historically disturbed natural vegetation. The proposed general waste disposal site will have impacts of medium to low significance on terrestrial biodiversity. All impacts can be reduced to low significance following the implementation of mitigation measures. Provided the recommendations suggested in the Terrestrial Biodiversity Impact Assessment are followed, and the developer complies with all relevant legislation pertaining to the development activities (such as the NEMA and NEMBA), there is no objection to the proposed development from an ecological perspective. Alternative A is preferred, while Alternative B is considered acceptable.

7.2.2. Impacts on Delineated Wetlands and Aquatic Biodiversity

Numerous hillslope seepage wetlands, which cover ~17% of the 500m study boundary, were identified, with areas of seasonal and permanent saturation. The closest seasonal wetlands are some 80 m from the nearest proposed landfill, while the closest permanent wetland is some 320 m from the nearest proposed landfill. A 30m buffer has been recommended around these wetland features. The aim of the buffer zone is to maintain the ecological integrity and functioning of the Seepage Wetlands by minimising indirect impacts that could be associated with the proposed landfill. There are no aquatic habitats within the two proposed footprint areas, so the proposed development will have no direct impacts on aquatic biodiversity.

The two proposed development options will have no direct impacts on aquatic ecosystems and as such, there was no justification for a management plan for alien invasive vegetation with respect to aquatic ecosystems. An alien invasive management plan is included in the Specialist Report on Terrestrial Biodiversity. There was also no justification for a wetland offset as the two proposed development options will have no direct impacts on aquatic ecosystems. Furthermore, potential indirect impacts can be managed, and the two proposed development options are unlikely to have measurable impacts on aquatic ecosystems.

The proposed general waste disposal site will have impacts of medium to low significance on freshwater resources. All impacts, with the exception of impacts on water quality due to seepage and stormwater runoff from the landfill, can be reduced to low significance following the implementation of mitigation measures. There is no preference in terms of alternatives considered. Authorisation of either of the two proposed waste disposal site alternatives in terms of risks to aquatic biodiversity is recommended.

7.2.3. Impacts on Groundwater Resources

The water quality of the nine (9) sampling points scattered around the site are, with the exception of one data point (i.e., BH2), currently indicative of an unpolluted water regime.

The landfill site is characterised by an aquifer of low significance and can only be used for monitoring purposes, confirming the fact that the site is not located in an area characterised by aquifers with a potentially strategic value. Furthermore, the surrounding area is seemingly devoid of groundwater boreholes and stock watering is not an issue as there is sufficient surface sources available.

The proposed general waste disposal site will have impacts of medium to low significance on groundwater resources. All impacts can be reduced to low significance following the implementation of mitigation measures. Alternative A is preferred while Alternative B is considered to be fatally flawed from a groundwater perspective; reason being that Alternative B intersects the spring line and is partially stripped of cover soils required for interlayering and capping and as such, pollution of groundwater sources is highly probable over the long term on this site. Given the potential hydrogeological impacts, the development of Alternative A can only be viable if the mitigation measures are implemented and adhered to. Groundwater monitoring is imperative and necessary in order to detect groundwater contamination before impacting nearby receptors. From a groundwater perspective, it is the specialist's opinion that the project can be authorised for Alternative A, provided the recommended mitigation measures are implemented and adhered to.

7.2.4. Impacts on Heritage Resources

A field survey was conducted on 03 April 2018 according to generally accepted archaeological practices, and was aimed at locating possible sites, objects, and structures of archaeological significance within the project site and development footprint. The field survey identified no sites, features or objects of archaeological significance within the project site and development footprint alternatives dating to the Stone Age, Iron Age and Historic Period.

As no sites, features or objects of cultural historic significance have been identified in the project area, there would be no impact as a result of the proposed development regardless of the development footprint alternative selected. From a heritage point of view, it is recommended that the proposed project be allowed to continue on acceptance of the conditions proposed for inclusion in the project's EMPr.

7.2.5. Impacts on Palaeontological Heritage

The proposed development footprint alternatives are primarily underlain by Jurassic dolerite while surrounding areas are underlain by potentially fossiliferous sedimentary rocks of the Early Permian Volksrust Formation (Ecca Group, Karoo Supergroup). However, recent Shape files updates (Council for Geosciences, Pretoria) indicate that the proposed waste disposal site is entirely underlain by the Volksrust Formation (Ecca Group, Karoo Supergroup). According to the PalaeoMap on the South African Heritage Resources Information System (SAHRIS) database, the palaeontological sensitivity of Jurassic dolerite is zero as it is igneous in origin and does not contain fossils while that of the Volksrust Formation is High.

Numerous impact assessments of the area have been conducted over the years with several site investigations - no fossils heritage was uncovered on the Majuba footprint. Although fossil heritage in this area is uncommon, fossil finds would be significant if found.

The proposed general waste disposal site will have an impact of medium significance on fossil heritage which can be reduced to low significance following the implementation of mitigation measures. As the geology and palaeontology of the proposed development footprint alternatives is similar, there would be no preferences on the grounds of palaeontological fossil heritage for any specific alternative under consideration. An overall low palaeontological sensitivity is allocated to the development footprint. It is therefore considered that the

proposed development is deemed appropriate and will not lead to detrimental impacts on the palaeontological reserves of the area.

7.2.6. Impacts on Air Quality

The Air Quality Impact Assessment assessed baseline meteorological and ambient air quality data from the Eskom Majuba Air Quality Monitoring Station, located approximately 2.5km east-northeast of the proposed general waste disposal site for the period January 2016 to December 2019.

The operation of the waste disposal site will result in the emission of landfill gas. Landfill gas emissions from the general waste disposal site gradually increase to reach a maximum during the operation of the last cell, when the maximum amount of waste is in place, whereafter it gradually decreases after closure of the landfill. During operation of the last cell when emissions are at a maximum, an estimated 6 m³/hr of landfill gas will be generated.

Decomposition of the compacted waste continues after the landfill is closed and capped, but since no more waste is deposited, the decomposable material becomes gradually less and less, resulting in a gradual decrease in the amount of landfill gas generated. Therefore, the maximum landfill gas generation (and emission) rate occurs just as, or very soon after, the maximum amount of waste is in place.

While landfill gas generation gradually decreases as the decomposable material is depleted, the “tail” of the LFG generation is quite long, with landfill gas generation only nearing zero after about 100 years. This has been annotated in the graph below.

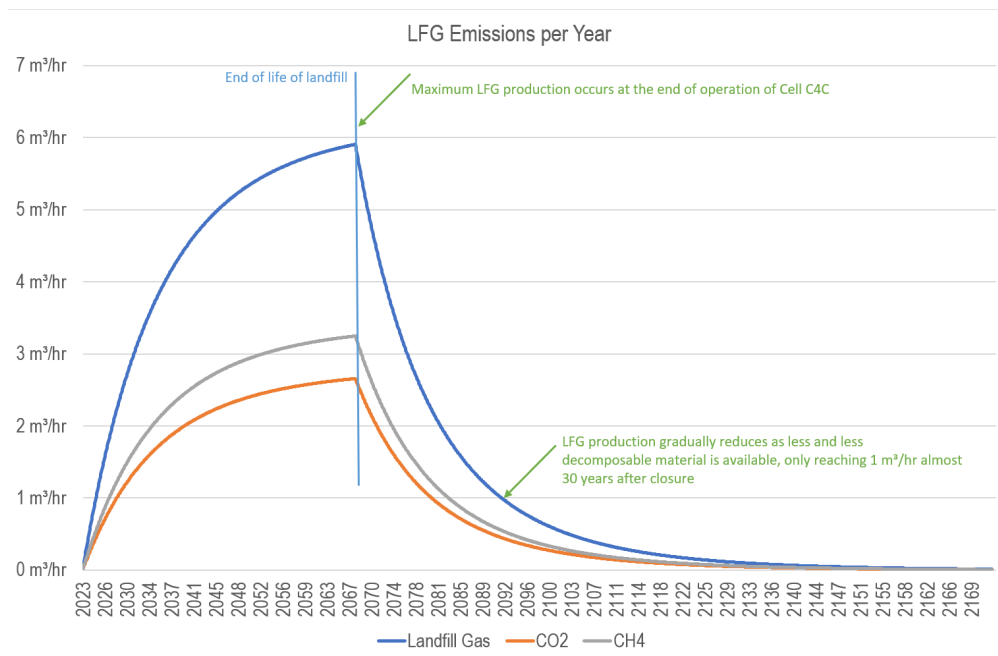


Figure 7.1: Estimated landfill gas emission rate

In terms of greenhouse gas emissions, over its lifetime, the general waste disposal site is estimated to result in a lifetime total of 2 030 tonnes of CO₂ and 740 tonnes of CH₄ emissions. Annual greenhouse gas emissions are expected to reach a maximum during the operation of the last cell. The maximum annual greenhouse gas emissions were estimated at 42.7 tonnes of CO₂/annum and 15.6 tonnes of CH₄ per annum.

From an air quality perspective, there is no need to mitigate or measure post-closure methane emissions, as emissions and their resultant impacts will be insignificant (with the exception of greenhouse gas impacts, which could be more significant). The landfill designers will need to stipulate if there are any management / monitoring measures to prevent methane build-up which could lead to fires or explosions.

Simulated PM₁₀, PM_{2.5} and benzene concentrations are in compliance with the SA National Ambient Air Quality Standards (NAAQS) for all areas outside the landfill site, and negligible for all areas outside the property boundary and at all sensitive receptor locations. Simulated dust fallout rates due to the operation of the general waste disposal site are below the SA National Dust Control Regulation (NDCR) limits for all areas outside the landfill site, and negligible at all areas outside the property boundary, including at all sensitive receptor locations.

The combined hazard index for all non-carcinogenic pollutant emissions from the general waste disposal site is below 0.1 for all areas outside the landfill site for all pollutants considered. The simulated cancer risk for all areas outside the property boundary, including at all sensitive receptor location, is negligible (less than 1:1 000 000 000 or one in a billion increased risk). Simulated concentrations of all odorous compounds considered were below 10% of the odour detection threshold for all areas, including within the landfill site.

The proposed general waste disposal site has a simulated low impact on air quality, including health impacts, cancer risk and odour impacts at all areas outside the landfill site, with a negligible impact at all identified sensitive receptor locations. There is no preference in terms of alternative considered. From an air quality perspective, it is the opinion of the specialist that the project be authorised subject to implementation of the specified recommendations.

7.2.7. Assessment of Cumulative Impacts

Cumulative impacts are expected to occur with the development of the general waste disposal site during all phases of the project life cycle. The main aim for the assessment of cumulative impacts is to test and determine whether the development will be acceptable within the landscape proposed for the development, and whether the loss, from an environmental and social perspective, will be acceptable without whole-scale change.

The assessment of the cumulative impacts was undertaken through the consideration of impacts in isolation and compared to the cumulative impacts of the proposed general waste disposal site in combination with other similar land uses within the area. The significance of the cumulative impacts associated with the development of the landfill is expected to be low. There are no impacts or risks identified to be considered as unacceptable with the development of the general waste disposal site when considered together with other developments within the surrounding area. In addition, no impacts which will result in whole-scale change are expected.

The limited potential for cumulative impacts and risks makes the location of this project within the identified site a desirable location for the proposed project, provided that environmental impacts are mitigated to suitable standards as recommended within this EIA Report.

7.3. Comparative Assessment of the Development Footprint Alternatives

This assessment considered the development of a general waste disposal site at the Eskom Majuba Power Station. Two (2) alternative sites are being considered for establishment of the general waste disposal site,

namely Alternative A, located on Portion 6 of the Farm Witkoppies 81HS and Alternative B, located on Portions 1 and 2 of the Farm Witkoppies 81HS.

From the specialist studies undertaken, the following conclusions were made regarding the development footprint alternatives:

Specialist Study	Alternative A	Alternative B
Terrestrial Biodiversity	Preferred	Acceptable
Aquatic Biodiversity	Acceptable	Acceptable
Geohydrology	Preferred	Fatally Flawed
Heritage	Acceptable	Acceptable
Palaeontology	Acceptable	Acceptable
Air Quality	Acceptable	Acceptable

From the above summary of the specialist findings, it was determined that Alternative A is the preferred option from a terrestrial biodiversity and groundwater perspective as it is dominated by Secondary Grassland, which is regarded to be of Low Site Ecological Importance, while Alternative B is dominated by Short Grassland, which is regarded to be of Medium Site Ecological Importance and also because the uppermost spring-line is some 9m below the crest of Alternative A and the 3m deep excavation for the landfill is sufficiently shallow to prevent interference with the phreatic line. Alternative A also has sufficient interlayer and capping material available on site and mitigation measures will reduce risk of contamination between low and medium for Alternative A.

Alternative B is considered acceptable from an aquatic biodiversity, heritage, palaeontology and air quality perspective and is fatally flawed from a groundwater perspective. Both alternatives are acceptable from an aquatic, heritage, palaeontology and air quality perspective. This is because Alternative B intersects the spring line and is partially stripped of cover soils required for interlayering and capping and as such, pollution of groundwater sources is highly probable over the long term on this site.

Considering the above findings, it can be concluded that Alternative A can be considered for implementation as it is not regarded as fatally flawed based on the specialist findings.

7.4. Environmental Sensitivity Mapping

The development footprint alternatives are located within two untransformed vegetation communities, namely, *Aristida congesta – Heteropogon contortus* Short Grassland and *Hyparrhenia hirta* Secondary Grassland. The Site Ecological Importance for Short Grassland is Medium, while that of Secondary Grassland is Low. Sensitive features in the form of permanent and seasonal wetlands were identified within the 500m regulated area of the development footprint alternatives. None of these wetlands encroach into the development footprint alternatives (refer to **Figure 7.2**). The closest seasonal wetlands are some 80m from the nearest proposed landfill, while the closest permanent wetland is some 320m from the nearest proposed landfill. A 30m buffer no-go has been recommended around these wetland features. The aim of the buffer zone is to maintain the ecological integrity and functioning of the seepage wetlands by minimising indirect impacts that could be associated with the proposed landfill. Both alternatives are located outside of this buffer.

Alternative A is situated within an area classified as Heavily or Moderately Modified and a CBA: Irreplaceable by the MBSP. Alternative B is mostly situated within an area classified as CBA: Irreplaceable by the MBSP, with

the eastern section of the site being situated within an area classified as Heavily or Moderately Modified. There are no sites, features or objects of archaeological significance within the project site and development footprint alternatives dating to the Stone Age, Iron Age and Historic Period. The palaeontological sensitivity of the project site ranges from insignificant to high.

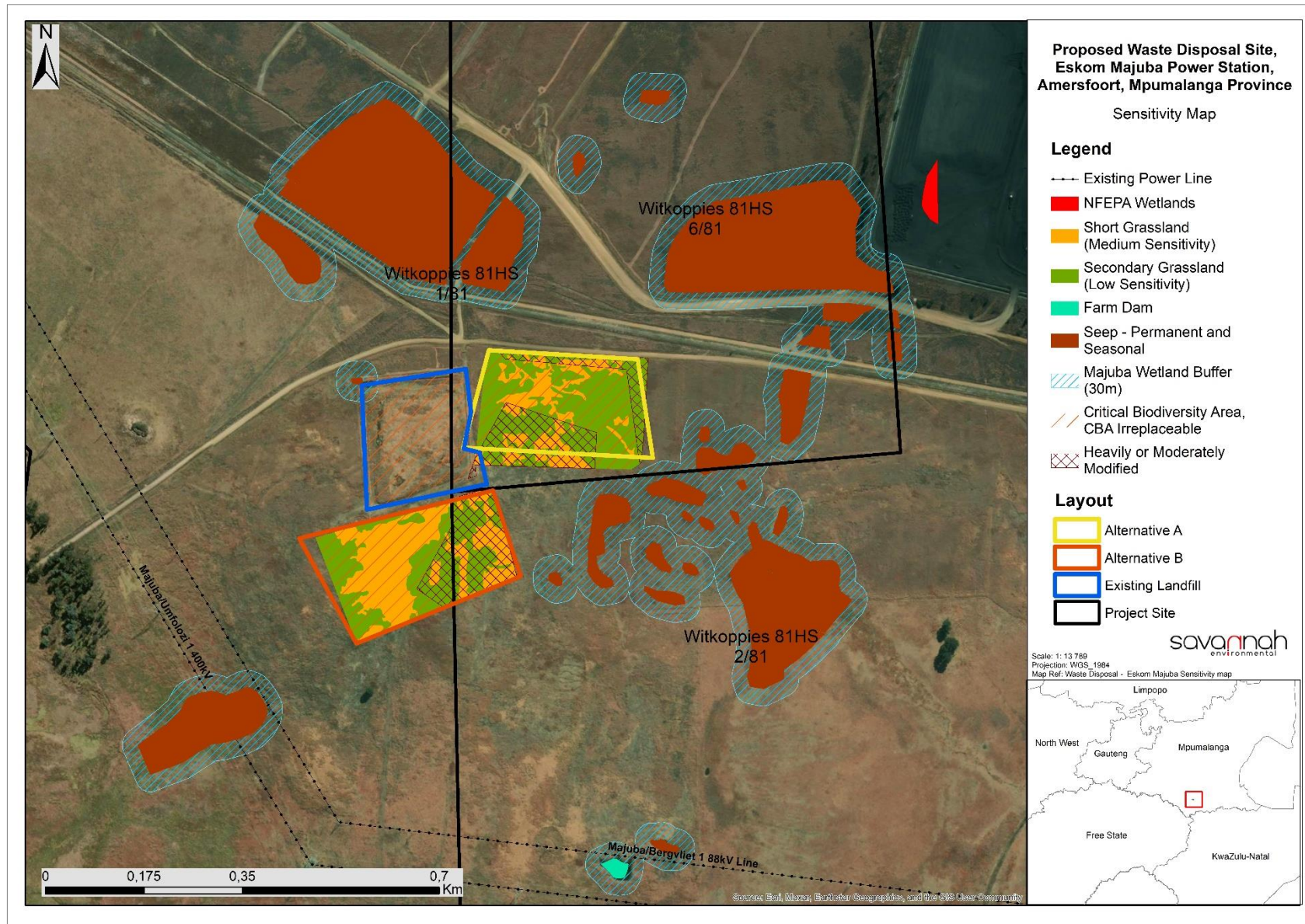


Figure 7.2: Environmental sensitivity map of the project site and development footprint alternatives

7.5. Overall Conclusion (Impact Statement)

The construction and operation of the general waste disposal site on a site located approximately 13km southwest of Amersfoort and 40km north-northwest of Volksrust, within jurisdiction of the Dr Pixley Ka Isaka Seme Local Municipality, which forms part of the Gert Sibande District Municipality in the Mpumalanga Province is proposed by Eskom Majuba Power Station.

Two (2) alternative sites are being considered for establishment of the general waste disposal site, namely Alternative A, located on Portion 6 of the Farm Witkoppies 81HS and Alternative B, located on Portions 1 and 2 of the Farm Witkoppies 81HS. The development footprint alternatives were assessed as part of the EIA process by independent specialists, and their findings have informed the results of this EIA Report.

Through a review of relevant policy and planning documentation, it was concluded that the proposed project is aligned with the local and provincial developmental policies and spatial frameworks.

The developer has proposed a technically viable and suitable layout for the project and associated infrastructure. The specialist findings have indicated that there are no identified environmental fatal flaws associated with the development of the general waste disposal site at either site considered. Sensitive features in the form of permanent and seasonal wetlands were identified within the 500m regulated area of the development footprint alternatives; however, none of these wetlands encroach into the development footprint alternatives. A 30m no-go buffer has been recommended around these wetland features to maintain the ecological integrity and functioning of the seepage wetlands by minimising indirect impacts that could be associated with the proposed landfill. Both alternatives are located outside of this buffer.

From the results of the specialist studies undertaken, it can be concluded that all impacts associated with the project can be mitigated to acceptable levels through implementation of the recommended mitigation measures. The layout map (including all associated infrastructure) provided in this EIA Report (**Figure 7.3**) is considered to be the preferred layout of the general waste disposal site for implementation.

Through the assessment of the development of the general waste disposal site within the development footprint alternatives, it can be concluded that the development of the waste disposal site is environmentally acceptable subject to the implementation of the recommended mitigation measures.

Based on the comparative assessment undertaken, it was determined that Alternative A is the preferred option from a terrestrial biodiversity and groundwater perspective as it is dominated by Secondary Grassland, which is regarded to be of Low Site Ecological Importance, while Alternative B is dominated by Short Grassland, which is regarded to be of Medium Site Ecological Importance and also because the uppermost spring-line is some 9m below the crest of Alternative A and the 3m deep excavation for the landfill is sufficiently shallow to prevent interference with the phreatic line. Alternative A also has sufficient interlayer and capping material available on site and mitigation measures will reduce risk of contamination between low and medium for Alternative A.

Alternative B is considered acceptable from an aquatic biodiversity, heritage, palaeontology and air quality perspective and is fatally flawed from a groundwater perspective. Both alternatives are acceptable from an aquatic, heritage, palaeontology and air quality perspective. This is because Alternative B intersects the spring line and is partially stripped of cover soils required for interlayering and capping and as such, pollution of groundwater sources is highly probable over the long term on this site.

Considering the above findings, it can be concluded that Alternative A can be considered for implementation as it is not regarded as fatally flawed based on the specialist findings.

7.6. Overall Recommendation

Considering the findings of the independent specialist studies, the impacts identified, and the development footprint alternatives proposed, it is the reasoned opinion of the EAP that the development of the general waste disposal site is acceptable within the landscape and can reasonably be authorised for Alternative A (**Figure 7.3**). The recommended validity period of the integrated EA is 10 years.

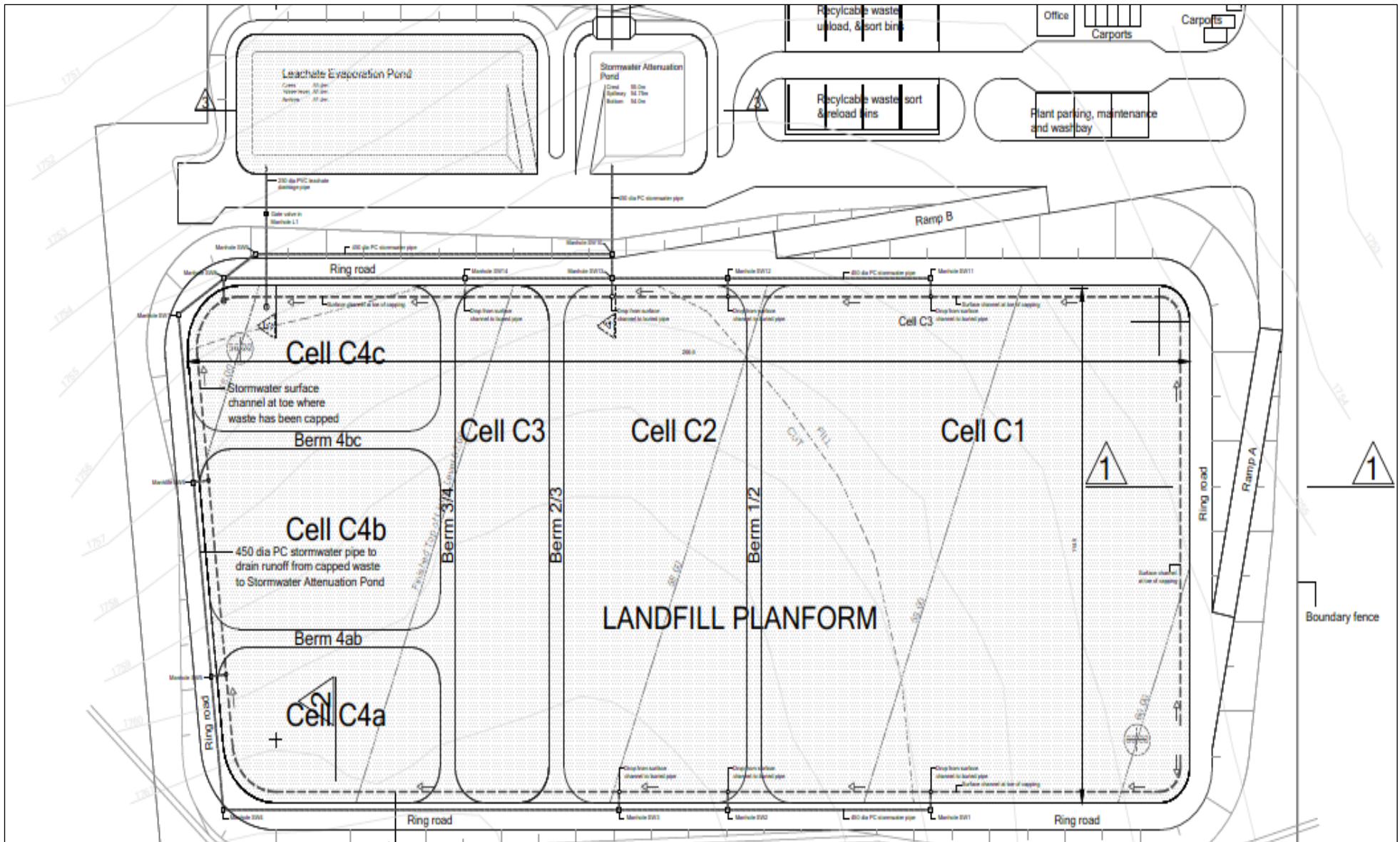


Figure 7.3: Layout map of the development footprint for the general waste disposal site, as was assessed as part of the EIA process

The authorisation should include the approval of the layout reflected in **Figure 7.3**, and described in the engineering design report (refer to **Appendix K**) which includes the following main infrastructure:

- » Fencing with appropriate signage.
- » An adequate access road (gravel or surfaced).
- » An access control gate.
- » A guard house with an ablution facility.
- » A conservancy tank connected to the ablution facility.
- » Covered parking facilities.
- » A designated area for parking and servicing of plant and machinery.
- » Sorting and storage facilities for recyclables.
- » Adequate water and electricity connection from the existing rising mains.
- » Stormwater drainage network and a stormwater evaporation pond for the stormwater entering the site through the waste body.
- » A leachate management system and a leachate evaporation pond.

The following key conditions would be required to be included within an authorisation issued for the general waste disposal site:

- » The general waste disposal site is authorised for Alternative A.
- » The general waste landfill must be located on either Portion 6 of the Farm Witkoppies 81HS or Portions 1 and 2 of the Farm Witkoppies 81HS, depending on which development footprint alternative is ultimately considered for implementation.
- » All mitigation measures detailed within this EIA Report, as well as the specialist reports contained within **Appendices D to K**, must be implemented.
- » The EMPr as contained within **Appendix N** of this EIA Report should form part of the contract with the Contractors appointed to construct and operate the general waste disposal site in order to ensure compliance with environmental specifications and management measures. The implementation of this EMPr for all life cycle phases of the project is considered key in achieving the appropriate environmental management standards as detailed for this project.
- » Obtain all other mandatory and environmental permits for the project, as required.
- » An independent Environmental Compliance Officer (ECO) must be appointed by the developer to monitor compliance with the Environmental Authorisation during construction. The ECO must be appointed prior to commencement of construction and be involved in all aspects of project planning that can influence environmental conditions on the site. Where possible, the ECO must attend relevant project meetings, conduct inspections to assess compliance with the Environmental Authorisation and relevant Health and Safety regulations, and be responsible for providing feedback on potential environmental problems associated with construction.
- » The landfill design must comply with the specifications of the Design Report contained in Appendix K of the EIA Report.
- » The liner of the landfill must be in accordance with the containment barrier engineering design requirements for a Class B Landfill stipulated in the National Norms and Standards for Disposal of Waste to Landfill (GG3678. GN R.636 of 23 August 2013).
- » To comply with the National Environmental Management: Biodiversity Act (Act No. 10 of 2004), all listed invasive exotic plants should be targeted and controlled. This is especially relevant to the many alien invasive tree and shrub species present, and may require the compilation of an alien plant control plan.

- » A sturdy, mammal-proof fence of at least 3m in height should be constructed around the perimeter of the site to prevent unwanted access from small mammals, cattle and people as well as prevent plastics from being blown out. This fence must be regularly inspected for damage or forced entry.
- » A buffer zone of no development within 30m from the outer edge of the seepage wetland must be implemented.
- » A Stormwater Management Plan must be developed for the proposed development and the associated access road.
- » If a chance find (fossil) is made the person responsible for the find must immediately stop working and all work that could impact that finding must cease in the immediate vicinity of the find.
- » To minimise landfill gas emissions and the impact thereof on the receiving environment, inactive areas should be capped with the final cap as soon as possible.
- » It is recommended that once-off H₂S sampling, using passive diffusive samplers, be conducted on the western and eastern edges of the landfill site to confirm dispersion modelling results. Since the generation of H₂S is expected to increase with time, it is recommended that this sampling be conducted after 5 years of operation, i.e., when the first cell is capped, and filling of the second cell starts.
- » It is recommended that the existing dust fallout monitoring network at the Majuba Power Station be extended to include a sampling location to the south of the landfill site.

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