ERGO SOLAR PHASE 1:
Up to 19.9MW PV facility, including a 11km of 22kV Overhead Power Line on the farm Witpoortjie 117 and Withok Estates, Ekurhuleni Municipality, Gauteng

Terrestrial Biodiversity (Vegetation) Report

Date: February 2021
Amended with Preferred Layout in May 2021

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Indemnity

This report is based on survey and assessment techniques which are limited by time and budgetary constraints relevant to the type and level of investigation undertaken. The findings, results, observations, conclusions and recommendations given in this report are based on the author's best scientific and professional knowledge as well as available information at the time of study. Therefore, the author reserves the right to modify aspects of the report including the recommendations if and when new information may become available from ongoing research or further work in this field, or pertaining to this investigation.

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The Environmental Impact Assessment Regulations (Government Notice No. R982 of 4 December 2014), requires that certain information is included in specialist reports. The terms of reference, purpose of the report, methodologies, assumptions and limitations, impact assessment and mitigation (where relevant to the scope of work) and summaries of consultations (where applicable) are included within the main report. Other relevant information is set out below:

Expertise of author:

- Working in the field of ecology, and in specific vegetation related assessments, since 2007;
- Is registered as a Professional Natural Scientist with the South African Council for Natural Scientific Professions in the field of ecology (Reg. No. 400019/11); and
- Has been working with plants indigenous to South Africa since 1997.

Declaration of independence:

Dimela Eco Consulting in an independent consultant and hereby declare that it does not have any financial or other vested interest in the undertaking of the proposed activity, other than remuneration for the work performed in terms of the National Environmental Management Act, 1998 (Act 107 of 1998). In addition, remuneration for services provided by Dimela Eco Consulting is not subjected to or based on approval of the proposed project by the relevant authorities responsible for authorising this proposed project.

Disclosure:

Dimela Eco Consulting undertake to disclose, to the competent authority, any material information that has or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) and will provide the competent authority with access to all information at its disposal regarding the application, whether such information is favourable to the applicant or not.

Based on information provided to Dimela Eco Consulting by the client, and in addition to information obtained during the course of this study, Dimela Eco Consulting present the results and conclusion within the associated document to the best of the authors professional judgement and in accordance with best practise.

_____ ____2021._____

Antoinette Eyssell-Knox Date

SACNASP Reg. No. 400019/11

EXECUTIVE SUMMARY

The applicant, Tshedza 1 Pre Project Development (Pty) Ltd, wants to establish a PV facility on one of their old mine tailings facilities. The land earmarked for the PV facility was an old tailings dam that was remined in the year 2000. The land is now vacant and has naturally been vegetated or hydroseeded.

This report is focused on Phase 1: an up to 19.9MW PV facility, including ~11km of 22kV Overhead Power line (OHL) which mainly follows an existing slurry pipe servitude /corridor. Phase 1 will include 100MWh Containerized battery storage.

Two alternatives were assessed:

1. The Alternative Layout was assessed in February 2021. The total area assessed for the PV facility was about 30ha (of which 17ha will comprise the PV facility), situated on the old mine tailings that was remined in the year 2000. The proposed powerline is about 11km in extent and links the PV facility to two existing substations: the Ergo Central 88/6.6kV substation at the mine, to the Ergo Transfer Pumps 88/11kV substation at the tailings dam. The powerline mostly follows existing roads, pipelines, and road servitudes, but traverses some natural grasslands in its eastern extent.

2. The Preferred Layout was assessed in May 2021. This layout is preferred from a technical and feasibility aspect for the mine and does not traverse sensitive areas as was reported on in February 2021 for the Alternative Layout. The Preferred layout corresponds greatly with the alternative layout. The main differences are:
    - The same area is proposed for the PV facility, however, the size has increased to about 45ha, and
    - The powerline in the east will supply the power into the Clients (Ergo) Substation within the Ergo Plant and not the Eskom Substation to the east of the Ergo plant. Thus, this section of the powerline will traverse degraded and modified areas and not grassland as does the Alternative Layout.

The site falls in an area that is listed by the National Screening Tool as being of 'High' terrestrial biodiversity. Furthermore, the Screening Tool lists a 'Medium' sensitivity for plant species, indicating that there is a likelihood of plant species of conservation concern being present. This report therefore comprises a terrestrial (vegetation) assessment, with reference to the occurrence or possible occurrence of plant species of conservation concern on the site and along the proposed powerline route.

The proposed PV facility will be located on portion 183/117 of the farm Witpoortjie IR, while the overhead powerline will traverse areas of the Withok and Witpoort Estates, as well as other farm portions of Farm 117 Witpoortjie IR in the Ekurhuleni Municipality. The southern boundary of the proposed PV facility is just north of 10th Street and is bordered by slurry pipelines. Much of the northern extent of the powerline will also align

with 10th Street, with small sections along 17th Road, Geluksdal Road, and the R23 (Heidelberg Road). The site is within the quarter degree square 2628AD.

The terms of reference for this report were:

Complete a terrestrial plant assessment in line with the terrestrial biodiversity protocols, including:

- Supply background information on the site relating to conservation plans and threatened ecosystems;
- Field survey to determine the state of the vegetation and whether threatened or protected species are present or could be impacted on;
- Report and map describing the vegetation communities found on the site and its conservation importance and function within the landscape;
- Assessment and report on the impacts that the proposed development and related activities could have on the vegetation on site, as well as recommendations to limit or negate these perceived impacts.

Complete a terrestrial plant species site verification that will form part of the terrestrial vegetation assessment and will contain:

- An indication on whether plant species of conservation concern were recorded on the site or the likelihood of such species occurring;
- Map indicating confirmed or potential habitat for plant species that are of conservation concern, as well as ecologically sensitive vegetation groupings; and
- Where plant species of conservation concern are found on site or have been confirmed to be likely present, a Terrestrial Plant Species Specialist Assessment will be recommended that must be undertaken in accordance with the requirements specified in the protocol for environmental impacts on terrestrial plant species.

The site visit for the Alternative Layout was undertaken on the 8th of February 2021, after good summer rainfall commenced. The follow-up verification of additional areas for the Preferred layout was undertaken on the 26th of May 2021.

Baseline information:
The landscape of the study area is characterised by moderately undulating plains. However, the site for the PV facility was flat, at an average elevation of about 1620m, and was relandscaped after being remined in the year 2000. A dam formed on the southern extent of the site and drains northwards to another dam just north of the northern boundary of the PV facility site. The powerline routes traverses the Withokspruit and some of its tributaries.

The PV facility site, and most of the powerline route, are situated within the historical extent of the Tsakane Clay Grassland. The most northern extent of the powerline route falls within the Soweto Highveld Grassland. Both vegetation types are considered Endangered. As per Section 52(1) (a) of the National Environmental Management: Biodiversity Act (Government Gazette 34809, Government Notice 1002, and 9 December 2011)), the PV facility site is within the Critically Endangered Klipriver Highveld Grassland ecosystem, whereas the powerline traverses the Soweto Highveld Grassland (Vulnerable), Klipriversberg Highveld Grassland and the Tsakane Clay Grassland (Endangered) listed ecosystems. Google Earth aerial imagery, as well as the site visit results, however, show that much of development footprint traverse areas that have already been modified from the natural state.

The area in which the PV facility site falls, is not classified as being of conservation concern in the Gauteng Conservation Plan. However, the powerline routes (Preferred and Alternative) traverse several Critical Biodiversity Areas (CBAs) classified as Important to reach the conservation targets in the Province. The conservation plan indicates that the CBAs comprise primary vegetation, which is also suitable habitat for several plant species of conservation concern. The CBAs are mostly surrounded by ESAs and are associated with the Withokspruit, its tributaries and surrounding grasslands. The Preferred Layout Powerline will traverse less CBAs than the Alternative Layout Powerline.

Results:
Historical aerial imagery indicated that the vegetation along the proposed powerline routes and on the site proposed for the PV Facility was historically cultivated, mined, or indirectly impacted on by agricultural and mining activities. Natural to semi-natural vegetation remain in pockets along the powerline route, where it is situated around the streams and in between mining and agricultural impacts. The area was grazed by cattle.

The PV facility site comprised a remined slime dam. The natural soil layers and vegetation were historically destroyed. Subsequently, the land was rehabilitated, and the soil conditions seemed good. Although it is understood that the area was left to be revegetated naturally, it appears that some hydroseeding and fertilisation took place. Three vegetation groups were delineated:

- Secondary *Eragrostis-Cynodon* grassland;
- *Cynodon-Cortaderia selloana* modified grassland; and
- Moist grassland

The powerline will traverse mostly secondary and modified grasslands, as well as small portions of moist grassland. Pockets of rocky grassland is present within the mapped buffer, but not along the actual proposed footprint. The vegetation along the proposed powerline route was classified as:

1. Secondary grassland

1.1 *Hyparrhenia hirta* dominated grassland
1.2 *Cynodon* dominated grassland
2. Modified vegetation (Cynodon-Cortaderia vegetation)
3. Rocky grassland; and
4. Moist grassland
3.1 *Phragmites australis dominated grassland*
3.2 Eragrostis plana moist grassland

Vegetation groups and Site Ecological Sensitivity:
The vegetation delineated on the site was grouped as follows:

Broad vegetation community		Site Ecological Importance (SEI) – mitigation
Secondary grasslands	Secondary ***Hyparrhenia hirta*** grasslands	Very-low (Minimise & Restore)
	Secondary ***Eragrostis plana-Cynodon dactylon*** grassland.	Very-low (Minimise & Restore)
	Secondary ***Cynodon dactylon*** grassland	Very-low (Minimise & Restore)
Rocky grassland	Rocky grassland	High (Avoid & Minimise)
Modified vegetation	***Cynodon-Cortaderia selloana*** vegetation	Very-low (Minimise & Restore)
Moist grassland	***Eragrostis plana*** moist grassland: PV Facility	Low (Minimise & Restore)
	Phragmites australis moist grassland	Medium (Minimise & Restore)
	Eragrostis plana moist grassland: powerline	High (Avoid & Minimise)

Due to the largely modified and secondary nature of the vegetation, the proposed development of the PV facility, as well as either of the proposed powerline route, will have a limited impact on sensitive vegetation. The extent of the powerline routes, as well as the PV facility, are within 15m of existing tar and dirt roads. Most of the powerline route follows the slurry pipes and its existing service road. Therefore, no additional access roads are needed, further limiting the proposed developments impacts on vegetation.

PV facility:
Much of the vegetation on the PV facility site is modified and of a low sensitivity. The moist grassland section on the PV facility site is classified as low due to its secondary nature. However, the results and recommendation as set out by the wetland assessment should take precedence of the sensitivity classification in this report.

Powerline:
Most of the vegetation along the proposed powerline route is modified and in a secondary state. Sensitive moist grassland areas along the route are relatively narrow and should be spanned by the powerlines. The sensitive rocky grassland will not be traversed by the proposed powerline route; however, the rocky grassland is within 50m of the route and these areas should be avoided and not used for construction camps, laydown areas or parking.

Provincially protected plant species were only recorded along the eastern extent of the Alternative Layout powerline route and can be avoided by approving the Preferred Layout powerline route. If these species can not be avoided, ensure that a permit or the authorization for this project, allows for the removal or damage to these species.

The site falls in an area that is listed by the National Screening Tool as being of 'High' terrestrial biodiversity. Furthermore, the Screening Tool lists a 'Medium' sensitivity for plant species, indicating that there is a likelihood of plant species of conservation concern being present.

However, much of the proposed development footprint has been modified from the naturally vegetated state. Due to the largely modified and secondary nature of the vegetation, the proposed development of the PV facility, as well as the proposed powerline routes (Alternative and Preferred), will have a limited impact on sensitive vegetation. However, the Preferred Layout powerline route will traverse less moist grassland and avoids the localities of three (3) provincially protected plant species. The powerline routes, as well as the PV facility, are within 15m of existing tar and dirt roads. Most of the powerline routes follows the slurry pipes and its existing service road. Therefore, no additional access roads are needed, further limiting the proposed developments impacts on vegetation.

The findings of the site visit, and modified nature of the vegetation, does not warrant a terrestrial plant species assessment as the probability of other species listed in Appendix C occurring is considered low. If mitigation measures are implemented to keep disturbances limited to the secondary grasslands and preventing impacts to moist grasslands and rocky grassland, the probability of impacting on plant species of conservation concern, if they occur, is low.
Therefore, this assessment does not object to the proposed development if mitigation measures are implemented. Furthermore, this assessment recommends the Preferred Layout as this layout will impact on less moist grasslands as well as confirmed localities of provincially protected plant species.

For ease of reference, the following table summarises results of the assessment as per the main requirements of the Protocols for Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial (Vegetation) Biodiversity as published on 20 March 2020.

Biodiversity (vegetation) aspect	Result
Conservation Plan Category: **CBA**	**Reason for the CBA** The CBA along the powerline route is classified based on the potential habitat for plant species of conservation concern and the potential presence of primary vegetation **Can CBA be maintained?** Yes. The, the CBAs area already traversed by the slurry pipes and existing roads. The proposed powerline route follows the existing linear infrastructure, and no additional fragmentation is expected. If the Preferred Layout is approved, less CBAs will be impacted on by the powerline route. **Impact on species composition and structure of vegetation** Areas that will be developed are proposed to be contained within the existing secondary and modified vegetation. If mitigation is implemented no natural to semi-natural grasslands will be affected. **Impact on ecosystem threat status** None expected as the proposed route follows existing linear infrastructure through mostly secondary grasslands. **Impact on explicit subtypes in the vegetation; and the impact on overall species and ecosystem diversity of the site;** See above
Protected Areas	• Not applicable
Strategic Water Source Areas (SWSA):	**Impact(s) on the terrestrial habitat of a SWSA** The site is not situated within a SWSA, however clearing of vegetation can have an impact on water infiltration and flow dynamics to the moist grassland and downstream watercourses. **Impacts of the proposed development on the SWSA water quality and quantity** Erosion, sedimentation and pollution caused by clearing of vegetation for the development, could impact on the downstream water quality temporarily (e.g. during construction). Once indigenous vegetation has re-established or recovered, the impact will be negligible, provided that impermeable surfaces are limited, and no runoff water are directed towards the moist grassland
National Freshwater Ecosystems Priority Areas (NFEPA):	See wetland assessment
Indigenous forest	Not applicable
Sensitive Areas	• As per the GDARD Requirements for Biodiversity Assessments Version 2 (2012): "All good condition natural vegetation must be designated as ecologically

Biodiversity (vegetation) aspect	Result
	sensitive". The rocky grassland is in a good ecological condition, falls within a CBA and forms part of a Critically Endangered Ecosystem • The buffer area to the moist grassland, as delineated by the wetland specialist must be avoided.
No go areas	Avoid direct impacts to moist grasslands and rocky grassland.
Plant species of conservation concern	• One Declining plant species was recorded within walked transects and sample points at the time of this assessment. • Suitable habitat is present for at least three species within the moist and rocky grassland. However, the probability of occurring is considered low as these areas were sampled during this assessment. Also, these areas can and must be avoided by the development and construction related activities.
Main impacts:	The main impacts expected are as follows: • Destruction of natural vegetation of high sensitivity (rocky- and moist grassland) • Destruction of modified vegetation of low sensitivity • Exposure to erosion and subsequent sedimentation or pollution of proximate moist grassland (watercourse) • Removal / Destruction of protected plants and plants of conservation concern • Potential increase in invasive vegetation • Compaction and destruction of soils
Cumulative impacts:	• If mitigation measures are adequately implemented, no cumulative impacts are expected.
Residual impacts:	• Trampling and edge effects; and • Impacts to the watercourse such as runoff from roads.

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1. INTRODUCTION

1.1 Background

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1.2 Locality

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1.3 Terms of reference

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1.4 Assumptions and Limitations

The following limitations are applicable; however, none is considered a fatal flaw:

- This report relied on a single site visit undertaken on the 8th of February 2021, after good summer rains commenced. Most of the site was densely vegetated due to good rains and smaller plant species may have been obscured.
- The follow-up verification of the larger PV Facility and preferred powerline route took place on 26 May 2021, when grasses were already dry and forbs dormant. The additional areas assessed was found to be modified and thus the late season assessment of these areas is not considered a fatal flaw.

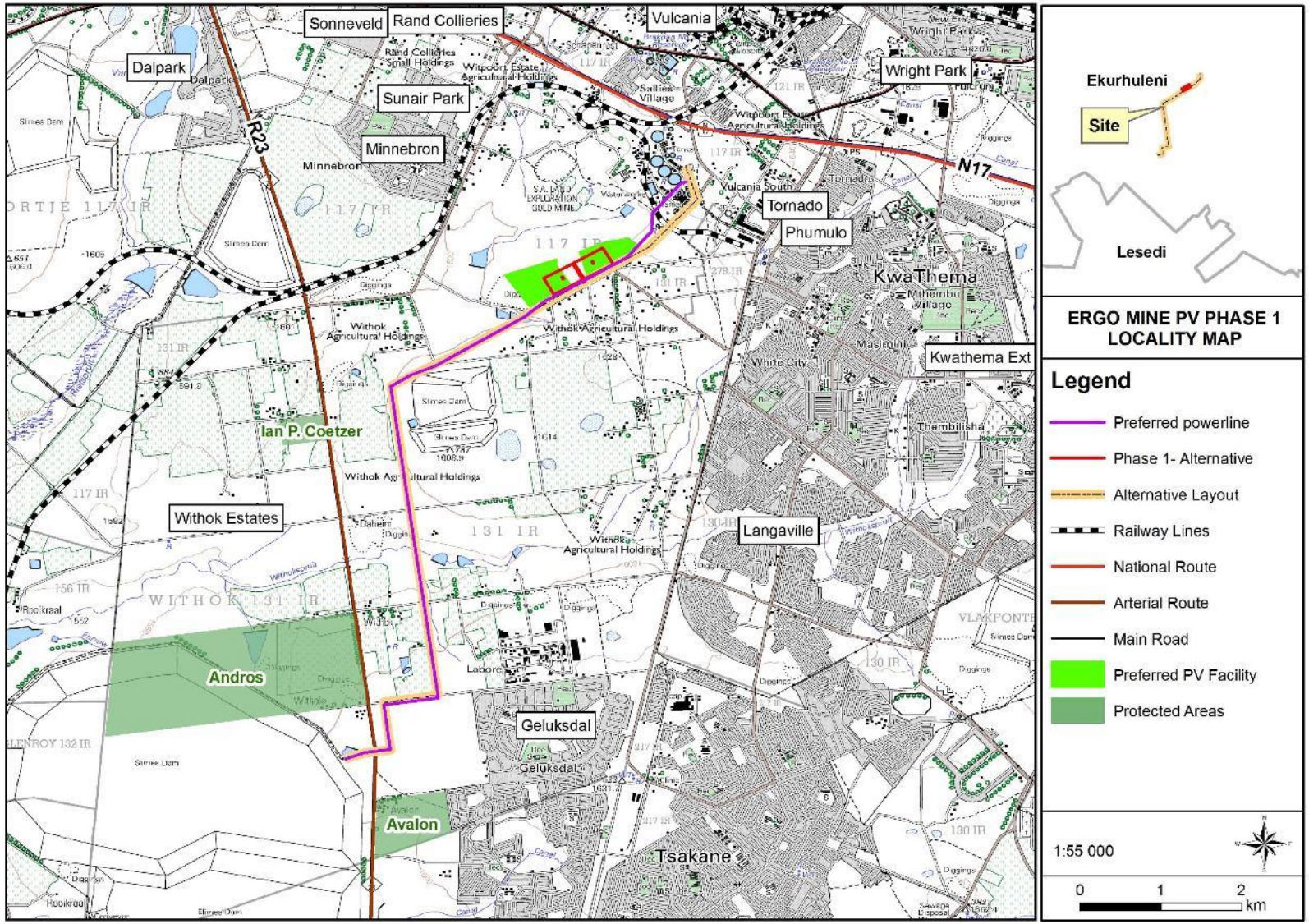


Figure 1: Locality map

2. METHODOLOGY

The assessment entailed a literature review, a site survey and reporting. The methodology used is shortly summarised below.

2.1 Literature and data review

The description of the regional vegetation relied on literature from Mucina & Rutherford (2006). Several field guides were used to identify plant species, including Van Wyk & Van Wyk (1997), Van Wyk & Malan (1997), Pooley (1998), Henderson (2001), Van Oudtshoorn (2002) and Bromilow (2010). The study was undertaken in accordance with the Gauteng Requirements for Biodiversity Assessments Version 2 (GDARD, 2012).

Data and literature consulted:

- The Gauteng Conservation Plan version 3.3 (2011)
- Information on plant species recorded for the Quarter Degree Square (QDS) that the site is situated in was extracted from the Botanical Database of Southern Africa hosted by SANBI on the new Plants of Southern Africa website (https://posa.sanbi.org). Additional info was sourced from the Gauteng Department of Agriculture and Rural Development (GDARD)
- The IUCN conservation status for plant species of conservation concern was verified on the website for the Threatened Species Programme, Red List of South African Plants (Red List of South African plants version 2020(http://redlist.sanbi.org/)).
- Threatened Ecosystem data was extracted from the NEM:BA listed ecosystems layer (SANBI 2008).
- Relevant literature, including historic vegetation reports undertaken for this area.

2.2 Project Area of Influence (PAOI)

The Project Area of Influence (PAOI) was defined as per the Draft Species Environmental Assessment Guideline (SANBI, 2020) and is based on the development footprint and the potential extent of the impacts (e.g., edge effects) of the project activities.

The site for the PV facility was regarded as the primary PAOI, as well as the 11km powerline route. A buffer area of 50m in which construction vehicles, construction camps and equipment could have an impact, was included as the secondary PAOI around the site and with the powerline as mid-line (thus 25m on either side of the powerline). An area of 100m around the site and 50m on either side of the powerline was considered as the tertiary PAOI. Where the powerline crosses rivers, stream of wetlands, the area if impact could extent further downstream (Figure 2)

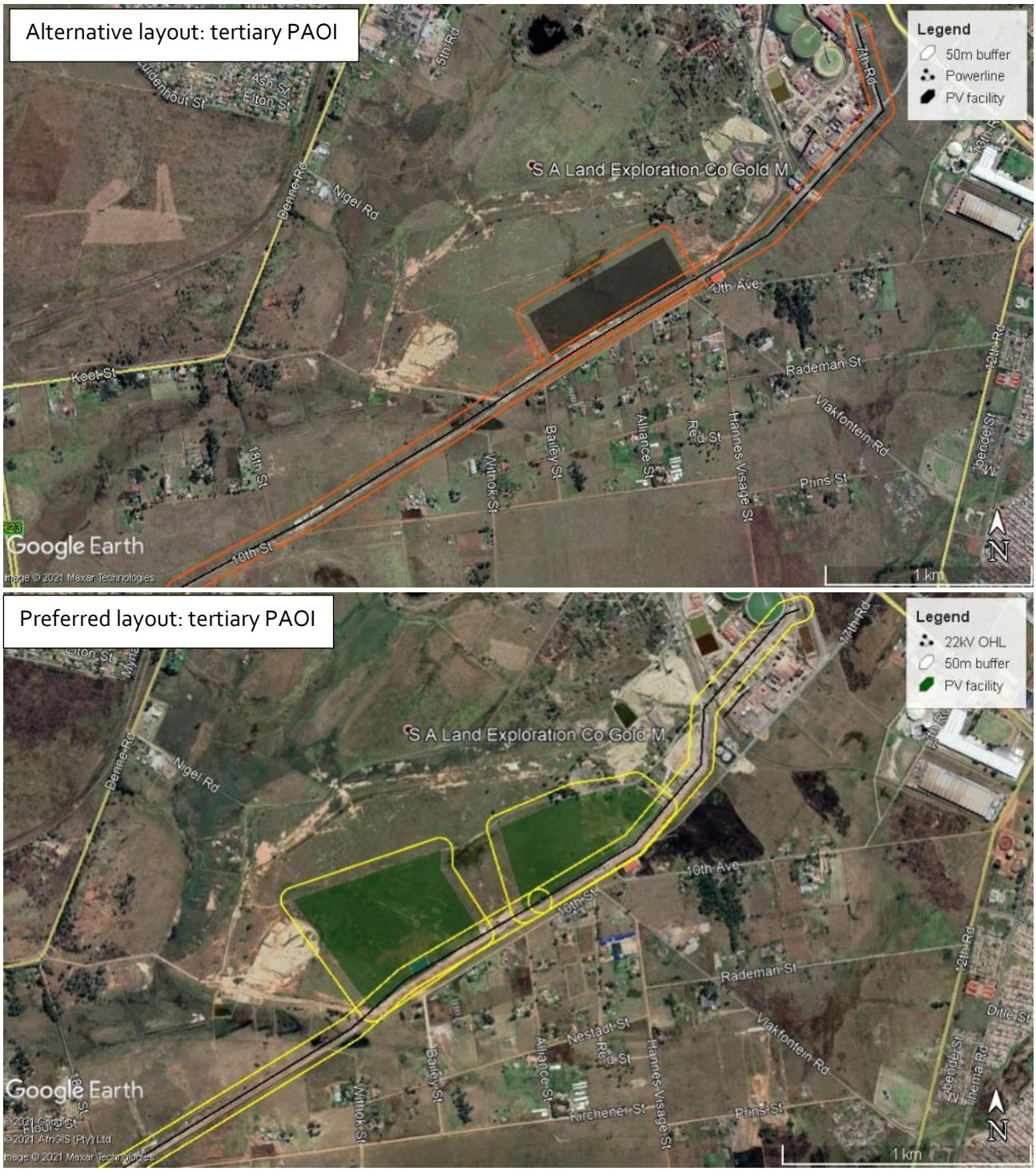


Figure 2: Example of the tertiary PAOI in the northern extent of the proposed development. The tertiary PAOI includes a 50m buffer around the PV facility and on either side of the powerline route (orange and yellow lines).

2.3 Field survey

2.3.1 Timing and intensity

The site visit for the Alternative Layout was undertaken on the 8th of February 2021, after good summer rainfall commenced. The follow-up verification of additional areas for the Preferred layout was undertaken on the 26th of May 2021. Sampling and track maps are given in Appendix A. Sampling was undertaken mainly within the primary and secondary PAOI.

2.3.2 Method

Prior to the site visit, the vegetation was delineated into homogenous units using currently available Google Earth imagery. The field survey focussed on identifying natural and untransformed vegetation, unique features that could indicate local sensitivities such as threatened and protected plants, as well as sensitive ecological features such as wetlands and rocky areas. Transects were walked through the site and along the powerline. At several sites along the transects, a survey of total visible floristic composition was undertaken. Plant identification and vegetation description relied on species recorded in the sampling points along the walked transects.

2.4 Mapping

Mapping was done by comparing georeferenced ground survey data to the visual inspection of available Google-Earth Imagery and in that way extrapolating survey reference points to the entire study area. Delineations are therefore approximate, and due to the intricate mosaics and often gradual mergers of vegetation associations, generalisations had to be made. Mapped associations will thus show where a certain vegetation unit is predominant, but smaller inclusions of another vegetation association in this area do exist but have not been mapped separately. Mapping was extrapolated to the secondary PAOI.

2.5 Site Ecological Importance (sensitivity)

The Site Ecological Importance (SEI) in terms of vegetation is discussed and mapped as per the requirements of the Draft Species Environmental Assessment Guideline (SANBI, 2020). The assessment criteria and matrices are detailed in Table 1, Table 2, and Table 3.

SEI is considered to be a function of the Biodiversity Importance (BI) of the receptor (e.g. species of conservation concern, the vegetation/fauna community or habitat type present on the site and its resilience to impacts (Receptor Resilience) as follows:

SEI = BI + RR

BI in turn is a function of Conservation Importance (CI) and the Functional Integrity (FI) of the receptor as follows:

BI = CI + FI

Conservation Importance (CI) is evaluated in accordance with recognised established internationally acceptable principles and criteria for the determination of biodiversity-related value, including the IUCN Red List of Species, Red List of Ecosystems and Key Biodiversity Areas (KBA; IUCN (2016)).

Table 1: Criteria for assessing CI, FI and RR

Classification	Conservation Importance	Functional Integrity	Receptor Resilience
Very high	• Confirmed or highly likely occurrence of CR, EN, VU or Extremely Rare or Critically Rare species that	• Very large (>100 ha) intact area for any conservation status of ecosystem type	• Habitat can recover rapidly (<5 years for >70% of the original species

Classification	Conservation Importance	Functional Integrity	Receptor Resilience
	have a global Extent of Occurrence of < 10 km² • Any area of natural habitat of a CR ecosystem type or large area (> 0.1 % of the total ecosystem type extent) of natural habitat of an EN ecosystem type	or >5 ha for CR ecosystem types • High habitat connectivity serving as functional ecological corridors, limited road network between intact habitat patches No or minimal current negative ecological impacts with no signs of major past disturbance (e.g. ploughing)	composition and functionality). • Species very highly likely to remain at a site during impact. • Species very highly likely to return once the impact ceases.
High	• Confirmed or highly likely CR, EN, VU species. IUCN threatened species must be listed under any criterion other than A, include if there are less than 10 locations or < 10 000 mature individuals remaining. • Small area (>0.01% but < 0.1 % of the total ecosystem type extent) of natural habitat of EN ecosystem type or large area (> 0.1 %) of natural habitat of VU ecosystem type. • Presence of Rare species.	• Large (>20 ha but <100 ha) intact area for any conservation status of ecosystem type or >10 ha for EN ecosystem types Good habitat connectivity with potentially functional ecological corridors and a regularly used road network between intact habitat patches Only minor current negative ecological impacts (e.g. few livestock utilising area) with no signs of major past disturbance (e.g. ploughing) and good rehabilitation potential	• Habitat can recover relatively quickly (5-10 years for >70% of the original species composition and functionality. • Species highly likely to remain at a site during impact. • Species highly likely to return to site once impact ceases.
Medium	• Confirmed or highly likely occurrence of populations of NT species, threatened species (CR, EN, VU) listed under A criterion only and which have more than 10 locations or more than 10 000 mature individuals. • Any area of natural habitat of threatened ecosystem type with status of VU • Presence of range-restricted species • More than 50 % of receptor contains natural	• Medium (>5 ha but <20 ha) semi-intact area for any conservation status of ecosystem type or > 20 ha for VU ecosystem types • Only narrow corridors of good habitat connectivity or larger areas of poor habitat connectivity and a busy used road network between intact habitat patches • Mostly minor current negative ecological impacts with some major impacts (e.g. established	• Recovers slowly (>10 years for >70 % of the original species composition and functionality • Species moderately likely to remain at site during impact. • Species moderately likely to return to site once impact ceases.

Classification	Conservation Importance	Functional Integrity	Receptor Resilience
	habitat with potential to support SCC	population of alien and invasive flora) and a few signs of minor past disturbance; moderate rehabilitation potential	
Low	• No confirmed or highly likely SCC. • No confirmed or highly likely range-restricted species. • Less than 50 % contains natural habitat with limited potential to support SCC.	• Small (1 – 5ha) area. • Almost no connectivity but migration still possible across transformed / degraded habitat; very busy surrounds. Low rehabilitation potential. • Several minor and major ecological impacts.	• Unlikely to recover fully (<50% restored) after >15 years. • Species have low likelihood of remaining at site during the impact. • Species have low likelihood of returning to site once impact ceases.
Very low	• No confirmed and highly unlikely populations of SCC. • No confirmed and highly unlikely populations of range-restricted species. • No natural habitat remaining.	• Very small (<1 ha) area. • No connectivity except for flying species. • Several major current ecological impacts.	• Unable to recover from major impacts. • Species unlikely to remain at site during the impact. • Species unlikely to return once impact ceases.

Table 2: Matrix for determining BI

Biodiversity Importance (BI)		Conservation Importance (CI)				
		Very High	High	Medium	Low	Very Low
Functional Integrity (FI)	Very High	**Very High**	**High**	**High**	**Medium**	**Low**
	High	**Very High**	**High**	**Medium**	**Medium**	**Low**
	Medium	**High**	**Medium**	**Medium**	**Low**	**Very Low**
	Low	**Medium**	**Medium**	**Low**	**Low**	**Very Low**
	Very Low	**Medium**	**Low**	**Very Low**	**Very Low**	**Very Low**

Table 3: Matrix for determining SEI

Site Ecological Importance (SEI) (Mitigation)		Biodiversity Importance (BI)				
		Very High	High	Medium	Low	Very Low
Receptor	Very Low	**Very High (Avoid)**	**Very High (Avoid)**	**High (Avoid & Minimise)**	**Medium (Minimise & Restore**	**Low (Minimise & Restore**

Site Ecological Importance (SEI) (Mitigation)		Biodiversity Importance (BI)				
		Very High	High	Medium	Low	Very Low
	Low	**Very High (Avoid)**	**Very High (Avoid)**	**High (Avoid & Minimise)**	**Medium (Minimise & Restore**	**Very Low (Minimise)**
	Medium	**Very High (Avoid)**	**High (Avoid & Minimise)**	**Medium (Minimise & Restore**	**Low (Minimise & Restore**	**Very Low (Minimise)**
	High	**High (Avoid & Minimise)**	**Medium (Minimise & Restore**	**Low (Minimise & Restore**	**Very Low (Minimise)**	**Very Low (Minimise)**
	Very High	**Medium (Minimise & Restore**	**Low (Minimise & Restore**	**Very Low (Minimise)**	**Very Low (Minimise)**	**Very Low (Minimise)**

The interpretation of the SEI ranks are described in Table 4 below. This table is a supplemented version of that which appears in the Draft Species Environmental Assessment Guideline (SANBI, 2020). The SEI rating was utilised to generate the vegetation sensitivity map. This plan must be considered along with the fauna sensitivity map and wetland map to obtain an overall sensitivity map.

Table 4: Guidelines for interpreting Site Ecological Importance (SEI) in the context of the proposed development activities.

SEI	Interpretation in relation to proposed development activities (SANBI, 2020), with *mitigation added by the specialist*
Very High	Avoidance mitigation - No destructive development activities should be considered. Offset mitigation not acceptable/not possible (i.e. last remaining populations of species, last remaining good condition patches of ecosystems/unique species assemblages. Destructive impacts for species/ecosystems where persistence target remains. • *Development within these areas is not supported.* • *Impacts are difficult to mitigate, if at all* • *Such features usually protected by legislation or guiding policies*
High	Avoidance mitigation wherever possible. Minimization mitigation – Changes to project infrastructure design to limit the amount of habitat impacted; limited development activities of low impact acceptable. Offset mitigation may be required for high impact activities. • *Development within these areas is undesirable and impacts are difficult to mitigate, if at all.* • *Impacts must be avoided or managed by an ecological management plan*
Medium	Minimization & restoration mitigation - Development activities of medium impact acceptable followed by appropriate restoration activities • *Development within these areas could proceed, limiting impact to sensitive vegetation, provided that appropriate mitigation measures are taken.* • *High impact developments should be considered with caution, if at all. Development must be restricted in footprint and impacts managed and mitigated by an approved management plan. Edge effects to higher sensitivity classes in its proximity must be mitigated / prevented.*

SEI	Interpretation in relation to proposed development activities (SANBI, 2020), with *mitigation added by the specialist*
Low	Minimization & restoration mitigation - Development activities of medium to high impact acceptable followed by appropriate restoration activities • *Developable areas that are connected to sensitive features.* • *Edge effects must be prevented.*
Very Low	Minimization mitigation - Development activities of medium to high impact acceptable and restoration activities may not be required • *Most types of development can proceed within these areas with little to no impact on conservation worthy vegetation.* • *Edge effects to other proximate sensitivity classes must be mitigated / prevented.*

3. BASELINE DESCRIPTION OF THE SITE

3.1 Climate

The study area is situated in the Highveld with summer rainfall and dry winters. Summer temperatures can reach an average of about 30°C while frost is common in winter. Annual rainfall is about 630 and 720mm (Mucina and Rutherford, 2006).

3.2 Topography and Hydrology

The landscape of the study area is characterised by moderately undulating plains. However, the site for the PV facility was flat, at an average elevation of about 1620m, and was relandscaped after being remined in the year 2000. A dam formed on the southern extent of the site and drains northwards to another dam just north of the northern boundary of the PV facility site (see insert, Figure 3). The powerline traverses the Withokspruit and some of its tributaries (Figure 3).

3.3 Geology and Soils

The most dominant rock in the area is Balsatic lava of the Klipriviersberg Group (Mucina & Rutherford, 2006). Soils are typical of the Ba and Bb land types. The soils include GsA soils, which are shallow (<500 mm) and medium sand to loam in texture. In general, they are associated with moderately deep (500 - 1000 mm), yellow-brown, apedal, mesotrophic, loam soils of the Avalon form. dHu27 is also prominent, comprising of deep (1200mm +mm), red apedal sandy loam / clay loam. AvA soils in the south of the powerline route area shallow (300-600mm) on soft or hard plinthite (Figure 4). WA indicate the presence of slimes dams.

3.4 Historical Vegetation Type Overview

The study site is situated within the Grassland Biome of South Africa. This biome is dominated by grasslands wherein high summer rainfall, combined with dry winters, night frost and marked diurnal temperature variations are unfavourable to tree growth. Most plant species in grasslands are non-grassy herbs (forbs), most of which are perennial plants with large underground storage structures. Furthermore, many Rare and Threatened plant species in the summer rainfall regions of South Africa are restricted to high-rainfall grasslands, making the Grassland Biome in most urgent need of conservation.

The Grassland Biome comprises several vegetation types (Mucina & Rutherford, 2006). The PV facility site, and most of the powerline route, are situated within the historical extent of the Tsakane Clay Grassland that occurs on slightly undulating plains and low hills (Figure 5). The vegetation is short, dense grassland dominated by a mixture of common highveld grasses such as *Themeda triandra, Heteropogon contortus, Elionurus muticus* and several *Eragrostis* species. Disturbance leads to an increase in the abundance of the grasses *Hyparrhenia hirta* and *Eragrostis chloromelas* (Mucina & Rutherford, 2006). Only about 2% of the 24% target of this grassland is conserved and it is classified as Endangered (Mucina & Rutherford, 2006). More than 60% was transformed by cultivation, urbanisation, mining, dam-building and roads and urbanisation is threatening the remaining portions of this grassland. The most northern extent of the powerline route falls within the Soweto Highveld Grassland. This vegetation type is also greatly transformed and classified as being Endangered. The vegetation grows on gently to moderately undulating landscapes of the Highveld Plateau and supports short to medium-high, dense, tufted grassland, dominated by a variety of grasses, mainly *Themeda triandra.*

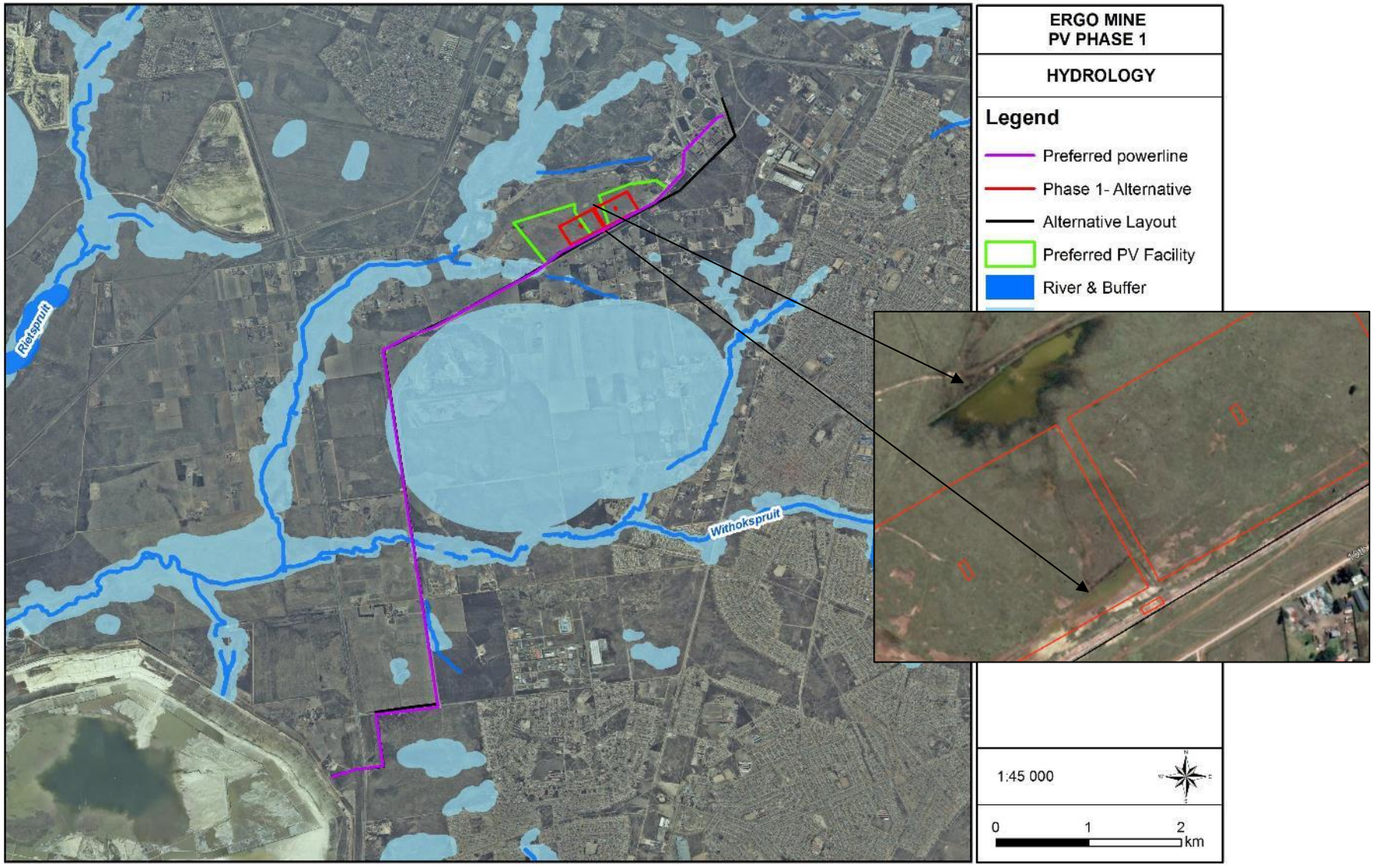


Figure 3: Hydrology of the area that the site is situated in, as per available national spatial data

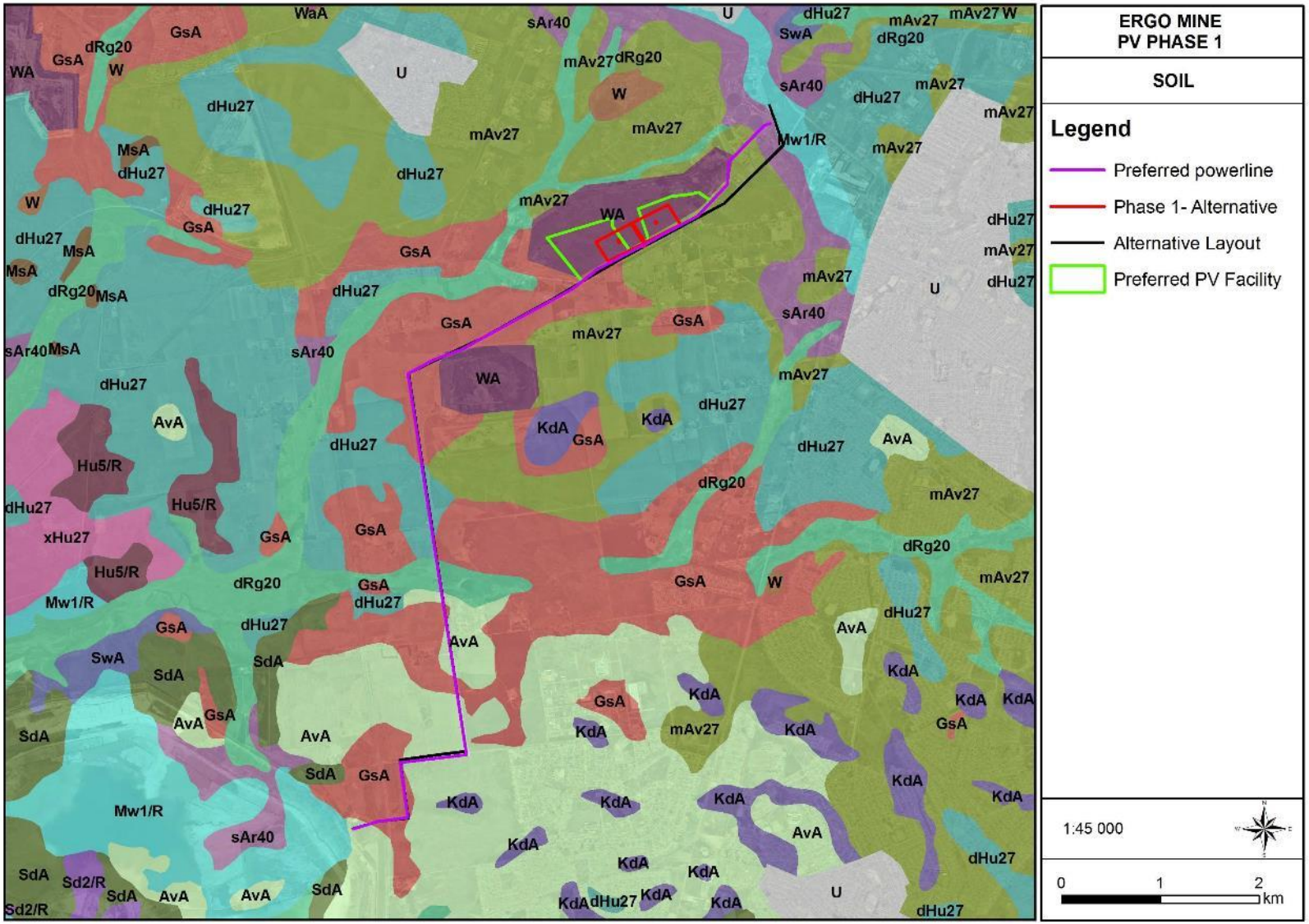


Figure 4: Soils present in the study area

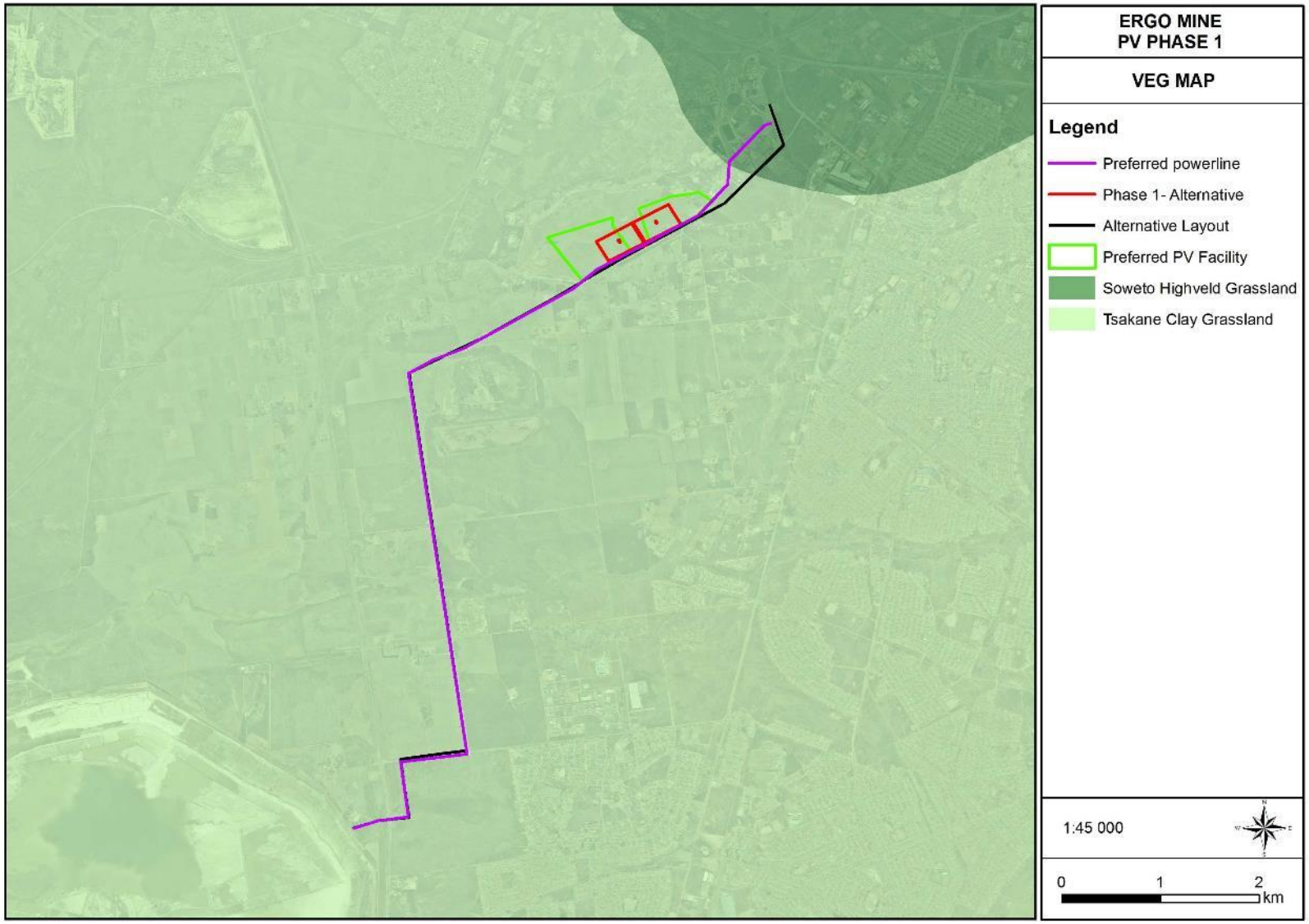


Figure 5: Vegetation units underlying the study area (Mucina and Rutherford, 2006).

3.5 Listed Ecosystems

The South African Biodiversity Act (Act 10 of 2004) provides for the listing of threatened or protected ecosystems. These ecosystems are grouped into Critically Endangered-, Endangered-, Vulnerable- and Protected Ecosystems (Section 52(1) (a) of the National Environmental Management: Biodiversity Act (Government Gazette 34809, Government Notice 1002, and 9 December 2011)).

The PV facility site falls within the Critically Endangered Klipriver Highveld Grassland ecosystem, whereas the powerline traverses the Soweto Highveld Grassland (Vulnerable), Klipriversberg Highveld Grassland and the Tsakane Clay Grassland (Endangered) listed ecosystems (Figure 6). Google Earth aerial imagery as well as the site visit, results, show that much of development footprint traverse areas that have already been modified from the naturals state.

3.6 Gauteng Conservation Plan

The Gauteng Conservation Plan (Version 3.3) (GDARD, 2011) classified areas within the province based on its contribution to reach the conservation targets within the province. These areas are grouped as Critical Biodiversity Areas (CBAs) or Ecological Support Corridors (ESAs). The CBAs comprise 'Irreplaceable' areas that must be conserved and areas classified as 'Important' to reach the conservation targets of the Province. ESA's are areas that are not essential for meeting biodiversity representation targets/thresholds but which nevertheless play an important role in supporting the ecological functioning of critical biodiversity areas and/or in delivering ecosystem services that support socio-economic development, such as water provision, flood mitigation or carbon sequestration. (ESAs) to ensure sustainability in the long term.

The area in which the PV facility site falls is not classified as being of conservation concern. However, the powerline traverse several Critical Biodiversity Areas (CBAs) classified as Important to reach the conservation targets in the Province (Figure 7). Note that the Preferred Layout will limit the number of CBAs impacted. The conservation plan indicates that the CBAs comprise primary vegetation, which is also suitable habitat for several plant species of conservation concern. The CBAs are mostly surrounded by ESAs and are associated with the Withokspruit, its tributaries and surrounding grasslands.

3.7 Ecological drivers and processes in grassland

Frost, fire and grazing maintain the herbaceous grass and forb layer and prevent the establishment of thickets or encroachment by trees into grasslands (Tainton, 1999). Fire is a natural disturbance caused by lightning, and regular burning is therefore essential for maintaining the structure and biodiversity of grasslands. If fire is prevented due to activities such as agriculture and mining, the vegetation structure degrades, and alien species could eventually dominate the natural vegetation.

When Tsakane Clay Grassland vegetation is disturbed, *Hyparrhenia hirta* (common thatching grass) and *Eragrostis curvulua* become dominant (Mucina and Rutherford, 2006).

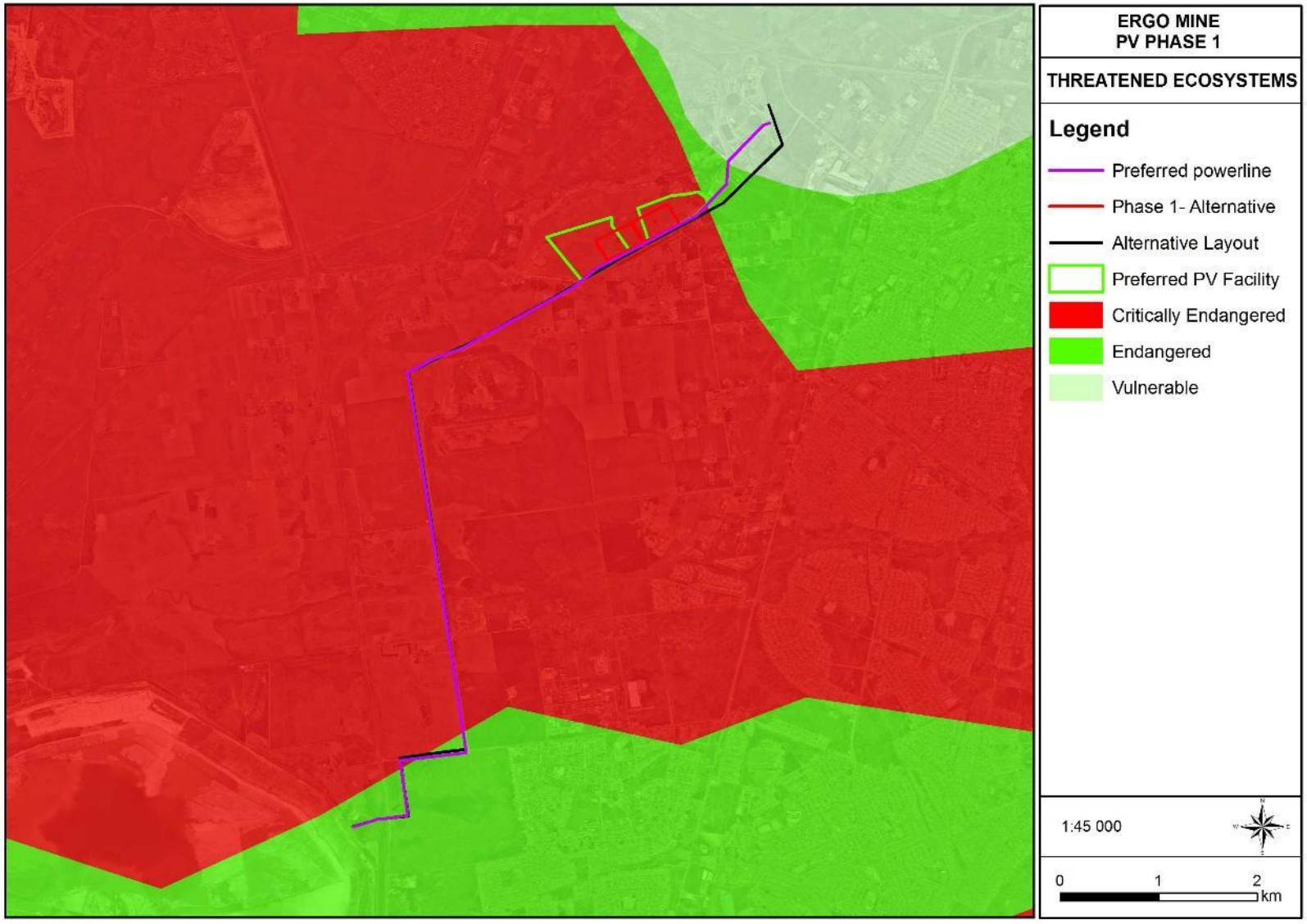


Figure 6: Threatened ecosystems

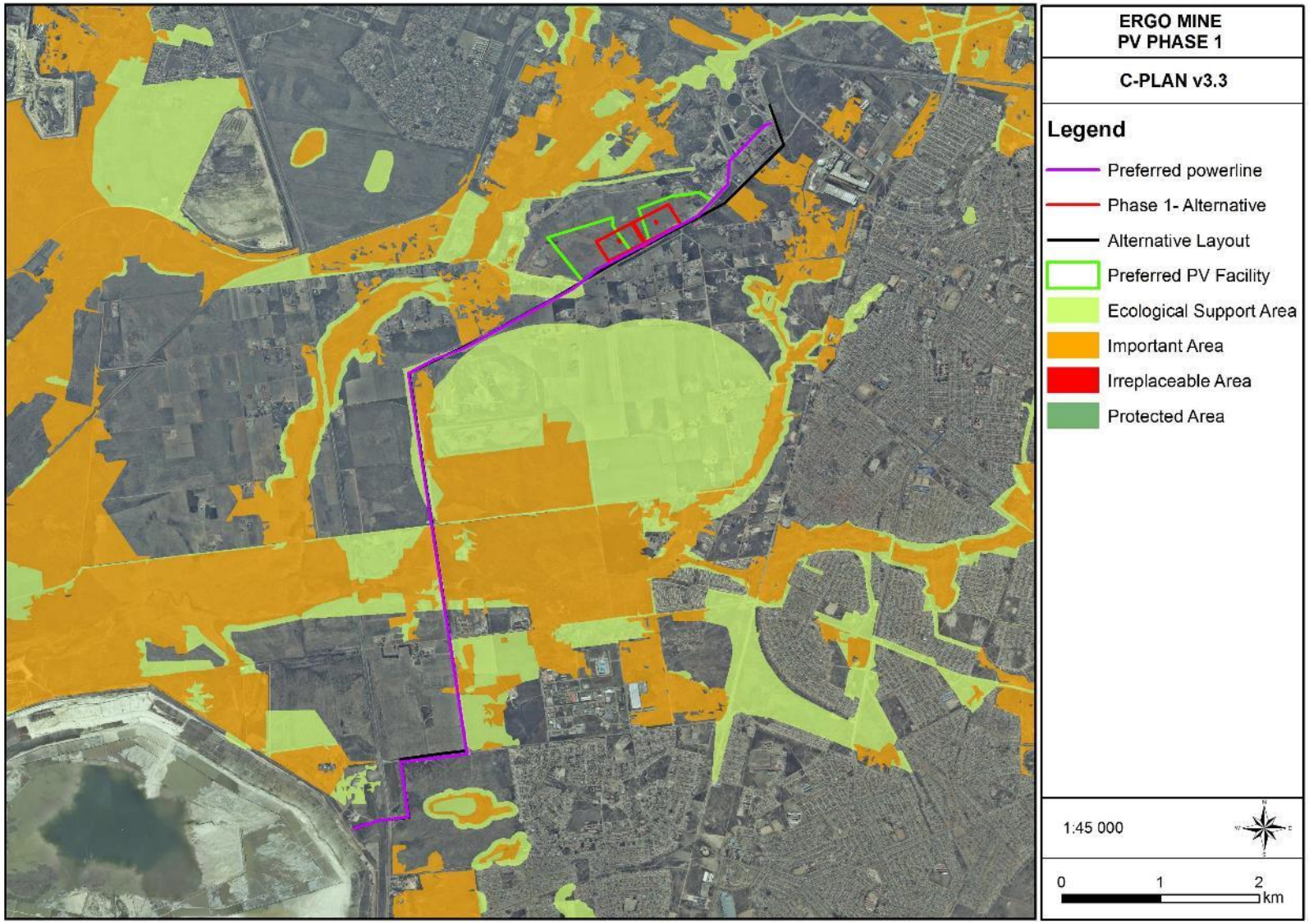


Figure 7: The proposed development in relation to the Gauteng Conservation Plan

3.8 Protected areas within 10km of site

No areas of international conservation (RAMSAR Wetlands and World Heritage Sites), Important Bird Areas (IBAs), National or Provincial Protected Areas, or National Protected Areas Expansion Strategy (NPAES) areas occur within 10km of site. However, some Private Nature Reserves are situated to the east and south of the powerline (Figure 1). The status of these reserves is unknown.

4. Results

4.1 Land use and disturbances

Historical aerial imagery (Google Earth) indicated that the vegetation along the alternative and preferred powerline routes and on the site proposed for the PV Facility was historically cultivated, mined, or indirectly impacted on by agricultural and mining activities. Natural to semi-natural vegetation remain in pockets along the powerline route, where it is situated around the streams and in between mining and agricultural impacts (Figure 8 & 9). The area was grazed by cattle with three herds noted between the PV facility site and the southern extent of the powerline route during the February 2021 site visit.

Figure 8: Google Earth aerial imagery showing land cover in the year 2002. Encircled areas contain some natural vegetation noted during the site visit that was not cultivated or directly impacted on by mining

Figure 9: Google Earth imagery showing historic cultivation along the southern extent of the powerline (2004, top image) and the historic slimes dam, slurry pipes and paddocks along the powerline route in the year 2005 (bottom image)

A 2008 image of of the PV facility site, shows the modified state thereof (Figure 10). Figure 11 shows various disturbances along the northern extent of the powerline route in the year 2011 (Google Earth).

Figure 10: A 2008 image of the re-mined slimes dam where the PV facility is proposed, indicating the disturbed nature of the site.

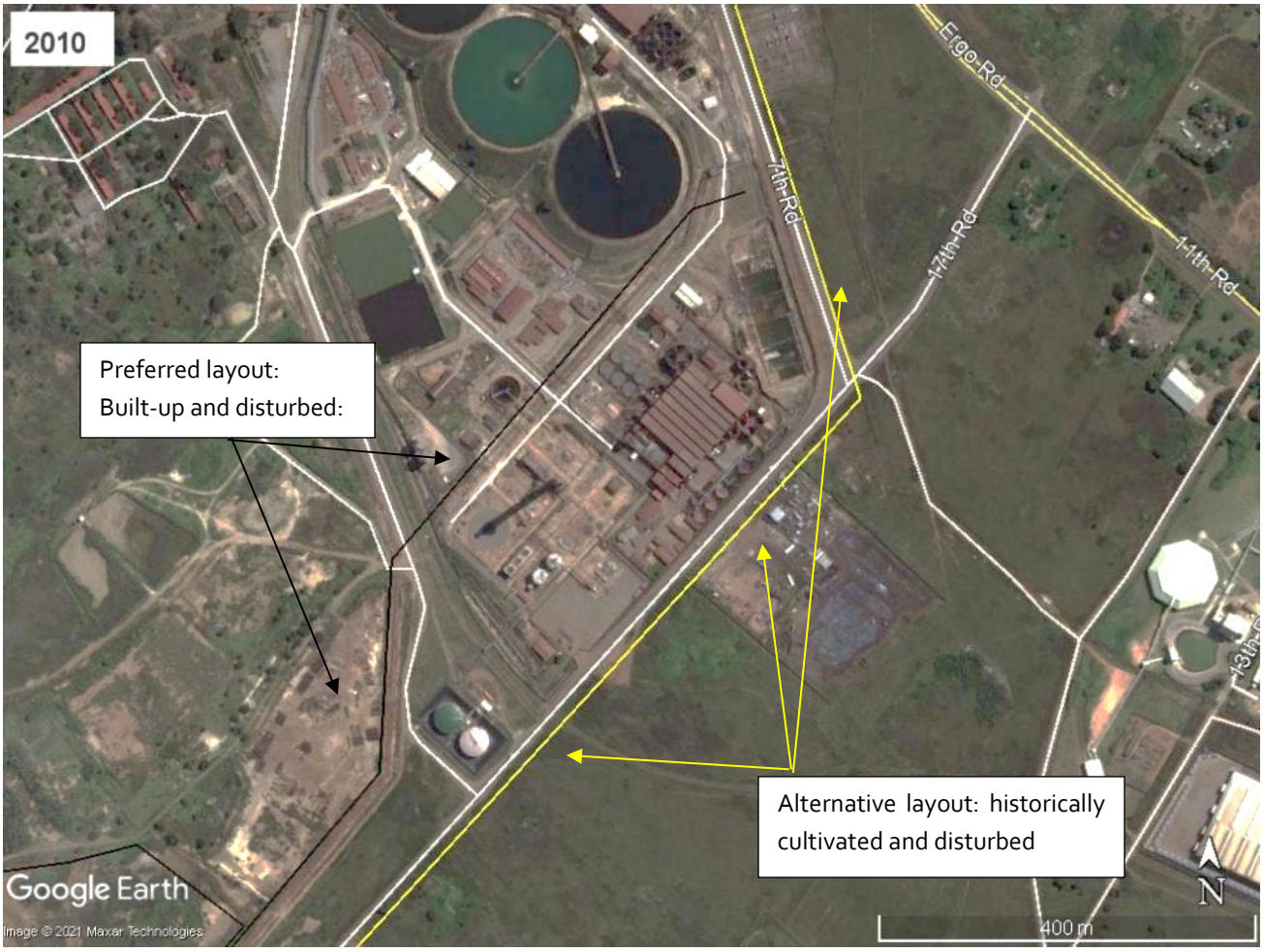


Figure 11: Historical cultivation, disturbances, and built-up areas along the northern extent of the Preferred and Alternative powerline routes.

4.2 Vegetation: PV facility

The proposed PV facility site comprised an historic slimes dam, that was remined around the year 2000. The natural soil layers and vegetation were historically destroyed. Subsequently, the land was rehabilitated, and the soil conditions seemed good. Although it is understood that the area was left to revegetate naturally, it appears that some hydroseeding and fertilisation took place.

Three vegetation groups were delineated (Figure 12):

- Secondary *Eragrostis-Cynodon* grassland;
- *Cynodon-Cortaderia* modified vegetation; and
- Moist grassland

4.2.1 Secondary *Eragrostis plana-Cynodon dactylon* grassland.

Most of the proposed PV facility site, as well as the powerline route directly east and west thereof, comprised secondary grassland and is being used to graze cattle. Secondary grasslands have undergone extensive

modification and a fundamental shift from their original state (e.g. to cultivated or mined areas) but have then been left to return to a grassland state. Although secondary grasslands may superficially look like primary grasslands, they differ markedly with respect to species composition and vegetation structure, while some or most ecological functions have been compromised.

At the time of the site visit, after good summer rains, the basal cover was high for grassland (Photograph 1). Some bare patches were present, and the grass species diversity was low. The grass layer comprised of hardy pioneer and perennial grasses, typical of rehabilitated grassland. The grass layer was dominated by *Eragrostis* species and *Cynodon dactylon.* The forb diversity was still poor. Table 5 lists the dominant and prominent species recorded in this grassland. No plant species of conservation concern were recorded in this vegetation group, and none are expected to be present due to the secondary and modified nature of the vegetation.

Table 5: Summary of the prominent and dominant species recorded within the secondary *Eragrostis-Cynodon* grassland (Appendix B)

Dominant taxa recorded during the site visit
Grasses: *Eragrostis plana, Cynodon dactylon, Eragrostis curvula, Digitaria eriantha, Paspalum sp* Forbs: *Conyza podocephala, Helichrysum rugulosa, Gazania krebsiana, Felicia muricata, Stoebe plumosa, Plantago lanceolata, Senecio greagatus* Sedge: *Cyperus esculentus*
Species richness (indigenous species) at the time of the site visit
Grasses: 6 Forbs:8 Sedges: 1
Protected or threatened plant species
None recorded and none are expected to occur
Alien and/or invasive plant species
Verbena tenuisecta, Schkuhria pinnata, Verbena bonariensis
Ecological function
• Soil stabilization • Potential groundwater recharge zones

Photograph 1: Secondary *Eragrostis-Cynodon* grasslands dominate the site proposed for the PV facility.

4.2.2 *Cynodon-Cortaderia* modified vegetation

The most eastern section of the Preferred Layout of the PV facility comprised degraded vegetation that was continuously disturbed. This area is also traversed by the Preferred Layout powerline route. The vegetation was sparse and dominated by the pioneer grass *Cynodon dactylon* and the category 1b invasive *Cortaderia selloana* (fountain grass) (Photograph 2). Tree species noted were all invasive (e.g Wattle, Eucalyptus and Tamarix). Artificial depressions support the hydrophyllic grass *Phragmites australis*. Table 6 lists the dominant and prominent species recorded in this grassland. No plant species of conservation concern were recorded, and none are expected to be present due to the secondary and modified nature of the vegetation.

Photograph 2: *Cynodon-Cortaderia* modified vegetation in the eastern extent of the Preferred Lout for the PV facility

Table 6: Summary of the prominent and dominant species recorded within the secondary *Cynodon-Cortaderia* modified vegetation (Appendix B)

Dominant taxa recorded during the site visit
Grasses: *Cynodon dactylon, Hyparrhenida hirta, Phragmites australis* Forbs: *none*
Species richness (indigenous species) at the time of the site visit
Grasses: 3
Protected or threatened plant species
None recorded and none are expected to occur
Alien and/or invasive plant species
Eucalyptus sp, Acacia dealbata, Tamarix ramosissima
Ecological function
• *none*

4.2.3 Moist *Eragrostis plana* dominated grassland-

Moist grasslands in this report refer to grassland vegetation that supported plant species with an affinity to grow in permanent, temporary, or seasonally saturated conditions. Note that the moist grasslands are an

indication of where wetlands could occur, based on plant species that are adapted to growing in inundated soils, or species that prefers moist soils, but are not necessarily wetlands. The wetland report must be consulted for the definitive wetland boundaries and recommended buffer zones.

A small dam is situated on the southern boundary of the proposed PV facility site, as well as directly north thereof (Photograph 3). These are assumed to be artificial wetlands (please refer to the wetland assessment for a definitive delineation of wetlands). Historic paddocks and depressions in the landscape filled with water and was colonised by species adapted to temporary or permanently moist conditions (Table 7). The edges of the moist areas were dominated by *Cynodon dactylon* (couch grass) and *Eragrostis plana* (tough love grass). Sedges such as *Juncus effusus* and *Cyperus congestus* were recorded. No plant species of conservation concern were observed, and none are expected to be present due to the secondary nature of the vegetation.

Table 7: Summary of the prominent and dominant species associated in the moist grassland at the PV facility site (Appendix B)

Dominant taxa recorded during the site visit
Grasses: *Cynodon dactylon, Eragrostis plana, Imperata cylindrica, Paspalum* species, *Phragmites* species Sedges: *Juncus effusus, Pycreus macranthus, Cyperus congestus, C esculentus* Forbs: *Senecio cf innornatus, Berkheya radula -*
Species richness (indigenous species) at the time of the site visit
Grasses: 6 Forb species: 6 Sedges: 4
Protected or threatened plant species
None recorded and none are expected to occur
Alien and/or invasive plant species
Verbena species
Ecological function
• Soil stabilization • Water purification

Photograph 3: Moist *E plana* grassland at the PV facility site

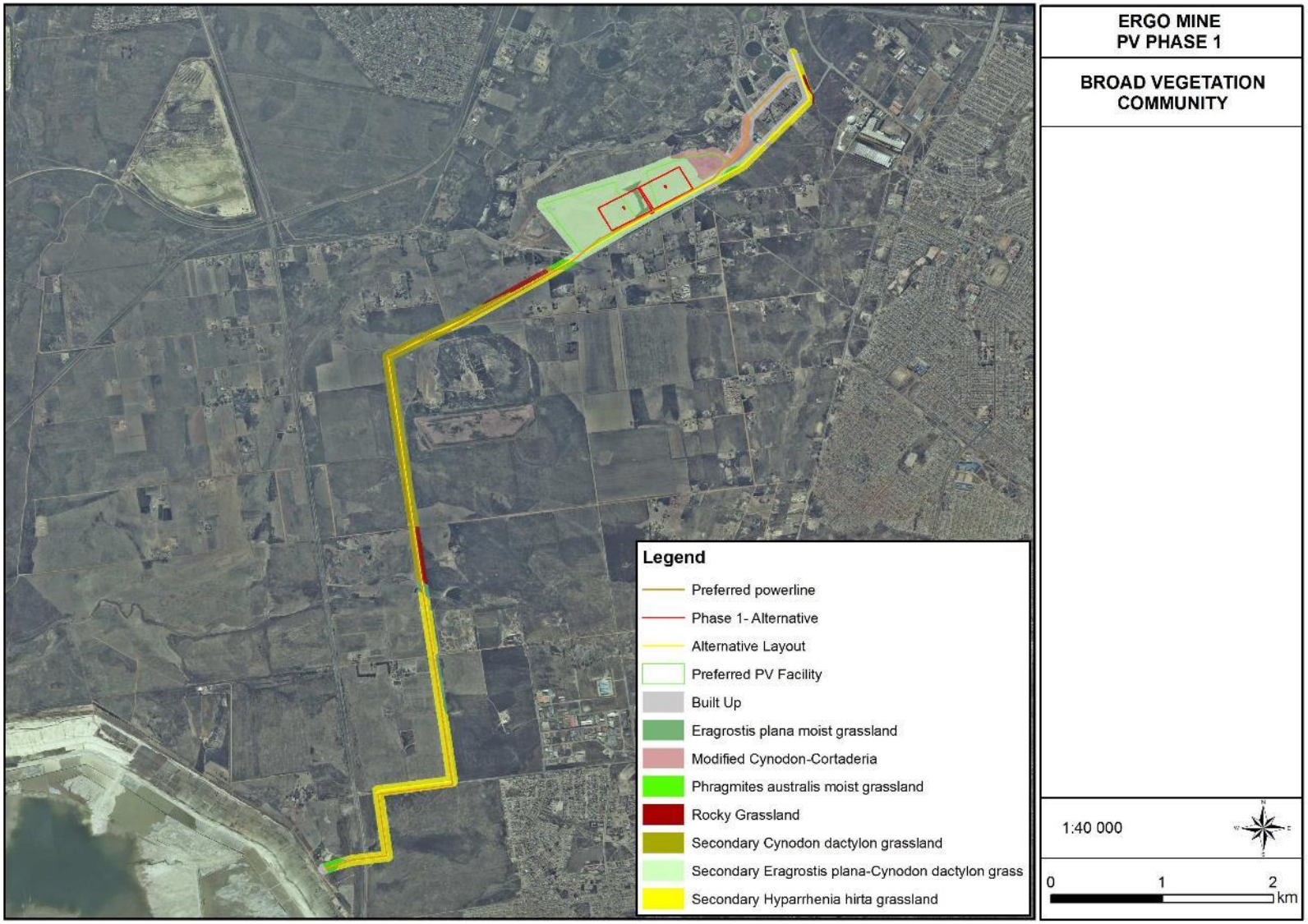


Figure 12: Broad vegetation groups on the PV facility site and along the proposed powerline routes

4.3 Vegetation: Powerline

Much of the vegetation along the proposed powerline route that stretches west and southward from the proposed PV facility site, has been historically disturbed by either cultivation, paddocks surrounding slimes dams, or the presence and maintenance of the slurry pipes (Photograph 4). The Alternative Layout route to the east and north mainly follows the road reserve through historically disturbed or cultivated areas (Photograph 5). The Preferred Layout route traverses built-up areas in the Ergo plant and degraded and modified vegetation west of the plant (Photograph 6).

Photograph 4: Powerline route west and south-west of the PV facility follows the slurry pipes, mostly through historic paddocks (estimated route indicated with dashed line)

Photograph 5:Alternative Layout Powerline route east and north-east of the PV facility, is mostly within 10m of the existing 17th Road. Estimated powerline route indicated with dashed line.

Photograph 6: Degraded and built-up areas in the eastern extent of the Preferred Layout Powerline route. Estimated powerline route indicated with dashed line.

The powerline will traverse mostly secondary and modified grasslands, as well as small portions of moist grassland. Pockets of rocky grassland is present within the mapped buffer, but not along the actual proposed footprint.

The vegetation along the route was classified as:

1. Secondary grassland
   1.1 Hyparrhenia hirta dominated grassland
   1.2 Cynodon dominated grassland
2. Modified vegetation
   2.1 Cynodon-Cordaderia degraded vegetation
3. Rocky grassland; and
4. Moist grassland
   4.1 Phragmites australis dominated grassland
   4.2 Eragrostis plana moist grassland

Each broad vegetation grouping is discussed below and geographically represented in Figure 12. Plant species that were recorded at sample points at the time of the site visit are listed in Appendix B.

4.3.1 Secondary grassland

Secondary grasslands develop where the original, undisturbed grassland vegetation was removed (e.g. cultivation or mining). After such disturbances cease, pioneer grassland species, as well as weedy pioneer plants, colonise the fallow lands leading to a pioneer grassland state with a much lower initial species diversity as opposed to the primary (climax) state prior to any disturbances. In the absence of further disturbances, the grassland could reach a secondary grassland state (more diverse and ecologically stable than pioneer grassland, yet lower in species diversity than primary grassland) and theoretically the

primary state over time. However, primary grasslands are species rich ecosystems, which once disturbed, are difficult, if not impossible to restore.

The secondary grasslands were the most prevalent along the powerline route and was further grouped into *Hyparrhenia hirta* dominated grassland and *Cynodon* dominated grassland.

4.3.1.1 Hyparrhenia hirta – Eragrostis chloromelas grassland

Disturbance in Tsakane Clay grasslands or a secondary state thereof, leads to an increase in the abundance of the grasses *Hyparrhenia hirta* and *Eragrostis chloromelas.* Historically cultivated areas, as well as severely disturbed land along the proposed powerline route were dominated by these grasses, along with other species such as *Eragrostis chloromelas, E. rigidor* and *Cynodon dactylon* (Table 8; Photograph 7). The forb layer was dominated by species of the Asteraceae family with fallow lands dominated by either *Helichrysum* species or *Senecio* species. The number of forb species were low compared to that of natural, or undisturbed grasslands.

No plant species of conservation concern were recorded, and none are expected to be present due to the secondary nature of the vegetation.

Table 8: Summary of the prominent and dominant species recorded within the secondary *Hyparrhenia hirta Eragrostis chloromelas* grassland (Appendix B)

Dominant taxa recorded at the tome of the site visit
Grasses: *Hyparrhenia hirta, Cynodon dactylon, Eragrostis chloromelas, Eragrostis regidor, E. curvula, E. plana, Aristida congesta* Forbs: *Helichrysum species, Senecio gregatus, Whalenbergia caledonia, Nemesia fructescens, Lotononis species, Felicia muricata, Solanum panduriforme,* Shrubs*: Stoebe plumosa, Hilliardiella oligiocephala*
Species richness (indigenous species) at the time of the site visits
Grasses: 17 Forbs:17Sedges:1
Protected or threatened plant species
None
Alien and/or invasive plant species
*Campuloclinium macrocephalum (*Pom-Pom weed), *Verbena bonariensis*
Sensitive ecological features
• Groundwater recharge zones

Photograph 7: Large starches of the proposed route comprise *H hirta-E chloromelas* secondary grassland with a low species diversity.

4.3.1.2 Cynodon dactylon dominated grassland

Grasslands that were subjected to mining impacts were dominated by the grass *Cynodon dactylon* (couch grass). Areas such as the paddocks along the slurry pipes, and reworked mine dump west of the proposed PV facility were colonised or seeded with this species (Photograph 8). This tough, indigenous grass is common in disturbed and trampled areas and can withstand high levels of nitrogen. The stolon grows rapidly and prevents soil erosion.

The species diversity in this grassland group was low. Hardy grass species such as *H hirta, E chloromelas* and *E plana* were common and *Imperata cylindrica* (cotton wool grass) in prolonged moist areas within the paddocks. Forbs were limited to weedy and pioneer species such as *Stoebe plumosa, Conyza alba,* and *Helichrysum rugulosa* (Table 9). The species diversity of this group is similar to the *Eragrostis plana-Cynodon dactylon*-grassland growing on the proposed PV facility site and surrounds, except that *E chloromelas* are more dominant here than *E plana.*

Table 9: Summary of the prominent and dominant species recorded within the secondary *Cynodon dactylon* grassland (Appendix B)

Dominant taxa recorded
Grasses: *Cynodon dactylon, Eragrostis chloromelas, E curvula, E. plana, Hyparrhenia hirta* Forbs: *Conyza podocephala, Helichrysum rugulosa, Felicia muricata, Stoebe plumosa*
Species richness (indigenous species) at the time of the site visits
Grasses: 10 Forbs:10
Protected or threatened plant species
None recorded and none are expected to occur
Alien and/or invasive plant species
Verbena tenuisecta, Schkuhria pinnata, Verbena bonariensis, Pennisetum clandestinum
Ecological function
• Soil stabilization • Pollution control

Photograph 8: *Cynodon dactylon* dominated grassland, mainly along slurry pipes and mined land

4.3.1.3 Secondary Eragrostis plana-Cynodon dactylon grassland.

This vegetation groups extend from the proposed PV facility plant eastwards and westward along the proposed powerline route. This section of the powerline traverses the historic slimes dam area that was remined and left to rehabilitate (Photograph 9). The species diversity is the same as that listed in Table 5.

Photograph 9: Secondary *Eragrostis plana-Cynodon dactylon* grassland west of the proposed PV facility site

4.3.2. Modified vegetation

The eastern extent of the Preferred Layout Powerline traverses a part of the ergo plant, as well as the degraded *Cynodon-Cortaderia* vegetation as described for the PV Facility (see 4.2.2;Table 6).

Photograph 10: The Preferred Layout route through *Cynodon-Cortaderia* degraded vegetation, towards the Ergo Plant

4.3.3 Rocky grassland

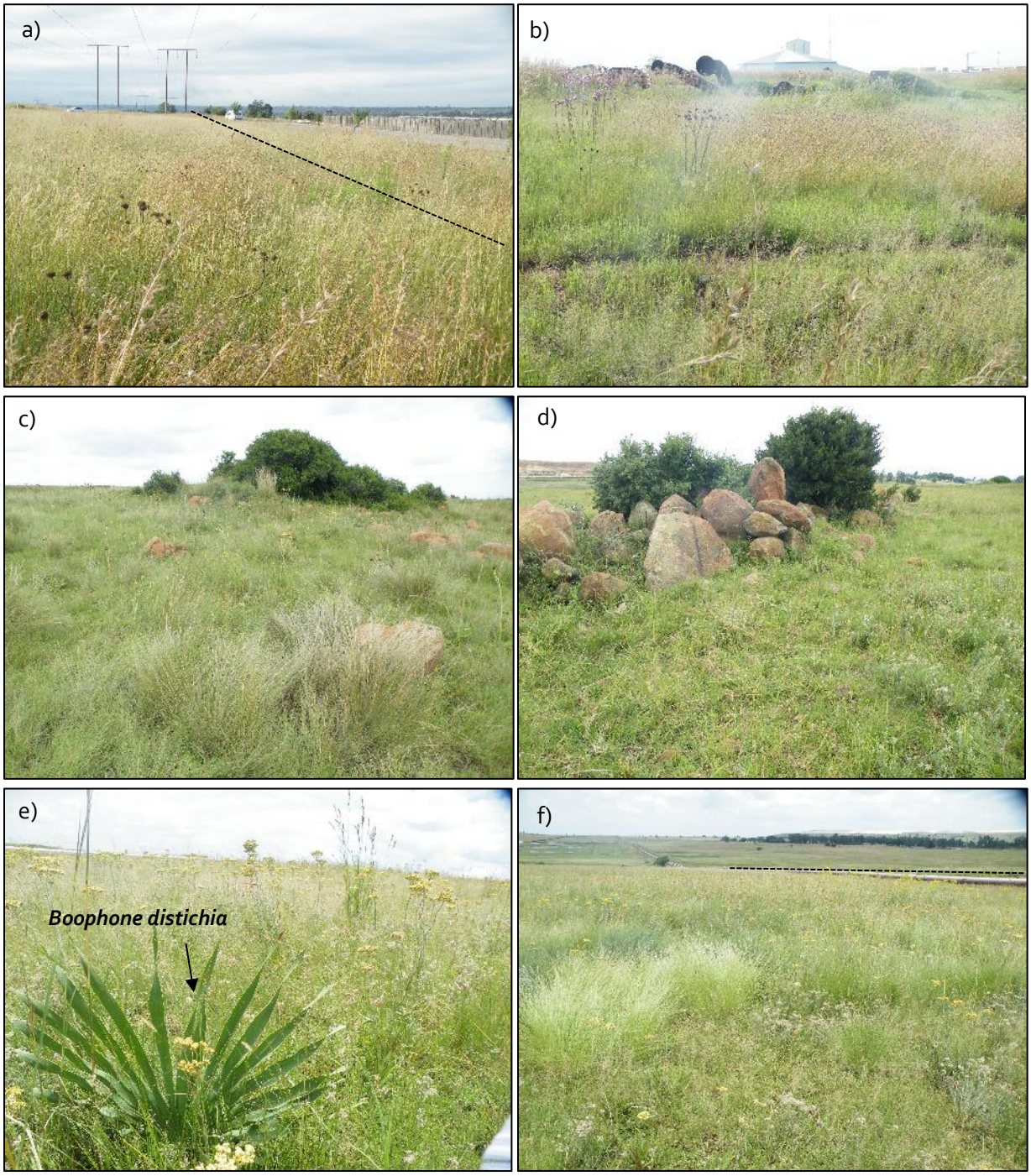
Small portions of natural to near-natural grassland was observed within the 50m buffer area assessed along the powerline route. A small, degraded patch is present south of the Ergo Central 88/6.6kV

substation (Photograph 11a-b). This area was historically disturbed; however, the species diversity was higher than secondary grassland, with dominant stands of the grass *Themeda triandra* (red grass) and *Setaria spachelata* and a diversity of grassland forbs (Table 11). The provincially protected orchid, *Habenaria humilior* were recorded just outside of the 50m buffer, on the southern side of 17th Road. Another piece of rocky grassland was present around mid-section of the line, north of the proposed route. The area is grazed and edge effects from the historic mining activities degraded the grassland. However, this area included rocky outcrops with indigenous trees such as *Diospyros lycioides* and *Searsia rigida* (Photograph 11c-d). The rocky areas are suitable habitat to plant species of conservation concern, however, none were recorded in walked transects.

North of the Withokspruit, a small rocky grassland patch remains. Although some areas were degraded and even cultivated or mowed in the past, several typical Soweto highveld Grassland species were recorded, including the geophyte *Boophone distichia* (Photograph 11e-f). This species is classified as Declining in Gauteng but is situated about 37m east of the proposed route, and on the opposite side of the slurry pipeline. It is therefore not considered threatened by the proposed route, however, edge effects may have an impact.

Table 10: Summary of the prominent and dominant species recorded within the rocky grassland (Appendix B)

Dominant taxa recorded during the site visit
Grasses: *Themeda triandra, Setaria sphacelata var spacelata, Aristida congesta, Hyparrhenia hirta, Eragrostis chloromelas* Forbs: *Helichrysum* spp, *Senecio* spp, *Ipomoea crassipes, Hermannia transvaalensis, Sphenostylis angustifolia, Schistostephium crataegifolium, Hilliardiella oligiocephala, Dyschoriste setigera, Scabiosa columbaria* Shrubs: *Stoebe plumosa* Geophytes: *Boohone distichia*, *Gladiolus crassifolius* Trees: *Searsia rigida, Diospyros austro-africana* Suffretex: *Ziziphus zeyheriana*
Species richness (indigenous species) at the time of the site visits
Grasses: 14 Forbs:40 Trees: 3
Protected or threatened plant species
The rocky areas are suitable habitat to a Near Threatened succulent; however, this species was not recorded in walked transects. *Boophone distichia*, classified as Declining in Gauteng, were recorded about 37m east of the proposed route and should be avoided.
Alien and/or invasive plant species
Verbena bonariensis, Oenothera species
Sensitive ecological features
• Groundwater recharge zones • Unique rocky habitat, which could support plant species of conservation concern • Good condition grassland that must be regarded as sensitive as per the GDARD sensitivity mapping rules (GDARD, 2012) • Mostly situated within a CBA: Important



Photograph 11: Rocky grassland south of the Ergo substation (top), east of the PV facility (middle) and just north of the Withokspruit (bottom)

4.3.3 Moist grasslands

Moist grasslands in this report refer to grassland vegetation that supported plant species with an affinity to grow in permanent, temporary, or seasonally saturated conditions. Note that the moist grasslands are an indication of where wetlands could occur, based on plant species that are adapted to growing in inundated soils, or species that prefers moist soils, but are not necessarily wetlands. The wetland report must be consulted for the definitive wetland boundaries and recommended buffer zones.

The moist grassland along the proposed powerline route was decided into two groups as discussed below.

4.3.3.1 Phragmites australis moist grassland.

The Alternative Layout powerline traverse three (3) areas where the tall growing grass *Phragmites australis* formed dominant stands in permanently wet areas, and the Preferred Layout, only two (2) such areas. The reed *Typha capensis* was also present at the most eastern *P australis* moist grassland, traversed only by the Alternative Layout powerline, where a population of the orchid *Habenaria schimperiana* were recorded (Photograph 12).

Photograph 12: *P australis* moist grassland just north of 17th Road. This small patch also supported the provincially protected orchid *Habenaria schimperiana* and could be impacted on by the eastern extent of the Alternative Layout Powerline route

A dammed tributary of the Withokspruit will be traversed by the route. The tributary comprised several dams associated with the historic mining north thereof and *P australis* were present on dominant stands (Photograph 13).

Photograph 13: *P australis* moist grassland south-west of the proposed PV facility site

The most southern tip of the powerline is within a disturbed area, adjacent to a mine dump. Here the permanently wet areas are densely vegetated by *P australis*. *Phragmites* plays an important role in wetlands, particularly disturbed or impacted wetlands as it has an extensive root system that binds soils and prevent erosion. It can withstand high levels of environmental contamination and can assimilate heavy metals, nitrogen and phosphorous (Tarr, 2006). The temporarily wet areas around the *P australis* were dominated by the grasses *Cynodon dactylon* and *Eragrostis plana,* with patchy occurrence of sedges such as *Juncus effusus* and *Cyperus congestus* (Table 11).

Table 11: Summary of the prominent and dominant species associated in the *P autralis* moist grassland along the powerline route (Appendix B)

Dominant taxa recorded during the site visit
Permanently wet areas Grasses: *Phragmites australis, Cynodon dactylon, Eragrostis plana, Paspalum dilatatum* Sedges: *Juncus effusus, Pycreus macranthus, Cyperus congestus, C esculentus* Forbs: *Conyza podocephala, Berkheya radula*
Species richness (indigenous species) at the time of the site visits
Grasses: 6 Forb species: 4 Sedges: 2
Protected or threatened plant species
A population of the provincially protected orchid, *Habenaria schimperiana* was recorded adjacent to 17th Road
Alien and/or invasive plant species
Verbena species
Ecological function
• Soil stabilization • Water purification

4.3.3.2 Eragrostis plana dominated moist grassland

The proposed powerline route traverses the Withokspruit in its southern extent. The edges of the moist areas were dominated by *Eragrostis plana* (tough love grass) and *Cynodon dactylon* (couch grass) (Photograph 14; Table 12). This vegetation group was similar as the *Eragrostis plana* moist grassland at

the proposed PV facility site, however, a higher species diversity was recorded. Sedges such as *Juncus effusus* and *Cyperus congestus* occurred and the forbs *Berkeya radula, Nidorella anomala, Senecio gregatus* and *Stoebe plumosa (*bankrupt bush) were common.

No plant species of conservation concern were observed, although this moist grassland is in a semi-natural condition and could support such species.

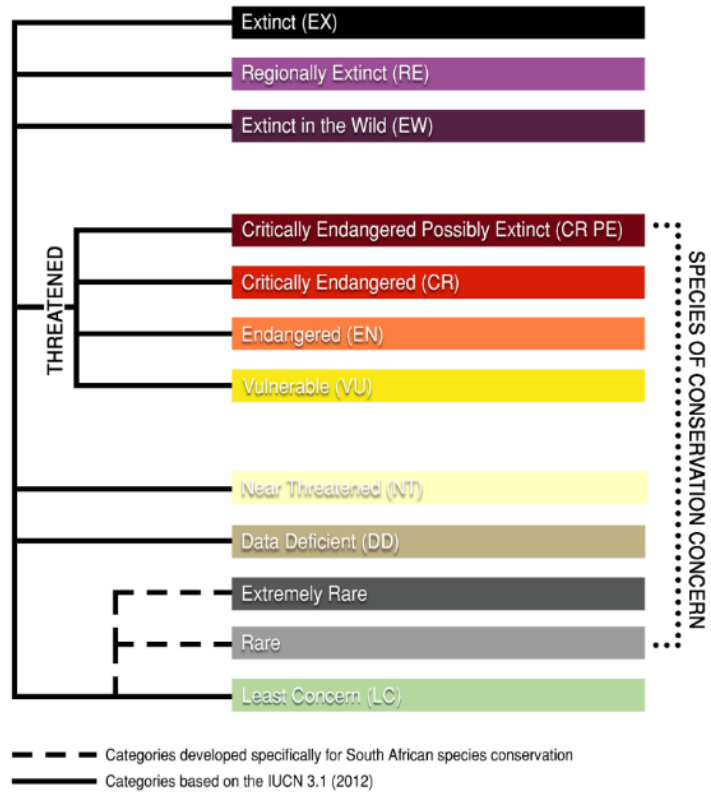
Photograph 14: *Eragrostis plana* moist grassland along the Withokspruit

Table 12: Summary of the prominent and dominant species associated in the *E plana* moist grassland along the powerline route (Appendix B)

Dominant taxa recorded during the site visit
Permanently wet areas Grasses: *Cynodon dactylon, Eragrostis plana, Paspalum* dilatatum, *Themeda triandra, Eragorsits gummiflua, Phragmites* species Sedges: *Juncus dregeanus, Juncus effusus, Pycreus macranthus, Typha capensis* Forbs: *Nidorella anomala, Berkheya radula, Senecio* cf *innornatus*
Species richness (indigenous species) at the time of the site visits
Grasses: 6 Forb species: 6 Sedges: 4
Protected or threatened plant species
None recorded, although this moist grassland provides suitable habitat to several species
Alien and/or invasive plant species
Verbena species, *Schkuhria pinnata, Eucalyptus* species, *Acacia dealbata*
Ecological function
• Soil stabilization • Water purification

3.4 Plant Species of Conservation Concern (PSCC)

Plants of conservation concern are those plants that are important for South Africa's conservation decision making processes and include all plants that are Threatened, Extinct in the wild, Data deficient, Near-threatened, Critically rare, Rare and Declining (Figure 13). Chapter 4, Part 2 of NEMA Biodiversity Act, 2004 (Act No. 10, 2004) provides for listing of species that are threatened or in need of protection to ensure their survival in the wild, while regulating the activities, including trade, which may involve such listed threatened or protected species and activities which may have a potential impact on their long-term survival.



(Source: http://redlist.sanbi.org/redcat.php)

Figure 13: Threatened species and species of conservation concern

A list of plants of conservation concern was compiled using information from the South African National Biodiversity Institute's (SANBI) checklist (SANBI, 2009), Raimondo *et al*, (2009) and information received from the Gauteng Department of Agriculture and Rural Development (GDARD) for the quarter degree square (qds) 2628AD. Appendix B list the species that was historically recorded in the area.

No plant species of conservation concern was recorded at the site proposed for the PV Facility and due to the historic land use and secondary nature of the vegetation, no such species are expected to be present.

Suitable habitat for plant species of conservation concern is present within the rocky grassland and *Eragrostis plana* moist grassland along the powerline route. One individual of *Boophone distichia*, classified as Declining in Gauteng, was recorded about 37m east of the proposed route, in rocky grassland At 26° 19.193'S; 28° 20.783'E). The plant was situated on the opposite side of the slurry pipeline as the proposed powerline route. It is therefore not considered threatened by the proposed route, however, edge effects may have an impact.

No other plant species of conservation concern were recorded in walked transects at the area where the powerline is proposed to traverse the moist grassland. Ideally, the powerline should span moist grassland areas to limit the potential of such species being impacted on. The findings of the site visit, and modified nature of the vegetation, does not warrant a terrestrial plant species assessment as the probability of other species listed in Appendix C occurring is considered low. If mitigation measures are implemented to keep disturbances within the secondary grasslands and prevent impacts to moist grasslands, the probability of impacting on such species if they occur is low.

3.5 Protected plants

3.5.1 NEMBA Threatened or Protected Plant Species (TOPS)

No TOP species were recorded or are expected to be present on the proposed PV facility site or along the powerline route. Chapter 4, Part 2 of the National Environmental Management: Biodiversity Act (No. 10 of 2004), (NEMBA) provides for listing of plant and animal species as threatened or protected. If a species is listed as threatened, it must be further classified as Critically Endangered, Endangered or Vulnerable. These species are commonly referred to as TOPS listed. The Act defines these classes as follows:

- Critically endangered species: any indigenous species facing an extremely high risk of extinction in the wild in the immediate future.
- Endangered species: any indigenous species facing a high risk of extinction in the wild soon, although it is not a critically endangered species.
- Vulnerable species: any indigenous species facing an extremely high risk of extinction in the wild in the medium-term future; although it is not a critically endangered species or an endangered species.
- Protected species: any species which is of such high conservation value or national importance that it requires national protection. Species listed in this category will include, among others, species listed in terms of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Certain activities, known as 'Restricted Activities', are regulated on listed species using permits by a special set of regulations published under the Act. Restricted activities regulated under the act are keeping, moving, having in possession, importing and exporting, and selling. The first list of threatened and protected species published under NEMBA was published in the government gazette on the 23rd of February 2007 along with the Regulations on Threatened or Protected Species.

3.5.2 Provincially Protected Plants

Several provincially protected plants are listed in the Transvaal Nature Conservation Ordinance Act No. 12 of 1983. These plants are not to be removed, damaged, or destroyed without permit authorisation from Gauteng Department of Agriculture and Rural Development (GDARD). The table below list the provincially protected species recorded. These species were only recorded along the eastern extent of the Alternative Layout powerline route and can be avoided by approving the Preferred Layout powerline route. If these species can not be avoided, ensure that a permit or the authorization for this project, allows for the removal or damage to these species.

Table 13: Provincially protected species recorded on the site.

Species or genus protected	General occurrence on the site / along the powerline route (Figure 14)
Gladiolus crassifolius (all Gladioli naturally occurring in Gauteng are protected)	Rocky grassland, south of Ergo Central 88/6.6kV substation and north of Withokspruit. This species occurs scattered in grasslands and was not mapped. Prevent edge effects into rocky grassland to prevent impact on this species.
Habenaria humilior (all orchids naturally occurring in Gauteng are protected)	Rocky grassland, south of 17th Road and on the 50m buffer at 26° 16.984'S; 28° 22.692'E
Habenaria schimperiana (all orchids naturally occurring in Gauteng are protected)	*Phragmites australis* moist grassland east of the proposed PV facility plant. This orchid is growing adjacent to 17th Road at 26° 17.347'S; 28° 22.270'E

3.5 Alien Invasive Plant Species

Declared weeds and invader plant species have the tendency to dominate or replace the canopy or herbaceous layer of natural ecosystems, thereby transforming the structure, composition and function of natural ecosystems. Therefore, it is important that these plants are controlled and eradicated by means of an eradication and monitoring programme. Some invader plants may also degrade ecosystems through superior competitive capabilities to exclude native plant species (Henderson, 2001).

The National Environmental Management: Biodiversity Act (NEMBA) is the most recent legislation pertaining to alien invasive plant species. In August 2020 the list of Alien Invasive Species was published in terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004) (Government Gazette No 78 of 2014). The Alien and Invasive Species Regulations were published in the Government Gazette No. 37886, 1 August 2014. The legislation calls for the removal and / or control of alien invasive plant species (Category 1 species). In addition, unless authorised thereto in terms of the National Water Act, 1998 (Act No. 36 of 1998), no land user shall allow Category 2 plants to occur within 30 meters of the 1:50 year flood line of a river, stream, spring, natural channel in which water flows regularly or intermittently, lake, dam or wetland. Category 3 plants are also prohibited from occurring within proximity to a watercourse.

Below is a brief explanation of the three categories in terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEMBA):

Category 1a: Invasive species requiring compulsory control. Remove and destroy. Any specimens of Category 1a listed species need, by law, to be eradicated from the environment. No permits will be issued.

Category 1b: Invasive species requiring compulsory control as part of an invasive species control programme. Remove and destroy. These plants are deemed to have such a high invasive potential that infestations can qualify to be placed under a government sponsored invasive species management programme. No permits will be issued.

Category 2: Invasive species regulated by area. A demarcation permit is required to import, possess, grow, breed, move, sell, buy or accept as a gift any plants listed as Category 2 plants. No permits will be issued for Category 2 plants to exist in riparian zones.

Category 3: Invasive species regulated by activity. An individual plant permit is required to undertake any of the following restricted activities (import, possess, grow, breed, move, sell, buy or accept as a gift) involving a Category 3 species. No permits will be issued for Category 3 plants to exist in riparian zones.

The alien plant species identified on the study site are listed in Appendix B. Note that according to the regulations, a person who has under his or her control a category 1b listed invasive species must immediately:

(a) notify the competent authority in writing

(b) take steps to manage the listed invasive species in compliance with

(i) section 75 of the Act;

(ii) the relevant invasive species management programme developed in terms of regulation 4; and

(iii) any directive issued in terms of section 73(3) of the Act.

The following category 1b plants were observed along the powerline route and at the PV facility site – the infestation levels are regarded as low.

Table 14: Category 1b invasive plant species and the vegetation group(s) it was recorded in

Species	Common name	Vegetation groups
Araujia sericifera	Moth catcher	Rocky grassland
Arundo donax	Giant Reed	Historically mined areas, built-up & modified
Cereus hildmannianus / jamacaru	Queen of the night	*Hyparrhenia hirta* grassland, south of 17th Road
Datura stramonium (M)	Thorn-apple	*Hyparrhenia hirta* grassland (Ergo substation)
Eucalyptes species	Bluegums	*Hyparrhenia hirta* grassland and moist grasslands
Mirabilis jalapa	Four-o'clocks	*Hyparrhenia hirta* grassland, south of 17th Road
Robinia pseudoacacia	Black Locust Tree	*Hyparrhenia hirta* grassland, south of 17th Road
Solanum sisymbrifolium	Wild Tomato	Scattered through secondary grasslands

5. SITE ECOLOGICAL IMPORTANCE

It has been clearly demonstrated that vegetation not only forms the basis of the trophic pyramid in an ecosystem, but also plays a crucial role in providing the physical habitat within which organisms complete their life cycles (Kent & Coker 1992). Therefore, the vegetation of an area will largely determine the ecological sensitivity thereof.

5.1 Rating and Analysis

The Site Ecological Importance (SEI) in terms of vegetation is discussed and mapped as per the requirements of the Draft Species Environmental Assessment Guideline (SANBI, 2020) and detailed in the methodology section (Section 2.5).

SEI is a function of the (BI) of the receptor (e.g. species of conservation concern, the vegetation/fauna community or habitat type present on the site13) and its resilience to impacts () as follows:

SEI = Biodiversity Importance (**BI) +** Receptor Resilience **(RR)**

Wherein **BI** in turn is:

BI = Conservation Importance (**CI) +** Functional Integrity (**FI)**

Table 15: Scoring of vegetation that occurs within the PAOI

Broad vegetation community		Conservation Importance (CI)	Functional Integrity (FI)	Receptor Resilience (RR)	Biodiversity Importance (BI)	Site Ecological Importance (SEI) – mitigation
Secondary grasslands	Secondary *Hyparrhenia hirta* grasslands	Very -low	Medium	High	Very-low	**Very-low (Minimise & Restore)**
	Secondary *Eragrostis plana-Cynodon dactylon* grassland.	Very -low	Medium	High	Very-low	**Very-low (Minimise & Restore)**
	Secondary *Cynodon dactylon* grassland	Very -low	Medium	High	Very-low	**Very-low (Minimise & Restore)**
Modified vegetation	*Cynodon-Cortaderia* modified vegetation	Very -low	Low	High	Very-low	**Very-low (Minimise & Restore)**

Broad vegetation community		Conservation Importance (CI)	Functional Integrity (FI)	Receptor Resilience (RR)	Biodiversity Importance (BI)	Site Ecological Importance (SEI) – mitigation
Rocky grassland	**Rocky grassland**	Very high (threatened ecosystems)	Medium	Medium	High	**High (Avoid & Minimise)**
Moist grassland	***Eragrostis plana* moist grassland: PV Facility**	Low	Medium	Medium	Low	**Low (Minimise & Restore)**
	***Phragmites australis* moist grassland**	High (threatened ecosystems)	Medium	Medium	Medium	**Medium (Minimise & Restore)**
	***Eragrostis plana* moist grassland: powerline**	Very high (threatened ecosystems)	Medium	Medium	High	**High (Avoid & Minimise)**

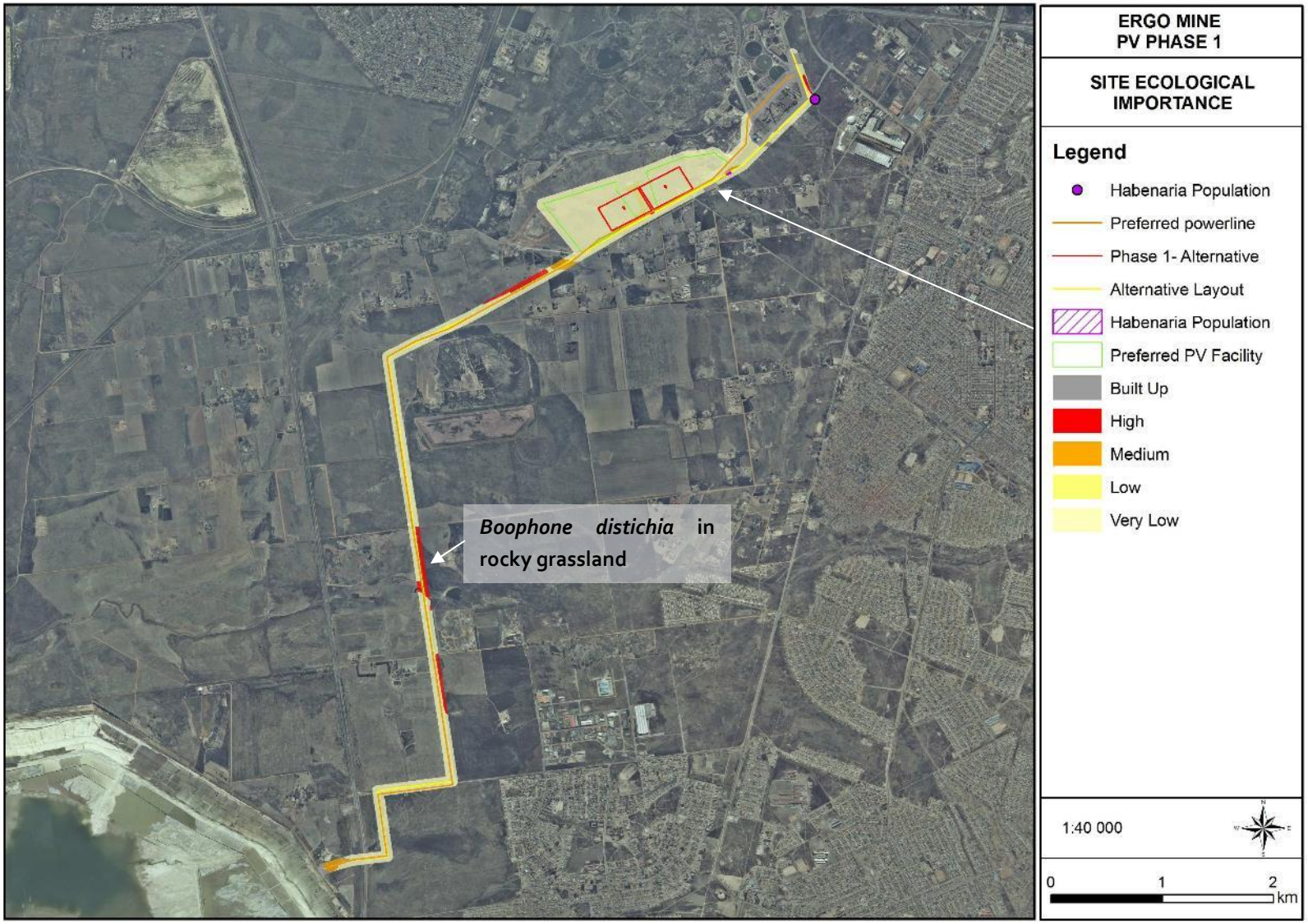


Figure 14: Site Ecological Sensitivity for the proposed site and powerline route, including a 100m buffer

5.2 Discussion of SEI results

The interpretation of the SEI ranks is described in Section 2: Methodologies; Table 4. The SEI rating was utilised to generate the vegetation sensitivity map (Figure 14). This map must be considered along with the fauna sensitivity map and wetland map to obtain an overall sensitivity map.

5.2.1 High SEI

The powerline stretches over the Critically Endangered Klipriver Highveld Grassland ecosystem, the Endangered Tsakane Clay Grassland ecosystem, and the Vulnerable Soweto Highveld Grassland. The proposed site for the PV facility falls within the Critically Endangered Klipriver Highveld Grassland ecosystem. However, limited natural vegetation within either of these ecosystems remain along the powerline route and none on the site proposed for the PV facility.

The semi-natural to natural rocky grassland and *Eragrostis plana* moist grassland vegetation along the powerline route should be regarded as sensitive and avoided where possible. As per the GDARD sensitivity mapping rules, all good condition grassland must be regarded as sensitive (GDARD, 2012). In addition, the remaining natural vegetation falls within CBAs: Important and provide suitable habitat for plant species of conservation concern. The watercourse and associated wetland / moist grassland areas are protected by the National Water Act.

Avoidance mitigation must be implemented wherever possible, e.g. span the moist grasslands. Changes to project infrastructure design should be allowed to limit the amount of habitat impacted on. The rocky grassland will not be directly affected by the proposed route; however, edge effects must be mitigated.

5.2.2 Medium SEI

The *Phragmites australis* moist grasslands have been impacted on by mining activities. Although the species diversity has been compromised, the vegetation function remains largely intact. These moist grasslands are more resilient to impacts but should ideally be spanned by the powerline. Development must be restricted in footprint and impacts managed and mitigated by an approved management plan.

5.2.3 Low and very-low SEI

The secondary grasslands and modified vegetation on the proposed PV facility site and along the proposed powerline route are not representative of the natural state and comprise of a low species diversity with no plant species of conservation concern present or likely to be present. Development activities of medium to high impact are acceptable followed by appropriate restoration activities. Edge effects must be prevented.

The *Eragrostis plana* moist grassland on the proposed PV facility site are likely artificial. However, it does have a functional role in pollution and erosion control. No plant species of conservation concern were

recorded or are expected to be present. The wetland report should be consulted, and mitigation measures as set out by the wetland specialist should be adhered to for this moist grassland area.

6. IMPACT ASSESSMENT AND MITIGATION

Mankind depends on the natural environment for many ecological services provided for by ecosystems, ecological processes, and plant species in general. However, any development activities in natural systems will impact on the surrounding natural environment and usually in a negative way. To limit or negate these impacts, the source, extent, duration, and intensity of the possible impacts needs to be identified. Once the significance of the impacts is understood, the development could both adequately plan for and mitigate these impacts to a best practise and acceptable level. However, if the impacts are significant, especially in already threatened ecosystems and vegetation units, and no adequate mitigation measures could reduce or avert these impacts, then the development should not be allowed to proceed.

6.1 Impact statement and recommendation

Due to the largely modified and secondary nature of the vegetation, the proposed development of the PV facility, as well as either of the proposed powerline route, will have a limited impact on sensitive vegetation. The extent of the powerline routes, as well as the PV facility, are within 15m of existing tar and dirt roads. Most of the powerline route follows the slurry pipes and its existing service road. Therefore, no additional access roads are needed, further limiting the proposed developments impacts on vegetation.

PV facility:

Much of the vegetation on the PV facility site is modified and of a low sensitivity. The moist grassland section on the PV facility site is classified as low due to its secondary nature. However, the results and recommendation as set out by the wetland assessment should take precedence of the sensitivity classification in this report.

Powerline:

Most of the vegetation along the proposed powerline route is modified and in a secondary state. Sensitive moist grassland areas along the route are relatively narrow and should be spanned by the powerlines. The sensitive rocky grassland will not be traversed by the proposed powerline route; however, the rocky grassland is within 50m of the route and these areas should be avoided and not used for construction camps, laydown areas or parking.

Provincially protected plant species were only recorded along the eastern extent of the Alternative Layout powerline route and can be avoided by approving the Preferred Layout powerline route. If these

species can not be avoided, ensure that a permit or the authorization for this project, allows for the removal or damage to these species.

6.2 Impact Assessment Criteria

The possible impacts, as described in the next section, were assessed based on the Significance Rating as received from Environmental Management Assistance. The Significance of the impact is calculated as follows and rating significance is explained below:

Significance = Consequence *(Extent + Duration+ Magnitude)* **X Probability**

I. The **nature,** which shall include a description of what causes the effect, what will be affected and how it will be affected.

II. The **extent,** wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):

III. The **duration,** wherein it will be 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; or
- permanent - assigned a score of 5;

IV. The **consequences (magnitude),** quantified on a scale from 0-10, where
- 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), and
- 10 is very high and results in complete destruction of patterns and permanent cessation of processes.

V. The **probability** of occurrence, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1–5, where
- 1 is very improbable (probably will not happen),
- 2 is improbable (some possibility, but low likelihood),
- 3 is probable (distinct possibility),
- 4 is highly probable (most likely) and
- 5 is definite (impact will occur regardless of any prevention measures).

VI. The significance, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high; and

VII. The **status,** which will be described as either positive, negative or neutral.

VIII. The degree to which the impact can be reversed.

IX. The degree to which the impact may cause irreplaceable loss of resources.

X. The degree to which the impact can be mitigated.

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).

6.3 Impact Assessments

The tables below list the activities that could impact on the vegetation due to the proposed development on the site. The tables also list recommended mitigation measures to limit the impacts.

6.3.1 Destruction of natural vegetation of high sensitivity (rocky grassland and moist grasslands)

Activity:	Clearing of vegetation at construction footprints				
Impact:	Destruction of natural vegetation (rocky grassland and moist grassland): • Edge effects e.g. heavy vehicles turning in adjacent areas; and • Storage of equipment within vegetation				
Significance rating:	**Duration**	**Extent**	**Magnitude**	**Probability**	**Significance**
Pre-Mitigation	2	2 Site and surrounds	8	4	**48 Medium**
Post-Mitigation	2	1 Site	4	3	**21 Low**
Is the Impact Reversible?	• Yes, the modified vegetation is in a secondary state and can be rehabilitated to that state				
Mitigation Measures:	*Planning:* • Do not plan any construction camps, tower positions or laydown areas within the sensitive moist grassland and rocky grassland vegetation. • Plan tower position to span the moist grasslands – follow recommendations and buffers as set out by the wetland specialist for wetlands and watercourses. *Construction:* An independent Ecological Officer (EO) should be appointed to oversee construction.				

	• A temporary fence or demarcation must be erected around the construction area (include the servitude, construction camps, areas where material is stored and the actual footprint of the development) to prevent access to sensitive environs. • Prohibit vehicular or pedestrian access into natural areas beyond the demarcated boundary of the construction area. • No open fires are permitted within naturally vegetated areas. • Make use of existing roads and tracks. • Do not dump litter or material within any vegetated aeras. *Operation and Maintenance:* • After construction, the land must be cleared of rubbish (refuse, waste material and litter), surplus materials, and equipment, and all parts of the land must be left in a condition as close as possible to that prior to construction. • Ensure that maintenance work does not take place haphazardly, but according to a fixed plan. • Maintenance workers may not trample natural vegetation and work should be restricted to previously disturbed footprint. • Address erosion, applying soil erosion control and bank stabilisation procedures as needed.
Cumulative impacts:	• Degradation of watercourses. • Increase in similar developments.
Residual impacts:	• Trampling of rocky grassland and moist grassland vegetation. • Degradation due to edge effects • Localized alteration of soil surface characteristics and loss of flora, possible increased fragmentation of remaining natural grassland If mitigation measures are adequately undertaken, the residual risk is considered to be low.
Climate Change:	• NA

6.3.2 Destruction of modified vegetation of low sensitivity

Activity:	Clearing or disturbance to vegetation at construction footprints
Impact:	Destruction of modified vegetation: • Clearing of and damage to vegetation in construction footprint, access roads, construction camps, vehicle / machinery traffic and trampling by workers • Illegal disposal and dumping of construction material such as cement or oil, as well as maintenance materials during construction; • Edge effects e.g. heavy vehicles turning in adjacent areas; • Storage of equipment within vegetation; and

<table>
<tr><td></td><td colspan="5">• Maintenance vehicles driving within natural or rehabilitated vegetation, not impacted on during the construction, will lead to the destruction of naturally occurring vegetation and compaction of soils and subsequent erosion or colonisation by alien invasive plant species. In addition, failed rehabilitation could lead to soil erosion during rainfall events and flooding</td></tr>
<tr><td>Significance rating:</td><td>Duration</td><td>Extent</td><td>Magnitude</td><td>Probability</td><td>Significance</td></tr>
<tr><td>Pre-Mitigation</td><td>2</td><td>2 Site and surrounds</td><td>4</td><td>5</td><td>40 Medium</td></tr>
<tr><td>Post-Mitigation</td><td>2</td><td>1 Site</td><td>2</td><td>5</td><td>25 Low</td></tr>
<tr><td>Is the Impact Reversible?</td><td colspan="5">• Impact on rocky- and moist grassland is difficult to rehabilitate and therefore must be avoided</td></tr>
<tr><td>Mitigation Measures:</td><td colspan="5">Planning:
• Keep the development footprint as small as possible to make sure the vegetation remains functional. This will ensure that the surrounding vegetation can serve as a seedbank for the disturbed areas.

Construction:
An independent Ecological Officer (EO) should be appointed to oversee construction.
• Keep the development footprint as small as possible.
• A temporary fence or demarcation must be erected around the construction area (include the servitude, construction camps, areas where material is stored and the actual footprint of the development) to prevent access to sensitive environs.
• Prohibit vehicular or pedestrian access into natural areas beyond the demarcated boundary of the construction area.
• No open fires are permitted within naturally vegetated areas.
• Make use of existing roads and tracks where feasible, rather than creating new routes through naturally vegetated areas.
• A vegetation rehabilitation plan should be implemented at the start of construction. The modified grassland can be removed as sods and stored within modified areas – remove alien invasive vegetation prior to storing grasslands sods in transformed areas. The sods must preferably be removed during the winter months and be replanted by latest springtime. The sods should not be stacked on top of each other. Once construction is completed, these sods should be used to rehabilitate the disturbed areas from where they have been removed. In the absence of timely rainfall, the sods should be watered well after planting and at least twice more over the next 2 weeks.
• Grass species, typical of the Highveld Grasslands can be sown in prepared soils. Revegetation should take place successively to re-</td></tr>
</table>

	establish vegetation as soon as possible after construction in a specific area. • Construction workers may not remove flora and neither may anyone collect seed from the plants without permission from the local authority. • Where topsoils need to be removed, store such in a separate area where such soils can be protected until they can be re-used for post-construction rehabilitation. o Never mix topsoils with subsoils or other spoil materials • Maintain site demarcations in position until the cessation of construction work. • After construction, the land must be cleared of rubbish, surplus materials, and equipment, and all parts of the land must be left in a condition as close as possible to that prior to construction. *Operation and Maintenance:* • After construction, the land must be cleared of rubbish (waste material, refuse or litter), surplus materials, and equipment, and all parts of the land must be left in a condition as close as possible to that prior to construction. • Ensure that maintenance work does not take place haphazardly, but according to a fixed plan. • Maintenance workers may not trample natural vegetation and work should be restricted to previously disturbed footprint. • Address erosion, applying soil erosion control and bank stabilisation procedures as needed. • Cordon off areas that are under rehabilitation as no-go areas using danger tape and steel droppers. If necessary, these areas should be fenced off to prevent vehicular, pedestrian and livestock access. • Delay the re-introduction of livestock (where applicable) to all rehabilitation areas until an acceptable level of re-vegetation has been reached.
Cumulative impacts:	• Degradation of watercourses. • Increase in similar developments.
Residual impacts:	• Degradation due to edge effects • Localized alteration of soil surface characteristics and loss of flora, possible increased fragmentation of remaining natural grassland If mitigation measures are adequately undertaken, the residual risk is low.
Climate Change:	• NA

6.3.3 Exposure to erosion and subsequent sedimentation or pollution of proximate moist grassland

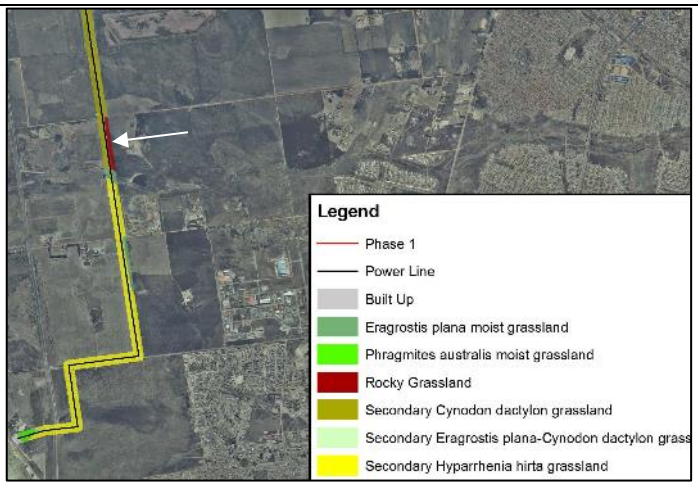
Activity:	Clearing of vegetation at construction footprints, access roads and lack of rehabilitation. Possible impacts can arise during maintenance.				
Impact:	The removal of surface vegetation will expose the soils, which in rainy events would wash down into moist grasslands and rivers, causing sedimentation. In addition, indigenous vegetation communities are unlikely to colonise eroded soils successfully and seeds from proximate alien invasive plant species can spread easily into these eroded soils. After construction, a lack of rehabilitation or failed rehabilitation will result in bare soils that are susceptible to erosion. Furthermore, maintenance vehicles could disturb rehabilitated areas which could lead to soil erosion, habitat modification, trampling of vegetation as well as the destruction of protected plants and plants of conservation concern. The sources of this impact include: • Removal of vegetation upslope of the moist grassland, without proper rehabilitation or failure of rehabilitation; • Access roads, especially on slopes, channels rainfall and causes erosion; • Maintenance vehicles disturbing rehabilitated areas; • Spillages of construction material and harmful chemicals; and • Failure of rehabilitation of the construction footprint.				
Significance rating:	**Duration**	**Extent**	**Magnitude**	**Probability**	**Significance**
Pre-Mitigation	2	2 Site and surrounds	8	4	**48 Medium**
Post-Mitigation	2	1 Site	4	3	**21 Low**
Is the Impact Reversible?	• Yes, however, rehabilitation activities are costly				
Mitigation Measures:	*Planning:* • Avoid placing pylons within wetlands and wetland buffers as delineated by a wetland specialist. • Where possible, no construction / activities should be undertaken within the moist grasslands. The extent of wetland conditions should be verified by a wetland specialist and no activities should take place within these areas without that a Water Use License was granted by the Department of Water and Sanitation (DWS) for these activities. *Construction:* • Do not allow erosion to develop on a large scale (e.g. beyond the initial onset of erosion) before acting. • Make use of existing roads and tracks where feasible, rather than creating new routes through grassland areas.				

	• Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction / earthworks in that area (DWAF, 2005). • Runoff from roads must be managed to avoid erosion and pollution problems. • Remove only the vegetation where essential for construction and do not allow any disturbance to the adjoining natural vegetation cover. The grassland can be removed as sods and re-established after construction is completed. • Colonisation of the disturbed areas by plants species from the surrounding natural vegetation must be monitored to ensure that vegetation cover is sufficient within one growing season. If not, then the areas need to be rehabilitated with a grass seed mix containing species that naturally occur within the study area. • Protect all areas susceptible to erosion and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and work areas. • Prevent spillage of construction material, oils or other chemicals, strictly prohibit other pollution. Ensure there is a method statement in place to remedy any accidental spillages immediately. • After construction clear any temporarily impacted areas of all foreign materials, re-apply and/or loosen topsoils and landscape to surrounding level. *Operation and Maintenance:* • Do not disturb soil unnecessary during maintenance. • Ensure maintenance work does not take place haphazardly, but according to a fixed plan. • Cordon off areas that are under rehabilitation as no-go areas using danger tape and steel droppers. If necessary, these areas should be fenced off to prevent vehicular, pedestrian and livestock access. • Monitor rehabilitation and ensure that rehabilitated areas do not erode. • If monitoring finds that indigenous vegetation from the surrounding grasslands is not colonising the site, implement a re-vegetation plan to ensure that grass species that naturally occur in the Eastern Highveld Grassland, are sowed to re-establish indigenous plant cover. • Monitor rehabilitation and delay the re-introduction of livestock (where applicable) to all rehabilitated areas until an acceptable level of re-vegetation has been reached. • Maintenance workers may not trample natural vegetation and work should be restricted to previously disturbed footprint. In addition,

	mitigation measures as set out for the construction phase should be adhered to.
Cumulative impacts:	• Erosion of the development footprint upslope from the moist grasslands could increase sedimentation in already degraded watercourses in the area. However, this could be mitigated. • Possible erosion of areas lower than the access roads, possible contamination of wetlands and/or groundwater reserves due to hydrocarbon or other spillage and an increase of modified areas (together with surrounding developments) that will affect flora population dynamics and runoff patterns
Residual impacts:	• A risk that heavy rain and flooding could erode the base of pylons, or the subsequent removal or destruction of the vegetation by other land uses do remain.
Climate Change:	• Loss of biodiversity and soil condition that buffer climate change

6.3.4 Removal / Destruction of protected plants and plants of conservation concern

Activity:	Construction and possibly maintenance				
Impact:	The construction of the powerline could impact on provincially protected plants, impact on their habitat, pollinators and inevitably the persistence of these species.				
Significance rating:	**Duration**	**Extent**	**Magnitude**	**Probability**	**Significance**
Pre-Mitigation	2	2 Site and surrounds	8	4	**48 Medium**
Post-Mitigation	2	1 Site	4	3	**21 Low**
Is the Impact Reversible?	Yes, however, rehabilitation activities are costly and species such as *Habenaria* does not replant well				
Mitigation Measures:	*Planning:* • The Preferred Layout should be approved, as the powerline will not traverse confirmed localities of three (3) provincially protected plants in its eastern extent as does the Alternative Layout. • Avoid natural vegetation (rocky and moist grasslands) that can house plant species of conservation concern. • The rocky grassland habitat of *Boophone distichia* at 26° 19.193'S; 28° 20.783'E, should be protected and edge effects to this area prevented. This area is east of the existing slurry pipeline and dirt road, whereas the proposed powerline is west thereof.				

	 • If the Alternative Layout is approved: ○ Span areas where the *Habenaria schimperiana* species were confirmed to occur in the *Phragmites australis* moist grassland at 26° 17.347'S; 28° 22.270'E ○ Prevent edge effects to the population of *Haberania humilior* in the rocky grassland at :26° 16.984'S; 28° 22.692'E ○ If these species can not be avoided, ensure that a permit or the authorization for this project, allows for the removal or damage to these species. *Construction:* • The EO should take note of any unearthed geophytes or orchids and contact a specialist for the correct naming and threat status of the species. This will determine whether any follow-up action is required.
Cumulative impacts:	• If mitigation measures are adequately implemented, no cumulative impacts are expected.
Residual impacts:	• Trampling during maintenance
Climate Change:	• NA

6.3.5 Potential increase in invasive vegetation

Activity:	Disturbed soils due to construction and trampling
Impact:	The seed of alien invasive plant species that occur on and in the vicinity of the construction areas could spread into the disturbed and stockpiled soil. Also, the construction vehicles and equipment were likely used on various other sites and could introduce alien invasive plant seeds or indigenous plants not belonging to this vegetation unit to the construction site. In addition, if

	rehabilitation of the indigenous vegetation along the route are unsuccessful or is not enforced, exotic and invasive vegetation may invade the area.				
Significance rating:	**Duration**	**Extent**	**Magnitude**	**Probability**	**Significance**
Pre-Mitigation	2	2 Site and surrounds	6	4	**40 Medium**
Post-Mitigation	2	1 Site	4	3	**21 Low**
Is the Impact Reversible?	Yes, however, rehabilitation activities are costly and can take several years to clear invasive species and destroy their seedbank.				
Mitigation Measures:	*Planning:* • Alien invasive species, in particular category 1b species that were identified within the study area (Table 9; Appendix B), should be removed from the development footprint and immediate surrounds, prior to construction or soil disturbances. By removing these species, the spread of seeds will be prevented into disturbed soils which could thus have a positive impact on the surrounding natural vegetation. • Manual removal is preferred to chemical control, particularly in the moist grassland. • Only suitably trained contractors (e.g. certified by the South African green Industries Council (SAGIC)) with knowledge of the species in question should be employed. • All alien seedlings and saplings must be removed as they become evident for the duration of construction. • All construction vehicles and equipment, as well as construction material should be free of plant material. Therefore, all equipment and vehicles should be thoroughly cleaned prior to access on to the construction areas. This should be verified by the ECO. • If filling material is to be used, this should be sourced from areas free of invasive species. *Construction:* • Implement an alien invasive plant monitoring and management plan whereby the spread of alien and invasive plant species into the areas disturbed by the construction are regularly removed and re-infestation monitored.				
Cumulative impacts:	• Several invasive species are present within the area that the proposed development is situated in. Therefore, if mitigation measures to limit and prevent the spread of alien species are not implemented, the cumulative impact could lead to remaining natural vegetation transformed by alien plant species.				
Residual impacts:	• Re-infestation in areas initially cleared.				

Climate Change:	• Loss of biodiversity that buffer climate change

6.3.4 Compaction and destruction of soils

Activity:	Clearing of vegetation and soil disturbance.				
Impact:	The movement of heavy machinery over vegetated areas during construction and maintenance will result in soil compaction that will modify habitats, destroy vegetation, and inhibit re-vegetation. Soil compaction because of vehicles and traffic, could lead to a decrease of water infiltration and an increase of water runoff. Such areas are more likely to be colonised by pioneer, alien invasive plant species, than indigenous species. This will further transform the vegetation of the area. The health of the topsoil is imperative for re-vegetation. Incorrect stripping, handling and storage could lead to failed rehabilitation.				
Significance rating:	**Duration**	**Extent**	**Magnitude**	**Probability**	**Significance**
Pre-Mitigation	2	2 Site and surrounds	8	4	**48 Medium**
Post-Mitigation	2	1 Site	4	3	**21 Low**
Is the Impact Reversible?	• Yes.				
Mitigation Measures:	*Construction:* • Vehicles and machinery may not veer from the dedicated roads. • Stringing must avoid trampling of grasslands e.g. aim to limit traffic in the vegetation under the powerline by only allowing necessary movement. • Once construction is complete, obsolete roads should be obliterated by breaking the surface crust and erecting earth embankments to prevent erosion, while the natural species composition should be re-established. • Prior to construction, the topsoil must be removed and stored separately from subsoil. The topsoil is imperative for the successful re-establishment of indigenous vegetation and it carries seed from the existing vegetation. • Topsoil (the upper 25 cm of soil) is an important natural resource; where it must and can be stripped, never mix it with subsoil or any other material, store and protect it separately until it can be re-applied, minimise handling of topsoil. • Topsoil is typically stored in berms with a width of 150 – 200 cm, and a maximum height of 100 cm, preferably lower, ideally in a disturbed but weed-free area. Place berms along contours or perpendicular to the prevailing wind direction.				

	• Rapid decomposition of organic material in warm, moist topsoils decreases microbial activity necessary for nutrient cycling, and reduces the number of beneficial micro-organisms in the soil. Therefore, topsoil should therefore not be stored for extensive periods and it is recommended that the reapplication of topsoil takes place as soon as possible. Adhere to the following general rule: *the larger the pile of topsoil storage needs to be, the shorter should be the time it is stored* • Topsoil handling should be limited to stripping, piling (once), and re-application. • Any movement of heavy machinery or vehicles over stored topsoils must be strictly prohibited. *Maintenance:* • Maintenance vehicles may not deviate from dedicated roads.
Cumulative impacts:	• Failed rehabilitation and soil compaction could lead to a cumulative invasion by alien invasion plant species from the surrounding transformed vegetation that can easily spread into the compacted soils.
Residual impacts:	• Altered soil characteristics and vegetation that remain in an unstable, pioneer phase or invaded by alien invasive plant species.
Climate Change:	• Soil disturbances, resulting in a loss of biodiversity.

7. CONCLUSION

The site falls in an area that is listed by the National Screening Tool as being of 'High' terrestrial biodiversity. Furthermore, the Screening Tool lists a 'Medium' sensitivity for plant species, indicating that there is a likelihood of plant species of conservation concern being present.

However, much of the proposed development footprint has been modified from the naturally vegetated state. Due to the largely modified and secondary nature of the vegetation, the proposed development of the PV facility, as well as the proposed powerline routes (Alternative and Preferred), will have a limited impact on sensitive vegetation. However, the Preferred Layout powerline route will traverse less moist grassland and avoids the localities of three (3) provincially protected plant species. The powerline routes, as well as the PV facility, are within 15m of existing tar and dirt roads. Most of the powerline routes follows the slurry pipes and its existing service road. Therefore, no additional access roads are needed, further limiting the proposed developments impacts on vegetation.

The findings of the site visit, and modified nature of the vegetation, does not warrant a terrestrial plant species assessment as the probability of other species listed in Appendix C occurring is considered low. If mitigation measures are implemented to keep disturbances limited to the secondary grasslands and preventing impacts to moist grasslands and rocky grassland, the probability of impacting on plant species of conservation concern, if they occur, is low.

Therefore, this assessment does not object to the proposed development if mitigation measures are implemented. Furthermore, this assessment recommends the Preferred Layout as this layout will impact on less moist grasslands as well as confirmed localities of provincially protected plant species.

8. PROTOCOL SUMMARY

For ease of reference, the following table summarises results of the assessment as per the main requirements of the Protocols for Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial (Vegetation) Biodiversity as published on 20 March 2020.

Table 16: Summary of the main terrestrial (vegetation) biodiversity findings

Biodiversity (vegetation) aspect	Result
Conservation Plan Category: **CBA**	**Reason for the CBA** The CBA along the powerline route is classified based on the potential habitat for plant species of conservation concern and the potential presence of primary vegetation **Can CBA be maintained?** Yes. The, the CBAs area already traversed by the slurry pipes and existing roads. The proposed powerline route follows the existing linear infrastructure, and no additional fragmentation is expected. If the Preferred Layout is approved, less CBAs will be impacted on by the powerline route. **Impact on species composition and structure of vegetation** Areas that will be developed are proposed to be contained within the existing secondary and modified vegetation. If mitigation is implemented no natural to semi-natural grasslands will be affected. **Impact on ecosystem threat status** None expected as the proposed route follows existing linear infrastructure through mostly secondary grasslands. **Impact on explicit subtypes in the vegetation; and the impact on overall species and ecosystem diversity of the site;** See above
Protected Areas	• Not applicable
Strategic Water Source Areas (SWSA):	**Impact(s) on the terrestrial habitat of a SWSA** The site is not situated within a SWSA, however clearing of vegetation can have an impact on water infiltration and flow dynamics to the moist grassland and downstream watercourses. **Impacts of the proposed development on the SWSA water quality and quantity** Erosion, sedimentation and pollution caused by clearing of vegetation for the development, could impact on the downstream water quality temporarily (e.g. during construction). Once indigenous vegetation has re-established or recovered,

Biodiversity (vegetation) aspect	Result
	the impact will be negligible, provided that impermeable surfaces are limited, and no runoff water are directed towards the moist grassland
National Freshwater Ecosystems Priority Areas (NFEPA):	See wetland assessment
Indigenous forest	Not applicable
Sensitive Areas	• As per the GDARD Requirements for Biodiversity Assessments Version 2 (2012): "All good condition natural vegetation must be designated as ecologically sensitive". The rocky grassland is in a good ecological condition, falls within a CBA and forms part of a Critically Endangered Ecosystem • The buffer area to the moist grassland, as delineated by the wetland specialist must be avoided.
No go areas	Avoid direct impacts to moist grasslands and rocky grassland.
Plant species of conservation concern	• One Declining plant species was recorded within walked transects and sample points at the time of this assessment. • Suitable habitat is present for at least three species within the moist and rocky grassland. However, the probability of occurring is considered low as these areas were sampled during this assessment. Also, these areas can and must be avoided by the development and construction related activities.
Main impacts:	The main impacts expected are as follows: • Destruction of natural vegetation of high sensitivity (rocky- and moist grassland) • Destruction of modified vegetation of low sensitivity • Exposure to erosion and subsequent sedimentation or pollution of proximate moist grassland (watercourse) • Removal / Destruction of protected plants and plants of conservation concern • Potential increase in invasive vegetation • Compaction and destruction of soils
Cumulative impacts:	• If mitigation measures are adequately implemented, no cumulative impacts are expected.
Residual impacts:	• Trampling and edge effects; and • Impacts to the watercourse such as runoff from roads.

9. REFERENCES

Department of Environmental Affairs (DEA), (2011): National Environmental Management: Biodiversity Act (Act 10 of 2004). National List of Ecosystems that are threatened and in need of protection. Government Gazette (34809).

Gauteng Department of Agriculture and Rural Development, (2011): Gauteng Conservation Plan Version 3 ArcGIS Spatial data.

Gauteng Department of Agriculture, Conservation and the Environment (2006): Red List Plant Species Guidelines. Updated 2017

Gauteng Department of Agriculture, Conservation, Environment and Landcare (2001): Development guidelines for ridges. Updated April 2006.

Kent, M. and Coker, P. (1992): Vegetation description and analysis: a practical approach. CRC Press

Mucina, L. & Rutherford, M.C. (2006): The vegetation of South Africa, Lesotho and Swaziland. *Strelitzia 19. South African National Biodiversity Institute*, Pretoria.

Perlman, D.L., and Milder, J.C. (2005): Practical ecology for planners, developers and citizens. Island Press, Washington.

Raimondo, D., von Staden, L., Foden, W., Victor, J.E., Helme, N.A., Turner, R.C., Kamundi, D.A. & Manyama P.A., (eds) (2009): Red List of South African plants 2009. *Strelitzea* 25, South African National Biodiversity Institute.

South African National Biodiversity Institute (SANBI).(2020): Draft Species Environmental Assessment Guideline. Guidelines for the implementation of the Terrestrial Flora (3c) & Terrestrial Fauna (3d) Species Protocols for environmental impact assessments in South Africa. South African National Biodiversity Institute, Pretoria. Version 1.0.

SANBI, (2016): Lexicon of Biodiversity Planning in South Africa. Beta Version, June 2016. South African National Biodiversity Institute, Pretoria. 72 pp.

Tarr, J.A., (2006): An evaluation of the Phragmites australis reed use by communities neighbouring the Tembe Elephant Park, Maputaland, KwaZulu-Natal, South Africa. Submitted in partial fulfilment of the requirements for the degree Magister Scientiae in Wildlife Management. Centre for Wildlife Management, Faculty of Natural ad Agricultural Sciences. University of Pretoria http://repository.up.ac.za/bitstream/handle/2263/23606/01chapter1.pdf?sequence=2

Internet recourses:

DEA screening tool report for the site: https://screening.environment.gov.za/screeningtool/

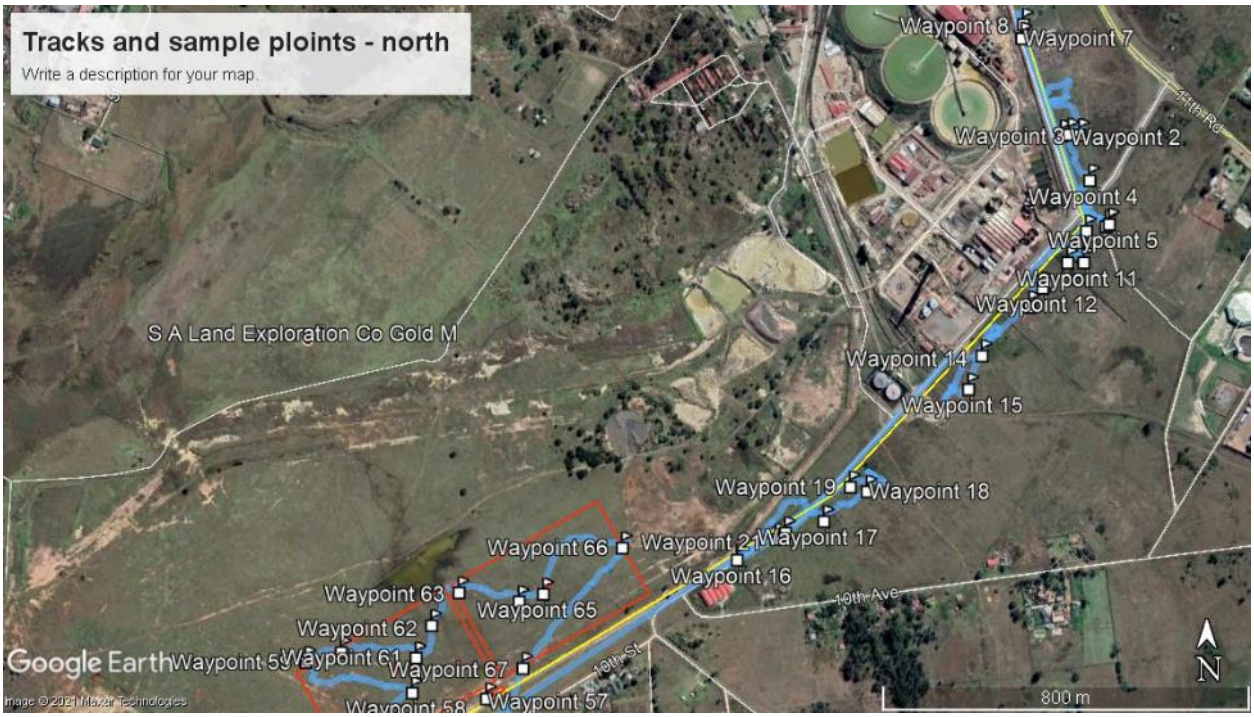
10. GLOSSARY

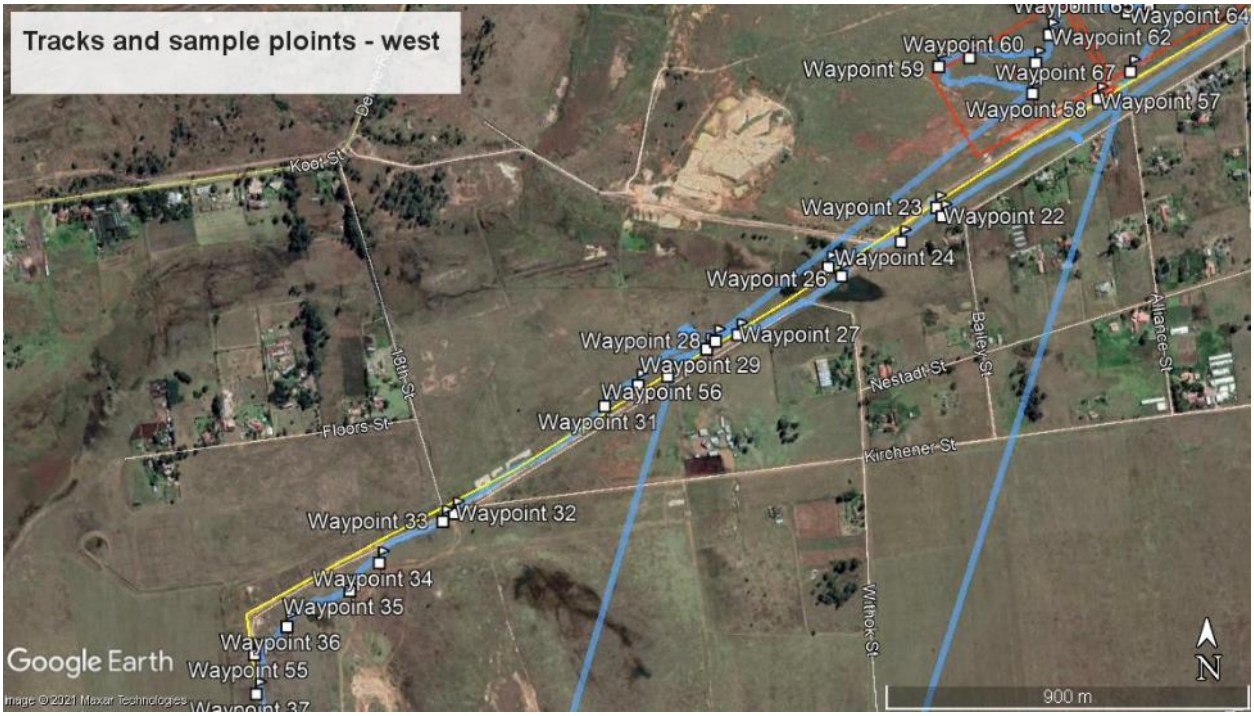
Conservation concern (Plants of..)	Plants of conservation concern are those plants that are important for South Africa's conservation decision making processes and include all plants that are Threatened (see **Threatened**), Extinct in the wild, Data deficient, **Near threatened**, Critically rare, Rare and **Declining**. These plants are nationally protected by the National Environmental Management: Biodiversity Act. Within the context of these reports, plants that are provincially protected are also discussed under this heading.
Critically Endangered	A taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in the immediate future.
Data Deficient	There is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. However, "data deficient" is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate.
Declining	A taxon is declining when it does not meet any of the five IUCN criteria and does not qualify for the categories Threatened or Near Threatened, but there are threatening processes causing a continuous decline in the population (Raimondo *et al*, 2009).
Edge effect	Inappropriate influences from surrounding activities, which physically degrade habitat, endanger resident biota and reduce the functional size of remnant fragments including, for example, the effects of invasive plant and animal species, physical damage and soil compaction caused through trampling and harvesting, abiotic habitat alterations and pollution
Endangered	A taxon is Endangered when it is not Critically Endangered but is facing a very high risk of extinction in the wild in the near future
Exotic species	Plant taxa in a given area, whose presence there, is due to the intentional or accidental introduction as a result of human activity
Forb	A herbaceous plant other than grasses.
Indigenous	Any species of plant, shrub or tree that occurs naturally in South Africa
Invasive species	Naturalised alien plants that have the ability to reproduce, often in large numbers. Aggressive invaders can spread and invade large areas
Irreversibly modified	An ecological condition class in which the ecosystem has been modified completely, with an almost complete loss of composition and structure. All or

	most ecosystem function has been destroyed and the changes are irreversible. Can apply to a site or an ecosystem.
Mitigation	The implementation of practical measures to reduce adverse impacts
Moderately modified	An ecological condition class in which ecological function is predominantly unchanged even though composition and structure have been compromised. Equates to a fair ecological condition or semi-natural
Natural	Unmodified. No significant changes in composition, structure or function have taken place. Good ecological condition.
Near Natural	Small changes in composition and structure may have taken place, but ecosystem functions are essentially unchanged. Good ecological condition
Near Threatened	A Taxon is Near Threatened when available evidence indicates that that it nearly meets any of the five IUCN criteria for Vulnerable and is therefore likely to qualify for a threatened category in the near future (Raimondo *et al*, 2009).
Protected Plant	According to Provincial Nature Conservation Ordinances or Acts, no one is allowed to sell, buy, transport, or remove this plant without a permit from the responsible authority. These plants are protected by provincial legislation.
Red Data	A list of species, fauna and flora that require environmental protection - based on the IUCN definitions. *Now termed Plants of Conservation Concern*
Semi-natural	Ecological function is predominantly unchanged even though composition and structure have been compromised. Fair ecological condition
Severely modified	An ecological condition class in which loss of composition, structure and ecological function is extensive. The land is in a poor ecological condition.
Species diversity	A measure of the number and relative abundance of species
Species richness	The number of species in an area or habitat
Threatened	Threatened Species are those that are facing a high risk of extinction, indicated by placing in the categories Critically Endangered (CR), Endangered (E) and Vulnerable (VU) (Raimondo *et al,* 2009)
Vegetation Unit	A complex of plant communities ecologically and historically (both in spatial and temporal terms) occupying habitat complexes at the landscape scale. Mucina and Rutherford (2006) state: "Our vegetation units are the obvious

	vegetation complexes that share some general ecological properties such as position on major ecological gradients and nutrient levels, and appear similar in vegetation structure and especially floristic composition".
Vulnerable	A taxon is Vulnerable when it is not Critically Endangered or Endangered but meets any of the five IUCN criteria for Vulnerable and are therefore facing a high risk of extinction in the wild in the future (Raimondo *et al*, 2009)

APPENDIX A1: SAMPLE POINT AND TRACK MAP FOR ALTERNATIVE LAYOUT






Tracks and sample ploints - mid-west
Waypoint 34
Waypoint 36
Waypoint 37
Coetzer St
Waypoint 39
Waypoint 38
Mans St
Waypoint 40
Waypoint 41
Waypoint 54
Waypoint 52
Waypoint 53
Lukas Steyn St
Withok Estates
Waypoint 44
Waypoint 45
Waypoint 51
Waypoint 48
Heidelberg Rd
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Withok St
Wentylis Rd
Google Earth
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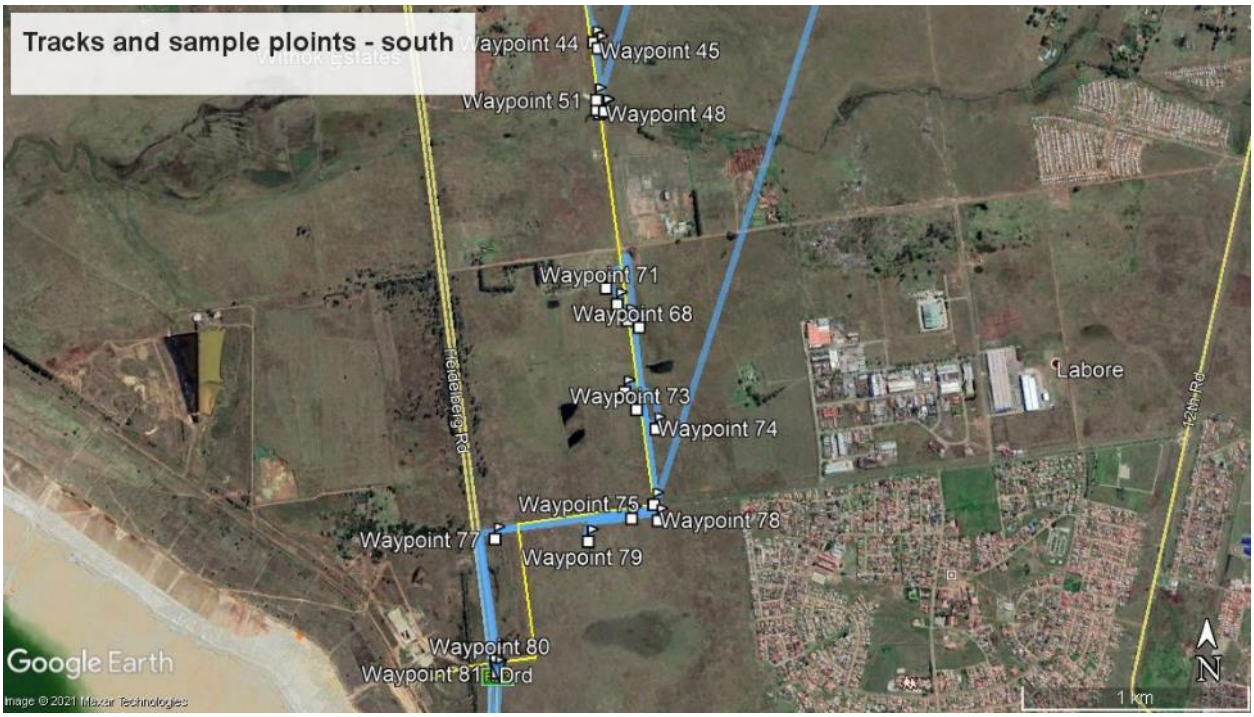
Tracks and sample ploints - south
Waypoint 44
Waypoint 45
Waypoint 51
Waypoint 48
Waypoint 71
Waypoint 68
Heidelberg Rd
Labore
Waypoint 73
Waypoint 74
12th Rd
Waypoint 75
Waypoint 78
Waypoint 77
Waypoint 79
Waypoint 80
Waypoint 81
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1 km
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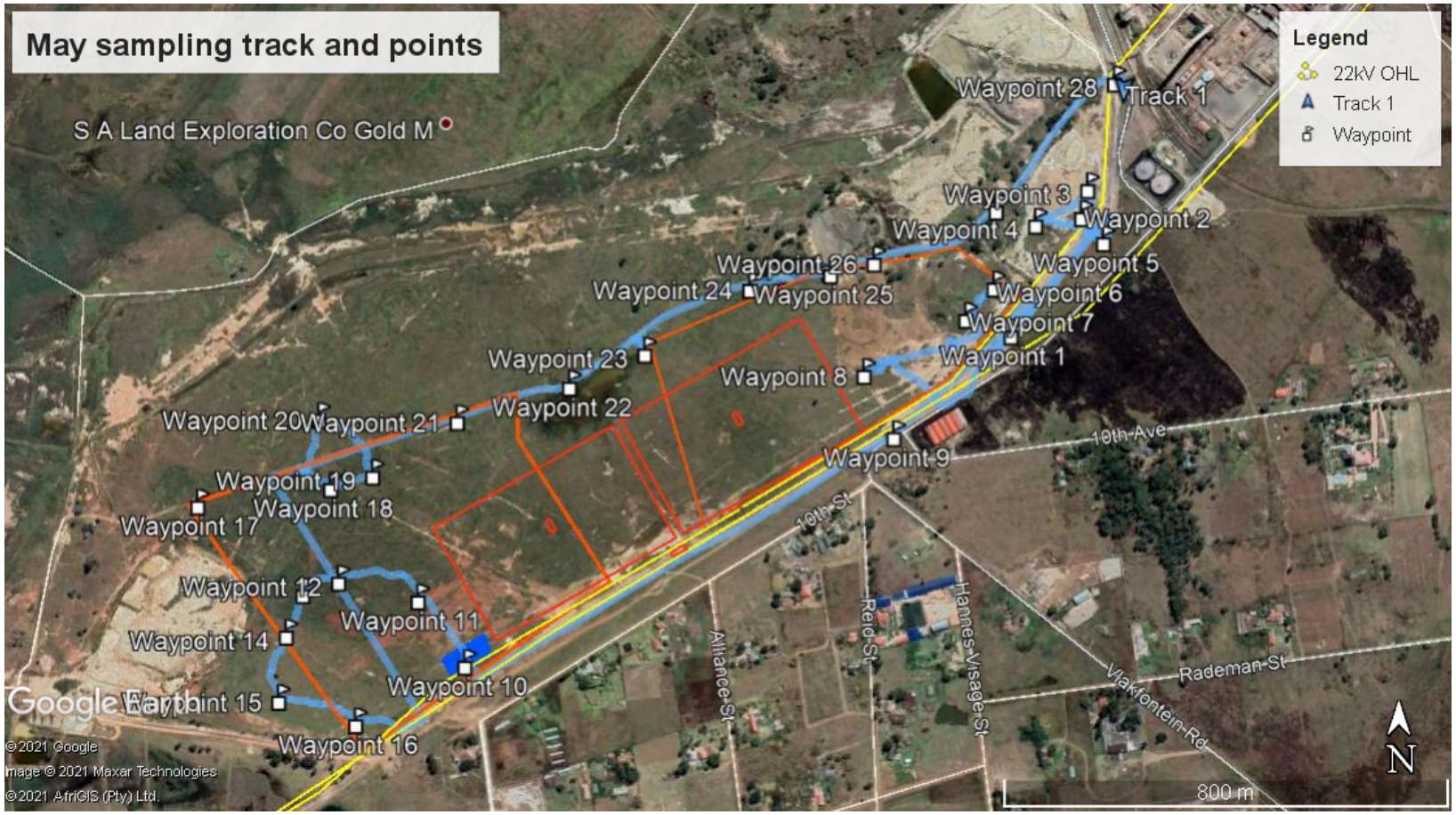
APPENDIX A2: SAMPLE POINT AND TRACK MAP FOR PREFERRED LAYOUT (MAY 2021)



APPENDIX B: SPECIES RECORDED DURING THE FEBRUARY 2021 FIELD SURVEY

1 = species recorded in broad vegetation group

M = Medicinal

P= Protected by provincial legislation

D=Declining

Species	Common name	Habitat notes	Secondary grasslands			Moist grasslands		Rocky grassland
			H hirta dominated	*Cynodon* dominated	*Eragrostis-Cynodon* dominated	*P.australis*	*E. plana*	
Trees								
Diospyros lycioides	Bluebush	Wide variety of habitats						1
Searsia rigida	Kliptaaibos	Growing between rocks						1
Ziziphus zeyheriana	Dwarf Buffalo-thorn	Grassland						1
Number of indigenous tree species recorded = 2			**0**	**0**	**0**	**0**	**0**	**3**
Grasses								
Aristida adscesionis	Annual Three-awn	Disturbed land such as road reserves. Increaser II	1	1				1
Aristida congesta	Tassel Three-awn	Disturbed, overgrazed or farmed land. Increaser II grass	1	1			1	1
Chloris virgata	Feather-top Chloris	Disturbed, moist areas, mostly clay soils and on edge of pans. Increaser II	1			1		
Cymbopogon caesius (also known as C excavatus)	Broad-leafed Turpentine Grass	Most soils, usually in disturbed areas. Increaser I grass, not palatable	1					1

Species	Common name	Habitat notes	Secondary grasslands			Moist grasslands		Rocky grassland
			H hirta dominated	*Cynodon* dominated	*Eragrostis-Cynodon* dominated	*P.australis*	*E. plana*	
Cynodon dactylon	Couch grass	Most soils, usually in disturbed areas. Increaser II grass, palatable	1	1	1	1	1	1
Digitaria eriantha	Finger Grass	Sandy, rocky soil in arid areas or next to rivers/vlei's in areas with higher rainfall. Planted for pasture			1			1
Eragrostis chloromelas	Narrow Curly leaf	Open Grassland.	1					1
Eragrostis curvula	Weeping Love Grass	Mostly occurs in disturbed areas / sown as pasture. Increaser II grass	1	1	1			1
Eragrostis gummiflua	Gum Grass	Subclimax grass, disturbed areas and often in moist soils. Increaser II grass	1				1	
Eragrostis lehmanniana	Lehmann's Grass	Sandy soil, mostly in disturbed land. Increaser II grass		1				1
Eragrostis plana	Tough Love Grass	Disturbed areas, mostly in moist patches. Increaser II grass	1		1	1	1	1
Eragrostis rigidior	Broad Curly Leaf	Disturbed areas such as old fields and overgrazed land. Increaser II grass	1					
Hyparrhenia hirta	Common Thatching Grass	Well drained, rocky soil in open grassland and disturbed areas. Increaser I grass	1	1	1		1	1
Imperata cylindrica	Cotton Wool Grass	Mostly in moist soils				1		
Melinis repens	Natal Red Top	Disturbed grassland. Increaser II grass.	1	1				1
Paspalum dilatatum	Dallis Grass	Introduced grass, moist areas in vlei's and close to rivers. Sometimes planted for pasture	1		1	1	1	

Species	Common name	Habitat notes	Secondary grasslands			Moist grasslands		Rocky grassland
			H hirta dominated	*Cynodon* dominated	*Eragrostis-Cynodon* dominated	*P.australis*	*E. plana*	
Phragmites australis	Common Reed	Grows close to water sources such as rivers and wetlands.				1		
Pogonarthria squarrosa	Herringbone Grass	Disturbed places, sparsely distributed in natural, open grassland. Sub climax grass that colonise disturbed sandy soils. Not palatable, Increaser II	1					
Setaria pallida-fuscua	Garden Bristle Grass	Disturbed areas e.g. next to roads and where rainwater collect	1	1				1
Setaria sphacelata var. sericea	Golden Bristle Grass	Moist areas, clay soils		1				
Themeda triandra	red grass	Undisturbed or disturbed open grassland. Decreaser Grass	1					1
Urochloa panicoides	Garden Urochloa	Disturbed areas, farmed land and moist areas.	1	1				1
Minimum number of grass species = 22			**17**	**10**	**6**	**6**	**6**	**14**
Small shrubs / Forbs / succulents								
Acalypha angustata	Copper Leaf	Grassland, rocky grassland						1
Ajuga ophrydis (M)		Grassland, often in colonies						1
Arctotis arctotoides		Grassland and sometimes in vlei's	1					1
Asparagus laricinus	Cluster-leaved Asparagus / katdoring	Thicket or disturbed areas, waste places. Difficult to eradicate if encroaching into grassland						1
Berkheya cf rigida	Disseldoring	Spiny plant that becomes problematic in overgrazed veld			1	1		

Species	Common name	Habitat notes	Secondary grasslands			Moist grasslands		Rocky grassland
			H hirta dominated	*Cynodon* dominated	*Eragrostis-Cynodon* dominated	*P.australis*	*E. plana*	
Berkheya radula	Boesmanrietjie	Moist grassland and vlei's	1			1	1	1
Berkheya setifera (M)	Rasperdisseldoring	Grassland, usually in large colonies.						1
Boophone disticha (P) (D) (M)	Poison Bulb	Grassland, often in rocky places						1
Chamaecrista comosa		Grassland						1
Chascanum hederaceum		Grassland						1
Chlorophytum cooperi		Grassland						1
Cleome monophylla	Spindlepod	Grows in disturbed places		1				1
Commelina africana		Widespread	1					1
Conyza podocephala		Roadsides and disturbed grasslands	1			1		
Crabbea acaulis		Grassland		1				
Crabbea hirsuta		Grassland, widespread						1
Dyschoriste setigera	Fairy stars	Variety of habitats in grassland, forest and renosterveld.						1
Euphorbia striata	MilkGrass	Infrequently scattered in grassland, often in seepage lines						1
Felicia muricata		Grassland, proliferating in overgrazed/disturbed places	1	1	1			
Gazania krebsiana	Botterblom	Grassland, widespread in other habitats			1			

Species	Common name	Habitat notes	Secondary grasslands			Moist grasslands		Rocky grassland
			H hirta dominated	*Cynodon* dominated	*Eragrostis-Cynodon* dominated	*P.australis*	*E. plana*	
Geigeria burkei	Vermeerbos	Common in overgrazed and disturbed areas	1					1
Gladiolus crassifolius (M)(P)		Grassland						1
Gomphocarpus fructicosus	milkweed	Grassland, often along roadsides and abandoned cultivated fields, disturbed areas.	1	1	1			
Habenaria humilior		Moist, but well drained grassland						1
Habenaria schimperiana (P)		Moist grassland				1		
Helichrysum coriaceum	Vaalteebossie	Grassland and rocky hillsides		1				1
Helichrysum nudifolium (M)	Hottentot's tea	Grassland	1		1			1
Helichrysum rugulosum (M)		Grassland, often in vlei's or patches in disturbed areas	1	1	1			1
Hermannia erodioides		Grassland usually in vleis						1
Hermannia depressa	Rooi-opslag / Creeping Hermannia	Grassland, also in trampled and overgrazed areas	1	1				1
Hermannia transvaalensis		Grassland.						1
Hilliardiella oligocephala (M)	Bitterbossie	Grassland	1					1
Ipomoea crassipes	Leafy-flowered Ipomoea	Grassland						1

Species	Common name	Habitat notes	Secondary grasslands			Moist grasslands		Rocky grassland
			H hirta dominated	*Cynodon* dominated	*Eragrostis-Cynodon* dominated	*P.australis*	*E. plana*	
Ledebouria marginata		Grassland, often in moist places, also disturbed areas						1
Monsonia angustifolia	pink Monsonia	Often in disturbed grassland						1
Nemesia fructicans	Wildeleeubekkie	Shallow soils on exposed rock, also in disturbed areas	1	1				
Nidorella anomala		Grassland, often occurring in groups in moist areas.					1	
Oxalis obliquifolia (M)	Sorrel	Grassland and rock crevices, often in moist places						1
Pelargonium luridum (M)		Grassland, often in moist places.						1
Pentanissia prunelloides (M)	Broad-leaved Pentanissia	Grassland						1
Polygala hottentotta	Small Purple Broom	Common in grassland, often in damp places						1
Psammotropha myriantha		Grassland, oftern in rocky places						1
Scabiosa columbaria	Wild Scabiosa	Grassland, mainly in rocky areas						1
Schistostephium crataegifolium	Bergkruie	Rocky grassland, moist places						1
Selago densiflora		Grassland and bushveld.		1				
Senecio erubescens		Grassland, often along streams and marshes	1				1	
Senecio gregatus		Grassland, often in moist places	1					

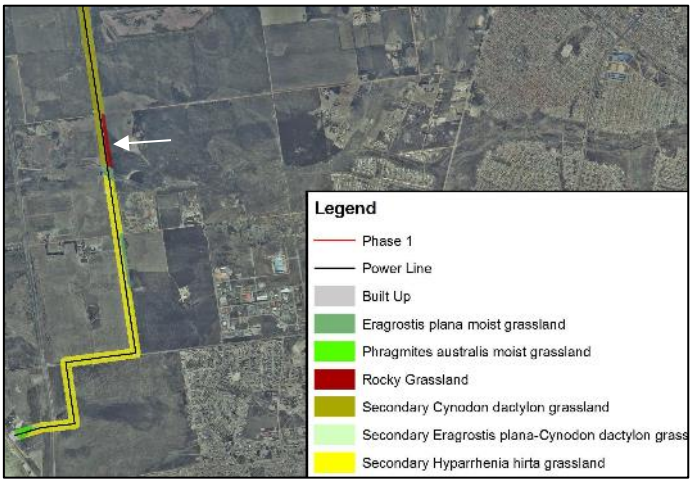
Species	Common name	Habitat notes	Secondary grasslands			Moist grasslands		Rocky grassland
			H hirta dominated	*Cynodon* dominated	*Eragrostis-Cynodon* dominated	*P.australis*	*E. plana*	
Senecio cf innornatus		Grassland often in moist places	1				1	
Stoebe plumosa	Bankruptbush	Grassland, often proliferating in overgrazed areas.	1	1	1		1	
Solanum panduriforme	Poison Apple	Disturbed places, often under trees (probably an indigenous specie)			1			
Sphenostylis angustifolia (M)	Wild Sweetpea	Clumps of bush, bushveld and rocky ridges						1
Tephrosia capensis var capensis		Grassland						1
Tephrosia longipes		Grassland/ rocky grassland	1					1
Vigna vexillata		Grassland						1
Wahlenbergia caledonica		Grassland, rocky or seasonally moist places					1	
Wahlenbergia grandiflora	Giant bell Flower	Grassland						1
Number of forb species recorded = 52			**17**	**10**	**8**	**4**	**6**	**40**
Cyperus congestus		Depressions in grassland, damp and temporary wet areas, ditches						
Cyperus esculentus		Weedy exotic in marshy or ploughed areas	**1**					**1**
Juncus dregeanus		Along permenant water e.g. rivers, vleis						
Juncus effusus	Soft Rush	Wetland, swampy areas and streambeds				1		
Pycreus macranthus		Marshes, vlei's, grassland floodplains, seasonal depressions						

Species	Common name	Habitat notes	Secondary grasslands			Moist grasslands		Rocky grassland
			H hirta dominated	*Cynodon* dominated	*Eragrostis-Cynodon* dominated	*P.australis*	*E. plana*	
*Typha capensis**	Bulrush	Grows in marshy areas and along watercourses.				1		
Number of sedge species recorded= 6			**1**	**0**	**0**	**2**	**0**	**1**
Alien / Invasive Species								
Acacia dealbata/decurrens *	Wattle	Invader of grassland and riverbanks, Category 2	1			1	1	1
Araujia sericifera	Moth catcher	Category 1b						
Arundo donax	Giant Reed	Category 1b						
Cosmos bipinnatus (Bidens formosa)	Cosmos	Weed in disturbed places	1					1
Bidens pilosa	Blackjack	Widespread, naturalised weed.						
Campuloclinium macrocephalum	Pom-Pom Weed	Invasive weed, Category 1b	1					1
Cereus hildmannianus / jamacaru	Queen of the night	Category 1b tall growing succulent						
Conyza albida	Tall Fleabane	Weed	1					1
Datura stramonium (M)	Thorn-apple / Olieboom	Category 1b	1					
Eucalyptes species	Bluegums	Category 1b	1		1	1		
Ficus carica	Common fig	At derelict farm areas	1					
Galinsoga parviflora	Knopkruid	Cosmopolitain weed in disturbed places						
Hibiscus trionum	Bladderweed	Invasive weed in disturbed places.	1			1		1

Species	Common name	Habitat notes	Secondary grasslands			Moist grasslands		Rocky grassland
			H hirta dominated	*Cynodon* dominated	*Eragrostis-Cynodon* dominated	*P.australis*	*E. plana*	
Mirabilis jalapa	Four-o'clocks	Category 1b invader	1					
Persicaria lapathifolia	Spotted Knotweed	Invasive weed						
Plantago lanceolata	Narrow-leaved Plantain	Introduced weed, usually in disturbed places			1			
Plantago major (M)	Broadleaved Ribwort	Weed in moist areas, used medicinally.			1			
Populus x canescens *	Grey Poplar	Declared invader of moist areas Category 2 (CARA)						
Robinia pseudoacacia	Black Locust Tree	Category 1b	1					
Rumex crispus	Curly Dock	Invades ditches and moist, waste places				1	1	
Schkuhria pinnata	Dwarf Marigold	Weedy annual herb from S America	1	1	1		1	
Solanum sisymbrifolium	Wild Tomato	Category 1b						
Tagetes minuta	Khaki Weed	Weed in disturbed places. Has become naturalised and due to the vast amount of seed set, difficult to control						
Verbena aristegera (=V. tenuisecta)	Fine-leaved Verbena	Garden escape, now naturalised along roadsides and disturbed areas	1					
Verbena brasiliensis		Common weed of disturbed and moist places, declared category 1b invader	1		1	1	1	
Number of alien and invasive species recorded= 25			**13**	**1**	**5**	**5**	**4**	**5**

APPENDIX C: PLANTS OF CONSERVATION CONCERN

The species listed below have previously been recorded in the qds and are the most likely to occur on or around the site.
Species printed in **bold** was confirmed on the site.

Species	Conservation Status	Habitat notes and *likelihood of occurrence*	Flowering period
Boophone distichia	**Declining (reclassified to LC nationally)**	**Rocky grassland** **Confirmed to occur about 37m east of the proposed powerline route at:** **26° 19.193'S 28° 20.783'E** 	**Oct-Jan**
Crinum bulbispermum	Declining (reclassified to LC nationally)	Occurs near rivers, streams, seasonal pans and in damp depressions. *Suitable habitat is present along the Withokspruit. This species was not recorded where the powerline traverses the Withokspruit*	Sept-Nov
Hypoxis hemerocallidea	Declining (reclassified to LC nationally)	Occurs in a wide range of habitats, from sandy hills on the margins of dune forests to open rocky grassland. *Although highly likely to occur, this species was not recorded along the proposed powerline route*	Sept-March
Gunnera perpensa	Declining (reclassified nationally as Least Concern)	Damp marshy area and vleis from coast to 2400m. *Suitable habitat within the Withokspruit. This species was not recorded and are unlikely to be present. It may be present further downstream.*	Oct-March
Eucomis autumnalis	Declining (reclassified nationally as Least Concern)	Damp, open grassland and sheltered places between rocks. Up to 2450m.	Nov-April

Species	Conservation Status	Habitat notes and *likelihood of occurrence*	Flowering period
		*Although **highly likely** to occur, it was not recorded in walked transects. It is likely that this species has been harvested for its medicinal properties.*	
Argyrolobium campicola	Near threatened	Highveld grassland. *Suitable habitat is present within the rocky grassland; however, this species was not recorded in walked transects and sampling plots. It is thought to be unlikely to occur.*	Nov-Feb
Delosperma leendertziae	Near Threatened	Rocky ridges, on rather steep south facing slopes of quartzite in mountain grassveld. *No suitable habitat is present on the site*	Oct-April
Gnaphalium nelsonii	Near threatened	Seasonally wet places in grassland and savanna, and along dry watercourses. *Suitable habitat is present, however, this species was not recorded in walked transects and sampling plots. It is thought to be **likely** to occur.*	Oct-Dec
Habenaria barbertoni	Near threatened	In grassland on rocky hillsides and in bushveld in association with Acacia-trees at an altitude of 1000-1500m. *No suitable habitat present on the site*	Feb-March
Habenaria bicolor	Near Threatened	Terrestrial in drained grassland, recorded from about 1600m. *Suitable habitat is present, however, this species was not recorded in walked transects and sampling plots. It is thought to be unlikely to occur.*	Jan-April
Habenaria kraenzliniana	Near threatened	Stony, grassy hillsides, mainly in Gauteng *Suitable habitat is present in the rocky grassland, however, this species was not recorded in walked transects and sampling plots. This species could **likely** be present and should be assessed during its flowering period if the rocky grassland is to be disturbed*	Feb-April
Kniphofia typhoides	Near Threatened	Heavy, black clay soil, climax *Themeda triandra* grassland, low lying marshy ground - pans or vleis. *No suitable habitat was recorded.*	Feb-March
Lithops lesliei subsp. *lesliei*	Near threatened	Primary habitat appears to be the arid grasslands in the interior of South Africa where it usually occurs in rocky places, growing under the protection of surrounding forbs and grasses. This plant is well camouflaged in brown shale on hilltops and difficult to spot when not in flower. *Suitable habitat is present in the rocky grassland and it is therefore **likely** in the rocky grassland north of the slurry pipes. These areas should not be impacted on during construction.*	March-June

Species	Conservation Status	Habitat notes and *likelihood of occurrence*	Flowering period
Bowiea volubilis subsp. *volubilis*	Vulnerable	Climber. Usually occurs along mountain ranges and in thickly vegetated river valleys. Often grows under bush clumps and in boulder screes it is often found in open and or on steep rocky hills usually in well-shaded situations. Tolerates wet and dry conditions. *No suitable habitat is present*	Sept-April
Cineraria longipes	Vulnerable	This specie occurs in grassland amongst rocks and along seepage areas and exclusively on basalt koppies on south facing slopes in association with *Pteridium*. The species has previously been recorded within the Klipriviersberg *No suitable habitat is present on the site*	March-May
Eulophia coddii	Vulnerable	Steep slopes, growing on sandstone-derived soils in grassland or bushveld. Heidelberg, Magaliesberg and Waterberg. *No suitable habitat is present on the site*	Late sprint - Early Dec
Khadia beswickii	Vulnerable	Open shallow soil over rocks in grassland. Known locations are declining due to habitat loss to urban and infrastructure development, alien plant invasion, mining and collecting for the specialist succulent horticultural trade. The plants main distribution is around the town of Nigel *Suitable habitat is present in the rocky grassland; however, this species was not recorded in walked transects and sampling plots. However, its presence can not be ruled out and the semi-natural to natural rocky grassland may thus not be disturbed during construction of the powerline.*	Jul-April
Holothrix micrantha	Endangered	Terrestrial on grassy cliffs, recorded from 1500 to 1800m. *No suitable habitat is present on the site. The plant would have been in flower at the time of this assessment but was not recorded.*	Oct

APPENDIX D: SPECIALIST QUALIFICATIONS

Curriculum Vitae

Antoinette Eyssell-Knox

Personal Information Summary

Name:	Antoinette Eyssell-Knox
Highest qualification:	MSc Environmental Science (2010), University of Pretoria
Professional membership:	SACNASP Pr Sci Nat (400019/11) Ecological Science
Company:	Dimela Eco Consulting
Contact details:	Antoinette@dimela-eco.co.za
	Tel 083 642 6295

Professional Experience

1. Environmental Management:

I have been working in the field of environmental management as a vegetation specialist since the year 2007 (11 years). I have been self-employed since November 2011.

Nov 2011 – current:	Dimela Eco Consulting
Sep 2007 – Nov 2011:	Strategic Environmental Focus (SEF)

Main field of work and experience include:

- Vegetation assessments, overviews or scans;
- Strategic ecological assessments;
- Ecological management, rehabilitation- and biodiversity action plans (including alien vegetation management);
- Specialist input: Gauteng and North-West Outlook Reports, ecological conditional requirements for Green Star rating;
- Ground-truthing of vegetation related data;
- Review of ecological reports; and
- Mentoring.

2. Environmental Education:

2011 – current:	Writer of the ecology feature for the bimonthly Supernova Kids Magazine
Aug 2003 – Sep 2007:	Snr Environmental Education Officer, South African National Biodiversity Institute (SANBI), Pretoria National Botanical Garden

3. Horticulture

Jun – Jul 2003:	Horticultural Trainer, 7 Shaft Training Centre, Johannesburg
May 1997 – Mar 2002	Horticulturist, Pretoria National Botanical Garden (then NBI, now SANBI)

Qualifications

- M.Sc Environmental Science, University of Pretoria (2010)

Dissertation: *Land cover change and its effect on future land uses*

- B. Sc (Hons) Horticulture, University of Pretoria (1999-2000)

Dissertation: *Horticultural uses of the indigenous Barleria species*

- B. Sc (Agriculture) Horticulture, University of Pretoria (1993-1996)

Memberships and Affiliations

SACNASP: Registered as a Professional Natural Scientist in the field of ecology since 2011 (Reg no 400019/11)

Botsoc: Member of the Botanical Society of Southern Africa since 2013

Course History

2018: Asteraceae Identification Course

2015: SAGIC Invasive Species Consultant Training

2012: Tools for Wetland Assessment (Rhodes University – September 2012)

2012: Landscape Functional Assessment, introductory workshop with David Tongway and Prof Klaus Kellner (North West University)

2012: Soil Classification and Wetland Delineation (Terra Soil)

2007: ISO 14000 Advanced EMS Auditors Course (SGS & University of Pretoria)

2007: Introduction into Forestry Stewardship Council (FSC) (University of Pretoria)

2006: Permaculture training course (S.E.E.D)

2005: Project Management Course (Wildlife and Environment Society of South Africa (WESSA) Umgeni Valley)

2004: Grass and plant identification courses

Presentations

July 2007: Environmental Education in a changing world, World Environmental Education Conference (WEEC), Durban

Sept2006: Environmental Education, BGCI Conference, Oxford England

Selected Project Experience (2011 onwards)

1. <u>Provincial Environmental Outlook Reports</u>

2017-2018: Vegetation input: Gauteng Outlook Report

in process: Vegetation input: North-West Outlook Report

2. <u>Open Space Planning</u>

Nov 2015: The proposed Kaalspruit Open Space Project, Thembisa, Gauteng. Kaalspruit River Rehabilitation Biodiversity Scan: (NuLeaf Planning and Environmental)

2015-2016: City of Johannesburg Open Space Planning – vegetation input for Linbro Park, Bassonia, Kyalami and Ruimsig areas (Iggdrasil)

3. Management- and Rehabilitation Plans

April-May 2012: Vegetation base line study and input into Biodiversity Action Plan for Kumba Iron Ore (Lidwala Consulting Engineers)

Jan 2015: Environmental Management Plan for the Krugersdorp Nature Reserve – vegetation section

Jan 2016: Tharisa Mine Railway Line – Vegetation rehabilitation plan (Limosella Consulting)

Sept 2016: General vegetation rehabilitation plan for the proposed Mezo Kitchens Panel Processing Facility (Shangoni)

Nov 2016: General Ecological Rehabilitation and Monitoring Plan for the N4 additional lane between: R52 Koster offramp & D1325 Marikana Interchange; and The R512 (Brits West Interchange) & K67 (Ga-Rankuwa Interchange) North West and Gauteng Provinces

Nov 2016: Biodiversity Management Plan: Afrisam (Sa) (Pty) Ltd, Dudfield Cement – vegetation input

June 2017: Rehabilitation planning for the Klip- Lower and Upper Rietspruit Water Management Units (Pregio, via Limosella Consulting)

Dec 2017: Eskom underground cable river crossings – vegetation input into rehabilitation plants (Envirolution)

4. Linear Infrastructure

March 2012: Kranspoort road upgrade Protected tree identification (Lidwala Consulting Engineers)

Oct 2012: Eskom: Perseus to Gamma Vegetation assessment (Mokgope Consulting)

March 2013: Diepsloot Eskom line and substation, Johannesburg (Envirolution)

Nov 2013: Masa Ngwedi 750kV and 400kV lines (Limpopo & North-West Provinces) Section D & E Vegetation Input for EMP (Mandara Consulting)

2013-2014 Eskom: Northern Alignments (Perseus in the Northern Cape to Juno in the Western Cape) (Mokgope Consulting)

Feb 2014: Meteor substation, as well as the 88kV line between the Pulsar, Meteor and Sonland substations, Sebokeng, (Nsovo Environmental Consulting)

Dec2014: Upgrading of Internal Roads in Stinkwater, Hammanskraal (Gauteng) (GladAfrica)

Sept 2015: Railway Siding for GCMC Open Cast Mine, Lephalale (Limpopo)

Feb 2016: N4 - Additional lane between Brits and Rustenburg (Environamic)

Nov 2016: Aggeneis-Paulputs 400kV Powerline and Substations Upgrades

Feb 2017: Proposed Lulamisa to Diepsloot East to Blue Hills to Crowthorne 88kv Power Line / Cable and 2 Substations Gauteng (Envirolution)

May 2017: Proposed 132 kV Powerline Between Fochville Municipal Substation and an Existing Line, Gauteng Province (Envirolution)

5. Solar Developments

January 2012: Schmidsdrift, Northern Cape Vegetation Assessment for Solar Panels (Nuleaf)

Aug 2015: Proposed Construction of A 75mw Solar Energy Facility Project, Limpopo Tshikovha Environmental and Communication Consulting

6. Mining

April 2012:	Rietfontein Open Cast Vegetation assessment (Cabanga Concepts)
Jan 2013:	Vierfontein Colliery Vegetation assessment and EMP input (Cabanga Concepts)
Jan 2017:	G&W Base and Industrial Minerals Koppies Betonite Mine Vegetation Assessment & Management Input Report (Cabanga Concepts)

7. Other Development

Dec 2013:	Marekele Bush camp – vegetation & fauna assessments (NuLeaf)
May 2013:	Komati Power Station – Coal stockyard (Envirolution)
April 2014:	Blesboklaagte & Leeupoort Township development (Shangoni)
May 2014:	Goldi Farm Composting Site, Section 24G Fauna and Flora assessment and Summary document (Shangoni)
Feb 2015:	TOPIGS: Proposed Piggery,Mpumalanga(Shangoni)
May 2015:	Kwaggasrant Recycling Facility Upgrade (Shangoni)
Oct 2016:	Proposed piggery on portion 139 of the farm Honingnestkrans 269JR Vegetation and Fauna investigation (Methale Environmental Consulting)
Oct 2017:	Ongoing Clinic Development & Proposed Emergency Medical Services Facility on Prt 79 of the farm De Wagendrift 417 JR Gauteng Province. (Methale Environmental Consultants)

8. Plant relocation and monitoring

April 2014:	Relocation of *C bulbipermum*, overlooked Colliery in Mpumalanga (Cabanga Concepts)
Feb 2017:	Monitoring report for the relocated *Crinum bulbispermum* at Overlooked Colliery
May 2017:	Relocation of protected plant species: Evander Mine
Feb 2018:	Monitor populations of the Critically Endangered *Chlorophytum radula* at the Woodbush Plantation, Limpopo.

9. International:

Oct 2009:	Tatu, Nairobi: Vegetation Assessment (Kenya) (Lokisa Environmental Consulting)
Sept 2014:	Vegetation input to the Regional Environmental and Social Assessment of Coal-based Energy Projects along the South Africa- Botswana Border (World bank Project, Mott MacDonald)

10. Mentorship:

May 2017:	Technical Peer Review of the vegetation section for the Emfuleni Bulk Water Supply Pipelines: Ecological Assessment. GIBB Engineering & Architecture (Pty) Ltd
Nov 2017:	Mentorship and Technical Peer Review of the vegetation section for the Merensky-Kennedy Powerline: vegetation assessment GIBB Engineering & Architecture (Pty) Ltd