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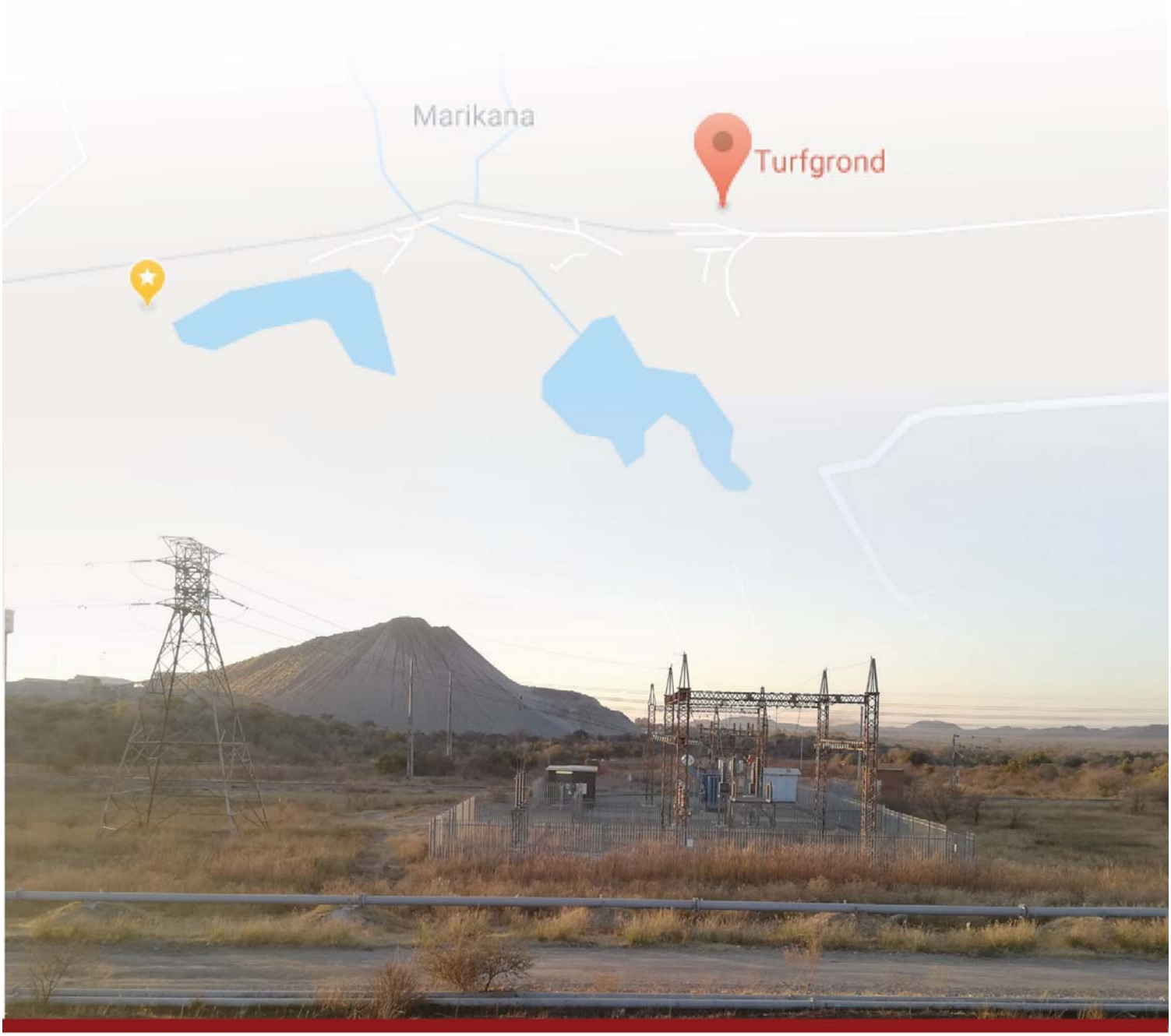

TRANSNET

DRAFT BASIC ASSESSMENT REPORT

FOR THE PROPOSED EXPANSION OF THE RAILWAY YARD AT TURFGROND SUBSTATION, MADIBENG LOCAL MUNICIPALITY, NORTH WEST PROVINCE

DEA REFERENCE NO:

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PROJECT NAME	**:**	The Proposed Expansion of the Railway Yard at Turfgrond Substation, Madibeng Local Municipality, North West Province **DEA REF NO**
TITLE OF DOCUMENT	**:**	Draft Basic Assessment Report

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EXECUTIVE SUMMARY

This Executive Summary incorporates the main findings of the Draft Basic Assessment Report (BAR) prepared as part of the Basic Assessment process being undertaken for the Proposed Expansion of the Railway Yard at Turfgrond Substation, Madibeng Local Municipality, North West Province.

i) Brief Description of the Project

Transnet has identified "the Proposed Expansion of the Railway Yard at Turfgrond Substation" to form part of the bigger project, "Transnet Waterberg Rail Corridor Expansion Programme". The Waterberg Rail Corridor Expansion Programme is a growth node for various activities within the mining and industrial sectors. Turfgrond Substation is an existing 88/25kV substation with one 20MVA transformer, one 88kV incomer bay and two 25kV OHTE feeder bays installed. In order to accommodate the increased freight volumes, Turfgrond substation capacity shall be increased with an additional 20MVA (Strydom, 2017).

ii) Summary of Activity Alternatives

Transnet is investigating the expansion of the Waterberg line, by means of the following studies:

- **Front End Loading 4: Coal** Expansion of the existing line, Stage 2 (currently being undertaken by TCP)
- **Front End Loading 3: Coal** Expansion of the existing line, Stages 3 to 5 (**Preferred option** for the Turfgrond Substation Expansion Project)
- **Front End Loading 2:** Study for the establishment of a new Heavy Haul line, from Hamelfontein to Lephalale, via Atlanta and Thabazimbi
- **Front End Loading 3: Chrome** Expansion of the existing line (currently being undertaken by the TFR Chrome / Ferrochrome business unit)
- **Do-Nothing alternative**: It is an option of not undertaking the proposed development. The existing Turfgrond Substation infrastructure would remain status quo and thus would not achieve its purpose of the rail expansion (part of the bigger project, Waterberg rail corridor expansion programme) to provide infrastructure along the coal railway line to increase the coal hauling capacity.

iii) Applicability of the EIA regulations 2014, as amended

A Basic Assessment is required in terms of the Environmental Impact Assessment (EIA) Regulations of 2014 (Government Notice (GN) R982), as amended, promulgated under the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended (NEMA) as the proposed project triggers GN R983 Activity 19 of Listing Notice 1 and GN R985 Activity 12 of Listing Notice 3 below:

Listing Notice 1: Activity 19: The infilling or depositing of any material of more than 10m³ into, or dredging, excavation, removal or moving of soil, sand, shells, grit, pebbles or rock of more than 10m³ from a watercourse

Listing Notice 3: Activity 12: The clearance of an area of 300m³ or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.

Batatise Consulting Engineers has been appointed as the independent Environmental Assessment Practitioner to undertake the Basic Assessment Process to meet the relevant requirements of NEMA and the EIA Regulations 2014, as amended.

iv) Public Participation Process (PPP)

The PPP has been designed to meet the requirements of the EIA Regulations 2014, as amended. The tasks undertaken to date include the following:

- A preliminary Interested and Affected Party (I&AP) database of relevant authorities, adjacent landowners, councillors, local community forums and other key stakeholders was compiled. Additional I&APs will be added to the database based on responses to notification letters/Background Information Document (BID).
- Notification letters / BID were sent to the identified I&APs and Stakeholders in July 2019 informing them of the proposed project and inviting them to provide initial comment.
- Site notices were erected at focal points at the study site.
- Focus Group meetings will be held affected parties in areas close to the proposed project. The anticipated month would be in August 2019. Venues, dates and times for the public meetings are yet to be confirmed.
- A Newspaper advert will be published to notify the public of the proposed project and will be announcing the availability of the Draft BAR as well as notification of the focus group meetings which are to be undertaken during the 30 days commenting period.

The Draft BAR will be distributed for a 30-day comment period in September 2019 to provide I&APs, Stakeholders and the commenting authorities the opportunity to comment on the proposed project. Copies of the full report will be made available at the following locations: Marikana Library and electronic copies will be available upon request. The I&APs who wish to participate by contributing comments, registering or obtaining more information on the project may contact: *Judy on: Cell: 076 876 2672, e-mail: judy@batatiseconsulting.com*

Comments received on the Draft BAR will be collated into a Comments and Responses Report and included in the Final BAR. Any comments received on the Final BAR will be forwarded together with the Final BAR for consideration and decision making to the relevant Departments. Once a decision has been made, all I&APs on the project database will be notified of the decision. A statutory appeal period will follow the issuing of the decision.

v) Affected Study Area

The study area is located in the Bushveld Complex which is an extensive deposit of platinum group minerals. In this area, there are four layers which are in the Pretoria Group of the Transvaal Supergroup. They are from primary magma. The topography is described as hills and lowlands, changing to plains to the northeast. The Maretlwane Spruit passes to the east of the study area, flowing from south to north. The original vegetation is classified as Marikana Thornveld, which is a savanna biome and forms part of the Central Bushveld Bioregion (Mucina & Rutherford, 2006). However, due to large-scale mining activities as well as infrastructure development in the region, this has been impacted on.

The majority of the eastern portion of the Turfgrond Substation Expansion Area in its entirety falls within the artificial seep wetland, which has been transformed as part of the existing Substation and comprises hardened infrastructure, with no natural vegetation remaining. Furthermore, the substation study area falls within an area considered to be a Critical Biodiversity Area 2 (CBA 2), and is considered to be a critical corridor linkage as well as an Important Bird Area (IBA).

vi) Overall Summary of Impacts and Mitigation Measures

Ecology

The overall sensitivity of the Turfground Substation Expansion Area is considered to be moderately low, which can be attributed to edge effects as a result of surrounding anthropogenic activities

(existing substation, access roads, overhead powerlines, the railway line and mining activities in the surrounding area). Although extensive habitat modifications have occurred, it is nonetheless imperative that the development footprint be kept as small as possible whilst all edge effects are to be strictly managed, to ensure the area continues to function as a landscape corridor in a built-up environment.

Overall, the construction of the proposed development poses a moderately low risk to the floral ecology of the area. All impacts can, however, be reduced if all mitigation measures are adhered to as stipulated in Section 6. Of utmost importance is the development of an Alien Invasive Plant Control Plan which should be implemented prior to ground clearance activities. Where bare soils are exposed, the soil should be ripped to a depth of 20cm, a weed free topsoil must be introduced, and the area be revegetated with an indigenous grass mixture. Continuous monitoring of rehabilitated areas as well as AIP proliferation should be inspected within 50m of the perimeter fence of the proposed Turfground Substation Expansion Area, bi-annually for the operational phase (Meintjies, 2019)

Freshwater

The expansion of the Turfgrond substation will most likely impact on the ecological integrity of the seep wetland. This is especially because the existing substation is already located within the identified artificial wetland. However, given that there is already existing infrastructure and access roads to the substation, there is an opportunity to reduce any further impacts on the wetland and surrounding environment.

The field results showed that although the wetland is considered artificial and has undergone serious modifications it has the potential to provide valuable hydrological functions, especially given the land uses within the surrounding catchment. This ultimately emphasises the importance of adhering to general 'good practice' mitigation measures during the proposed expansion as well as the operation of Turfgrond substation in order to ensure these ecological services are maintained and no further degradation occurs (Lushozi, 2019)

Heritage

As no sites, features or objects of cultural significance are known to exist in the development area, there would be no impact as a result of the proposed development. Should archaeological sites or graves be exposed in other areas during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made (van Schalkwyk, 2019)

vii) RECOMMENDATIONS

It is recommended that the "Proposed Expansion of the Railway Yard at Turfgrond Substation" be considered, as the project would not have any far-reaching impacts (Low to Very Low Negative) and is therefore supported from an environmental perspective.

In this regard it is fundamental that the Environmental Management Programme (EMPr) (provided in **Appendix H)** and all other mitigation measures in this Basic Impact Assessment Report be instituted during all phases of the proposed project. The following recommendations are to form part of the conditions of approval:

- The development footprint is to be kept as small as possible whilst all edge effects are to be strictly managed, to ensure the area continues to function as a landscape corridor in a built up environment.

- Alien Invasive Plant (AIP) Control Plan should be implemented prior to ground clearance activities.

- Removal and control of floral AIP species, through the implementation of an AIP Control Plan and subsequent follow up activities, the floral ecology of the area can be enhanced, and subsequently provide improved habitat and increased food resources for faunal species

- Where bare soils are exposed, the soil should be ripped to a depth of 20cm, a weed free topsoil must be introduced, and the area be revegetated with an indigenous grass mixture.

- Continuous monitoring of rehabilitated areas as well as AIP proliferation should be inspected within 50m of the perimeter fence of the proposed Turfground Substation Expansion Area, bi-annually for the operational phase.

- Connectivity for faunal species movement should be retained as far as possible by keeping the development footprint as small as possible, and by regularly monitoring edge effects with particular emphasis on AIP and erosion control.

- If feasible, construction must be scheduled for drier period in order to minimise sediment laden runoff within the wetland as a result of the construction activities.

- Areas where vegetation needs to be cleared including constructor laydown areas within the wetland must remain as small as possible in order to reduce risks associated with any further proliferation of alien vegetation.

- All exposed soils must be protected for the duration of the construction phase with a suitable geotextile to prevent erosion and sedimentation within the wetland. Stockpiled soils should not exceed 2m in height in order to prevent structural properties of the soil being compromised.

- The use of existing access roads/tracks within the artificial seep is strongly encouraged in order to minimise further impacts on the artificial seep.

- It is highly recommended that the proponent make provision for small-scale rehabilitation of the reaches of the wetlands which may be directly impacted upon by construction activities. Acknowledging that this wetland is considered artificial, it is considered important to ensure that service provision are maintained, and where feasible, improved during the construction and operation.

- Should archaeological sites or graves be exposed in other areas during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.

- An independent ECO must be appointed to audit compliance with the EMPr during the construction of the bridge and to audit compliance of rehabilitation in post construction phase.

- Prior to construction phase, it is relevant to obtain the other necessary Environmental Authorisations in terms of other legislations. For example: Water Use License.

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LIST OF ACRONYMS

AC	Alternating Current
AIP	Alien Invasive Plant
BAR	Basic Assessment Report
BAS	Best Attainable State
BDM	Bojanala District Municipality
BID	Background Information Document
CBA	Critical Biodiversity Area 2
CDEGS	Current Distribution, Electromagnetic Fields, Grounding and Soil Structure Analysis
CEAD	Centre of Environment, Agriculture and Development
CRR	Comments and Response Report
CSIR	Council of Scientific and Industrial Research
CV	Curriculum Vitae
CVB	Channeled valley bottom
DC	Direct Current
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
EMPr	Environmental Management Programme
ESA	Ecological Support Area
FEL	Front End Loading
GDARD	Gauteng Department of Agriculture and Rural Development
GN	Government Notice
IAIAsa	International Association for Impact Assessment, South Africa
I&AP	Interested and Affected Party
IBA	Important Bird Area
IDP	Integrated Development Plan
IEM	Environmental Management
MLM	Madibeng Local Municipality
NBA	National Biodiversity Assessment
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NFEPA	National Freshwater Ecosystem Priority Areas
NPAES	National Protected Areas Expansion Strategy
NWBSP	North West Biodiversity Spatial Plan
OHTE	Overhead Traction Equipment
PES	Present Ecological State
PPP	Public Participation Process
RLM	Rustenburg Local Municipality
SACAD	South Africa Conservation Areas Database
SACNASP	South African Council of Natural Scientific Professions
SAHRIS	South African Heritage Resources Information System
SANBI	South African National Biodiversity Institute
SAS	Scientific Aquatic Services
SCC	Species of Conservation Concern
STS	Scientific Terrestrial Services
TFR	Transnet Freight Rail
UKZN	University of KwaZulu-Natal
UCVB	Unchannelled valley-valley bottom
WULA	Water Use License Application

1 INTRODUCTION

1.1 PROJECT BACKGROUND

Transnet Group Capital (hereafter referred as Transnet) intends to expand the existing railway yard at Turfgrond Substation, which is located within the Madibeng Local Municipality and within the Jurisdiction of Bojanala Platinum District Municipality in the North West Province. Transnet has identified "the Proposed Expansion of the Railway Yard at Turfgrond Substation" to form part of the bigger project called, "Transnet Waterberg Rail Corridor Expansion Programme". The Waterberg Rail Corridor Expansion Programme is a growth node for various activities within the mining and industrial sectors. The main focus of the rail expansion is to provide infrastructure along the coal railway line to increase the coal hauling capacity (Viljoen, 2017).

The Proposed Turfgrond Substation Expansion Study Area is situated within an artificial Seep Wetland and is located within a Critical Biodiversity Area-2, and this has triggered the need for a Basic Assessment process. Transnet has appointed Batatise Consulting Engineers, as independent Environmental Consultants, to undertake the Basic Assessment process for the Proposed Turfgrond Substation Expansion project.

1.2 PROJECT DESCRIPTION

Turfgrond Substation is an existing 88/25kV substation with one 20MVA transformer, one 88kV incomer bay and two 25kV OHTE feeder bays installed. In order to accommodate the increased freight volumes, Turfgrond substation capacity shall be increased with an additional 20MVA (Strydom, 2017). **Figure 1** (a & b) shows the existing 25kV feeders and the existing transformer bay respectively.

a. Existing 25kV feeders

b. Existing transformer bay

Figure 1: a. Existing 25kV feeders, b. transformer bay

The proposed development footprint is approximately 2140m^2 and the access road is approximately 1703m^2. The proposed site for construction, stockpiling and site camp does not fall within the Transnet servitude. Transnet will need land for construction and for site camp establishment from the adjacent Landowners (Eskom and Mine).

A schematic layout of the proposed Turfgrond Substation expansion is illustrated in **Figure 2** below and provided in **Appendix B.**

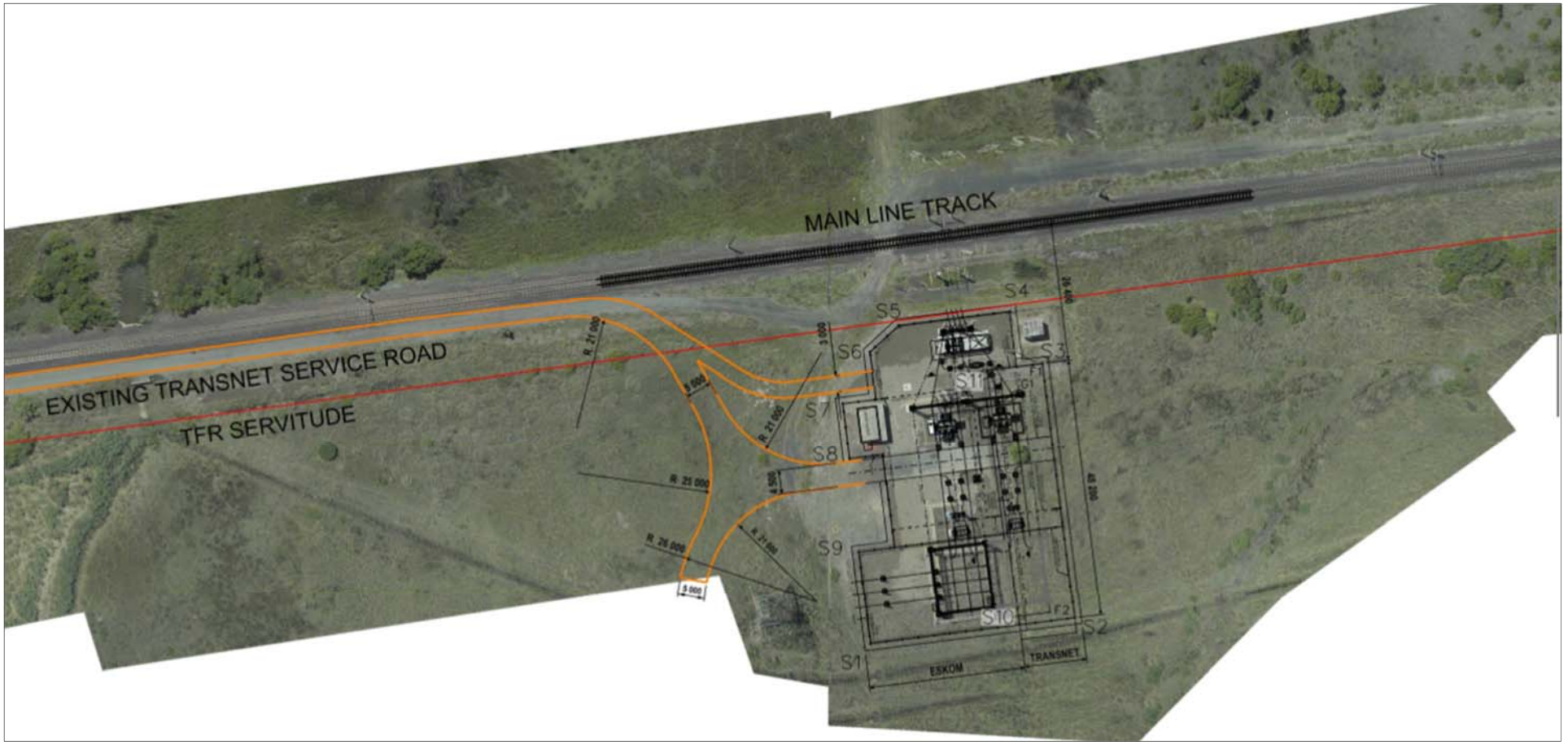


Figure 2: Schematic layout of the Proposed Turfgrond Substation Expansion

1.2.1 Scope of Work

The contractor shall be responsible for the manufacturing, testing, suppling, delivery to site, installation and commissioning of the following at the existing Turfgrond substation:

- All earth works to prepare the terrain as per the general arrangement drawing including access roads, platform, drainage system, gates and fences.
- Extension of existing earthmath.
- Foundations, steelwork and earthing for all new equipment.
- Testing of earthing and correcting of earthing for existing equipment as needed.
- Area lights, lightning protection and trenches as per general arrangement drawing.
- All associated control plant which includes protection, metering, RTU, communication equipment, battery and charger and AC/DC board.
- All associated cables and conductors for both control a primary plant and terminations.
- Equipment to be installed:

    - New 88/25kV transformer bay consisting of the following:
        - 1 x 88kV isolator with earthing switch (2-phase)
        - 1 x 88kV breaker (2-phase)
        - 2 x 88kV voltage transformer
        - 2 x 88kV current transformer
        - 2 x 88kV surge arrestor
        - 1 x 88/25kV 20MVA transformer
        - 1 x 25kV surge arrestor
        - 1 x 3.3kV surge arrestor
        - 1 x 25kV isolator (2-phase)
        - 1 x 25kV breaker
        - 1 x 25kV current transformer
        - 1 x 25kV voltage transformer
        - 1 x 33kV fuse link
        - 1 x auxiliary transformer

    - Existing 88/25kV transformer bay add the following:
        - 1 x 3.3kV surge arrestor
        - 2 x 88kV voltage transformer (1-phase)
        - 2 x 88kV current transformer (1-phase)

    - New 25kV busbar consisting of the following:
        - 2 x 25kV isolator (single phase)
        - 1 x 25kV breaker

    - New 25kV feeder bay x 2, each consisting of the following:
        - 1 x 25kV breaker
        - 1 x 25kV current transformer

    - New 88kV gantries x2, each consisting of the following:
        - 2 x 88kV columns
        - 1 x 88kV beam

    - New 25kV Line terminal structure

All equipment and work shall be done according to the latest applicable Transnet standards.

1.3 NEED AND DESIRABILITY

The proposed Turfgrond Substation expansion is part of the Waterberg complex, which is a strategic growth node for various activities within the mining and industrial sectors. Adequate rail infrastructure capacity is deemed critical to unlock the potential of this economic hub. The Waterberg region represents an in-situ coal resource in excess of 76 billion tons and is expected to experience significant growth in coal and mineral production over the next 20 years.

The purpose of rail expansion from Waterberg is to provide infrastructure along the coal railway line to increase the coal hauling capacity as well as other commodity traffic on the line including Chrome, Ferrochrome, Cement, Lime, Granite, Iron Ore, Containers and other General Freight (Viljoen, 2017). In recent years there have been numerous requests from industry for an assessment and subsequent supply of long-term rail network capacity from the Waterberg area to Richards Bay and Maputo, for export, and to various inland destinations, for the domestic market.

2 PROJECT LOCALITY

The Waterberg railway corridor is aligned between Ermelo and Lephalale, via Ogies, Welgedag, Sentrarand and Pyramid South. From Pyramid South, the corridor is aligned via Pendoring, Rustenburg and Thabazimbi. The proposed Turfgrond Substation expansion project site is in the Rooiheuwel area, along the railway line between Brits and Rustenburg. The corridor route alignment is indicated in **Figure 3** below. The Turfgrond site is located within the red circle.

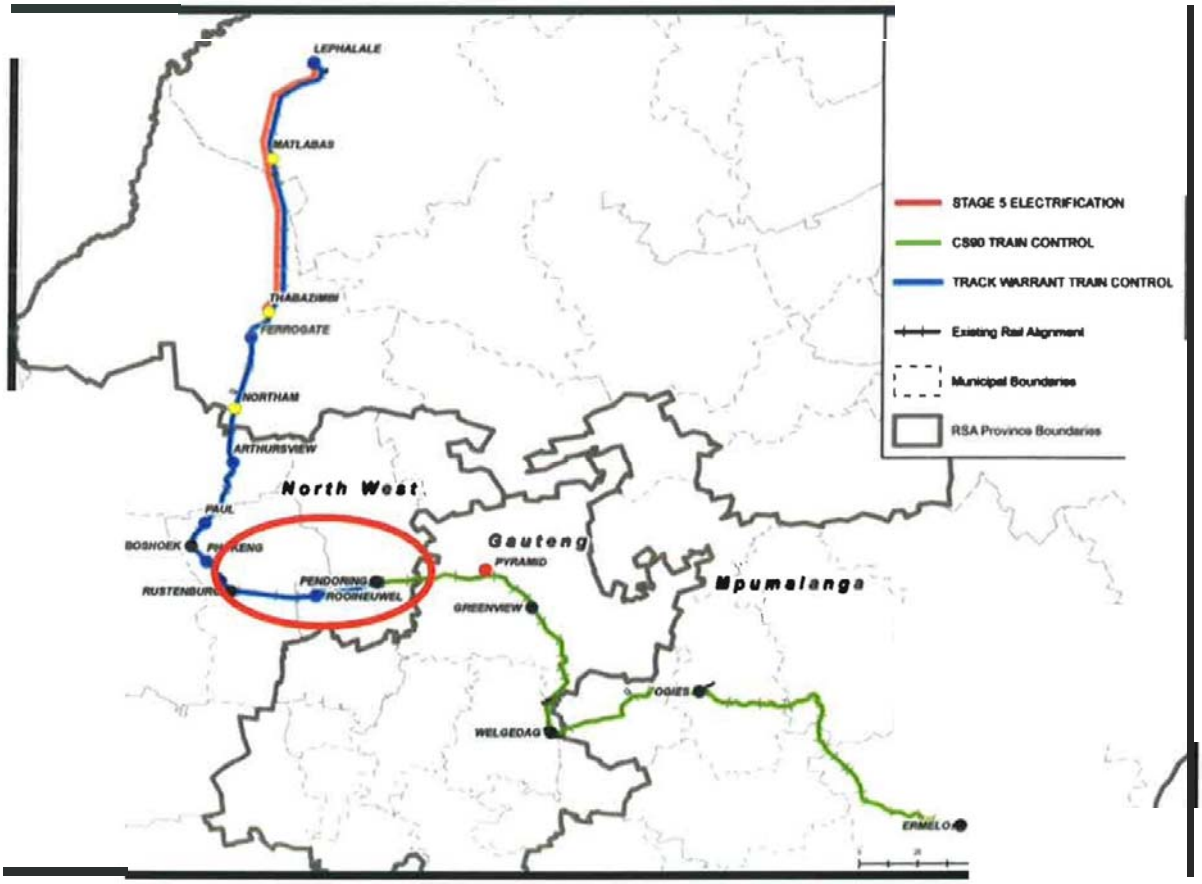


Figure 3: Waterberg Route Alignment (Turfgrond site is located within the red circle)

Turfgrond Substation is located within the Madibeng Local Municipality and within the Jurisdiction of Bojanala Platinum District Municipality in the North West Province. See **Figure 4** below.

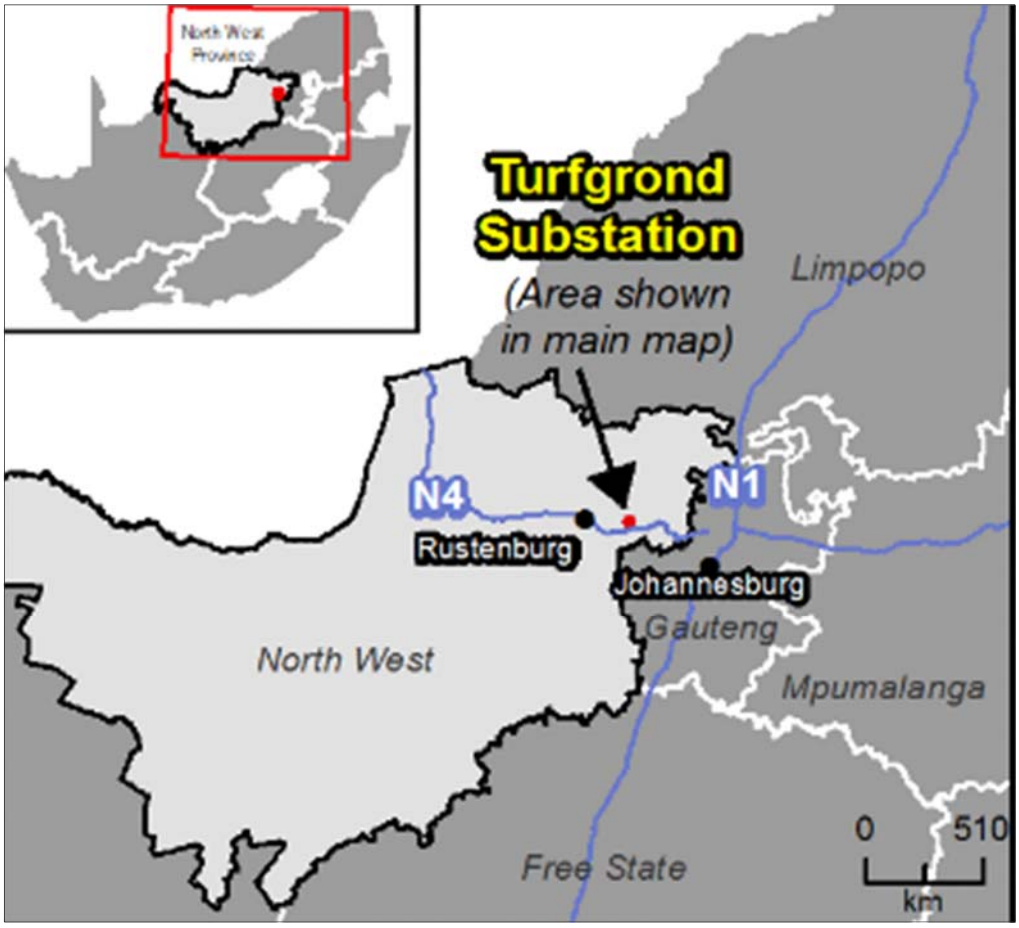


Figure 4: Location of Turfgrond Substation within Madibeng Local Municipality

The Turfgrond development forms part of the Transnet Waterberg rail corridor expansion programme (**Figure 3,** above). The land use in the surrounding study area is generally mining. Numerous features associated with mining occur within a 5km radius of the Turfgrond Substation expansion. Approximately 200m south of the Turfgrond Substation expansion there is mine tailings dam facility and a return water dam located on the southern boundary of a wetland (**Figure 5**).

Figure 5: Locality Map

The locality Map is provided in **Appendix A.**

FARM NAME

The proposed Turfgrond Substation expansion project will be constructed on Portion 14 of Farm Middlekraal 466 **(Figure 6)**.

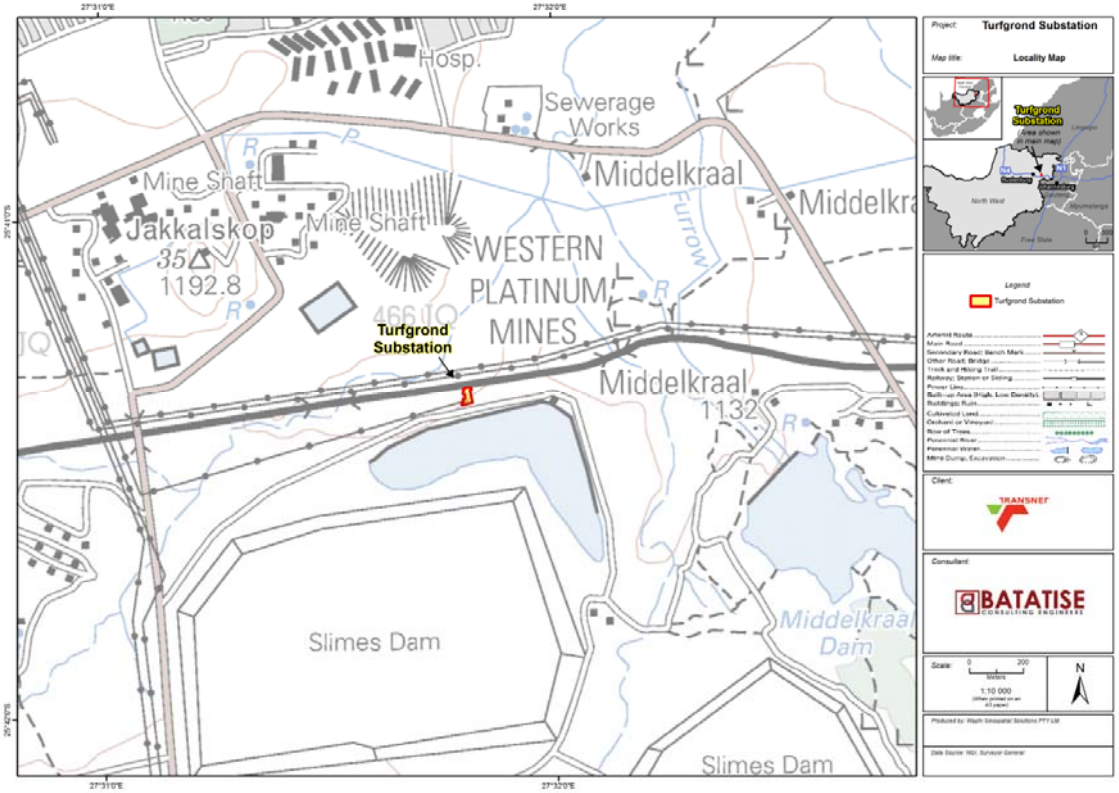


Figure 6: Farm location for Turfgrond Substation

COORDINATES

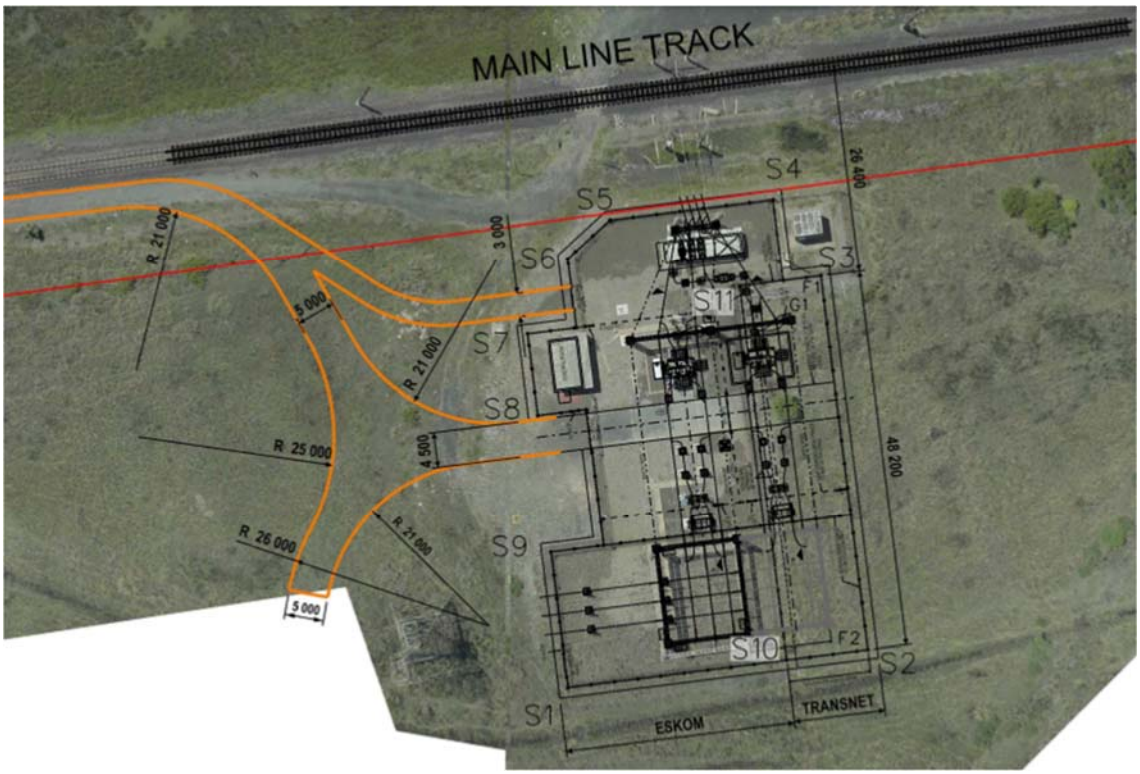


Figure 7: Turfgrond Substation Position Coordinates

The various coordinate positions in **Figure 7** are set out in the following tables.

Table 1: Proposed Existing Substation Servitude Coordinates

DESCRIPTION	COORDINATES	
	X	Y
S1	53 206.358	-2 842 556.762
S4	53 234.656	-2 842 491.624
S5	53 212.246	-2 842 494.441
S6	53 206.094	-2 842 500.136
S7	53 200.881	-2 842 509.174
S8	53 202.402	-2 842 521.278
S9	53 203.889	-2 842 537.117
S10	53 235.379	-2 842 551.904
S11	53 229.368	-2 842 504.081
AREA (m^2)	SUBSTATION	
	1 635.768	

Table 2: Proposed New Substation Fence Coordinates

DESCRIPTION	COORDINATES	
	X	Y
F1	53 245.761	-2 842 550.600
F2	53 239.749	-2 842 502.776

Table 3: Proposed New Substation Servitude Coordinates

DESCRIPTION	COORDINATES	
	X	Y
S2	53 247.101	-2 842 551.641
S3	53 240.786	-2 842 501.406
AREA (m^2)	SUBSTATION	
	504.317	

Table 4: Proposed New Substation 25kV Gantry Coordinates

DESCRIPTION	COORDINATES	
	X	Y
G1	53 235.933	-2 842 508.497

3 IDENTIFICATION OF ALTERNATIVE SCENARIOS

The Basic Impact Assessment (BIA) process is required to involve the identification of alternatives based on the activity, location and technology. The alternatives that are identified must be feasible. The options should also include the do-nothing alternative. The BIA process involves the assessment of these alternatives in terms of their potential impacts on the surrounding biophysical and socio-economic environment. The following alternative scenarios were investigated for this project:

3.1 ACTIVITY ALTERNATIVES - ROUTE CAPACITY EXPANSION OPTIONS AND STUDIES

Transnet is investigating the expansion of the Waterberg line, by means of the following studies:

Table 5: Route Capacity Expansion Options

Front End Loading 4	Front End Loading 3	Front End Loading 2	Front End Loading 3
Coal Expansion of the existing line, Stage 2 (currently being undertaken by TCP)	**Coal** Expansion of the existing line, Stages 3 to 5. (**Preferred option** for this study - Turfgrond Substation Expansion Project)	Study for the establishment of a new Heavy Haul line, from Hamelfontein to Lephalale, via Atlanta and Thabazimbi	**Chrome** Expansion of the existing line (currently being undertaken by the TFR Chrome / Ferrochrome business unit)

3.1.1 Front End Loading (FEL) 3 Expansion Study

This study focuses on the coal capacity expansion of the existing line, over Stages 3 to 5, with Stage 2 excluded from the study.

3.1.2 Stage 2 Works

As basis for the Stages 3 to 5 study, it is assumed that the Stage 2 works have been completed, which primarily consisted of:

- Lengthening the crossing loop at Matlabas to facilitate the crossing of 2 x 100 wagon trains at this location.
- 200 Wagon Loop in the Thabazimbi area
- Doubling of the main line between Dam and Onderstepoort
- Doubling of the main line between Bleskop and Norite

This essentially allows the operation of 3 x 100W trains / day, with the potential of up to 6.3 mtpa of coal.

3.1.3 Stage 3 to 5 Works

The Stages 3 to 5 FEL-3 solutions are to be developed in line with the preferred / selected solution as summarised in **Table 6** below, based on the findings of the simulation studies conducted by LTS Consulting for Transnet Freight Rail (TFR), during October 2013 and further refinements to the simulation completed during 2015, culminating in the final November 2015 report (Strydom, 2017).

Table 6 below provides a summary of the preferred corridor expansion solution.

Table 6: Summary of Preferred Solution

Track Section	Current Infrastructure		Preferred Solution Infrastructure		
	Power	Signalling	Stage 3 (3 x 200W) 20t/a	Stage 4 (6 x 200W) 20t/a	Stage 5 (Electrification)
Lephalale Thabazimbi	Diesel	Lephalale to Pendoring: Track Warrant System Pendoring to Ermelo: Colour Light	200W (100D+100D)	200 W (100D+100D)	Lephalale to Thabazimbi electrification
Thabazimbi - Pyramid South	25kV AC		200 W (100E**+100D)	200 W (100E+100D***)	
Pyramid South - Ermelo	3kV DC		200 W (100E+100D)	200 W (100E+100D)	
Ermelo - Richards Bay	25kV AC		200 W (100E+100D)	200 W (100E+100D)	
Infrastructure			Lengthen loops: Arthursview, Paul, Phokeng, Rooiheuwel Ferrogate OTF Line: Pyramid South New Yard: Lephalale Convert Track Warrant System to Colour light Signalling	Lengthen Matlabas Lengthen Northam Additional yard line at Thabazimbi Convert Track Warrant System to Colour light Signalling	
Potential Capacity (Coal)			12.6 Mtpa	24 Mtpa****	24 Mtpa

*W=Wagons, **E=Electrical, ***D=Diesel, **** To meet the volume demand for Stage 4 (24 mtpa), the expansion of Full Colour Light signaling up to Lephalale, may be required – needs further investigation in FEL 4.

3.2 LOCATION ALTERNATIVES

The new portion of platform required for the expansion of the Turfgrond Substation shall integrate seamlessly with the existing platform (Strydom, 2017). This indicates that the preferred site location for the expansion development will be on the existing developed area. No other location alternative was necessary for this project.

3.2.1 Future Expansion Considerations

Transnet has indicated that the existing 25kV indoor switchgear will be replaced with outdoor switchgear in the near future. This design have allowed for easy integration of the before mentioned future project with the installation that will be done as part of this project (Strydom, 2017).

3.3 TECHNOLOGY / DESIGN ALTERNATIVES

The site conditions as listed in **Table 11** in Chapter 6, is the condition on site where all the equipment under this project's design shall be installed and operated. Therefore the following design types are the preferred options for the site conditions. No other design alternative was necessary for this project.

3.3.1 Platform Design

All equipment and associated steelwork, foundations and installation methods will comply with the Transnet standards and regulations as well as the SANS standards.

The existing site will have to be extended as per general arrangement drawing. A portion of the site has already been prepared. From a visual inspection at the site it was noticed that area was predominantly flat, with no noticeable fall in any direction. The site is covered with natural vegetation consisting of Bush grasslands. The platform will be designed to naturally drain the water from the surface by establishing a 1:100 fall over the substation platform. Subsoil drainage may be eliminated as a result. The side slopes of the platform should be constructed at a maximum fill slope of 1:3 (Strydom, 2017).

3.3.2 Earthing Design

Drawings of the currently installed earth mat are not available. For the purpose of this design a typical earth mat drawing was done. The conductors used for the earth mat, as well as for the bounding of equipment, structures and foundations, shall be as specified on the earth mat drawing.

- All equipment supports and columns will be connected with HD bolts to the substation earth grid.
- Earthing balls for portable leads, to be installed on the isolator steelwork supports.

A detailed design for the earth mat shall be done in CDEGS during the FEL 4 study (Strydom, 2017).

3.3.3 Protection and Control Design

The extension to the Turfgrond Substation consists of the addition of a traction transformer and associated equipment to increase the substation capacity by 20MVA. The protection and control schemes that are proposed will comply with the Transnet Freight Rail standard requirements. The following protection shall be required (Strydom, 2017):

Table 7: List of Equipment to be protected - Turfgrond Substation

Description	Feeder Name
1x88/25kV Traction Transformer	Transnet 2 Feeder
1x24 Incomer	Incomer 2

3.4 DO NOTHING ALTERNATIVES

The “Do Nothing” Alternative is the option of not undertaking the proposed development. The existing Turfgrond Substation infrastructure would remain status quo and thus would not achieve its purpose of the rail expansion (part of the bigger project Waterberg rail corridor expansion programme) to provide infrastructure along the coal railway line to increase the coal hauling capacity. As such, the “Do Nothing” Alternative would not be socially or economically feasible in the long-term and is thus not deemed feasible. However, the “Do Nothing” Alternative is nevertheless considered and assessed in relation to the potential implications of the proposed project, as required in terms of NEMA and its EIA Regulations.

4 LEGISLATIVE FRAMEWORK

South Africa's policy and legislation for environmental management, including biodiversity conservation, has undergone profound changes in the past decade. The proposed project was considered in accordance with the legislation described below.

Of importance are also all provincial and municipal by-laws and regulations that are not listed here but which would be complied with during all phases of the proposed expansion development. Some of the acts may have changed or are in the process of change. However, once the construction phase commences, legislation and all amendments that are current at that time will apply.

4.1 LEGISLATION RELATED TO THE PROPOSED PROJECT

Table 8: Legislation Related to the Proposed Project

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
Constitution of the Republic of South Africa (Act 108 of 1996)	Section 24 of the Constitution makes provision for an environment that is not harmful to human well-being.	Republic of South Africa	1996
National Environmental Management Act (Act 107 of 1998, NEMA)	NEMA is South Africa's overarching environmental legislation. The Act sets out the principles of Integrated Environmental Management (IEM) and aims to promote sustainable development. The Act has implications for all three tiers of government and Section 2 of the Act contains a list of environmental principles that government must keep in mind when taking any decision that may significantly affect the environment. Section 24 of the Act (as amended) indicates that activities that may have a significant detrimental effect on the environment and require permission or authorisation in terms of the law must be assessed prior to decision-making.	Department of Environmental Affairs	1998
National Environmental Management: Biodiversity Act (Act 10 of 2004, NEM:BA)	This Act provides for the protection of those species and ecosystems that warrant national protection, the sustainable use of natural resources, the fair and equitable sharing of benefits arising from	Department of Environmental Affairs	2004

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
	bio-prospecting that involves indigenous biological resources. It also outlines the authority and responsibility of the South African National Biodiversity Institute (SANBI).		
National Water Act 1998 (Act 36 of 1998, NWA)	This Act provides for the protection of water resources. In Section 21 of the Act certain activities are described that need a Water Use License (WUL) in order to commence / continue. Some of the activities in this project triggers activities listed in Section 21 of the Act. A separate Water Use License Application (WULA) process is underway to address the activities identified in the light of this Act.	Department of Water and Sanitation	1998
National Heritage Resources Act (Act 25 of 1999)	This Act is aimed at an integrated system for the identification, assessment and management of heritage resources in South Africa. Under Section 28 of this Act, an agency wishing to establish any development or other activity which will change the character of a site exceeding 5 000 m^2, and the re-zoning of a site exceeding 10 000 m^2 in extent must notify the responsible heritage resources agency of its intention.	South African Heritage Resources Agency (SAHRA)	1999

4.2 LISTED ACTIVITIES

EIA Regulations of 2014 promulgated in terms of NEMA under Government Notice (GN) No. 982 outline the activities for which EIAs should apply. Amendments to the 2014 EIA Regulations were promulgated with effect from 7 April 2017. The 2017 amendments retain the ethos of the 2014 EIA Regulations with some aspects clarified or deleted.

Developments which trigger activities within GN R983 and R985 require a Basic Impact Assessment (BIA) application process and those that trigger GN R984 activities require a full EIA application process. The proposed Turfgrond Substation expansion and associated activities are undergoing a BIA application process as the project triggers Listing Notice 1 and 3 activities.

The table below outlines the proposed project activities, their potential impacts and mitigation measures in relation to the activities applied for in terms of the EIA Regulations 2014, as amended. Furthermore, the description of the proposed project including its associated infrastructure, unpacks the activities applied for, provided in **SECTION 1.2** in this report.

Table 9: Activities listed within Government Notice No. R983 and R985 applicable to this project (as per numbering in the Government Notice)

Activity Number	Reasons for Listed Activities Triggered	Potential Impacts	Mitigation Measures
GN R983: LN 1 of 2014 EIA Regulations, as amended			
19 The infilling or depositing of any material of more than 10m^3 into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10m^3 from a watercourse.	The proposed Turfgrond Substation expansion study area is within an artificial seep wetland. As part of the construction activities, there will be removal or moving of soil, sand, pebbles or rock of more than 10m^3 from a watercourse.	• Driving through watercourses during the construction and phase of the project will result in soil compaction within watercourse; • The above will further affect watercourse vegetation and result in erosion; • Flow, sedimentation and erosion changes in watercourses due to expansion construction activities, refers to changes in the pattern of surface and subsurface flow in watercourses, as well as resultant sediment depositional impacts and erosion impacts.	• Driving should be done on existing roads and tracks as far as possible, in order to prevent vehicle track entrenchment and avoid the potential for new channel initiation and erosion. • If the wetland area is unavoidable make sure that substrate continuity in the watercourse is maintained within upstream and downstream portions of the channel bed. • Construction works should preferably take place during the dry period.
GN R985: LN 3 of 2014 EIA Regulations, as amended			
12: (h) (iv) (vi): The clearance of an area of 300m^2 or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance	The proposed development footprint is approximately 2140m^2. Therefore, the development area will need to be cleared of 300m^2 or more of indigenous vegetation for site camps and construction activities. The study area is situated within Critical Biodiversity Areas and a wetland area.	• Clearing of surface vegetation that will expose the soils, which in rainy events would wash down into wetlands, causing sedimentation. • Indigenous vegetation communities are unlikely to colonise eroded soils successfully. In addition, seeds from proximate alien invasive plants can spread easily into the	• Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction / earthworks in that area • A vegetation rehabilitation plan should be implemented. Grassland can be removed as sods and stored within transformed vegetation. The sods must preferably be removed during the winter months and be replanted by latest springtime. The

Activity Number	Reasons for Listed Activities Triggered	Potential Impacts	Mitigation Measures
management plan. (h) In North West (iv) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority; (vi) Areas within a watercourse or wetland, or within 100m from the edge of a watercourse or wetland.		eroded soil.	sods should not be stacked on top of each other or within sensitive environs. 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. • Remove only the vegetation where essential for construction and do not allow any disturbance to the adjoining natural vegetation cover.
		Destruction of vegetation	• Incorporate proper planning for construction to avoid threatened or small vegetation communities where possible. • Erosion control should be implemented in all areas where soil erosion can be foreseen (e.g. slopes, destabilised soil and/or soils with high erodibility).

5 APPOINTMENT OF ENVIRONMENTAL CONSULTANT AND SPECIALISTS

5.1 ENVIRONMENTAL ASSESSMENT PRACTITIONOR (EAP)

Name of EAP: Judith Fasheun

Description: Master of Environment and Development:

Graduated from the School of Environmental Sciences, UKZN. Judith majored in Geography and Environmental Management, studied a BSc honours degree in the latter, and completed a Master's degree through the Department of CEAD at UKZN. In terms of environmental consulting, Judith has 9 years relevant experience, and has been involved in undertaking a number of EIAs associated with powerline projects, amongst others. Judith is a member of the (IAIAsa and a member of the South African Council of Natural Scientific Professions (SACNASP) registered as *Cert Sci Nat 300019/14.*

The EAP has signed the Declaration of Interest and undertakings under oath regarding correctness of information and level of agreement in front of a commissioner of oaths. The signed document inclusive of the EAP's CV is provided in **Appendix I**.

5.2 APPOINTED SPECIALITS

Table 10: Team of Specialists Appointed

Field	Name / Company	Experience	Function
Ecological Assessment	Marelie Meintjies STS	• Qualifications: MSc Medicinal Plant Science (University of Pretoria). • Field Biologist with four years' experience. • Has conducted over 20 specialist related ecological assessment studies.	To conduct an Ecological assessment of the flora and vegetation in the area designated for the proposed Turfgrond Substation expansion project.
Freshwater Assessment	Nqobile Lushozi SAS	• Qualifications: MSc (cum laude) Geoinformatics (Stellenbosch University) and BSc (Hons) Environmental Sciences (UKZN) • Junior Field Ecologist with 1 year experience. • Has conducted over 4 specialist related Freshwater assessment studies.	To conduct a Freshwater assessment (wetlands and riparian areas) in the area designated for the proposed Turfgrond Substation expansion project.
Heritage Impact Assessment	Johan Abraham van Schalkwyk (Independent Heritage Consultant)	• Qualifications: DLitt et Phil (Anthropology), UNISA. • Independent Heritage Consultant with more than 40 years' experience. • Has conducted over 2000 Phase 1 and 2 related Heritage	To conduct Phase 1 cultural heritage assessment to determine if the proposed expansion of Turfgrond Substation would have an impact

Field	Name / Company	Experience	Function
		assessment studies.	on any sites, features or objects of cultural heritage significance.

The Specialists' "Declaration of Interest" documents and CVs are provided in **Appendix J**.

6 OVERVIEW OF THE RECEIVING ENVIRONMENT

This section discusses the key characteristics of the biophysical and biodiversity aspects of the potentially affected area. For this project, the study area is defined as the development footprint and its immediate surroundings as well as to a larger scale; the local municipal areas, the broader district and region. The information pertaining to the receiving environment has been compiled with information from desktop studies, which represent basic literature survey and a review of available spatial data. Nonetheless, information gathered during the field survey by the specialists is available in **Appendix G**. Field survey data was used to inform the various specialist assessments within the project study area

6.1 CLIMATE SITE CONDITIONS

Table 11: Climate Site Conditions

ITEM	DESCIPTION	
Altitude	1156m above sea level	
Temperature*	Yearly average temperature	18.6°C
	Minimum average temperature	10.7 °C
	Maximum average temperature	26.6°C
Pollution Level***	Low (Zinc coating loss <0.8µm/year	
Lightning Frequency**	8.1 flashes/km^2/year	
Average Yearly Rainfall*	663 mm	

Source:

* Weather information retrieved from http://en.climate-data.org/ in Strydom (2017)

** Lighting ground flash density retrieved from http://www.liveline.co.za/gfd.php (CSIR 2007) in Strydom (2017)

*** Pollution levels based on Zinc corrosion map (CSIR 2008) in Strydom (2017)

According the Transnet specification all equipment shall be designed and rated for operation under the following service conditions:

- Altitude: 0 to 1800m above sea level
- Relative humidity: 10% to 90%
- Ambient temperature range : minus 10°C to plus 55°C
- Level of pollution: Heavily salted laden or polluted with smoke from industrial sources
- Lighting conditions: 20 ground flashes / km^2 / annum

6.2 GEOLOGY AND SOILS

Most of the area is underlain by the mafic intrusive rocks of the Rustenburg Layered Suite of the Bushveld Igneous Complex. Rocks include gabbro, norite, pyroxenite and anorthosite. The shales and quartzites of the Pretoria Group (Transvaal Supergroup) also contribute mainly vertic melanic clays with some dystrophic or mesotrophic plinthic catenas and some freely drained, deep soils.

6.3 VEGETATION

- The Turfgrond Substation Expansion Area is situated within the **Savanna Biome.**
- The Turfgrond Substation Expansion Area is located within the **Central Bushveld Bioregion**

- The Turfgrond Substation Expansion Area is situated within the **Marikana Thornveld**

Conservation details:
The Turfgrond Substation Expansion Area falls within an area that is currently not protected. Ecosystem types are categorised as “not protected”, “poorly protected”, “moderately protected” and “well protected” based on the proportion of each ecosystem type that occurs within a protected area recognised in the Protected Areas Act, 2003 (Act No. 57 of 2003), and compared with the biodiversity target for that ecosystem type. Ecosystems where less than 5% of the biodiversity target has been met, is considered as not protected (NBA, 2011).

The Turfgrond Substation Expansion Area is not considered to form part of the remaining extent of any threatened ecosystems, and is therefore of least concern (National Threatened Ecosystems, 2011)

The Turfgrond Substation Expansion Area is located on the northern border of the Magaliesburg Biosphere Reserve according to the SACAD (Q1, 2019). There are no other protected or conservation areas within 10km of the Turfgrond Substation Expansion Area according to the various datasets assessed. NPAES (2009) does, however indicates the Northwest/Gauteng Bushveld Focus Area approximately 4 km north. Focus areas are areas identified for land-based protected area expansion, and are large, intact unfragmented areas of high biodiversity importance and representation as well as ecological persistence, suitable for the creation or expansion of large protected areas. See **Figure 8** below.

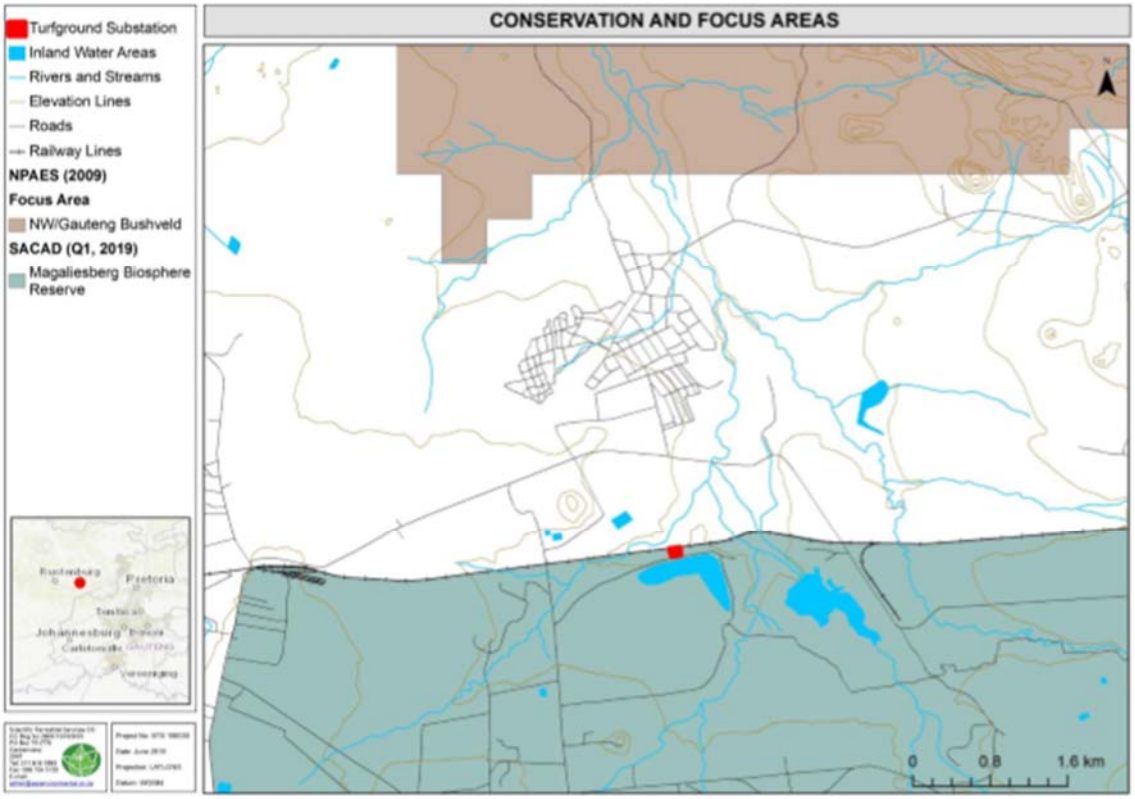


Figure 8: Conservation and Focus Areas
Source: Meintjies (2019)

Vegetation & landscape features:

Open Vachellia karroo woodland, occurring in vallies and slightly undulating plains, and some lowland hills. Shrubs are denser along drainage lines, on termitaria and rocky outcrops or in other habitats protected from fire.

According to the NWBSP (2015) in Meintjies (2019) the Turfgrond Substation Expansion Area falls within an area considered to be a CBA 2, and is considered to be a critical corridor linkage as well as an Important Bird Area (IBA). Critical corridor linkages are linkages in the provincial biodiversity corridor network where existing conversion of natural landscapes to other land uses has severely restricted options for maintaining connectivity in the natural landscape. See **Figure 9** below.

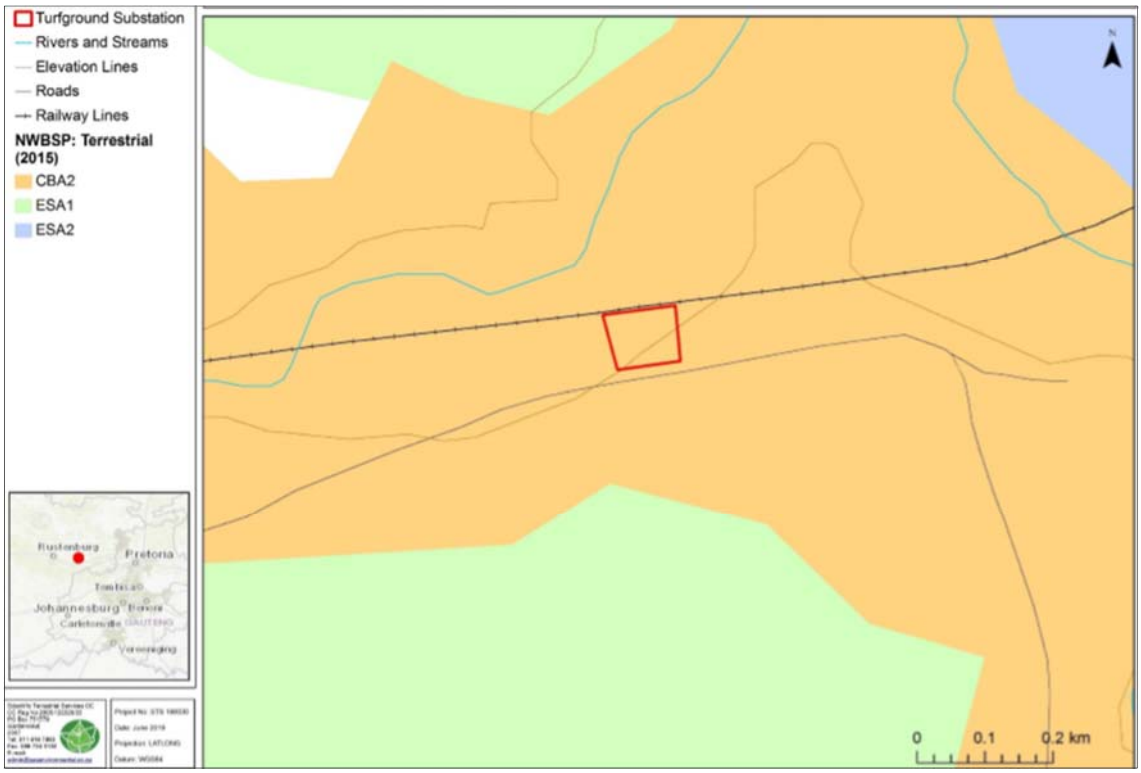


Figure 9: The Turfgrond Substation Expansion Area is situated within a CBA 2
Source: NWBSP, 2015 in Meintjies (2019)

6.4 LAND USE

Turfgrond Substation is situated within the Madibeng Local Municipality (MLM) area. Madibeng Local Municipality is one of 21 local municipalities in North West Province and forms part of the Bojanala District Municipality (BDM). It represents the core part of platinum mining in South Africa, and the N4 Platinum Development Corridor runs from east to west through the municipal area (RLM IDP, 2018).

In the context of the Bojanala District (**Figure 10**) it is clear that the bulk of platinum mining activity is located in the MLM area. From here it extends northwards towards Moses Kotane LM (west of the Pilanesberg) and eastwards past Marikana towards Madibeng LM. The platinum mining belt runs parallel to the north of the Magalies Mountain which extends from the Pilanesberg right up to the City of Tshwane to the far east. Also evident is the concentration of informal settlements along the mining belt.

Another prominent feature is the large number of rural villages and small towns located in the northern extents of the District, and more specifically in Moses Kotane, northern parts of Rustenburg, Madibeng and the Moretele municipalities. Most of these areas are under traditional leadership.

The regional road and railway network traversing the district provides good accessibility to the majority of areas in the district and surrounding provinces (Limpopo and Gauteng). Most notable in this regard is the N4 Development Corridor.

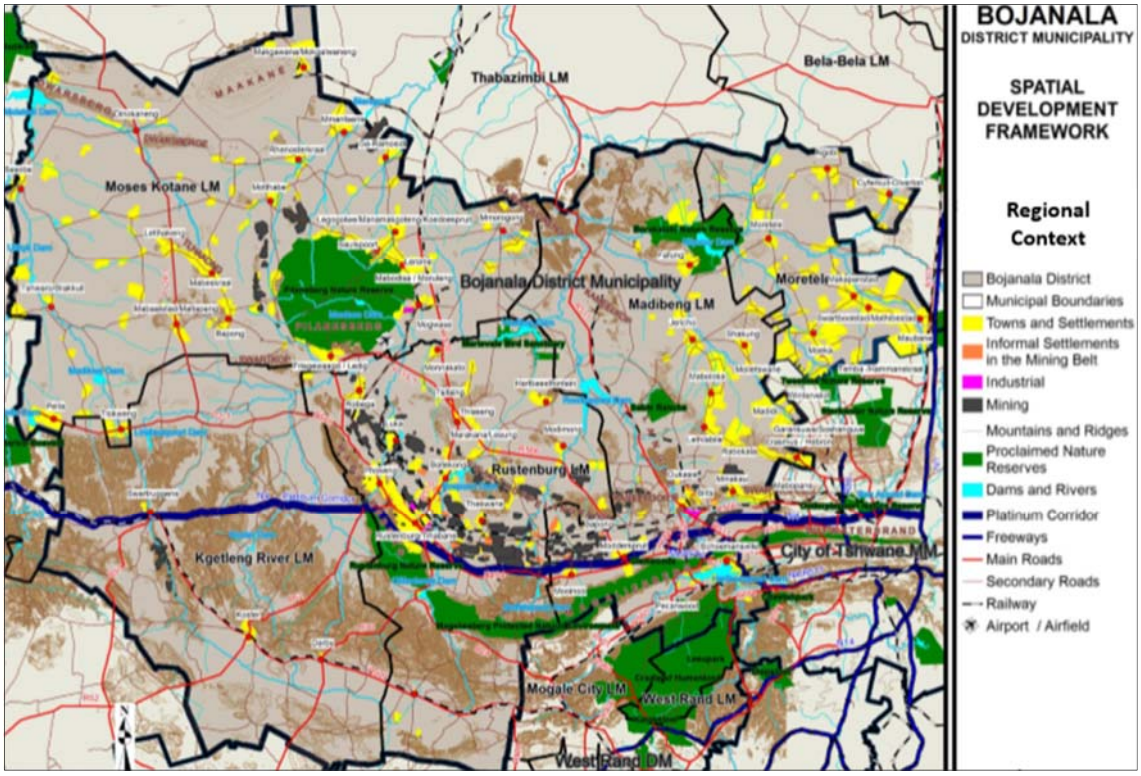


Figure 10: Spatial Development Framework for BDM
Source: RLM IDP, 2018

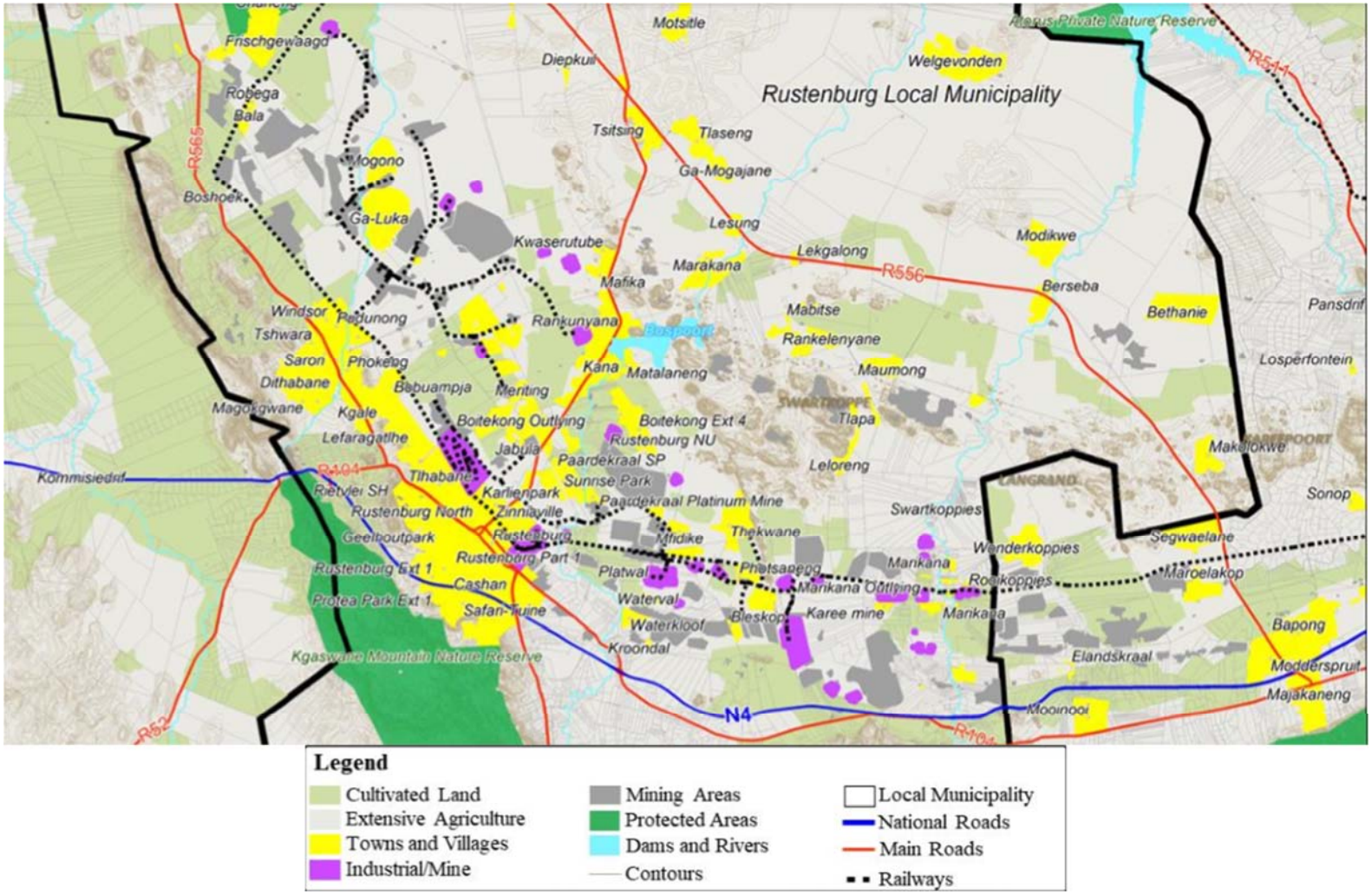


Figure 11: Land Use Map for RLM
Source: RLM IDP, 2018

From **Figure 11** above it is evident that four major elements have shaped the historical development of the settlement patterns in the RLM area (RLM IDP, 2018):

- **Rustenburg town** represents the centre of population concentration, employment opportunities and shopping opportunities. This attracted urban development towards the town.
- **The Magalies Mountain Range** traverses the municipal area south of Rustenburg Town and inhibited urban expansion in a south westerly direction. Hence, urban expansion was forced in a northern and north-easterly direction.
- **The Provincial Roads** that cross the Madibeng and Rustenburg Municipal Area have had a profound impact on the shape of urban development within the municipal area. Two provincial roads traversing the municipal area can be distinguished as having the largest impact on urban development in the region. These roads are the Rustenburg/Sun City road (R565) that links Rasimone, Luka and Phokeng to Rustenburg; and the Rustenburg/Thabazimbi road (R510) that links Tlaseng, Kanana and Boitekong to Rustenburg.
- **The Platinum Mines**, running parallel to the north of the Magaliesberg mountain range, have dramatically shaped the settlement pattern in the municipal area. On the one hand, it fragmented urban development by creating physical barriers such as transport facilities, pipelines, infrastructure and surface mining infrastructure between Rustenburg and the settlements located north of the mining belt, (e.g. Boitekong). On the other hand, it also led to the development of isolated towns such as Luka, Kanana, Thekwane and Photsaneng in close proximity to mining activities (job opportunities).

6.5 TOURISM AND HERITAGE FEATURES

The main local tourism attractions the region has to offer, are closely linked to the comparative advantages the area has to offer with regard to its natural assets, the occurrence of many heritage sites relating to iron/stone age, Anglo-boer history and indigenous tribes such as the Tswana and Ndebele, and the variety of minerals and mining activities found in the area.

Furthermore, to the heritage features:

- Stone tools dating the Middle Stone Age are known to occur on some of the larger outcrops/hills in the region as well as on the banks of some of the rivers and streams crossing the region;
- Stone walled settlement sites dating to the Late Iron Age occur to the north and northeast of the study area;
- Historic structures, inclusive of buildings, fortifications, infrastructure related features such as bridges and culverts occur in a sporadic manner across the landscape;
- Formal cemeteries are located in the town and surrounding townships;
- Informal burial sites occur sporadically throughout the country side.

However, in relation to the Turfgrond Substation study area (**Figure 12**), the probability of cultural heritage sites, features and objects occurring in the study area is deemed to be low.

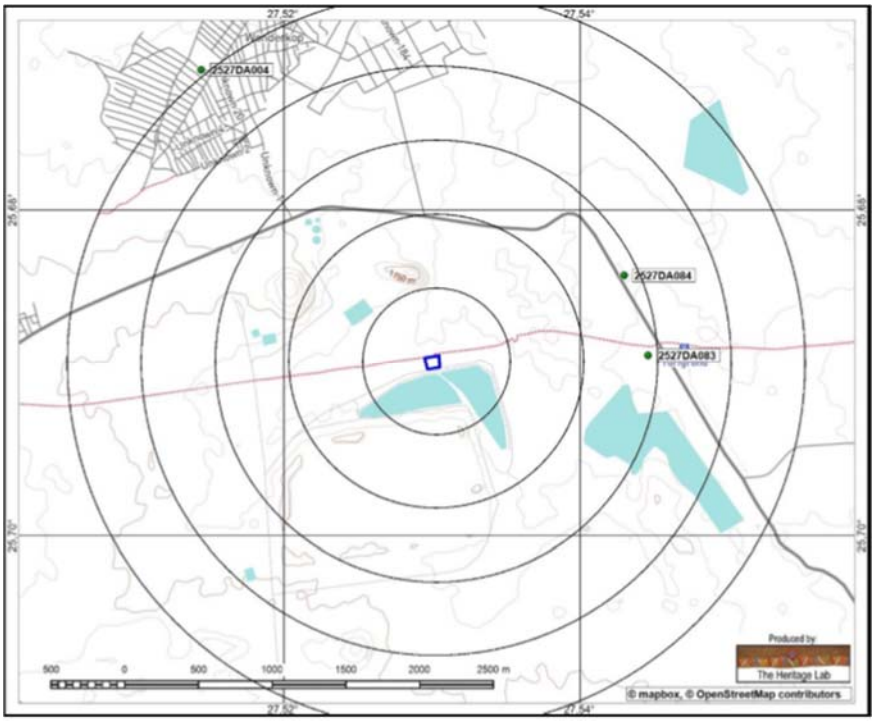


Figure 12: Location of known heritage sites and features in relation to the study area
(Circles spaced at a distance of 0,5km: heritage sites = coded green dots)
Source: van Schalkwyk, 2019

Most of the tourism and accommodation establishments are located in the immediate Rustenburg area (71%) with the remainder being in the Buffelspoort/ Mooinooi/ Maanhaarand area (16%), at Vaalkop dam (5%), at Boshoek (4%) or near Magaliesburg (4%).

Tourism plays an increasingly important role within the Madibeng and Rustenburg Municipal Area. The typical Bushveld climate and vegetation of the Municipal Area, as well as the unique topography of the Magaliesberg, offer several opportunities for tourism. These include opportunities for eco-tourism, as well as tourism associated with the variety of historical and cultural interests found within the municipal area. Primary tourism areas and facilities located within the municipal area are as follows:

- Rustenburg Town;
- Kgaswane Game Reserve;
- Vaalkop Dam Nature Reserve;
- Kroondal;
- Bafokeng Sport Palace; and
- Buffelspoort Dam.

Despite the above mentioned tourist attractions, the most prominent regional tourist destination are not located within the RLM area itself, but on its borders. The broader region has some of the finest game parks, cultural and archaeological sites and entertainment resorts in South Africa, including:

- Pilanesberg National Park;
- Madikwe Game Reserve;
- Sun City and Lost City Resort; and
- Cradle of Humankind.

7 BASIC IMPACT ASSESSMENT PROCESS

7.1 BASIC IMPACT ASSESSMENT (BIA) PROCESS

The following objectives were met during the BIA process:

- To identify and evaluate potential environmental impacts that could emanate from activities at different stages of the implementation of the proposed Turfgrond Substation expansion. These could either be positive and or negative impacts. This was done through a desktop review of existing literature as well as conducting specialist field assessments.

- To ensure considerable evaluation of all alternatives including the “do nothing option”.

- To identify key environmental, biophysical and social issues associated with the proposed Turfgrond Substation expansion.

- To conduct an open participatory and transparent process and facilitate the inclusion of Interested and Affected Parties (I&APs) and Stakeholders’ concerns of the proposed project in the decision-making process.

- To provide the competent authorising body with sufficient information to identify the issues that require assessment as well as the nature and extent of specialist studies required during the BIA process.

Figure 13 below provides a summary illustration of the BIA approach.

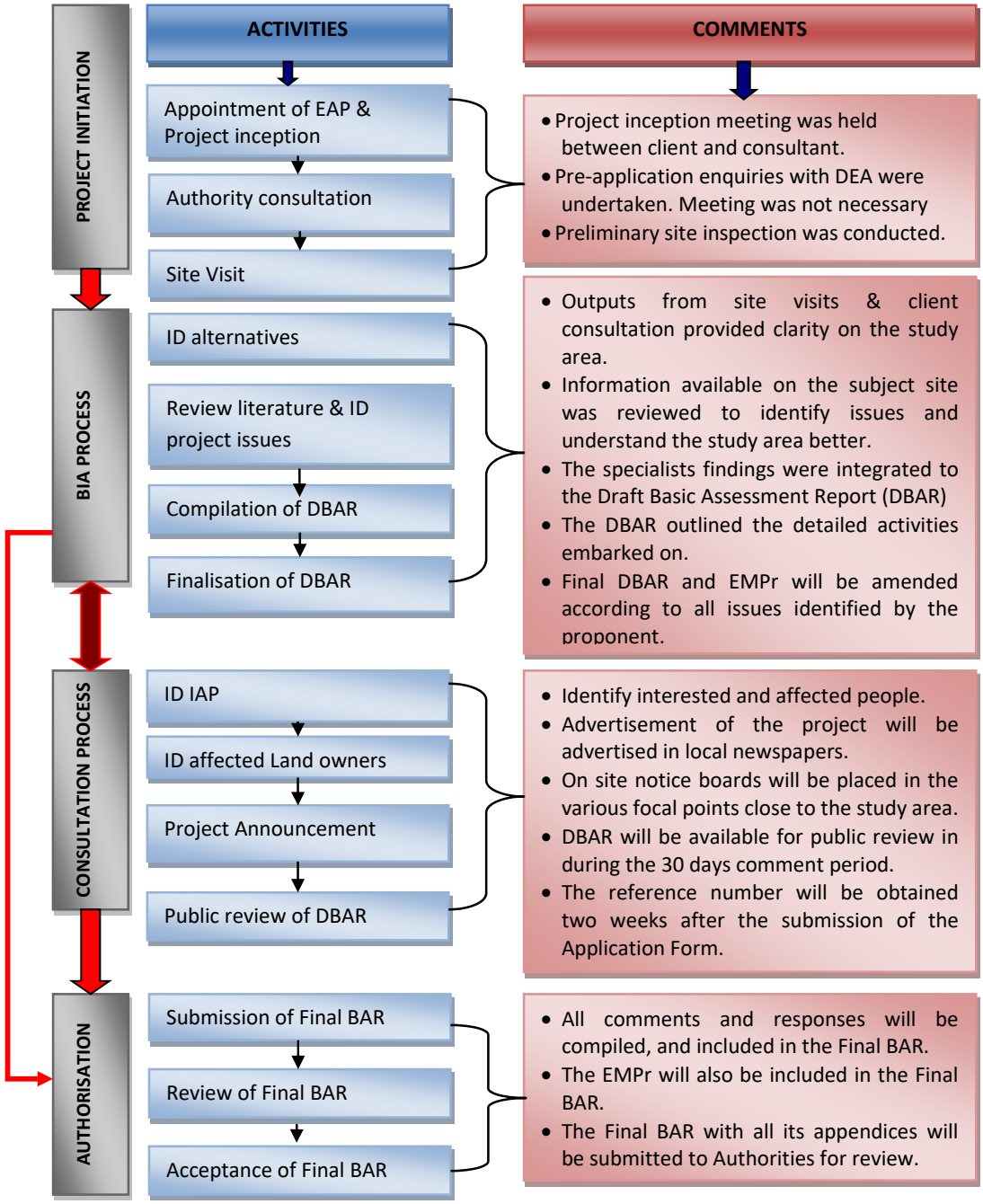


Figure 13: BIA Approach for the proposed Turfgrond Substation expansion project

7.2 TECHNICAL PROCESS

7.2.1 Inception Meeting with Client

On notification and receipt of the appointment letter from Transnet, a project inception meeting was convened between Transnet and Batatise Consulting Engineers. During this project kick-off meeting the following was discussed:

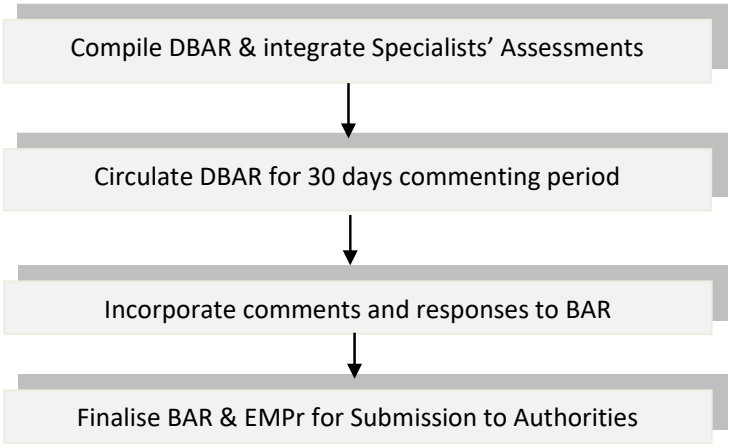
- Project Scope and requirements (confirmation of scope of work);
- Project Schedule;
- Identification of key stakeholders and role players; and
- Preliminary analysis for the Turfgrond Substation expansion.

7.2.2 Application for Environmental Authorisation in Terms of GN R982 of 2014, as amended

An application for Environmental Authorisation (EA) will be submitted together with the Draft BAR to the Department of Environmental Affairs (DEA). This avoids the timeframe constraints for the final submission of the Final BAR to the Authorities. The Application form is provided in **Appendix D2.**

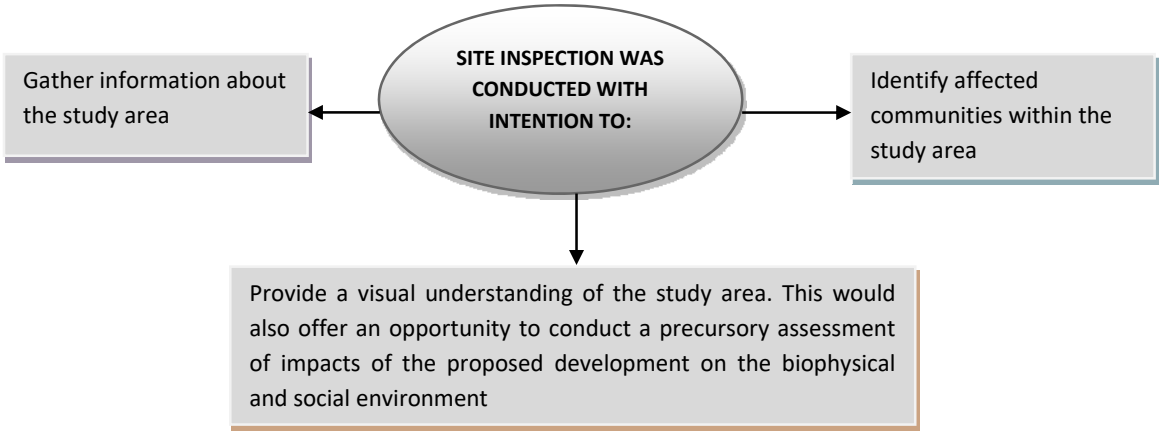
The Gauteng Department of Agriculture and Rural Development (GDARD), is regarded as the provincial commenting authority for the BAR of this project and has been included on the list of key stakeholders.

To secure approval for the BAR from the authorities, the following activities will be embarked on:



7.2.3 Site Inspection

A preliminary site inspection was conducted during the inception phase of the project in May 2019. The purpose of the site inspection is outlined below:



Photographs of the site at the time of the site inspection are presented in **Appendix C.**

7.2.4 Issues Identified

In order to compile the Basic Assessment Report (BAR), issues identified by the I&APs and stakeholders will be considered. Furthermore, it was necessary to conduct specialist assessment studies to determine more potential impacts that would need to be avoided or minimised by the development. The specialist assessment findings and recommendations are discussed in **Chapter 9** in this report.

7.2.5 Collection of Information

Basic information was gathered from existing literature on the study area with inputs from the specialists' assessment surveys.

7.2 6 Review of Basic Assessment Report

The final BAR will be prepared on the basis of specialists' findings and issues identified during the PPP. Thereafter the Final BAR will be submitted to the relevant authorities for final review and acceptance.

7.3 PUBLIC AND STAKEHOLDER PARTICIPATION DURING DRAFT BAR

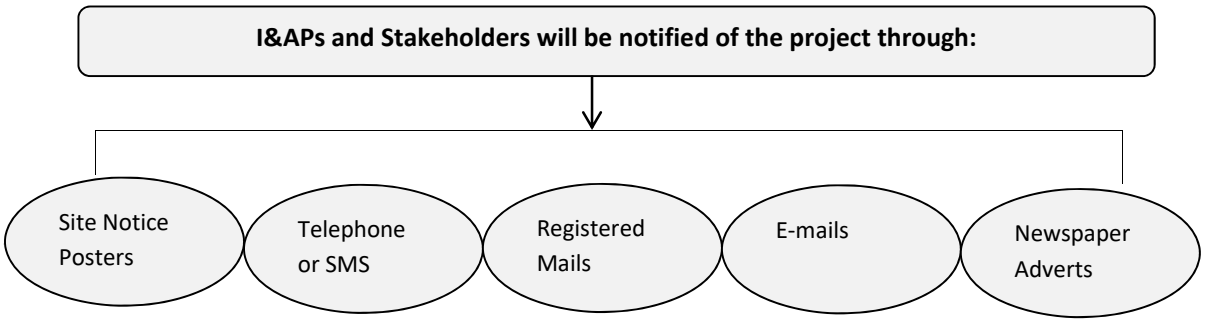
7.3.1 Background Information Document / Notification Letter

A Background Information Document (BID) / notification letter, was circulated to all identified I&APs in July 2019. The BID encouraged all individuals to contact the consultant should they wish to be registered on the I&AP database and / or to provide comments regarding the proposed project.

The BID / notification letter is provided in **Appendix F1**.

Email Notification of the BID is provided in **Appendix F2.**

7.3.2 Registration as Interested and Affected Parties (I&APs)



The I&APs database has been provided in **Appendix F3**.

7.3.3. Newspaper Adverts

A Newspaper advert will be published to notify the public of the proposed project and will be announcing the availability of the DBAR as well as notification of the focus group meetings which are to be undertaken during the 30 days commenting period. The newspaper advert will be provided in the Public Participation section of the final BAR.

7.3.4. Site Notices

Site notices were posted at focal points within the communities close to the study area. Similar to the newspaper adverts, the site notices were calling for registration of I&APs on the project register.

The site notice photographs are provided in **Appendix F4.**

7.3.5. Involvement of Key Stakeholders

The affected local authorities and organisations were contacted to introduce the project and identify relevant people to engage with during the project execution process. Names of representatives from these authorities and organisations are included in the I&APs database.

The I&APs database is provided in **Appendix F3**.

7.3.6. Public Meetings

A Focus Group meeting will be held in the areas close to the proposed project area. The anticipated month would be in August 2019. Venue, date and time for the Focus Group meeting will be notified as indicated in section 7.3.2 above.

The purpose of the meetings will be to:

- introduce the project to the local I&APs;
- identify issues pertinent to the project;
- invite people to register as I&APs;
- link Transnet, the consultant and the affected parties; and
- provide I&APs with an opportunity to provide comments.

7.3.7. Public Review of Basic Assessment Report

All I&APs and Stakeholders will be given the opportunity to review and comment on the draft BAR for a minimum of 30 days. The Draft BAR will be circulated for public review in the month of September 2019. The report will be placed at focal points for public access such as government department / offices and libraries.

All I&APs and stakeholders will be given an opportunity to forward their written comments, objections, inputs and queries within the 30 days commenting period. All comments received from stakeholders and I&APs will be acknowledged and responded to in the Comments and Response Report (CRR). The Final BAR will include the CRR. All issues will have to be considered and dealt with before submission to the Authorities.

7.4 Basic Assessment Process Timeframes

The following work programme would be followed during the BIA process.

Table 12: Proposed Project Schedule

ACTIVITY	TIME FRAME	STATUS
Preliminary Site Visit	May 2019	**Complete**
Circulation of Notifications/BID to I&APs	July 2019	**Complete**
PPP for Draft BAR phase	August/Sept 2019	In progress
Circulation of Draft BAR 30-day comment period	Sept 2019	In progress
SUBMISSION OF DBAR / APLICATION FORM TO DEA	Sept 2019	In progress
PREPARE FINAL BAR	Oct 2019	Pending
SUBMISSION OF FBAR TO DEA	Nov 2019	Pending
Anticipated Environmental Authorisation	January 2020	Pending

7.4.1 Environmental Authorisation Timeframes

- The Environmental Authorisation is required in February 2019.
- The expansion activity will be concluded in December 2022.
- The post construction monitoring requirements would be finalise in December 2023.

8 METHODOLOGY OF THE ASSESSMENT OF POTENTIAL IMPACTS

All impacts identified during BIA phases are classified in terms of their significance. The broad significance categories are as follows:

- The **Nature** of the impact: This will describe the cause and the effect, what will be affected and how it will be affected.

- **Mitigation level:** The degree at which the impact can be mitigated.

- The **Extent** of the impact: This will be categorised as either local, regional or national.

- The **Magnitude** of the impact: This will be quantified as either:
    - Low: Will cause a low impact on the environment;
    - Moderate: Will result in the process continuing but in a controllable manner;
    - High: Will alter processes to the extent that they temporarily cease; and
    - Very High: Will result in complete destruction and permanent cessation of processes.

- The **Probability:** which shall describe the likelihood of impact occurring and will be rated as follows:
    - Extremely remote: Which indicates that the impact will probably not happen;
    - Unusual but Possible: Distinct possibility of occurrence;
    - Can Occur: there is a possibility of occurrence;
    - Almost Certain: Most likely to occur; and
    - Certain/Inevitable: Impact will occur despite any preventative measures put in place.

- **The duration (Exposure)**: wherein it will be indicated whether:

    - The impact will be immediate;
    - The impact will be of a short tem (Between 0-5 years);
    - The impact will be of medium term (between 5-15 years);
    - The impact will be long term (15 and more years); and
    - The impact will be permanent.

- **Reversibility/Replaceability:** The degree at which the impact can be **reversible or the lost resource can be replaced.**

To determine the significance ranking, the following ranking (or similar) was applied to each specialist's impact identified. According to this method, the impact assessments tables are presented in **Chapter 9**. All impacts are considered without mitigation taking place as well as with mitigation fully implemented.

Table 13: Example of the Significance Ranking

RANKING	MAGNITUDE	REVERSIBILITY	EXTENT	DURATION	PROBABILITY
5	Very high/ don't know	Irreversible	International	Permanent	Certain/inevitable
4	High		National	Long term (impact ceases after operational life of asset)	Almost certain
3	Moderate	Reversibility with human intervention	Provincial	Medium term	Can occur
2	Low		Local	Short term	Unusual but possible
1	Minor	Completely reversible	Site bound	Immediate	Extremely remote
0	None		None		None

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

9 SUMMARY OF SPECIALISTS IMPACT ASSESSMENT FINDINGS

The information provided in this section summarises findings and recommendations of specialist reports. The detailed specialist reports are provided in **Appendix G.**

9.1 ECOLOGICAL IMPACT ASSESSMENT

9.1.1 Ecological Findings

Terrestrial:

At the time of the assessment it was evident that most of the Turfgrond Substation Expansion Area is situated within a seep wetland (Meintjies, 2019). Details of the wetland are discussed in the next chapter. The majority of the eastern portion of the Turfgrond Substation Expansion Area in its entirety falls within the artificial seep wetland, which has been transformed as part of the existing Substation and comprises hardened infrastructure, with no natural vegetation remaining. With the Turfgrond Substation Expansion Area located within the artificial seep wetland, the remaining extent of the Turfgrond Substation Expansion Area is considered to be freshwater habitat. See the figure below.

Figure 14: Habitat units associated with the Turfgrond Substation Expansion Area
Source: Meintjies (2019)

Further to the above, the substation study area falls within an area considered to be a Critical Biodiversity Area 2 (CBA 2), and is considered to be a critical corridor linkage as well as an Important Bird Area (IBA) **(Figure 15).** Critical corridor linkages are linkages in the provincial biodiversity corridor network where existing conversion of natural landscapes to other land uses has severely restricted options for maintaining connectivity in the natural landscape. Despite habitat transformation of the Turfgrond Substation Expansion Area, the area is still connected to a larger

open space area towards the east and the west, and together with the Channelled Valley Bottom wetland and Maretlwane River to the north, serves not only as a movement corridor for faunal species, but also a corridor for the dispersal of floral species.

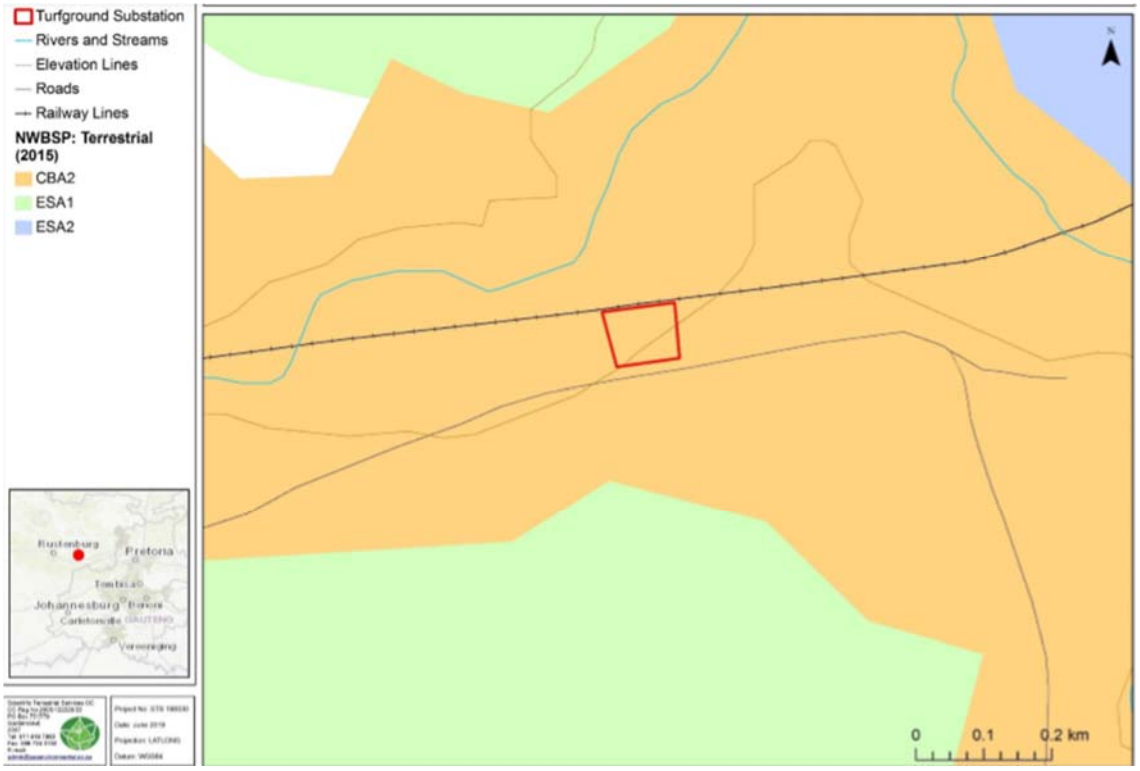


Figure 15: The Turfgrond Substation Expansion Area is situated within a CBA 2
Source: North West Biodiversity Sector Plan, 2015 in Meintjies, 2019

Floral:
The Turfgrond Substation Expansion Area currently supports a moderately low diversity of floral species, primarily as a result of the historic and ongoing anthropogenic impacts associated with the Lonmin Mine, as well as maintenance activities associated with the existing railway line, substation and overhead powerlines. Seepage from the Lonmin Tailings Facility and Return Water Dams to the south have likely resulted in the permanent saturation of the soils associated with the Turfgrond Substation Expansion Area. This has led to the establishment of facultative and obligate wetland species such as: *Schoenoplectus brachyceras, Phragmites australis and Cyperus fastigiatus,* amongst others.

The altered floral species composition has subsequently altered the floral habitat from bushveld, with a substantial woody component, to Freshwater Habitat dominated by sedges as listed above, and interspersed with herbaceous Alien Invasive Plants (AIP) such as: *Cirsium vulgare, Flaveria bidentis and Verbena bonariensis.*

Terrestrial grass species were associates with the outer boundaries of the Turfground Substation Expansion Area where no permanent surface water was present, and include grass species such as: *Pennisetum setaceum, Eragrostis curvula, Cynodon dactylon and Heteropogon contortus.* The woody layer was limited with a few indigenous woody species such as: *Vachellia karroo, V. exuvialis* and *Searsia pyroides* observed.

Floral Species of Conservation Concern (SCC):
During the field assessment no floral SCC was recorded within the Turfgrond Substation Expansion Area. Following the analysis of the Turfgrond Substation Expansion Area, it is further considered unlikely that any floral SCC will occur within the area, due to severe habitat degradation associated with the Turfground Substation Expansion Area and surrounding region, which has altered the floral species composition and diversity.

Representative photographs of the Turfgrond Substation Expansion Area are set below:


a


b


c

Figure 16: a. Excavation activities taking place within the artificial seep wetland, b. Wetland vegetation in the foreground, with the existing substation and overhead powerlines visible in the background, c. Wetland vegetation adjacent to the existing substation
Source: Meintjies (2019)

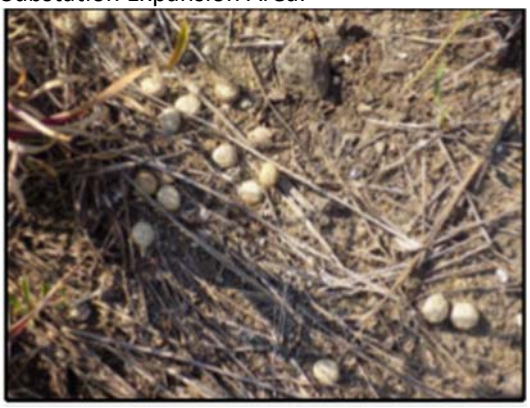
Faunal:
Faunal species diversity was considered moderately low throughout the Turfground Substation Expansion Area and surroundings. This can be attributed to the level of habitat disturbance and modification observed, continuous anthropogenic activities related to the Lonmin Mine, the existing railway line, the substation and overhead powerlines, as well as the time of the assessment (during the autumn season), whereby faunal species become less active, and are subsequently less frequently noted.

The area is, however, connected to a larger open space to the east and west and is considered as a CBA 2 serving as a landscape corridor (NWBSP, 2015 database in Meintjies, 2019). This area, although degraded, still allows for the movement of faunal species between the Turfground Substation Expansion Area and surrounding open spaces, albeit predominantly common widespread species. Various movement barriers are, however, associated with the area including the railway line, overhead powerline, as well as several gravel roads used for maintenance activities. These features have led to habitat fragmentation, and potentially also an increase in faunal mortality rates.

Only common faunal species, well adapted to degraded habitat were observed during the field assessment and include species such as: *Mungos mungo* (Banded Mongoose), *Phalacrocorax lucidus* (White-breasted Cormorant), *Apus affinis* (Little Swift), *Junonia hierta* (Yellow Pansy), and *Danaus chrysippus* (African Monarch). Avifaunal species were the most abundant faunal species observed.

Faunal Species of Conservation Concern (SCC):
No faunal SCC was encountered during the field assessment. It is considered unlikely that any faunal SCC will utilise the Turfgrond Substation Expansion Area for breeding or foraging purposes due to the disturbed nature of the substation area and lack of suitable habitat associated with the freshwater habitat unit that is large enough or in a suitable ecological state to support SCC.

Representative photographs of faunal species observed within the vicinity of the Turfgrond Substation Expansion Area.



a

b

c

Figure 17: a. Lepus saxatilis (Scrub Hare) droppings, b. Euplectes orix (Southern Red Bishop), c. Acraea neobule (Wandering Donkey Acraea)
Source: Meintjies (2019)

9.1.2 Ecological Impacts and Mitigation Measures

The following table highlights the perceived impacts on the habitat and diversity of floral species pertaining to the relevant habitat units affected by the proposed Turfgrond Substation Expansion Area Activities.

Table 14: Impact on the Floral Habitat Integrity and Species Diversity

WITHOUT MITIGATION								
PHASES	Probability of Impact	Sensitivity of receiving environment	Severity	Spatial Scale	Duration of Impact	Likelihood	Consequences	Significance
Construction	**4**	**2**	**3**	**3**	**2**	**6**	**8**	**48 (LOW)**
Operational	**3**	**2**	**3**	**3**	**4**	**5**	**10**	**50 (LOW)**
WITH MITIGATION								
PHASES	Probability of Impact	Sensitivity of receiving environment	Severity	Spatial Scale	Duration of Impact	Likelihood	Consequences	Significance
Construction	**3**	**2**	**2**	**1**	**2**	**5**	**5**	**25(VERY LOW)**
Operational	**2**	**2**	**2**	**1**	**2**	**4**	**5**	**20 (VERY LOW)**

The following table highlights the perceived impacts on the habitat for floral SCC pertaining to the relevant habitat units affected by the proposed Turfgrond Substation Expansion Area Activities.

Table 15: Impact on the Floral Species of Conservation Concern

WITHOUT MITIGATION								
PHASES	Probability of Impact	Sensitivity of receiving environment	Severity	Spatial Scale	Duration of Impact	Likelihood	Consequences	Significance
Construction	**2**	**2**	**2**	**2**	**3**	**4**	**7**	**28 (LOW)**
Operational	**2**	**2**	**1**	**2**	**4**	**4**	**7**	**28 (LOW)**
WITH MITIGATION								
PHASES	Probability of Impact	Sensitivity of receiving environment	Severity	Spatial Scale	Duration of Impact	Likelihood	Consequences	Significance
Construction	**1**	**2**	**1**	**1**	**3**	**3**	**5**	**15(VERY LOW)**
Operational	**1**	**2**	**1**	**1**	**4**	**3**	**6**	**18 (VERY LOW)**

Impact Mitigation:
The Turfground Substation Expansion Area has already been subjected to habitat degradation and transformation due to anthropogenic related activities associated with the Lonmin Mine, which has seen a shift in habitat from Bushveld to Freshwater floral species. Edge effects from anthropogenic activities related to the existing railway line, overhead powerline as well as vegetation clearance for gravel roads has led to AIP proliferation and subsequently a further change in the floral and faunal species composition.

Table 16 highlights the key integrated mitigation measures that are applicable to all the development activities in order to suitably manage and mitigate the ecological impacts pertaining to faunal and floral species that are associated with the construction and operation phases of the proposed expansion of Turfgrond Substation. Provided that all management and mitigation measures are implemented, as stipulated in this report, the overall risk to floral and faunal diversity, habitat and SCC can be adequately mitigated and minimised.

Table 16: A summary of the mitigatory requirements for floral and faunal species

NATURE OF IMPACT	MANAGEMENT / MITIGATION MEASURES
CONSTRUCTION PHASE	
Loss of Faunal and floral habitat species and SCC	• The construction footprint must be kept as small as possible in order to minimise impact on the surrounding environment. Furthermore, construction vehicles should remain on existing roads, to limit further habitat fragmentation of the surrounding natural area; • Although unlikely the following should be implemented in the event that floral or faunal SCC are observed within the development footprint during the construction phase: - All activities should be stopped immediately, and a rescue and relocation plan be implemented for floral SCC. In the event that any faunal SCC are encountered, the same approach is to be taken and a suitably qualified specialist should be contacted in order to advise on the best way forward; - The necessary permits should be obtained from the relevant departments prior to the removal/destruction of plant species or the selling of saplings or seeds; and - All rescue and relocation plans should be overseen by a suitably qualified specialist; • Removal of vegetation should be restricted to what is absolutely necessary; • No collection of floral plant material must be allowed by construction personnel; • No hunting or trapping of faunal species is to be allowed by construction personnel; • Informal fires by construction personnel should be prohibited, and no uncontrolled fires whatsoever should be allowed; • Alien vegetation must be removed and controlled within the Turfground Substation Expansion Area as well as a 50m corridor around the fence perimeter during both the construction and operational phases, with specific mention of Category 1b and 2 species in line with the NEMBA Alien and Invasive Species Regulations (2016); • Care should be taken during the construction and operation of the proposed development to limit edge effects on the natural surrounding area. This can be achieved by: - Demarcating all footprint areas during construction activities; - No construction rubble or cleared alien invasive species are to be disposed of within these areas, and should be taken to a registered waste disposal facility; - All soils compacted as a result of construction activities should be ripped, profiled and reseeded; and - Manage the spread of alien and invasive plant species proliferation, which may affect sensitive habitat within surrounding areas. Specific mention in this regard is made to Category 1b and Category 2 species identified within the development footprint areas (refer to Appendix F of the Ecological Assessment Report); and • Upon completion of construction activities, it must be ensured that no bare areas remain, and that indigenous plant species be used to revegetate the disturbed area. Recommended seed mix: Reclamation mixtures for rehabilitation of damaged veld and disturbed areas – available from http://mayford.co.za/veld-grass/.

NATURE OF IMPACT	MANAGEMENT / MITIGATION MEASURES
OPERATIONAL PHASE	
Loss of Faunal and floral habitat species and SCC	• The operational footprint must be kept as small as possible and maintenance vehicles should be restricted to existing designated roads, and no indiscriminate driving through the surrounding Freshwater Habitat should be allowed in order to minimise impact on the surrounding environment; • Edge effects on the surrounding natural area should be actively managed by the proponent to minimise further impacts to the receiving environment with specific mention of the implementation of an alien and invasive control plan; • Ongoing alien and invasive plant monitoring and control should take place bi-annually throughout the operational phase of the development, and the project perimeters should be regularly checked during the operational phase for alien and invasive plant proliferation to prevent spread into surrounding natural areas; • No informal fires are allowed by maintenance personnel; • No hunting/trapping or collecting of faunal species is allowed; and • Any bare areas or compacted soils that might arise from operational and maintenance activities should be rehabilitated as soon as the impact become visible. Affected areas should be ripped, profiled and reseeded with an indigenous grassland seed mixture.

9.1.3 Ecological Conclusion

Edge effects from existing and ongoing anthropogenically related activities associated with the Lonmin Tailings Facility and Return Water Dams to the south, as well as the existing Railway line, and overhead powerlines have altered the floral species composition and subsequently the floral and faunal habitat and diversity of the area. The Freshwater Habitat was dominated by plant species generally associated with saturated soil conditions, while the herbaceous layer was dominated by floral AIPs. Due to the altered habitat of the area the Freshwater Habitat is considered to be of moderately low ecological importance and sensitivity.

No floral or faunal SCC were observed at the time of the assessment, nor is it considered likely that any will occur within the Turfground Substation Expansion Area due to the degraded nature of the area.

Recommendations:

- Although extensive habitat modifications have occurred, it is nonetheless imperative that the development footprint be kept as small as possible whilst all edge effects are to be strictly managed, to ensure the area continues to function as a landscape corridor in a built up environment

- AIP Control Plan should be implemented prior to ground clearance activities.

- Removal and control of floral AIP species, through the implementation of an AIP Control Plan and subsequent follow up activities, the floral ecology of the area can be enhanced, and subsequently provide improved habitat and increased food resources for faunal species

- Where bare soils are exposed, the soil should be ripped to a depth of 20cm, a weed free topsoil must be introduced, and the area be revegetated with an indigenous grass mixture.

- Continuous monitoring of rehabilitated areas as well as AIP proliferation should be inspected within 50m of the perimeter fence of the proposed Turfground Substation Expansion Area, bi-annually for the operational phase.

- Connectivity for faunal species movement should be retained as far as possible by keeping the development footprint as small as possible, and by regularly monitoring edge effects with particular emphasis on AIP and erosion control.

9.2 FRESHWATER IMPACT ASSESSMENT

9.2.1 Freshwater Findings

Desktop Analyses:

The majority of the investigation area is defined as an Ecological Support Area (ESA). An ESA provides connectivity and important ecological processes between CBAs and is therefore important in terms of habitat conservation. A small north-eastern portion of the investigation area is defined as a CBA, this is associated with the Maretlwane River which traverses the edge of the investigation area. See **Figure 18** below. Large percentage of these areas could not be identified during analysis of current satellite imagery or during the field assessment as infrastructure associated with the neighbouring mining activities exist where the ESA and CBA features are indicated to be by the North West Biodiversity Spatial Plan (NWBSP) (Lushozi, 2019).

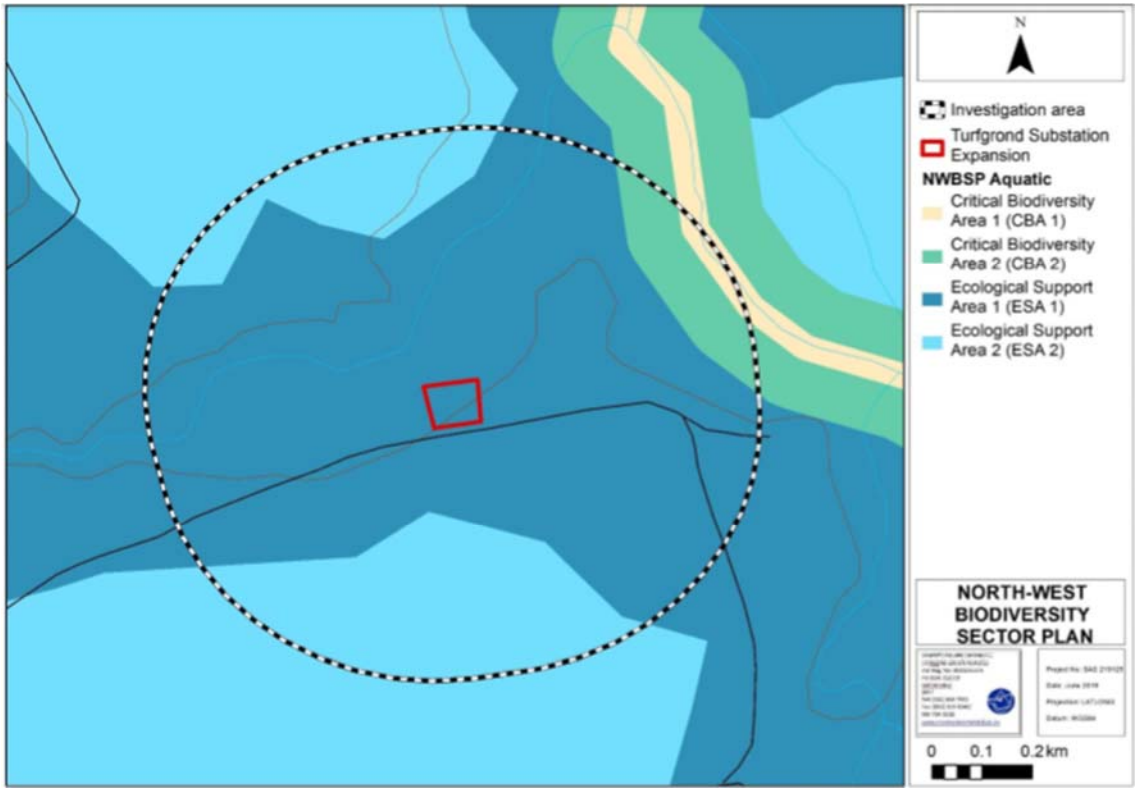


Figure 18: Aquatic Ecological Support Area (ESA 1 and 2) and Critical Biodiversity Area (CBA 1 and 2) within the investigation area

Source: NWBSP (2015) in Lushozi (2019)

According to the NFEPA Database, a natural wetland feature is present within the investigation area. The wetland situated on the eastern portion of Turfgrond substation expansion is identified by NFEPA as an unchannelled valley-valley bottom (UCVB) wetland. See **Figure 19** below.

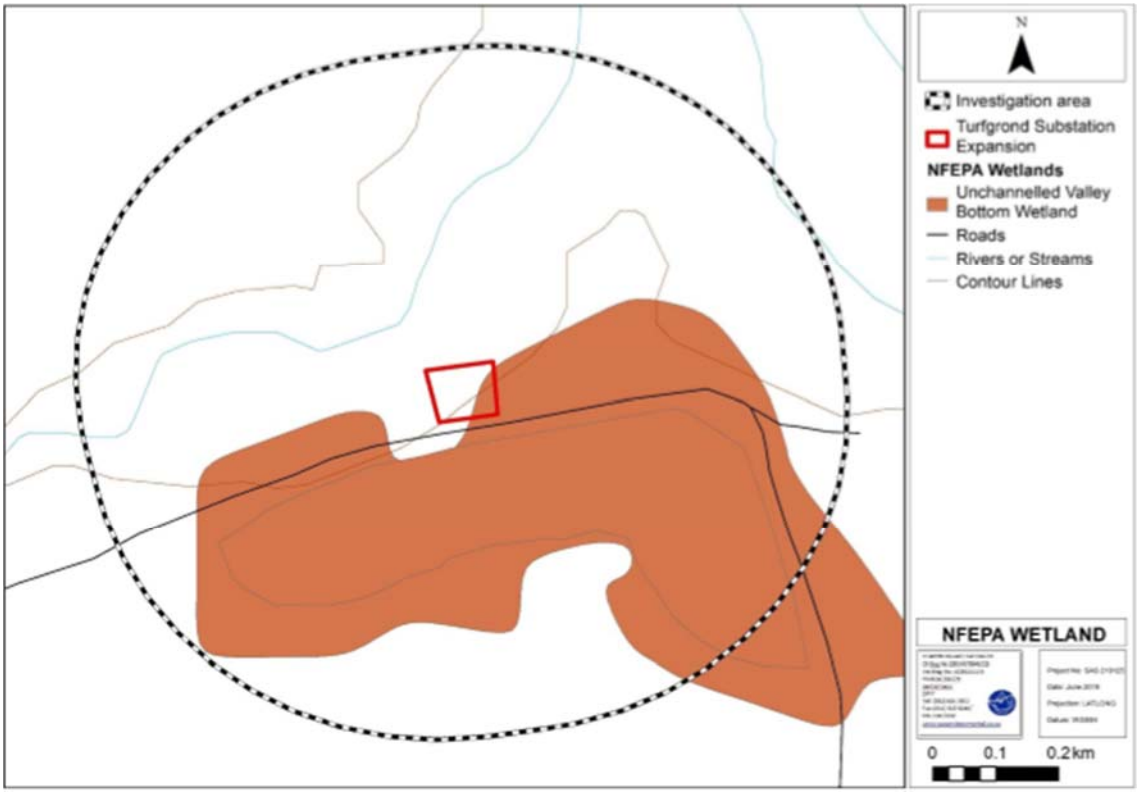


Figure 19: The wetland features associated with the Turfgrond Substation Expansion
Source: (NFEPA, 2011) in Lushozi (2019)

A portion of the UCVB wetland occurring within Turfgrond substation expansion is considered moderately modified (Class C), according to the NFEPA database. The outer portion occurring within the investigation area is considered heavily to critically modified (Lushozi, 2019). See **Figure 20** below.

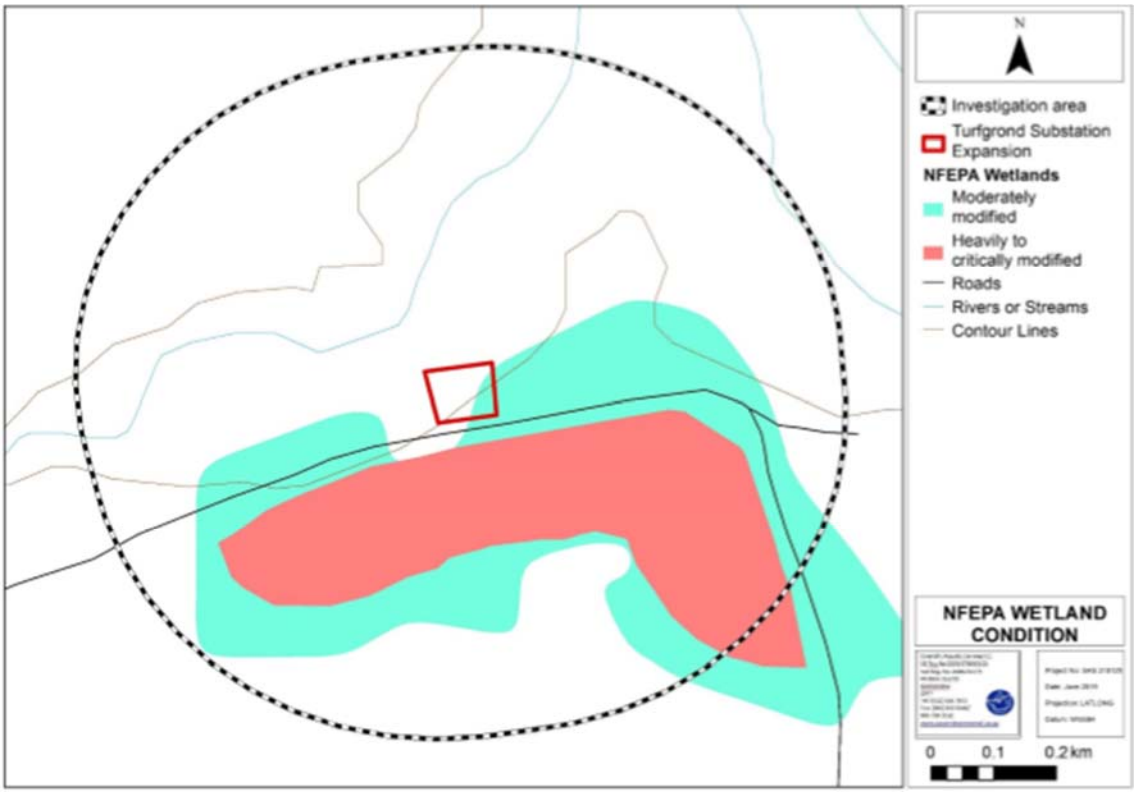


Figure 20: Condition of the Wetlands associated with the Turfgrond Substation Expansion
Source: (NFEPA, 2011) in Lushozi (2019)

Delineation:
During the site assessment, an artificial unchannelled valley bottom (UCVB) and channelled valley bottom (CVB) were identified within the investigation area and an artificial seep wetland was identified within the Turfgrond substation expansion area. The UCVB wetland occurs on the north-western portion of the investigation area and it was found to be associated with the pollution control dam located adjacent. The CVB wetland traverses the central portion the investigation area. The existing Turfgrond substation to be expanded occurs within the western portion of the delineated seep wetland. The delineation of the watercourses identified within the investigation area is illustrated in **Figure 21.**

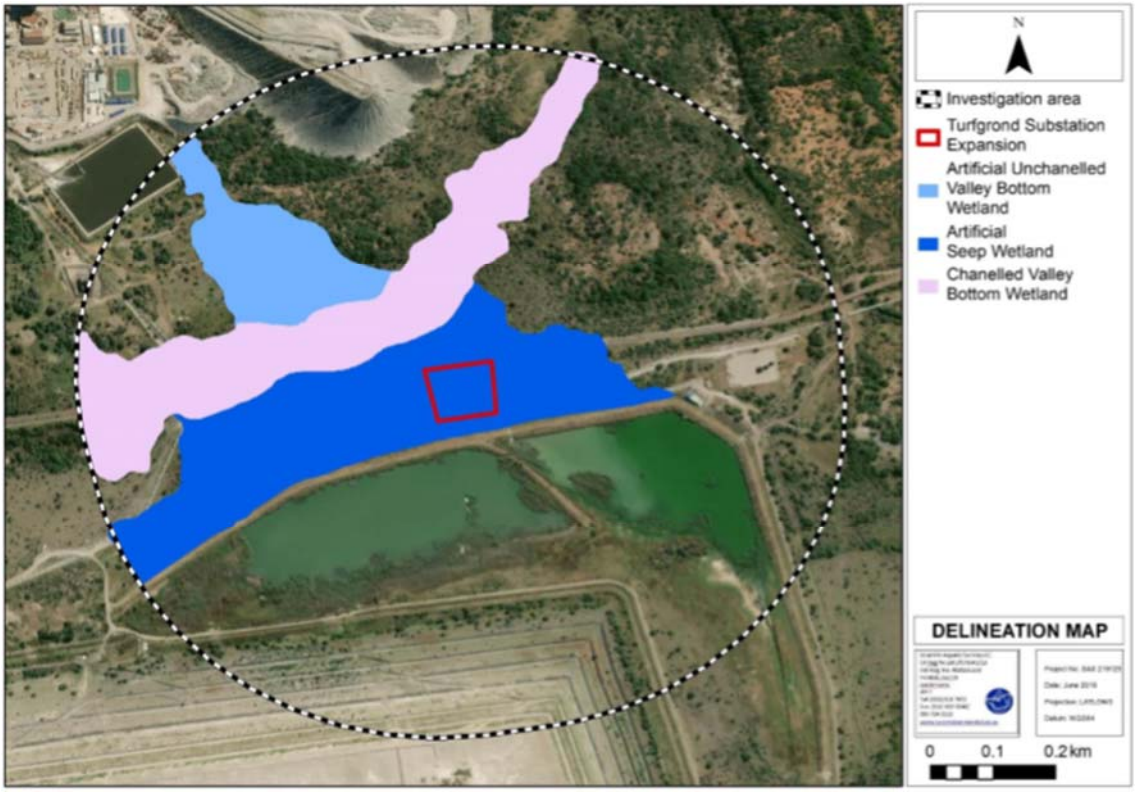


Figure 21: The location of the delineated wetlands within the investigation area
Source: Lushozi (2019)

The CVB wetland within the central portion of the investigation area was identified as a natural wetland, since the channel associated with this wetland also appears on the topographical map as a non-perennial stream. Although the flow in this watercourse has been significantly augmented by seepage from the tailings dam and return water dam, it was assumed that the CVB wetland would still occur under normal circumstances in the absence of the return water dam, albeit on a smaller extent (Lushozi, 2019).

Railway infrastructure was identified to traverse the central portion of the artificial seep and CVB wetland. This potentially impacts on the connectivity of flow within the wetlands since it impedes the flow of water **(Figure 22a).** The tailings dam (indicated by the arrow) occurs further south of the seep wetland **(Figure 22b)**, stormwater runoff from this feature contributes to changes in water quality of the delineated wetlands (Lushozi, 2019).

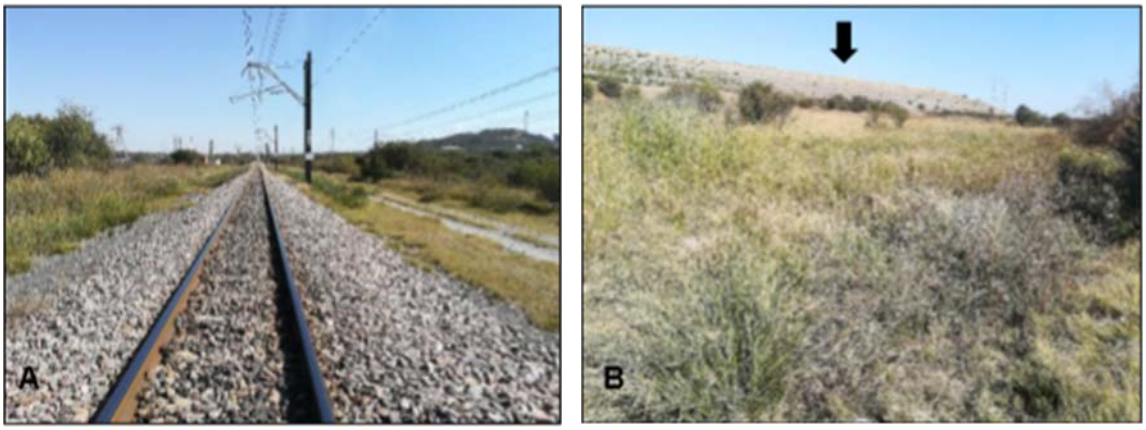


Figure 22: a. Railway infrastructure which traverses the wetland, b. tailings facility located south of the wetland
Source: Lushozi (2019)

Evidence of excavations which have formed artificially wetter areas and created a ponding effect within the artificial seep wetland **(Figure 23a)** was observed, resulting in the observed disturbance of vegetation. Geomorphological disturbances within the wetland as a result of imported construction materials including building rubble were identified within the wetland.

Figure 23: a. Evidence of excavation which has occurred, b. disturbed vegetation along with imported soils showing evidence of disturbance within the artificial seep wetland
Source: Lushozi (2019)

Various pipelines were identified within the artificial seep wetland, some pipes are currently being used while others have been abandoned and left within the seep wetland (Figure 10A). Road infrastructure traverses parts of the seep and the CVB wetland, these informal roads are used to provide access to the existing substation and neighbouring mines located outside of the investigation area **(Figure 24b).** These roads contribute to increased surface runoff by reducing the area of permeable surfaces.

Figure 24: a. Pipelines found within the wetland, b. informal gravel roads that traverse the wetland

Present Ecological State (PES):
The artificial seep wetland was considered seriously modified, the hydrology and vegetation within the wetland were found to have been impacted by current and historical modifiers. Evidence of soil disturbance as a result of excavations were observed within the wetland which have resulted in increased erosion and proliferation of alien vegetation and altered the flow concentrations which, over time have caused residual ponding. Seepage from the tailing's dam to the south of the artificial seep will have altered the pattern, flow and timing of water in the landscape associated with the wetland as well as the water quality (Lushozi, 2019).

Ecological Importance and Sensitivity (EIS):
The EIS assessment indicates that the wetland is considered moderately ecologically important and sensitive. The biodiversity of these wetlands is not usually sensitive to limited flow and habitat modifications. The moderate importance of the wetland is related mostly to the ecoservices, mostly hydrological, it provides which have been discussed above. The ecological importance of the wetland is a result of the surrounding catchment land uses (Lushozi, 2019).

Ecoservices Provision:
As a result of the loss of ecological integrity, the wetland's ability to provide ecoservices was found to be moderately low. Ecoservices such as erosion control, flood attenuation, nitrate assimilation, and carbon storage were the highest. This is largely a result of the increased gully erosion and the influence of surrounding catchment to runoff within wetland.

9.2.2 Freshwater Impacts and Mitigation Measures

Following the assessment of the watercourses associated with the proposed Turfgrond substation expansion, the DWS approved Risk Assessment Matrix was applied to ascertain the significance of perceived impacts on the key drivers and receptors (hydrology, water quality, geomorphology, habitat and biota) of the freshwater environment associated with the Turfgrond substation. These results are summarised in **Table 17 and Table 18** presented below.

Table 17: Summary of the results of the DWS Risk Assessment applied to the watercourses associated with the proposed Turfgrond Substation Expansion

No	Activity	Aspect	Impact	Severity	Consequence	Likelihood	Significance	Risk Rating
CONSTRUCTION PHASE								
1	Site preparation prior to expansion of the substation, including placement of contractor laydown areas and storage facilities.	*Removal of vegetation leading to exposure of soils and associated disturbances to soils; and *Increased likelihood of dust generation due to exposed soils	*Exposure of soils, leading to increased runoff, erosion and sedimentation, and thus increased sedimentation of the watercourse; *Increased sedimentation of freshwater habitat, leading to smothering of flora and benthic biota and potentially further altering surface water quality; *Decreased ecoservice provision; and *Proliferation of alien vegetation as a result of disturbances.	**2**	**5**	**10**	**55**	**LOW**
2	Trenching for installation of power cables within the wetland.	*Removal of vegetation and associated disturbances to soil. *Compaction of soils as a result of movement of construction vehicles within the wetland; *Removal of topsoil and creation of a topsoil stockpile; and *Miscellaneous activities by	*Disturbances of soils leading to increased alien vegetation proliferation. *Altered runoff patterns, leading to increased erosion. *Loss of wetland habitat and ecological structure resulting in impacts on biota; and *Potential changes to the ecoservice provision of the	**3**	**5**	**9**	**54**	**LOW**

No	Activity	Aspect	Impact	Severity	Consequence	Likelihood	Significance	Risk Rating
		construction personnel.	wetland.					
3	Potential spillage from construction vehicles and potential indiscriminate waste disposal.	*Spills / chemical leaks from construction vehicles.	*Possible contamination of freshwater soils and surface water, leading to reduced ability to support biodiversity.	**2**	**5**	**7**	**39**	**LOW**
4	Construction activities associated with the proposed development within the delineated seep wetland including delivery of substation infrastructure.	*Movement of construction equipment within the wetland. *Stockpiling of construction materials; and *Increased likelihood of dust generation due to exposed soils.	*Loss of ecological structure as a result of edge effects associated with the development. *Impacts to the ecoservice provision of the wetland; and *Proliferation of alien and invasive plant species within the wetland.	**3**	**5**	**10**	**53**	**LOW**
OPERATIONAL PHASE								
5	Ongoing maintenance of the substation and repairs in the event of failure.	*Potential risk of contaminated runoff into the CVB wetland from surfaces such as roads and parking areas associated with the proposed development.	*Potential for proliferation of alien and invasive species; and *Increased compaction of soil resulting in reduced infiltration within wetland.	**2**	**4**	**7**	**34**	**LOW**
6	Clearing or trimming of vegetated areas around the facilities	*Removal of vegetation leading to exposure of soils and associated disturbances to soils.	*Potential for proliferation of alien and invasive species; and *Increased soil erosion due to reduced basal cover.	**2**	**5**	**7**	**36**	**LOW**

No	Activity	Aspect	Impact	Severity	Consequence	Likelihood	Significance	Risk Rating
7	Rehabilitation activities of affected wetland portions.	Rehabilitation activities of affected wetland portions.	No negative impacts are envisioned for the proposed rehabilitation activities.	**2**	**4**	**6**	**32**	

Table 18: Summary of the mitigatory requirements for watercourses associated with the proposed Turfgrond Substation Expansion

NATURE OF IMPACT	**MANAGEMENT / MITIGATION MEASURES**
CONSTRUCTION PHASE	
• Exposure of soils, leading to increased runoff, erosion and sedimentation, and thus increased sedimentation of the watercourse; • Increased sedimentation of freshwater habitat, leading to smothering of flora and benthic biota and potentially further altering surface water quality; • Decreased ecoservice provision; and • Proliferation of alien vegetation as a result of disturbances.	• Contractor laydown areas and stockpiles to be established outside of the 32m zone of regulation associated with the CVB wetland. • These stockpiles may not exceed 2m in height, and their footprint should be kept to a minimum. Stockpiling of removed materials may only be temporary (may only be stockpiled for during the period of clearing at a certain crossing point) and should be disposed of at a registered waste disposal facility; and • All development footprint areas to remain as small as possible and vegetation clearing to be limited to what is absolutely essential and retain as much indigenous vegetation as possible.
• Disturbances of soils leading to increased alien vegetation proliferation. • Altered runoff patterns, leading to increased erosion. • Loss of wetland habitat and ecological structure resulting in impacts on biota; and • Potential changes to the ecoservice provision of the wetland.	• Protect exposed soils and stockpiles from wind, and limit the time in which soils are exposed, by covering with a suitable geotextile such as hessian sheets; • All construction must take place during the dry season to limit potential impacts to the artificial wetland as a result of construction activities; • Ensure no stockpiles are higher than 2m; and • All excavated trenches must be compacted to natural soil compaction levels to prevent the formation of preferential surface flow paths and subsequent erosion. Similarly, areas compacted as a result of construction activities must be loosened to natural soil compaction levels.
• Possible contamination of freshwater soils and surface water, leading to reduced ability to support biodiversity.	• Vehicles should be regularly inspected for leaks and be refuelled on sealed surfaces to prevent ingress into soils; • All spills are to be immediately cleaned up and treated accordingly. There is a potential risk for spills to contaminate water within the natural CVB wetland; and

NATURE OF IMPACT	MANAGEMENT / MITIGATION MEASURES
	• All waste is to be removed from the site and if required, disposed at a registered facility.
• Loss of ecological structure as a result of edge effects associated with the development. • Impacts to the ecoservice provision of the wetland; and • Proliferation of alien and invasive plant species within the wetland.	• Careful planning of all construction equipment must be undertaken beforehand to ensure that the minimum impact on the wetland occurs; • Any concrete mixing/temporary storage must be undertaken in bunded areas or on batter boards only. Care must be taken to prevent any spillage within the wetland or surrounding environment; and • Construction must be scheduled for the drier winter period in order to minimise the risk of sediment-laden runoff reaching the wetland as a result of the construction activities.
OPERATIONAL PHASE	
• Potential for proliferation of alien and invasive species; and • Increased compaction of soil resulting in reduced infiltration within wetland.	• An AIP Control and Management plan must be compiled and implemented to prevent further proliferation of AIPs within the wetlands.
• Potential for proliferation of alien and invasive species; and • Increased soil erosion due to reduced basal cover.	• An AIP Control and Management plan must be compiled and implemented to prevent further proliferation of AIPs within the wetlands; and • Natural vegetation should be kept intact wherever possible
• No negative impacts are envisioned for the proposed rehabilitation activities.	• An alien vegetation management plan should be developed and implemented; and • All soils exposed as a result of the construction activities should be protected during the operational phase. This should be done with a suitable geotextile (e.g. Geojute or hessian sheeting) in order to prevent erosion and sedimentation of the wetland.

9.2.3 Freshwater Conclusion

Based on the findings of the freshwater ecological assessment and the results of the risk assessment, it is the opinion of the ecologist that the proposed Turfgrond Substation expansion poses a low risk to the ecological integrity of the artificial seep wetland.

Since the determination of the PES of a system is confined to natural watercourses that have a natural reference state, the PES, EIS and Eco-services of this artificial seep wetland was assessed on a qualitative basis. The results of the assessments are discussed in detail provided in Section 5 of the Freshwater Assessment Report and summarised below:

Watercourse:	Seep Wetland
PES:	Seriously Modified
EIS:	Moderate
Ecoservices:	Moderately Low
REC:	REC / BAS Category: D – Largely Modified
RMO:	RMO: D - Maintained

Recommendations:

- The impact footprint during the construction phase should be minimised as best as possible in order to limit any further deterioration of the artificial wetland.
- This can be achieved through limiting the extent of vegetation removal and using already existing informal roads to access the substation.
- Adherence to cogent, well-conceived and ecologically sensitive site development plans, the mitigation measures provided in this report as well as general good construction practice and ongoing management, maintenance and monitoring, are essential if the significance of perceived impacts is to be reduced to limit further degradation to the freshwater environment.

9.2 HERITAGE IMPACT ASSESSMENT

9.2.1 Heritage Findings

Field Survey:

The field survey was done according to generally accepted archaeological practices, and was aimed at locating all possible sites, objects and structures. The site was visited on 31 May 2019 and was investigated by walking transects across the area. See **Figure 25** below. During the site visit, archaeological visibility was limited due to the dense vegetation growth on the site. See **Figure 26** (van Schalkwyk, 2019).

Figure 25: Map indicating the track log of the field survey
(Site = blue polygon; Track log = green line)
Source: van Schalkwyk, 2019

Figure 26: Vegetation cover encountered on the site during the survey
Source: van Schalkwyk, 2019

Palaeontological Survey:

The Palaeontological Sensitivity Map (SAHRIS) indicate that the study area (indicated by the red arrow in **Figure 27**) has an insignificant to zero sensitivity of fossil remains to be found and therefore no palaeontological study is required.

Colour	Sensitivity	Required Action
RED	VERY HIGH	field assessment and protocol for finds is required
ORANGE/YELLOW	HIGH	desktop study is required and based on the outcome of the desktop study, a field assessment is likely
GREEN	MODERATE	desktop study is required
BLUE	LOW	no palaeontological studies are required however a protocol for finds is required
GREY	INSIGNIFICANT/ZERO	no palaeontological studies are required
WHITE/CLEAR	UNKNOWN	these areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map.

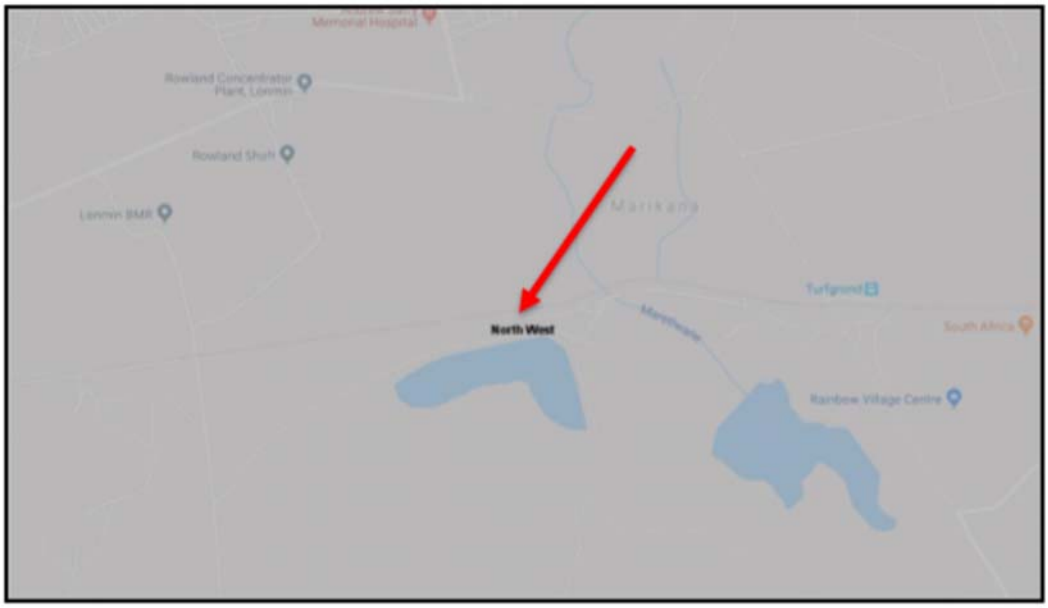


Figure 27: The Palaeontological sensitivity of the study area (arrowed)
Source: SAHRIS in van Schalkwyk, 2019

Cultural Survey:
During the physical survey, the following sites, features and objects of cultural significance were identified in the study area **(Figure 28).**

Stone Age:	No sites, features or objects of cultural significance dating to the Stone Age were identified in the study area.
Iron Age:	No sites, features or objects of cultural significance dating to the Iron Age were identified in the study area.
Historic period:	No sites, features or objects of cultural significance dating to the historic period were identified in the study area.

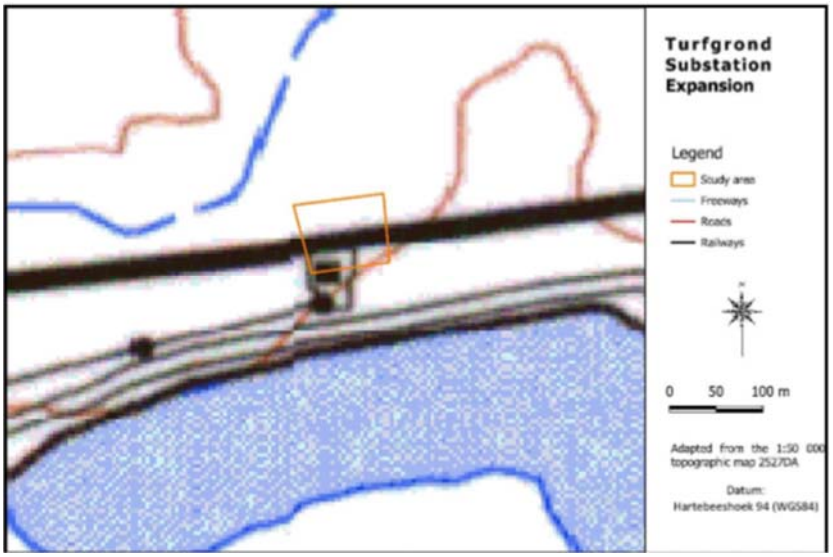


Figure 28: Location of heritage sites in the study area

Please note: As no heritage sites were identified, nothing is shown on the map.

Source: van Schalkwyk, 2019

9.2.2 Heritage Impacts and Mitigation Measures

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

For the current study, as no sites, features or objects of cultural historic significance have been identified in the study area, no mitigation measures are proposed. Nonetheless, some general mitigation measures should apply and be included in the Environmental Management Programme.

Table 19: General Heritage Mitigation Measures

MANAGEMENT / MITIGATION MEASURES
Known sites should be clearly marked in order that they can be avoided during construction activities.
The contractors and workers should be notified that archaeological sites might be exposed during the construction activities.
Should any heritage artefacts be exposed during excavation, work on the area where the artefacts were discovered, shall cease immediately and the Environmental Control Officer shall be notified as soon as possible.
All discoveries shall be reported immediately to a heritage practitioner so that an investigation and evaluation of the finds can be made. Acting upon advice from these specialists, the Environmental Control Officer will advise the necessary actions to be taken.
Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site.
Contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or palaeontological artefacts, as set out in the National Heritage Resources Act (Act No. 25 of 1999), Section 51. (1).

In order to achieve the above mitigation measures, the following should be in place:

- A person or entity, e.g. the Environmental Control Officer, should be tasked to take responsibility for the heritage sites and should be held accountable for any damage.
- Known sites should be located and isolated, e.g. by fencing them off. All construction workers should be informed that these are no-go areas, unless accompanied by the individual or persons representing the Environmental Control Officer as identified above.
- In areas where the vegetation is threatening the heritage sites, e.g. growing trees pushing walls over, it should be removed, but only after permission for the methods proposed has been granted by SAHRA. A heritage official should be part of the team executing these measures.

9.2.3 Heritage Conclusion

During the physical survey, no sites, features or objects of cultural significance were identified.

Impact analysis of cultural heritage resources under threat of the proposed development, is based on the present understanding of the development:

As no sites, features or objects of cultural significance are known to exist in the development area, there would be no impact as a result of the proposed development.

Recommendations:

From a heritage point of view, it is recommended that the proposed development be allowed to continue on acceptance of the proposed mitigation measures and the conditions proposed:

- Should archaeological sites or graves be exposed in other areas during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.

10 ENVIRONMENTAL IMPACT STATEMENT

It is the opinion of the EAP that the proposed expansion of the Railway Yard at Turfgrond Substation should be constructed. Transnet has identified the "Proposed Expansion of the Railway Yard at Turfgrond Substation" to form part of the Waterberg Rail Corridor Expansion Programme. The main focus of the rail expansion is to provide infrastructure along the coal railway line to increase the coal hauling capacity. From an environmental perspective, the development will not have a significant detrimental impact on the environment, as the development will occur within a transformed site.

The potential environmental impacts have been assessed for the Turfgrond Substation expansion project. Based on the summary of environmental observations presented, the majority of impacts are expected to occur during the construction phase of the project. All negative impacts related to project activities (both during construction and operations) are rated 'LOW' to 'VERY LOW' significance after mitigation. Implementation of the Do Nothing alternative would mean that the existing Turfgrond Substation infrastructure would remain status quo and would not achieve its purpose of the rail expansion to provide infrastructure along the coal railway line to increase the coal hauling capacity. As such, the "Do Nothing" Alternative would not be environmentally, socially or economically feasible in the long-term and is thus not deemed feasible.

The following is a summary of the key findings and well as impacts presented in the Specialists' Impact Assessment Reports (reports provided in **Appendix G**).

10.1 SUMMARY OF KEY FINDINGS

Ecological Findings:
Floral: The Turfgrond Substation Expansion Area currently supports a moderately low diversity of floral species, primarily as a result of the historic and ongoing anthropogenic impacts associated with the Lonmin Mine, as well as maintenance activities associated with the existing railway line, substation and overhead powerlines. Seepage from the Lonmin Tailings Facility and Return Water Dams to the south have likely resulted in the permanent saturation of the soils associated with the Turfgrond Substation Expansion Area. This has led to the establishment of facultative and obligate wetland species. The altered floral species composition has subsequently altered the floral habitat from bushveld, with a substantial woody component, to Freshwater Habitat dominated by sedges and interspersed with herbaceous Alien Invasive Plants.

Faunal: Faunal species diversity was considered moderately low throughout the Turfground Substation Expansion Area and surroundings. This can be attributed to the level of habitat disturbance and modification observed, continuous anthropogenic activities related to the Lonmin Mine, the existing railway line, the substation and overhead powerlines, as well as the time of the assessment (during the autumn season), whereby faunal species become less active, and are subsequently less frequently noted. The area is, however, connected to a larger open space to the east and west and is considered as a CBA 2 serving as a landscape corridor. This degraded area, still allows for the movement of faunal species between the Turfground Substation Expansion Area and surrounding open spaces.

No floral and faunal SCC was recorded within the Turfgrond Substation Expansion Area.

Freshwater Findings:
The majority of the investigation area is defined as an Ecological Support Area (ESA). A small north-eastern portion of the investigation area is defined as a CBA. This is associated with the Maretlwane River which traverses the edge of the investigation area. An artificial unchannelled valley bottom (UCVB) and channelled valley bottom (CVB) were identified within the investigation area and an artificial seep wetland was identified within the Turfgrond substation expansion area. The artificial seep wetland is considered moderately modified (Class C). The outer portion occurring within the investigation area is considered heavily to critically modified.

Heritage Findings:
During the physical survey, the following sites, features and objects of cultural significance were identified in the study area:

Stone Age:	No sites, features or objects of cultural significance dating to the Stone Age were identified in the study area.
Iron Age:	No sites, features or objects of cultural significance dating to the Iron Age were identified in the study area.
Historic period:	No sites, features or objects of cultural significance dating to the historic period were identified in the study area.

The Palaeontological Sensitivity Map **(Figure 27)** indicated that the study area has an insignificant to zero sensitivity of fossil remains to be found and therefore no palaeontological study is required.

Sensitive features summarised above are geographically represented in the sensitivity map below:

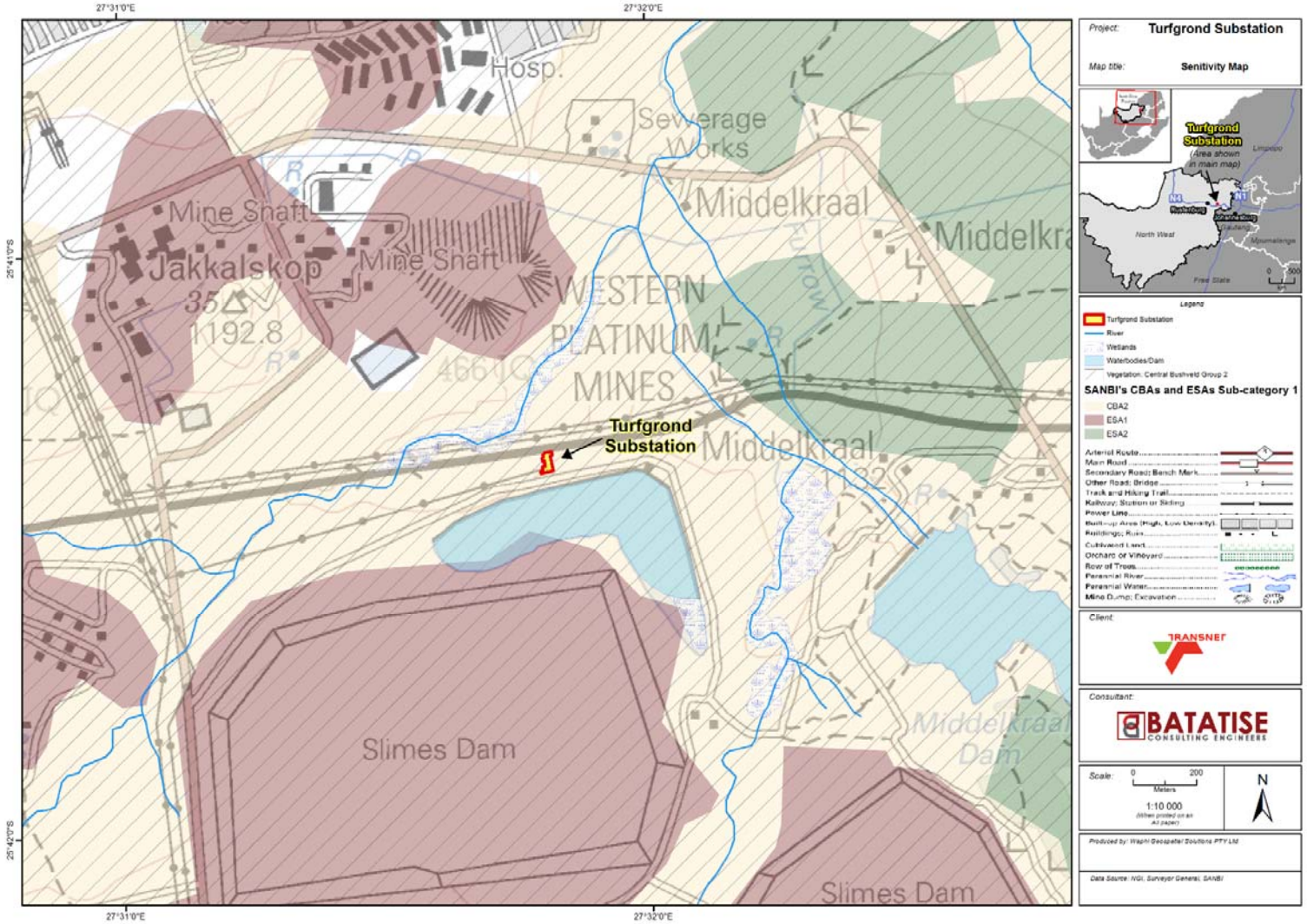


Figure 29: Sensitivity Map for the Turfgrond Substation Expansion Project Area

10.2 SUMMARY OF IMPACTS

Loss of Faunal and Floral habitat Species:
Construction activities will lead to loss of Freshwater Habitat, albeit artificial in origin. Ineffective control of AIP species during the construction phase, as well as lack of continuous maintenance during the operational phase will further alter floral habitat of areas downstream of the Turfground Substation Expansion Area, due to the connectivity of the artificial wetland to natural watercourses situated to the north. An AIP plan should be designed and come into effect at the onset of construction and should be actively implemented throughout the operation of the development.

Furthermore, construction activities will result in loss of faunal habitat from the Turfground Substation Expansion Area, however due to the limited extent of the development footprint, the proposed development will not significantly impact upon the faunal ecology of the larger area. Mitigation efforts should be aimed at limiting edge effects from construction activities to the natural areas east and west of the Turfground Substation Expansion Area and implementing an AIP management plan.

There are four key **ECOLOGICAL IMPACTS ON WATERCOURSES** associated with the proposed Turfgrond Substation Expansion that are anticipated to occur:

- Loss of freshwater habitat and ecological structure;
- Changes to the sociocultural and service provision;
- Impacts on the hydrology and sediment balance of the watercourses; and
- Impacts on water quality.

Various activities and development aspects may lead to these impacts, however, provided that the mitigations listed in **Table 18** is followed, these impacts can be avoided or adequately minimised where avoidance is not feasible.

HERITAGE IMPACTS
As no sites, features or objects of cultural historic significance have been identified in the study area, there would be **NO IMPACT** as a result of the proposed expansion development. Nonetheless, Should archaeological sites or graves be exposed in other areas during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.

10.3 RECOMMENDATIONS

It is recommended that the “Proposed Expansion of the Railway Yard at Turfgrond Substation” be considered, as the project would not have any far-reaching impacts (Low to Very Low Negative) and is therefore supported from an environmental perspective.

In this regard it is fundamental that the Environmental Management Programme (EMPr) (provided in **Appendix H)** and all other mitigation measures in this Basic Impact Assessment Report be instituted during all phases of the proposed project. The following recommendations are to form part of the conditions of approval:

- The development footprint is to be kept as small as possible whilst all edge effects are to be strictly managed, to ensure the area continues to function as a landscape corridor in a built-up environment.

- Alien Invasive Plant (AIP) Control Plan should be implemented prior to ground clearance activities.

- Removal and control of floral AIP species, through the implementation of an AIP Control Plan and subsequent follow up activities, the floral ecology of the area can be enhanced, and subsequently provide improved habitat and increased food resources for faunal species

- Where bare soils are exposed, the soil should be ripped to a depth of 20cm, a weed free topsoil must be introduced, and the area be revegetated with an indigenous grass mixture.

- Continuous monitoring of rehabilitated areas as well as AIP proliferation should be inspected within 50m of the perimeter fence of the proposed Turfground Substation Expansion Area, bi-annually for the operational phase.

- Connectivity for faunal species movement should be retained as far as possible by keeping the development footprint as small as possible, and by regularly monitoring edge effects with particular emphasis on AIP and erosion control.

- If feasible, construction must be scheduled for drier period in order to minimise sediment laden runoff within the wetland as a result of the construction activities.

- Areas where vegetation needs to be cleared including constructor laydown areas within the wetland must remain as small as possible in order to reduce risks associated with any further proliferation of alien vegetation.

- All exposed soils must be protected for the duration of the construction phase with a suitable geotextile to prevent erosion and sedimentation within the wetland. Stockpiled soils should not exceed 2m in height in order to prevent structural properties of the soil being compromised.

- The use of existing access roads/tracks within the artificial seep is strongly encouraged in order to minimise further impacts on the artificial seep.

- It is highly recommended that the proponent make provision for small-scale rehabilitation of the reaches of the wetlands which may be directly impacted upon by construction activities. Acknowledging that this wetland is considered artificial, it is considered important to ensure that service provision are maintained, and where feasible, improved during the construction and operation.

- Should archaeological sites or graves be exposed in other areas during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.

- An independent ECO must be appointed to audit compliance with the EMPr during the construction of the bridge and to audit compliance of rehabilitation in post construction phase.

- Prior to construction phase, it is relevant to obtain the other necessary Environmental Authorisations in terms of other legislations. For example: Water Use License.

11 CONCLUSION

Batatise Consulting Engineers was appointed by Transnet to conduct the BIA process for the construction of the "Proposed Expansion of the Railway Yard at Turfgrond Substation". Transnet has identified the "Proposed Expansion of the Railway Yard at Turfgrond Substation" to form part of the Waterberg Rail Corridor Expansion Programme. The main focus of the rail expansion is to provide infrastructure along the coal railway line to increase the coal hauling capacity.

Four activity alternatives were considered. The regarded preferred option for the Turfgrond Substation Expansion Project was the Front End Loading 3, as this study focuses on the coal capacity expansion of the existing line. The specialist assessments that have been undertaken at the study area, have found low to very low levels of significant impacts "with and without" mitigation measure, respectively. This is due to the the development occurring within an already transformed and disturbed site.

I&APs and stakeholders in this Draft BIA phase were identified and will be contacted, informed of the project through electronic mailing system and copies of letters will be sent through the post, if necessary. Notices of the project and invitations to register on the I&AP database were posted at focal points at the study area. Notice of the project will be published in the one of the provincial newspapers. All I&APs and Stakeholders will be given the opportunity to review and comment on the draft BAR for a minimum of 30 days. The Draft BAR will be circulated for public review in the month of September 2019. The report will be placed at focal points for public access such as government department / offices and libraries. The draft EMPr developed also needs to be reviewed for public comment and be implemented as a final EMPr. The final EMPr shall be adhered to during the construction and operational phase under the supervision of the site Engineer / Project Manager and / or Environmental Control Officer.

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