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**DRAFT BASIC ASSESSMENT REPORT FOR THE EXPANSION OF RAILWAY LINES AT
PYRAMID SOUTH WITHIN CITY OF TSHWANE MUNICIPALITY IN PRETORIA,
GAUTENG PROVINCE.**

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kimopax (Pty)Ltd
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EXECUTIVE SUMMARY

Transnet is geared to expand the rail transportation from the Waterberg region in stages, to meet the potential expansion of the mining activities, coal transportation and transportation of other commodities. The Waterberg Railway Corridor starts in Lephalale, passes through Thabazimbi, Rustenburg, Pyramid South and links to the existing Ermelo railway line, which provides linkage to the main coal export terminal in Richards Bay Harbour and Durban Harbour. The upgrade of Pyramid South Yard to accommodate 200 wagon DP (Diesel/Electric Locomotives) trains has been identified in Stage 4 of the Waterberg Stage 2 – 5 Programme. The need to provide adequate rail infrastructure capacity is deemed critical to unlock the potential of this economic hub which necessitates a review of the required capacity to support the forecast growth of various commodities, of which coal potentially is dominant. The successful execution of Stage 4 will result in a ramp up from 3 x 200 wagon DP trains to 6 x 200 wagon DP trains. Pyramid South Yard is currently operating as an AC/DC change-over yard to allow traction change for trains travelling from the DC line south of the yard to an AC line north of Pyramid South Yard.

Kimopax Pty Ltd was appointed to undertake the Environmental Impact Assessment process (EIA) and the Water Use License Application (WULA). The objective of the EIA phase is to investigate the potential impacts of the proposed project activities on the receiving environment. The potential impacts were quantified to assess the significance that each impact may pose on the receiving environment, and suitable mitigation, management and monitoring requirements were proposed. The specialist studies that were used for this EIA/EMP Report are listed below:

- Biodiversity Study
- Wetland Study
- Hydrology Study

Public Participation

The Public Participation Process for the Project is an on-going process and will be undertaken for the duration of the EIA process. The key issues raised for the proposed Project are listed below and all the issues and concerns raised have been recorded and have been included in the report:

- Impacts on water quantity and quality; and
- Stormwater management.

Potential Impacts with a High Significance

During the construction phase, the highest rated impacts (impacts with a high significance) are those that significantly affect fauna, heritage and visual impacts and are described below. Mitigation and management measures have been provided to help avoid and/or to reduce the potential impacts from affecting the baseline environment.

Construction Phase:

- Soil quality and quantity may be affected by the removal of vegetation, construction of roads, storm water run-off and vehicular activity;
- Flora will be affected due to the reduction of the availability of soil due to the removal of vegetation during construction activities;
- Activities such as soil stripping to accommodate surface infrastructure, construction noise and vehicular activities will reduce fauna habitats and associated food and nesting resources;
- Surface water quantity may be impacted due to the establishment of surface infrastructure and may lead to the reduction of the quantity of surface water run-off linked to the catchment;
- Surface water quality may be impacted by the deposition of dust from soil resulting in siltation and contamination of surface water run-off, especially during the wet season;
- Dust will be generated on site, decreasing air quality;
- Removal of topsoil may affect the heritage resources of importance identified in the Project area; and
- Negative social significant impacts include influx of workers in the project area and positive significant impacts include increased activity and population movement to the project area and employment.

Operational Phase:

- Spillages of hydrocarbons may impact groundwater and surface water resources;
- Noise receptors may be affected due to the operation of surface infrastructure; and
- Key social impacts for this phase are positive due to employment opportunities and goods and services.
- The use and maintenance of water related infrastructure will change the surface water dynamics in the project area, impacting the topographical landscape;
- The operation of the surface infrastructure may lead to soil compaction resulting in an increased water run-off and erosion of soils;

- Soil may also be contaminated due to potential leakages and spillages of fuel, lubricants and hazardous waste chemicals;
- Traffic may affect the fauna habitats in the project area;

Effective management measures to be applied to the project have been proposed and included as part of the EMP compiled for the Project.

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ACRONYMS

BID	Background Information Document
DEA	Department of Environmental Affairs
GDARD	Gauteng Department of Agriculture and Rural Development
BAR	Basic Assessment Report
DWS	Department of Water and Sanitation
EIA	Environmental Impact Assessment
EMP	Environmental Management Programme
GN	Government Notice
I&APs	Interested & Affected Parties
IDP	Integrated Development Plan
LED	Local Economic Development
NEMA	National Environmental Management Act
SAHRA	South African Heritage Resources Agency
SOC	State-owned Company
TFR	Transnet Freight Rail
TNPA	Transnet National Ports Authority
ToR	Terms of Reference
TPL	Transnet Pipelines
TPT	Transnet Port Terminals
TRE	Transnet Rail Engineering

TERMS AND DEFINITIONS

Administrative Framework: The compendium of requirements with which the project is required to, and/or has chosen to, comply with. This will typically include the following:

- Legal requirements (laws, regulations, decrees, etc.);
- International treaties or conventions, including those ratified by the country in which the project will occur and potentially those non-ratified;
- Internal corporate standards (e.g., company specific environmental performance standards, company specific impact assessment standards);
- Programme requirements (e.g. IFC Performance Standards, EHS Guidelines); and
- Jurisdictional policies.

Affected Community: Any community that is subject to actual or potential project related positive or negative impacts on its social, physical, economic, cultural or natural environment. Such communities often include those located in the project's near geographical proximity, particularly those contiguous to the proposed project facilities. However, more distant communities may also be affected by project impacts, for example those communities where construction workers are housed.

Alternative: A possible course of action, in place of another, that would meet the same purpose and need (of the proposal). Alternatives can refer to any of the following but are not limited to: alternative sites for development, alternative projects for a particular site, alternative site layouts, alternative designs, alternative processes and alternative materials.

Competent Authority: The environmental authority at the national, provincial or local level entrusted in terms of legislation, with the responsibility for granting approval to a proposal or allocating resources and for directing or coordinating the assessment of a proposal that affects a number of authorities.

Culvert: A metal or concrete pipe/structure placed below a road or railway to allow drainage systems to function as naturally as possible.

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

- the land, water and atmosphere of the earth;
- micro-organisms, plant and animal life;
- any part or combination of (i) and (ii) and the interrelationships among and between them; and
- the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being. This includes the economic, social, cultural, historical and political circumstances, conditions and objects that affect the existence and development of an individual, organism or group.

Environmental Assessment: The generic term for all forms of environmental assessment for projects, plans, programmes or policies. This includes methods/tools such as environmental impact assessment, strategic environmental assessment, sustainability assessment and risk assessment.

Impact: The positive or negative effects on human well-being and / or on the environment.

Interested and Affected Parties: Individuals, communities or groups, other than the proponent or the authorities, whose interests may be positively or negatively affected by the proposal or activity and/ or who are concerned with a proposal or activity and its consequences.

Mitigate: The implementation of practical measures to reduce adverse impacts or enhance beneficial impacts of an action,

Project Site: The (future) primary operational area for the project activities. Private transport corridors (i.e. those dedicated for use solely by project operational activities) are included as part of the project site.

Stakeholder Engagement: The process of engagement between stakeholders (the proponent, authorities and I&APs) during the planning, assessment, implementation and/or management of proposals or activities.

Study area: The area that needs to be studied in order to adequately understand and describe the baseline likely to be affected by the project (i.e.

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1 INTRODUCTION

1.1 Project Applicant

Transnet is a State-owned Company (SOC) holding itself accountable not only to the South African Government as a Sole Shareholder, but to civil society at large for the long-term sustainable value it creates for the economy, society and the environment through its day-to-day business activities. Transnet's mandate is to assist in lowering the cost of doing business in South Africa, enabling economic growth and ensuring security of supply through providing appropriate port, rail and pipeline infrastructure in a cost-effective and efficient manner, within acceptable benchmarks (Transnet Sustainability Report, 2016).

Transnet has a coordinating Corporate Centre located in Johannesburg, South Africa and five Operating Divisions with operations spread across South Africa. The five operating divisions are as follows:

- Transnet Freight Rail (TFR),
- Transnet Engineering (TE),
- Transnet National Ports Authority (TNPA),
- Transnet Port Terminals (TPT), and
- Transnet Pipelines (TPL).

The operational aspects of Transnet's business are supplemented by Specialist Units including:

Transnet Capital Projects: executes large infrastructure capacity expansion projects on behalf of, and with input from the Operating Divisions.

Transnet Foundation: implements the Company's corporate social investments (CSI) projects.

Transnet Property: manages Transnet's non-core property portfolio comprising commercial and residential properties (approximately 13% of the total Transnet property portfolio).

1.2 Project Background

Unlocking the Waterberg area is a key priority in Government's National Development Plan and has been identified as part of Strategic Infrastructure Projects (SIP 1) by the Presidential Infrastructure Coordinating Commission (PICC). Specifically, for coal, expansion in rail capacity was identified as strategic initiative and received much attention from Government as a key driver for the South African economy.

Transnet is geared to expand the rail transportation from the Waterberg region in stages, to meet the potential expansion of the mining activities, coal transportation and transportation of other commodities. The Waterberg Railway Corridor starts in Lephalale, passes through Thabazimbi, Rustenburg, Pyramid South and links to the existing Ermelo railway line, which provides linkage to the main coal export terminal in Richards Bay Harbour and Durban Harbour.

Previous studies show that coal resources in the Mpumalanga area are progressively depleting. The area accounts for 80% of coal production in South Africa. Coal reserves were discovered in the Waterberg region in Limpopo. In order to meet the anticipated transportation of coal volumes from the Waterberg region, additional freight capacity is required to supply the market demand for coal.

The Waterberg complex is regarded as 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 which necessitates a review of the required capacity to support the forecast growth of various commodities, of which coal potentially is dominant.

1.3 Description of the activity/ Scope of work

The scope of the project includes the expansion of the existing railway lines in the yard. The expansion of Pyramid South Yard to accommodate 200 wagon DP trains has been identified in Stage 4 of the Waterberg Stage 2 – 5 Programme. The need to provide adequate rail infrastructure capacity is deemed critical to unlock the potential of this economic hub which necessitates a review of the required capacity to support the forecast growth of various commodities, of which coal potentially is dominant. The successful execution of Stage 4 will result in a ramp up from 3 x 200 wagon Distributed Power (DP) trains to 6 x 200 wagon (DP) trains (Diesel/Electric Locomotives). Pyramid South Yard is currently operating as an AC/DC change-over yard to allow traction change for trains travelling from the DC line south of the yard to an AC line north of the Yard.

Pyramid South Yard requires upgrading to stage 200 wagon DP trains (Diesel/Electric Locomotives). Pyramid South Yard was also identified as a location for driver change operations and, therefore, requires a staging length for 200 wagon DP trains. The infrastructure upgrade will serve as a crossing loop for coal trains. The following operational requirements are deemed necessary for the successful expansion of the yard:

- Allow “on-the-fly” traction change from 3 kV DC to 25 kV AC;
- Crossing loop for 200 wagon DP trains;
- Re-crewing facilities;
- Compilation and de-compilation of 100/200 wagon DP trains.
- Construction of new culverts, extension of culverts and new surface drains.

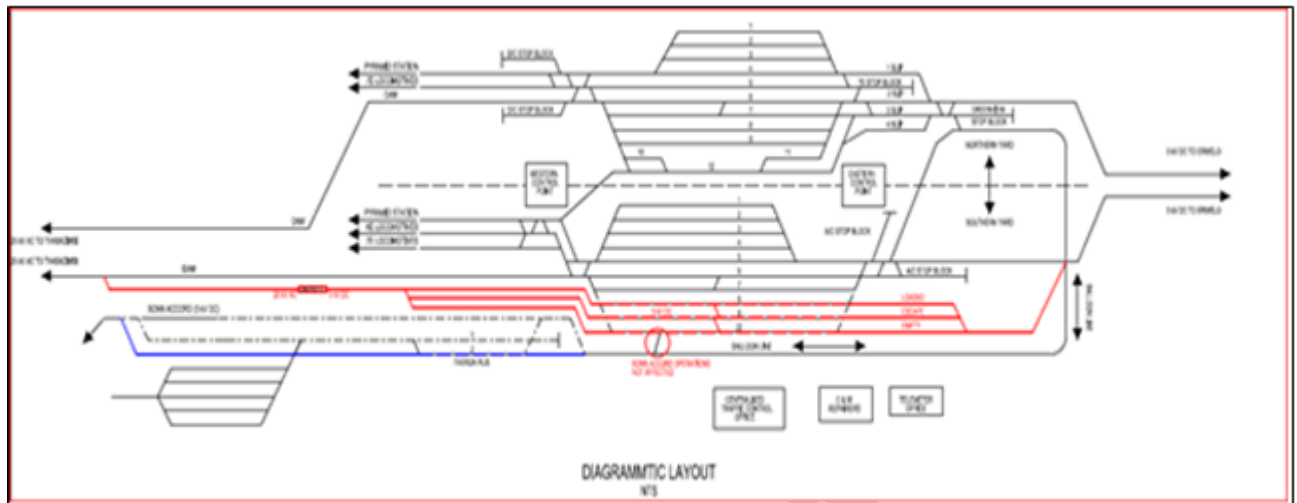


Figure 1: Diagrammatic layout of Pyramid South yard (Blue lines: Phase 1 (Bonn Accord Deviation), Red lines: Phase 2 (End-state))

1.4 Project Location

The proposed project is located on farm Doornpoort 295 JR within City of Tshwane Municipality with the following coordinates:

Southings: $25^{\circ}36'37.23''$

Eastings: $28^{\circ}13'14.69''$

Pyramid South is in the Onderstepoort, Bon Accord in Pretoria North, Gauteng Province and is situated along the old Warmbaths road (R101) in the Northern part of Rooiberg Asphalt Pyramid in Pretoria North. See locality map below.

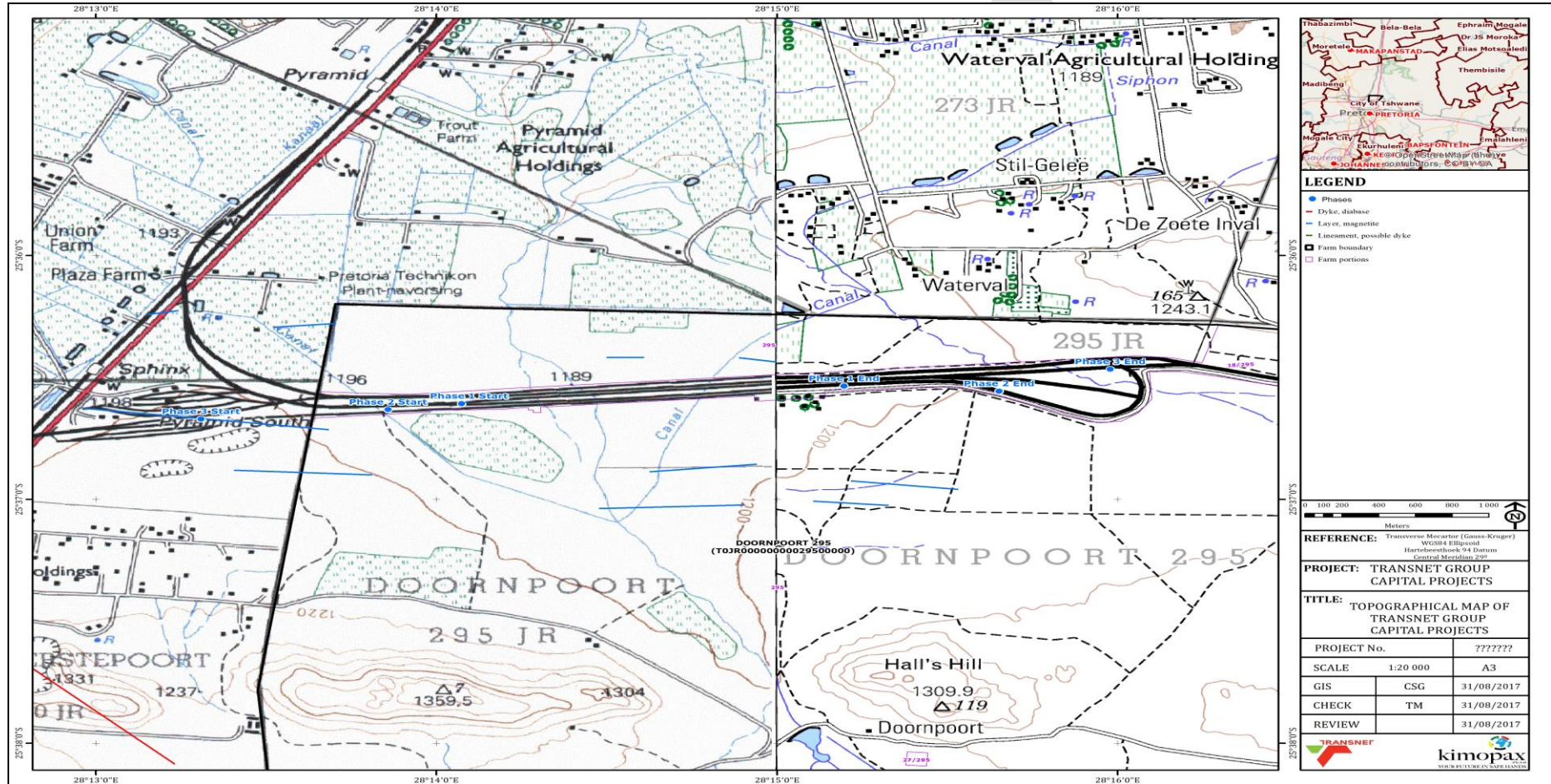


Figure 2: Location of Pyramid South Yard, Gauteng.

1.5 Purpose of this Report

This Basic Assessment report has been compiled as part of the EIA process in accordance with the regulatory requirements stipulated in the EIA Regulations GNR 982 of 2014, of the National Environmental Management Act 107 of 1998 (as amended by GN 326 of 2017), promulgated in terms of section 19 and 20.

The “Basic Assessment” process, as required by the EIA Regulations, as amended, is one of carefully reviewing background information of the proposed activity, as well as assessing the receiving environment (social, economic and bio-physical) where the activity is to take place. Based on this review and assessment, environmental impacts potentially associated with the activity which may cause significant harm or benefit to the receiving environment, either, directly, indirectly or on a cumulative basis, are identified and assessed in the Environmental Management Programme

The objectives of this report are to provide information to stakeholders (Interested and Affected Parties), including the public and authorities about the proposed expansion of railway lines and the Basic Assessment Process followed to date.

2 DETAILS OF ENVIRONMENTAL ASSESSMENT PRACTITIONER

Kimopax Pty Ltd has been appointed as an independent Environmental Assessment Practitioner (EAP) to apply for Environmental Authorisation in accordance with National Environmental Management Act 107 of 1998, as amended and a Water Use License in accordance with the National Water Act 36 of 1998, as amended and all relevant regulations promulgated in terms thereof for the proposed expansion railway lines.

2.1 Details of Expertise

This report was prepared by Thabelo Teresa Matshisevhe (Cand. Sci. Nat), a certified Environmental Assessment Practitioner with 3 years working experience in the field of Environmental Sciences. She holds an Honours degree in Environmental Management and specialises in EIA (Environmental Impact Assessment) and related projects. She has been involved in a variety of different types of EIAs, which include construction and water related projects in South Africa. Thabelo Matshisevhe has also been involved in public participation programmes on a number of projects.

The EIA process was managed by Mr Charles Gumisai Chigurah (IAIA, Cert. Sci. Nat, IWMSA), a certified Environmental Assessment Practitioner with more than 10 years working experience. Charles Chigurah has an honours degree in Environmental Management from the Midlands State University in Zimbabwe and Postgraduate Diploma in Water Supply and Sanitation from the Institute of Water Supply, Sanitation and Development in Zimbabwe; SAMTRAC and is currently finalizing his NEBOSH International Diploma in Occupational Safety and Health. He is a Senior SHE Consultant with Kimopax Pty Ltd and also a member of International Association of Impact Assessors (IAIA), South African Council for Natural Scientific Professions (SACNASP), Institute of Waste Management in Southern Africa (IWMSA) and is in the process of registering with the South African Council for Project and Construction Management Professions (SACPCMP) as a Construction Health and Safety Manager (CHS). He has more than 9 years working experience in the field of Construction, Waste Management, Environmental Management and Environmental Management Systems (EMS) Implementation and Auditing and has published a paper in Geographical Information Systems (GIS) and Remote Sensing. He has worked on a number of municipality projects among them included the following:

- Integrated Waste Management Plan for Nkonkobe Local Municipality
- Integrated Waste Management Plan for Tokologo Local Municipality
- Integrated Environmental Management Plan for Xhariep District Municipality
- Environmental Management Framework for Amajuba District Municipality

Apart from doing municipality projects, Charles has also managed more than fifty (50) Environmental Impact Assessment Projects both in Zimbabwe and South Africa. He has also worked as a Construction SHE Advisor and Consultant on a number of major construction projects across South Africa among them include the construction of multi-storey buildings in Mpumalanga and Limpopo Provinces; the construction of gas pipelines for Sasol in Gauteng, the construction and upgrades of road networks in Limpopo Province as well the construction and upgrades of Bulk Water and Sewer Systems for Ekurhuleni Metropolitan Municipality and was also a Safety Advisor for Eskom Hendrina Power Station responsible for managing sub-contractor's safety officers.

3 ADMINISTRATIVE FRAMEWORK

3.1 LEGISLATIVE FRAMEWORK

The proposed project is subject to legislative and policy requirements at a national and provincial level. Relevant legislation/guidelines that are applicable to the proposed expansion of railway lines include, *inter alia*, the following:

Provincial Legislations:

- Town- Planning and Townships Ordinance (Act No. 15 of 1986); and
- Transvaal Nature Conservation Ordinance (Act No. 12 of 1983)

National Legislations

- National Environmental Management Act (NEMA) (No. 107 of 1998), as amended;
- NEMA EIA Regulations (2014) as amended in 2017;
- National Water Act (No. 36 of 1998);
- National Environmental Management: Biodiversity Act (No. 10 of 2004);
- National Heritage Resources Act (No. 25 of 1999);
- Occupational Health and Safety Act (No. 85 of 1993);
- Noise Control Regulations in terms of Section 25 of the Environment Conservation Act, 1989 (Act No. 73 Of 1989) and SANS Code 10328; and

The competent authority in terms of decision-making for this application is the National Department of Environmental Affairs (DEA). The provincial environmental authority, the Gauteng Department of Agriculture and Rural Development (GDARD), is a key commenting authority.

3.1.1 National Environmental Management Act (Act No. 107 of 1998)

The South African Constitution states that all South African citizens have a right to an environment that is not harmful to their health or well-being, it is the constitution that gave effect to the establishment of the National Environmental Management Act. Key principles related to the EIA process and public participation specifically, are described in Part 2 of the Act and include the following:

- Development must be socially, environmentally and economically sustainable;
- Environmental management must be integrated;
- Decisions concerning the environment must take into account the needs, interests and values of all I&APs;
- Community well-being and empowerment must be promoted through environmental education and awareness, and the sharing of knowledge and experience; and
- Decisions must be taken in an open and transparent manner, and access to information must be provided in accordance with law, etc.

The planning and implementation of the project must, therefore, take these principles into account at all stages.

3.1.2 NEMA, EIA Regulations (2014) as amended in 2017

On 07 April 2017 revised EIA Regulation (GNR 983, as amended by GN 327 of 2017 and GNR 985 as amended by GN 324 of 2017) were promulgated in terms of Section 19 and 20 of National Environmental Management Act 107 of 1998 (as amended by GN 326 of 2017). These regulations came to effect on 07 April 2017, replacing the regulations of 08 December 2014.

The EIA Regulations, April 2017 (Government Notice 327 and 324) identify activities which may have a detrimental effect on the environment and the listed activities which may be triggered by the expansion of railway lines are included in the Table 1; below.

Table 1: Relevant Listed Activities (EIA Regulations, 2017) applicable to this project

Relevant Government Notice and its Listed Activity	Description of listed activity	Description of project activity that triggers listed activity.
Notice R. 327 Activity 19:	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;	It is anticipated that the construction phase of the development will warrant excavation and removal of soil from the adjacent watercourses. Given the magnitude of the project it is anticipated that this will be more than 10 cubic metres.
Notice R. 327 Activity 24:	The development of a road– (ii) with a reserve wider than	It is anticipated that a road will be developed to access the site for construction and maintenance, and

	<p>13,5 meters, or where no reserve exists where</p> <p>the road is wider than 8 metres;</p>	<p>permanent access for existing offices and facilities</p>
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3.1.3 National Water Act (Act No. 36 of 1998)

It is anticipated that the following water uses (in terms of Section 21) of the National Water Act (NWA), 36 OF 1998 will also be triggered, and therefore a Water Use License Application will have to be submitted to the Department of Water and Sanitation (DWS):

- Section 21 (a): Taking water from a water source;
- Section 21 (c): Impending or diverting the flow of water in a watercourse; and
- Section 21 (i): Altering the bed, banks, course or characteristics of a watercourse.

4 NEED AND DESIRABILITY OF THE PROPOSED EXPANSION OF RAILWAY LINES

Transnet’s vision is to meet customer demand for reliable freight transport and handling through; fully integrating and maximizing the use of its unique set of assets, continuously driving cost efficiently, and demonstrating a concern for sustainability in all they do (Sustainable report, 2016).

Unlocking the Waterberg area is a key priority in Government’s National Development Plan and has been identified as part of Strategic Infrastructure Projects (SIP 1) by the Presidential Infrastructure Coordinating Commission (PICC). Specifically, for coal, expansion in rail capacity was identified as a strategic initiative and received much attention from Government as a key driver for the South African economy. The latest rail capacity demand from coal miners in the Waterberg is informed by mine expansion projects and proposed new mine developments. In line with these strategic priorities for the country, Transnet has developed a programme for expansion of railway infrastructure between Lephalale in the Limpopo province and Ermelo, located in Mpumalanga province.

The increased provision of coal to mines as well as national power stations will increase the availability of electricity needed by local, regional as well as national communities. The benefit to coal miners in Waterberg will be improvement on electricity supply to power stations, uplifting poor communities and increase economic development. The benefits to coal miners in Waterberg will also be applicable to the local communities.

According to the development guideline, the “need “for a facility relates to whether the facility is needed now; whilst the desirability of the facility relates to the location or the receiving environment in which the facility is situated; i.e. “is this the right time and is it the right place for locating the type of land-use/ activity being proposed?”.

The concept of sustainable is thus the cornerstone of any investigation into the need and desirability of a development is commonly defined as “development that meets the needs of the present without compromising the ability for future generations to meet their own needs”.

The National Department of Environmental Affairs and Development Planning's Guideline on Need and Desirability.

The DEA&DP's Guideline on Need and Desirability poses a series of questions, the answers to which will inform whether the new galvanising facility is necessary, and desirable given the broader planning and environmental management imperatives, policies and plans (such as those detailed above) which relate to the area. These questions have been answered below

Table 2: Need and desirability for the proposed project

QUESTIONS	RESPONSES
NEED ("timing")	
Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved Spatial Development Framework (SDF) agreed to by the relevant environmental authority? (i.e. is the proposed development in line with the projects and programmes identified as priorities within the credible IDP)	The land use is currently zoned for industrial use and the project does not need to acquire any land. Transnet does not need to apply for rezoning.
Should development, or if applicable, expansion of railway lines concerned in terms of this land use (associated with the activity being applied for) occur here at this point in time?	Yes, the application form for environmental authorisation to the Department of Environmental Affairs was submitted on the 31 st of October 2017. Water Use License Application will be submitted to the Department of Water and Sanitation.
Does the community/area need the activity and the associated land use concerned (is it a societal priority)? This refers to the strategic as well as local level (e.g. development is a national priority, but within a specific local context it could be inappropriate)	The proposed expansion of railway lines is considered to be a national priority to accommodate the increased export of minerals in Waterberg area.
Are the necessary services with adequate capacity currently available (at the time of application), or must additional capacity be created to cater for the development?	Transnet will cater for most of the services required for the proposed expansion, which includes water, electricity and service road. Effluent, solid waste disposal and some of the water requirements will be accommodated by City of Tshwane Local Municipality.
Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services and opportunity costs)?	The project is an expansion of railway lines on the existing Transnet Infrastructure (i.e. railway line) which will take place on the existing Transnet Servitude.

<p>Is this project part of a national programme to address an issue of national concern or importance?</p>	<p>The National Planning Commission’s vision states “one way to reduce transport costs is to invest in inter-linked rail and port infrastructure, supported by road.” The proposed expansion of railway lines fits with this strategy and is aimed at ensuring that the mining industry is not constrained by transport logistics and costs associated with transporting minerals from the mines to port. This project and similar projects are incorporated into ‘the Transnet Long Term Planning Framework, which forms an important part of a national planning process.’</p>
<p>DESIRABILITY (“Placing”)</p>	
<p>Is the development the best practicable environmental option for this land/site?</p>	<p>Activities will be undertaken within the existing rail reserve which is about 4 ha along the existing railway line for the proposed railway lines expansion. There is a wetland close by which can be disturbed during the proposed expansion of railway lines. Although potential impacts are envisaged, as discussed in this BA these do not pose any fatal flaws and can reasonably be managed by the mitigation measures outlined in this report.</p>
<p>Would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF as agreed to by the relevant authorities?</p>	<p>No, the proposed expansion of railway lines would not compromise the integrity of the IDPs in the various local municipalities as the rail infrastructure is an important infrastructural component in terms of job creation (rail operations and mining) which is key in Gauteng province or the whole country South Africa. The proposed expansion of railway lines will contribute towards job creation both in the construction and the operational phases of the development. In terms of the spatial development framework, the railway line which has been in existence for decades is deemed to be part and parcel of the landscape and planning of new developments would consider the railway line as such.</p>
<p>Would the approval of this application compromise the integrity of the existing environmental management priorities for the area (e.g. as defined in EMFs), and if so, can it be justified in terms of sustainability considerations?</p>	<p>No, EMFs have not been adopted for the municipalities under consideration. In terms of compromising any other environmental management priorities, this is not anticipated as the proposed railway lines extension are adjacent to the existing railway line and will be undertaken in consultation with a Biodiversity and ecological specialist, landowners, relevant competent authorities and other stakeholders and should any environmental resource conflicts arise, this will be addressed</p>

	timeously.
Do location factors favour this land use (associated with the activity applied for) at this place? (This relates to the contextualisation of the proposed land use on this site within its broader context).	Yes, the proposed expansion of railway lines is in line with the current land use and context of the sites as the proposed project is an extension of the existing railway lines.
How will the activity or the land use associated with the activity applied for, impact on sensitive natural and cultural areas (built and rural/natural environment)?	Most of the railway lines are outside of the urban edge, however the proposed expansion of railway lines is within Transnet servitude, outside the urban edge.
How will the development impact on people's health and wellbeing (e.g. in terms of noise, odours, visual character and sense of place, etc)?	The expansion of railway lines will have minimal noise and aesthetic impacts in the area. Potential impacts will be during the construction phase where heavy machinery will be used.
Will the benefits of the proposed land use/development outweigh the negative impacts of it?	Yes, the proposed project is an expansion of an existing development, therefore socio-economic and economic benefits will outweigh the negative impacts. Benefits of the proposed expansion are job creation and opportunities for small entrepreneurs to benefit from the associated employment and economic opportunities. Negative impacts on the environment are going to be minimal.
Will any person's rights be negatively affected by the proposed activity/ies?	No, a thorough public participation process or stakeholder engagement process will be undertaken to ensure that no person's rights are negatively affected by the process. Directly affected landowners will specifically be consulted in this regard in addition to surrounding communities and local authorities.

5 INVESTIGATION OF ALTERNATIVES FOR MEETING GENERAL PURPOSE AND REQUIREMENTS OF THE APPLICATION

5.1 Site alternatives

5.1.1 Strategic alternatives

The demand forecast of potential new mining clients in Limpopo province is considerable – up to 80Mtpa. These volumes require substantial capacity upgrades to efficiently link them to the ports and domestic destinations.

5.1.2 Process alternatives

Process alternatives are dictated by various aspects including but not limited to the operating conditions, throughput needs and design requirements and/or restrictions. The most optimal solution

is found by limiting the extent of infrastructure and rolling stock investments required. This is achieved by optimizing the processes i.e. streamlining activities and using an optimal train length. Shorter trains would result in increased train frequency and fleet size, with the latter carrying a significant capital cost. An increase in train frequency would require additional train slots in the overall schedule. The schedule would then slowly get more and more congested which would require additional railway lines to be extended or built to alleviate the problem, and the compilation yard would need to be of sufficient size to cope with the required extension of railway lines and deconsolidation. This construction would carry a cost burden and potential environmental and social risks.

5.2 Activity alternatives

An alternative for this project will be transportation of these goods by road, rather than rail. Assessing the potential for road transport would need to involve other role players and government and would require considerable input and investigation, owing to the large geographic scale of the study area and the volumes of goods that need to be transported. There are a number of advantages and disadvantages to road transport which include the following:

- **Advantages** - include opportunities for small entrepreneurs / road transport contractors to benefit from the associated employment and economic opportunities
- **Disadvantages** - include the impact on the public in terms of road infrastructure maintenance, vehicle congestion, vehicle emissions and road safety, accessibility and extent of major road networks, and the cost of transport by road.

It is generally recognized that rail is the preferred mode of transport for coal, phosphate and other minerals given the bulk volumes requiring transport.

5.3 No-go option

Should the proposed railway lines and associated infrastructure not be constructed then an increase in container and commodity capacity on the railway line in Pyramid South will not be possible. This would have serious implications for South Africa's commodities which includes; coal, chrome, ferrochrome, cement, lime, granite, iron ore and container handling sectors and would affect the country's export capabilities. This suggests direct negative consequences for the provincial and national economy associated with no additional revenue generation, no increase in export tax generation or economic stimulation. Local effects would be related to a lack of stimulation in terms of employment and opportunities for small and medium enterprises, which would benefit from the proposed development.

6 PRELIMINARY IDENTIFICATION OF IMPACTS

6.1 Introduction

A key part of the Basic Assessment Report is the preliminary identification and consideration of the ways in which the project may impact (positively and negatively) on environmental and socio-economic resources or receptors. The issues that are identified as potentially significant during the Basic Assessment Report provide focus for more detailed specialist studies for the BA process. Each of the potential issues and the significance of any resulting impacts will be described in this section.

6.2 Description of potential impacts

The potential impacts on environmental and socio-economic resources and receptors arising from the project include direct and indirect impacts. Impacts will also be linked to the different stages of the project which are identified as construction, operation and decommissioning.

6.2.1 Environmental Impact Assessment

All activities that are related to the proposed activity that could have some impact on the environment were identified. These impacts can be of environmental, socio-economic or cultural nature. Impacts are often not only confined within the direct scope of the proposed activity and can accumulate as a network of indirect impacts on the surrounding area.

The significance will be determined by both the extent and duration of the impact. The environmental risk of any aspect is determined by a combination of parameters associated with the impact. Each parameter connects the physical characteristics of an impact to a quantifiable value to rate the environmental risk.

Table 3: Impacts Parameters and description

PARAMETERS	DESCRIPTION
Extent	Refers to the physical or geographical size that is affected by the impact. It can be categorised into the following ranges: <ul style="list-style-type: none"> Onsite – Within specific site boundary (weight value – 1) Local – Within municipal boundary (weight value – 2) Regional – Outside municipal boundary (weight value – 3)
Duration	Time span associated with impact: <ul style="list-style-type: none"> Short term – 1 Year or less (weight value – 1) Medium term – 1-5 Years (weight value – 2) Long term – Longer than 5 Years (weight value – 3)
Intensity and Reversibility	The severity of an impact on the receiving environment: <ul style="list-style-type: none"> Low – Natural and/or cultural processes continue in a modified way and is reversible (weight value – 1) Medium – Natural and/or cultural processes stop and is partially reversible (weight value – 2) High – Natural and/or cultural processes disturbed to an irreversible state (weight value – 3)
Impact Significance/Consequence	Adding the extent, duration and intensity together provides the significance of the impact (High, Medium or Low). Extent + Duration + Intensity = High/Medium/Low Impact
Probability	The likelihood of an impact occurring: <ul style="list-style-type: none"> Unlikely – 0% - 45% chance of the potential impact occurring (weight value – 1) Possible – 46% - 75% chance of the potential impact occurring (weight value – 2) Likely - >75% chance of the potential impact occurring (weight value – 3)
Environmental Risk	Multiplication of the significance of the impact by the probability of the impact occurring produces a final conclusion of the overall risk that an

Refer to table below	impact poses to the surrounding environment. High/Medium/Low Impact X Probability = High/Medium/Low Environmental Risk
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Table 4: Significance of Impacts

Significance of Impact		Low Impact (1-5)	Medium Impact (6-8)	High Impact (9)
Probability	Definite/Very Likely (3)	9 - 15 L - M	18 - 24 M - H	27 H
	Possible (2)	6 - 10 L - M	12 - 16 M	18 M - H
	Unlikely (1)	3 - 5 L	6 - 8 L	9 L
ENVIRONMENTAL RISK	Guidelines for Control Strategies			
(H)-High	Proactively reduce risk level, short term response			
(M-H) Medium-High	Proactively reduce risk level, short term response			
(M)-Medium	Management strategies to reduce risk level, short to medium term response			
(L-M) Low-Medium	Management strategies to reduce risk level, short to medium term response, operational control and housekeeping			
(L)-Low	Operational Control			

Table 5: Impacts that may result from the planning and design, construction, operational, decommissioning and closure phases as well as proposed management of identified impacts and proposed mitigation measures.

Activity	Impact summary	Significance	Proposed mitigation
Alternative 1 (preferred alternative): Planning and design related impacts			
	Site Selection of Infrastructure	No rating as this is not an impact but rather an aspect.	The first step in any mitigation measure should be avoidance of particularly sensitive ecological. These sites could be ear-marked and where possible avoided either by the loop itself or associated infrastructure.
Alternative 2: Construction related impacts			
	Alien Plant Invasion Risk	Low- Medium	<ul style="list-style-type: none"> • Soil disturbance and vegetation clearing should be kept to minimum. • Cleared areas that are not going to be used should be re-vegetated with locally-collected seed of indigenous species. • Regular post-construction monitoring should take place to ensure that alien plants are not increasing because of the disturbance that has taken place • All alien plants present at the site should be controlled annually using the best practice methods for the species present.
	Impacts on Vegetation and Protected Plant Species	Low- Medium	<ul style="list-style-type: none"> • All areas to be cleared should be clearly demarcated. • A search and rescue operation for protected species within the final development footprint should be conducted prior to construction. • Cleared areas which are not being used should be re-vegetated using plants or seed of locally occurring or endemic plant species. • Where service roads or other infrastructure traverse sensitive areas, specific precautions to limit impacts should be undertaken. • Any vegetation clearing that needs to take place as part of maintenance activities, should be done in an environmentally friendly manner, including avoiding the use of herbicides and using manual clearing methods wherever possible.
	Direct Faunal Impacts	Low- Medium	<ul style="list-style-type: none"> • Any fauna directly threatened by the construction activities should be removed to a safe location by the ECO/SHE Officer. • The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden. • No fires are allowed on site. • No fuel wood collection should be allowed on-site. • No animals should be allowed on site. • All hazardous materials should be stored in the appropriate manner to prevent

Activity	Impact summary	Significance	Proposed mitigation
			contamination of the site. <ul style="list-style-type: none"> Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.
	Impacts on Critical Biodiversity Areas	Low- Medium	<ul style="list-style-type: none"> Preconstruction surveys to locate any listed plant species within the development footprint for translocation. Actions to reduce the loss of vegetation at the site such as re-vegetation of disturbed areas after construction.
	Noise and Vibration Disturbance	Low- Medium	<ul style="list-style-type: none"> Operate equipment within its specification and capacity so as not to overload them and cause them to operate ineffectively; Regularly maintain equipment (particularly with regards to lubrication) and vehicles (exhausts) so that they operate efficiently; Drive at the legal speed limit on public roads and at 30 km/h on dirt or private roads to limit the noise generated; Restrict construction activities to daylight hours and The site visits did not identify schools or sensitive receptors in close proximity to the railway lines. However, if during construction any sensitive social receptors are identified, they will be given adequate notice of when noisy activities, such as drilling will occur.
	Contamination of Soil, Groundwater Resources and Surface Water Features.	Medium- High	<ul style="list-style-type: none"> Fuel, oil and used oil storage areas will have appropriate secondary containment; Spill containment and clean up kits will be available onsite and clean-up from any spill will be appropriately contained and disposed of; and Construction vehicles and equipment will be serviced regularly and provided with drip trays, if required
	Dust Nuisance	Low- Medium	<ul style="list-style-type: none"> The removal of vegetation will be limited to the construction areas only. Minimise disturbance of natural vegetation during right-of-way construction (e.g. erection of fences) to reduce potential erosion, run-off, and air-borne dust. Apply dust suppression measures that are appropriate, reasonable and practicable to the scale of the stock piles that are based on accepted principles such as wetting. Access roads should be wetted down where reasonable and practicable to limit dust generation. Speed restrictions of 30km/h will be implemented on construction sites and access roads to limit dust entrainment by vehicles. Verges, cuttings, lay-down areas and construction areas will be re-vegetated

Activity	Impact summary	Significance	Proposed mitigation
	The impacts of delivery trucks during construction	Low- Medium	<p>according to specific site conditions as soon as the construction activity is completed at each of the respective sites and in accordance with the operational or post-construction utilisation of that particular site.</p> <p>The following mitigation is aimed at managing potential impacts associated with the movement of delivery trucks to and from site. The impacts on the existing traffic can be reduced by scheduling the arrivals and departures of construction vehicles;</p> <ul style="list-style-type: none"> • Educate both the construction crew and the local community on traffic safety and possible hazards arising from the construction activities; • All warning, regulatory and prohibition signs recommended by the National Department of Transportation, South African Roads Traffic Signs Manual (SARTSM) should be implemented; • All regulatory and warning signs recommended by the National Department of Transportation, South African Roads Traffic Signs Manual (SARTSM) should be adhered to; and • All plans, and specifications should provide details on how the traffic control operations are to be carried out.
	Impact on Local Economy	Low- Medium	<p>The following measures will be implemented to ensure that employment of local people is maximised, and procurement of local, regional and national services is maximised:</p> <ul style="list-style-type: none"> • Transnet’s recruitment and procurement policy will set reasonable targets for the employment of local residents/suppliers (originating from the City of Tshwane Metropolitan municipality) and promote the employment of women as a means of ensuring that gender equality is attained. Criteria will be set for prioritising, where possible, Pretoria local residents/suppliers over regional or national people/suppliers. • All contractors will be required to recruit and procure in terms of Transnet’s recruitment and procurement policy. • Transnet will work closely with relevant local authorities, community representatives and organisations to ensure that the use of local labour and procurement is maximised. This may include: <ul style="list-style-type: none"> ✓ Sourcing and using available databases on skills/employment seekers that local authorities may have. ✓ Advertising job opportunities and criteria for skills and experience needed through local and national media. ✓ Conducting an assessment of capacity within the

Activity	Impact summary	Significance	Proposed mitigation
			<ul style="list-style-type: none"> ✓ City of Tshwane Municipality to supply goods and services over the operational lifetime of the project. • No employment will take place at the entrance to sites. Only formal channels for employment will be used. • Ensure that the appointed project contractors and suppliers have access to Health, Safety, Environmental and Quality training as required by the project. This will help to ensure that they have future opportunities to provide goods and services to the sector. • Transnet will implement a grievance procedure that is easily accessible to local communities, through which complaints related to contractor or employee behaviour can be lodged and responded to. Transnet will respond to such complaints. Key steps of the grievance mechanism include: <ul style="list-style-type: none"> ✓ Circulation of public complaints procedure with public complaints register or key Transnet contact. ✓ Awareness raising among local communities (including all directly affected and neighbouring farmers) regarding the grievance procedure and how it works. ✓ Establishment of a grievance register to be updated by Transnet, including all responses and response times.
	Change of Sense of Place	Low- Medium	<ul style="list-style-type: none"> • Transnet will give adequate notice to the industries near Pyramid South Railway lines. • Notice will be given to surrounding industries before construction begins such that they are aware of the impacts and may make the necessary changes.
	Managing Stakeholder Expectations	No rating	<ul style="list-style-type: none"> • All concerns regarding jobs and other expectation will be addressed in accordance to the grievance procedures. • Maximize local employment and procurement as far as practicable. • Work together with local farmer unions and landowners to clearly explain the increased waiting time that is expected at the different crossings. • Advertise job criteria, required skills and experience for available jobs through local and national media and local communication channels. • Advertise experience, quality and volume requirements for the supply chain needs. • Local residents' expectations of Transnet will continue to grow over time. It will not be possible for Transnet to deliver on all community and stakeholder

Activity	Impact summary	Significance	Proposed mitigation
			<p>expectations; hence a CSI Programme should be developed that clearly outlines the anticipated initiatives. These initiatives will need to be identified in consultation with the local communities. The plan should outline what the nature of the assistance will be and how the investment projects will be distributed through the project area. This strategy will be communicated to stakeholders/ local residents to ensure that their expectations remain realistic and are well-managed. Examples of potentially relevant programmes could include community policing, financial management, and drilling of boreholes.</p>
	Increased Erosion Risk	Medium- High	<ul style="list-style-type: none"> • Service roads and tracks running down slope must be designed to limit erosion potential. • Any extensive cleared areas that are no longer required for construction activities should be re-vegetated using topsoil removed during site clearing or with locally-sourced seed of suitable species. Bare areas can also be packed with brush removed from other parts of the site to encourage natural vegetation regeneration and limit erosion. • No construction vehicles should be allowed to drive through the veld. All construction vehicles should remain on properly demarcated roads. • Regular post-construction monitoring for erosion to ensure that no erosion problems are occurring at the site as a result of the roads and other infrastructure. Erosion problems observed should be rectified as soon as possible.
Alternative 3: Operational related impacts			
	<p>Direct impacts: Impact from Increased Noise Generation</p>	Medium	<ul style="list-style-type: none"> • The objective of mitigation is to minimise the impacts of noise disturbance on sensitive social and ecological receptors (i.e. Brick making industry) during operations. <p>Amongst others, some specific measures include:</p> <ul style="list-style-type: none"> • The need for noise barriers (in the form of walls or earth berms) at sites where the acceptable noise limits (85dBA) are exceeded at sensitive social receptors (such as Brick making industry in close proximity to the railway line), will be investigated during the detailed design of the relevant railway lines, with the aim of reducing the noise impact caused by the additional trains. • A noise monitoring program will be established at sensitive social receptors during the operational phase. The purpose of this program will be to establish a base level of the noise caused by the existing rail traffic; and • Should significant incremental increases in the noise levels be observed after

Activity	Impact summary	Significance	Proposed mitigation
			operation has started, appropriate measures will be implemented to mitigate these using, amongst others, the noise attenuation strategies described above.
	Impact on Public Safety	Low	Rail crossings are to be clearly marked and existing signage and safety procedures are to be maintained.
	Alien Plant Invasion Risk	Low- Medium	<p>The aim of the mitigation measures outlined below is to minimise and manage the spread of invasion of alien species:</p> <ul style="list-style-type: none"> • Monitoring to ensure alien plants are not increasing as a result of the disturbance caused during the construction phase. • Alien plants at the sites should be controlled according to the management plan using the best practice methods for the species present.
	Indirect impacts: Economic opportunities	Medium- High	Increased rail capacity and transport efficiency is likely to result in reduction in long distance bulk commodity and container movements by road, which has a high negative impact on roads.
No-go option			
	<p>Direct impacts: The impact of not implementing the project can be viewed as both positive and negative. The positive impacts include not causing impacts to the biophysical and social environment, particularly to sensitive receptors, whereas the negative implications are associated with the direct loss of opportunities for employment and procurement of goods and services at a local level but also resulting in decreased growth potential, given the importance of the mining industry, on a provincial and national scale.</p> <p>The no-go alternative is therefore not recommended.</p>		

7 BASIC ASSESSMENT PROCESS

Basic Assessment is the environmental applied to activities listed in Listing Notice 1 and Listing Notice 3. These are smaller scale activities, the impacts of which are generally known and can be easily managed. Typically, these activities are considered less likely to have significant environmental impacts and, therefore, do not require a full Environmental Impact Assessment.

Basic Assessment requires public notice and participation, consideration of the potential environmental impacts of the activity, assessment of possible mitigation measures, and an assessment of whether there are any significant issues or impacts that might require further investigation. The expansion of railway lines at Pyramid South have triggered a Basic Assessment Process and all the requirements of BA process have been followed when drafting this report.

7.1 Initial Site visit and Project Initiation

As part of the project initiation Kimopax Pty Ltd carried out an initial site reconnaissance visit with all specialists and the applicant (Transnet SOC Ltd) on the 22nd of September 2017. The purpose of the site visit was to familiarise the project team with the project proposal and study area and to also begin the environmental and social screening and BA process.

7.2 Public Participation Process

Public Participation Process (PPP) is regarded as an integral part of an EIA process. It allows the public to have access to all information regarding the proposed development in hand through transparency and provision of sufficient and accessible information about the development. Public participation plays an important role in the compilation of a Scoping Report as well as the planning, design and implementation of the project. Public participation is a process leading to informed decision - making, through a joint effort. The PPP for this project will satisfy the requirements stipulated in Chapter 6, Sections 54, 55, 56 and 57 of the NEMA EIA Regulations in terms of the National Environmental Management Act, Act 107 of 1998.

7.2.1 Notification of Landowners, Authorities, and Organs of State

At the commencement of the EIA, Kimopax Pty Ltd notified the landowner and occupiers of land within 100 metres of the proposed project site were notified by emails and hand delivering the Background Information Documents (BID).

7.2.2 Advertisement according to EIA Regulations

A newspaper advertisement detailing information about the project and the EIA process that has since been finalised, as well as calling for the registration of I&AP's, was placed on the 10th of November 2017 in the Pretoria North Rekord. The advertisement provided I& APs 30 days to register and to submit their comments in writing to Kimopax Pty Ltd.

7.2.3 Written Notice

A BID was compiled to provide additional information and description of the activities. A BID and project notices and invitations were e-mailed, and Hand delivered to identified stakeholders and I&APs. Stakeholders and I&APs were encouraged to identify additional I&APs and submit written comments or representation within a stipulated time frame.

7.2.4 Site Notice

A total of seven A3 site notices, were placed at identified sites on the 10th of November 2017, the size and lettering of on-site notice complied with the requirements as outlined in the EIA regulations. Placement included on-site at the property where the activities will be undertaken.

7.2.5 Background Information Document

At commencement of the project a Background Information Document (BID) was prepared and sent to I& APs that provided a summary of the details of the proposed project as well as the EIA process that was to follow.

7.3 Specialist Studies

A number of potentially significant issues were identified during the assessment of impact in this Basic Assessment Process. The following specialist studies were, therefore, commissioned to further investigate these issues and any data gaps:

- Biodiversity study
- Hydrological study
- Wetland delineation study

Findings and Recommendations for each of the specialist study are included in **Table 6** below.

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Table 6: Findings and Recommendations for specialist studies

SPECIALIST STUDY	FINDINGS	RECOMMENDATIONS
<p>Biodiversity study</p>	<p>Floral diversity The floral diversity was low within the subject site areas. Most areas were covered by grass species, which were not categorized and identified to species level as they were recovering from fire disturbance. The impact likely to be posed on the flora diversity would be of no significance, with or without implementation of mitigation measures.</p> <p>Faunal habitat diversity</p> <p>Terrestrial This unit has shown occurrence of mammal faeces that are highly likely to be associated with <i>Parahyaena brunnea</i> and <i>Crocuta crocuta</i>, which are both ranked as Near Threatened, based on ICUN Red Listed and City of Tshwane C-plan. Furthermore, the faeces appeared to be less likely of <i>Leptailurus serval</i> and <i>Caracal caracal</i>, which are of Least Concern. Based on these findings, a relevant permit to develop environmental activities on habitat that is supporting NT species is required. Although mammals are mobile, loss of their feeding habitat could also have some behavioural impacts on their populations.</p> <p>Wetland This habitat unit has shown occurrence of the faeces and spoor that are less and highly likely to be of the <i>Lutra maculicollis</i> and <i>Aonyx capensis</i>, respectively, which are both assigned to Near Threatened status in the both City of Tshwane C-Plan and IUCN Red Listed Species. This implies that, the wetland unit cannot be disturbed or modified as it is supporting Near Threatened mammal species to extinction. The <i>L. maculicollis</i> and <i>A. capensis</i> are the only two otter's species in South Africa with limited distribution. Therefore, based on this circumstance, the wetland unit becomes a 'no go area' as there is no mitigation that could inhibit destruction of this niche to the NT species.</p> <p>Fauna of special conservation concern According to the faunal diversity and assemblage's data collected, there was four (4) Red Data Listed (RDL) species identified within wetland and terrestrial units in the site. However, more RDL species could still be existing, and might have been missed out, because the site experienced extensive fire disturbances prior. Therefore, the likelihood of the proposed development resulting in loss of these species is considered to be of Medium Significance for terrestrial unit, and High significant for wetland unit, as it is localised.</p>	<p>Floral species: based on the ecological study conducted on the site, there was no Red Data Listed species. Despite the absence of RDL, seven (7) alien invasive species namely, <i>Tipuana tipu</i>, <i>Argemone mexicana</i>, <i>Solanum elaeagnifolium</i>, <i>Solanum sisymbriifolium</i> and other 3 three unidentified <i>Solanum</i> species were associated with the both wetland and terrestrial units, and they are listed by CARA. There is no impact that is likely to posed on any of these species. However, as stated by the CARA, these plants species should be removed. Any form of habitat clearing that could be done prior removal of these plants species, could results in higher infestations within the site and neighbouring areas, and removal of the resulting infestations could be highly expensive. Therefore, as stated in the previous sections, there is no translocation or removal permit required for the flora associated with the both units.</p> <p>Faunal species: based on the ecological study conducted on the occurrence and movement of faunal specie on the site, there was five (5) mammal Red Data Listed species. However, some of the fauna species types could still be existing and missed out during field assessment.</p> <p>The wetland unit appeared as a potential breeding habitat for most of the fauna types, but only one Near Threatened otter species, <i>Aonyx capensis</i> was highly liked to the spoor and faeces detected on this unit, than other otter species, <i>Lutra maculicollis</i>, which is also an NT species. The pre-impact assessment has suggest that, the wetland unit should be ranked as a 'no go area', since the otter species have limited distribution as wetlands are also diminishing from our country. Thus, conservation of these species is highly recommended, than clearing or disturbing their wetland environment</p> <p>Habitat units: The ecological study have shown the occurrence of two types of habitat units, namely wetland and terrestrial units within the site. Pertaining to the biodiversity profile compiled by the City of Tshwane C-Plan, the subject site area falls in the grassland biome, despite the occurrence of some trees and shrubs that were scattered throughout the area. Moreover, the site does not fall in to any of the threatened ecosystem (figure 5), however does form part of the Critical Biodiversity Area 1 and other natural areas assessed (City of Tshwane C-Plan 2014) (figure 7). This</p>

	<p>This implies that, there is no mitigation measure that could be provided for Red Listed mammal species associated with the wetland. However, impacts that are likely to be posed on the Red Listed, terrestrial mammal species could be of Low Significance, if the mitigation measures suggested in this report are adhered to.</p>	<p>implies that, the site is associated with the areas of conservation concern. Although, the terrestrial unit has no flora of special concern, development should be strictly be conducted on the areas proposed, leaving adjacent areas as natural as they are. This will further provide some of the avifauna species (i.e. birds, scorpion, insects and reptiles) feeding and possibly breeding niche</p>
<p>Wetland delineation study</p>	<p>Wetland ecological status was assessed by considering impacts to wetland hydrology, geomorphology and vegetation. A summary of the findings is outlined in this report. Prominent land use features surrounding the delineated wetlands, and within the wetlands, include:</p> <ul style="list-style-type: none"> • Road network; • Railway lines; and • Agriculture areas (game and cattle). 	<p>The proposed expansion of rail infrastructure will have minimal to no impact on the 2 wetlands on site. The site is already heavily disturbed due to many years of railway infrastructure on site. Any additional water inputs will therefore be channeled offsite through these existing systems. However, due care still needs to be exercised around this area. General recommendations are listed below.</p> <p>a. Loss and disturbance of wetland habitat Mitigation:</p> <ul style="list-style-type: none"> • Avoid additional wetland loss by limiting construction activities to as small an area as possible. • Mark wetland areas with 'No-Go' signage. • Limit all activities within the demarcated areas. • Include environmental awareness aspects into the site induction program to ensure all construction staff are aware of the location and importance of wetland habitats. • Establish emergency response measures and a clearly defined chain of communication to rapidly deal with any unforeseen impacts to wetlands, e.g. spills. • No stockpiling of material may take place within the wetland areas and temporary construction camps and infrastructure should also be located outside the wetland footprint. • Regular cleaning up of the wetland areas should be undertaken to remove litter. <p>b. Increased sediment transport into wetlands Mitigation:</p> <ul style="list-style-type: none"> • Where practically possible, the major earthworks should be undertaken during the dry season (roughly from April to August) to limit erosion due to rainfall runoff. <p>c. Water quality deterioration within wetlands Mitigation:</p>

		<ul style="list-style-type: none"> • Store and handle potentially polluting substances and waste in designated, banded facilities. • Waste should be regularly removed from the construction site by suitably equipped and qualified operators and disposed of in approved facilities. • Locate temporary waste and hazardous substance storage facilities a minimum of 100m from any wetland edge. • Keep sufficient quantities of spill clean-up materials on site.
Hydrological study	<p>Water quality assessments were undertaken on the surface water from the two wetlands identified on site. Two water samples were collected in September 2017. The water samples collected and analysed will be used as a baseline surface water chemistry during the construction and operational phases of this project. The water chemistry results showed a once off analysis.</p> <p>The two water samples were submitted to WATERLAB (Pty) Ltd, which is a SANS-accredited in Pretoria for analysis as per the South African Bureau of Standards (SABS) water analysis procedures and protocols. The water chemistry results were compared to four different guidelines, namely:</p> <ul style="list-style-type: none"> • Department of Water Affairs (DWA) South African Water Quality Guidelines Volume 1 for Domestic Use (1996a); • DWA South African Water Quality Guidelines Volume 5 for Livestock Watering (1996b); and • DWA South African Water Quality Guidelines Volume 7 for Aquatic Ecosystems (1996c) • South African Bureau of Standards (SABS) SANS 241-1:2015 Drinking Water Standards; <p>In this study, the drinking water guidelines were used as they are the most comprehensive set of standards and provide for a worst-case scenario where the water is unintentionally used for consumption by humans. Both the DWA and the SABS standards for drinking water were referred to in this report. The water samples were sampled from two wetlands identified on sites and as such Aquatic Ecosystem guidelines were included even though it is not a very comprehensive list of standards. The two wetlands that were sampled is currently being used by local livestock in the farms nearby for drinking water, thus the DWA water quality guidelines for Livestock Watering were also referred to.</p>	<p>The proposed railway lines expansions is unlikely to pose significant risks to local surface water resources provided that appropriate measures, as discussed in this specialist report, are implemented. The most important recommendation is to ensure that the proposed railway lines expansion is implemented and that the associated infrastructure is properly designed by a registered Engineer and maintained.</p>

7.3.1 Integration and assessment of specialist studies

a. Hydrological Investigations

The impacts of the proposed activities and infrastructure are assessed based on the impact's magnitude, as well as the receptor's sensitivity, culminating in impact significance for the most important impacts that require management.

Based on a review of the project description and activities, the project will be located in existing servitude with no additional land clearings however, the following project activities are likely to cause an impact to surface water during the construction and operational phases:

- Site clearing, including the removal of existing railway lines for upgrade;
- Construction of culverts and the rail lines; and
- Operation of the railway lines in the yard.

The proposed project design includes various mitigation by design measures- in terms of surface drainage. Theoretically without these measures the drainage impacts on the environment would be much higher. Upgrading and new drainage structures such as culverts and drains is anticipated to improve drainage of water through the railway lined in the yard based on the proposed railway line upgrades thereby implying a limited source for water quantity impacts limited to construction phase.

Water quality however remains at risk of impacts during construction and operation stages of the project. In terms of potential surface water quality, oil spills could prove catastrophic as the site is crossing several drainage channels as detailed in the scope of work, without compliance with current best practice and relevant industry guidelines.

The potential unmitigated impacts (unrealistic worst-case scenario), and residual water impacts of the project after considering the design mitigation measures proposed are qualitatively assessed in this section and presented together with proposed mitigation. All measures implemented for the mitigation of impacts, should be regularly reviewed as best practice and as compliance with various licenses issued on site by authorities including Water Use Licenses (WULs).

b. Wetland Delineation study

A level 2 Wet-Health method was used to determine the health of wetlands on site, thus describing their present ecological status (PES) (Macfarlane, et al. 2008). This method utilizes geomorphology, hydrology and vegetation to determine the health of a wetland. The hydrology module assesses the land use descriptors (irrigation, level of reduction or increase in flows, hydro-geomorphic setting of the wetland and extent of canalisation and gully formations). The vegetation module assesses the level of vegetation transformation, which is indicated by level of alien species invasion, terrestrial species encroachment and encroachment by indigenous invasive species. The geomorphology module captures deviations in the sedimentary inputs and outputs to and from wetlands that are consequence of human activities.

c. Biodiversity study

i. Flora

Flora diversity

The floral diversity was low within the subject site areas. Most areas were covered by grass species, which were not categorized and identified to species level as they were recovering from fire disturbance. The impact likely to be posed on the flora diversity would be of no significance, with or without implementation of mitigation measures.

Flora habitat diversity

Terrestrial unit

The terrestrial habitat unit has shown occurrence of flora species that are of no Special Conservation Concern (SCC) and are highly diverse in the country. This implies that, with or without mitigation measures, destruction or modification of this habitat type in the site, will result in no significant impact. However, portions of this habitat type that are not forming part of the development, should be kept as natural as they are.

Wetland unit

Wetland verification and its status assessment was not part of this study; however, it is highly recommended that it should be done prior any development of the project activities. There were no plant species of SCC associated with this habitat unit. No impact could result on flora species associated with the habitat unit, as the species occurring there are highly diverse in the country and elsewhere.

Flora of special conservation concern

There were no flora of SCC associated with the both terrestrial and wetland units. However, few species are listed by Conservation of Agriculture Resources Act 1983 (Act 43 of 1983) (CARA), and this implies that such species could be removed through mechanical or chemical measures. However, mechanical removal of these species is highly recommended to be followed, as the site is small, with less diversity of alien invasive plant species. Pictures of the alien invasive species are provided in this report to serve as a field guide. It is also further recommended that; these species should be cleared before commencement of the project activities in the both wetland and terrestrial habitats units.

i. Fauna

Field assessment

Visual observation, live trapping and environmentally friendly pit fall traps

Faunal observations were made while driving, walking, and inspecting different habitats on site and in the area. Taxa were identified based on observed specimens, spoor, droppings, burrows and other evidence of occurrence. Rocks and logs were turned in search of reptiles, scorpions, frogs and invertebrates. A scouting hand sweep and live trapping nets were used to catch butterflies and other pollinating species.

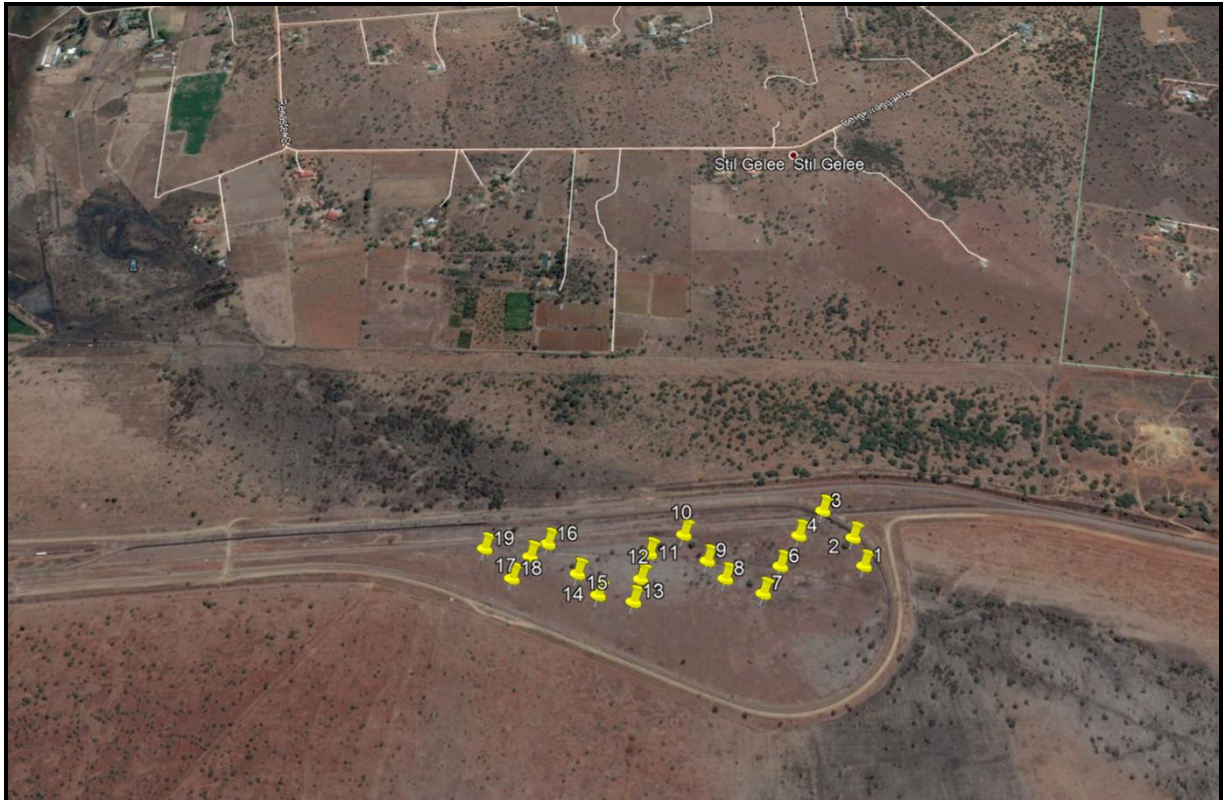


Figure 3: Illustration of line sampling tracts procedure conducted in the terrestrial habitat unit



Figure 4. Illustration of faunal (invertebrates and herpetofauna) sampling procedure

Desktop faunal assessment

7.4 Biodiversity components associated with wetland assessment

Vegetation and fauna species associated with the wetland unit were assessed according to the walking through sampling procedure. Long waiting observation was done to document movement or any other activities by aquatic faunal species. A total of five (5) quadrats of 1 m² by size, were placed on flowing water from the adjacent farm to determine fish and frog species associated. Sweep netting was also applied to document dragonflies' species.

8 RESULTS AND DISCUSSION

8.1 Desktop flora and fauna assessment

The City of Tshwane falls within the grasslands biome, and is home to a disproportionately high percentage of rare and threatened species and threatened ecosystems. There are at least 35 threatened plant species and 15 threatened animal species that occur in Tshwane (see Table 7), and 15 nationally listed threatened ecosystems (figure 4). Furthermore, 83% of wetland types and 58% of river types in the city are threatened. Just under two-thirds of Tshwane is in a natural or near-natural state (65%), with urban areas (14%), intensive agriculture (19%) and mining (2%) together covering 35% of the city. Critical biodiversity areas (CBAs) cover 26% of the city, with CBA 1 (natural or near-natural state) covering 25% and CBA 2 (highly modified landscapes that are important for threatened species) covering 1%. Ecological support areas (ESAs) cover a further 17% of the city, with ESA 1 (natural, near-natural or degraded state) covering 11% and ESA 2 (highly modified landscapes that are important for ecological processes) covering 6%. Protected areas cover just over 3% of Tshwane (figure 6).

Table 7: List of threatened species occurring in the City of Tshwane

Plants	Mammals	Birds	Invertebrates
NT-<i>Encephalartos dolomiticus</i>; <i>Encephalartos dyerianus</i> ; <i>baueri</i> Baueri; <i>Leucadendron chamelaeae</i> ; <i>caespitose</i> ; <i>strictum</i>	CR-<i>Neamblysomus julianae</i>	VU-<i>Podica senegalensis</i>; <i>capensis</i> ; <i>Anthropoides paradiseus</i> ; <i>Gorsachius leuconotus</i>	VU-<i>Ichneustoma Tyto stobbiai</i>

Africanum		
EN-9 species	NT-Atelerix <i>frontalis</i> ; <i>Lutra</i> <i>maculicollis</i> ; <i>Rhinolophus</i> <i>darling</i> ; <i>Rhinolophus</i> <i>clivosus</i> ; <i>Miniopterus</i> <i>schreibersii</i>	NT-Sagittarius <i>serpentarius</i> ; <i>Miraфра cheniana</i> ; <i>Alcedo semitorquata</i>
VU-19 species	VU-Rhinolophus <i>blasi</i>	
EX- <i>Macledium pretoriense</i>		

Terrestrial habitats

The study area was surrounded by agricultural plantation and game farms. The site falls in the grassland biome, despite the occurrence of some shrub and tree species scattered throughout the site. In addition, wetland units were also associated with the terrestrial habitat unit.

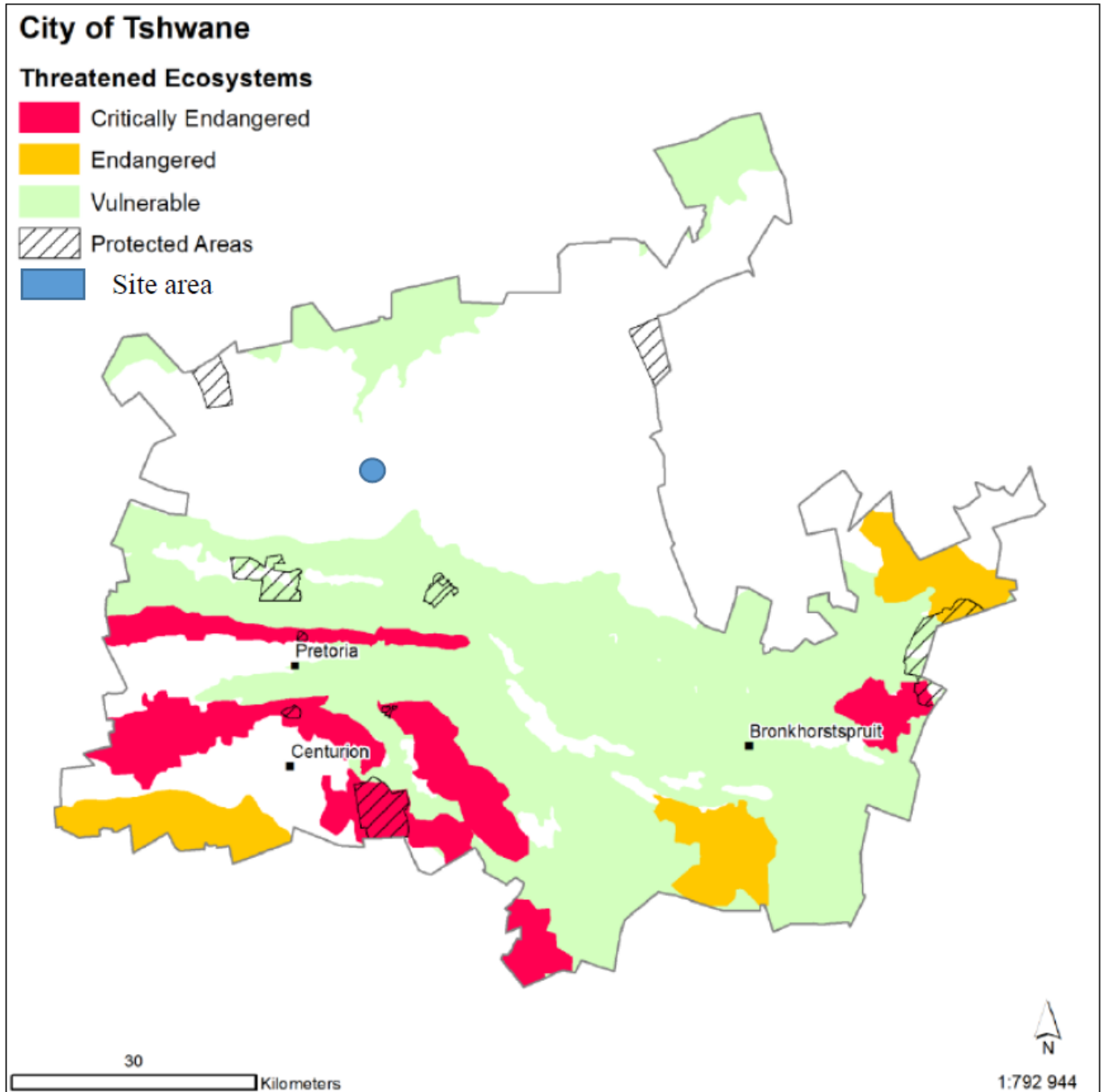


Figure 4: Map showing threatened ecosystems within the City of Tshwane. Site.

According to the Mucina and Rutherford (2006) Vegmap, four regional vegetation types are present along the rail line route (Figure 2). These include:

- Soweto Highveld Grassland (Gm 8)
- Eastern Temperate Freshwater Wetland (Azonal – Azf 3)
- Eastern Highveld Grassland (Gm 12)
- KaNgwane Montane Grassland (Gm 16)

The Biodiversity Act (No 10 of 2004) (Amendment December 2011), lists 225 threatened ecosystems based on vegetation type. All four vegetation types are listed by this Act as Vulnerable. Therefore, as a minimum, the Act stipulates that a minimum of a Basic Assessment must be conducted when an activity is proposed within these ecosystems and should any of these vegetation types in a natural state be lost the significance of the impact should be rated as **HIGH**.

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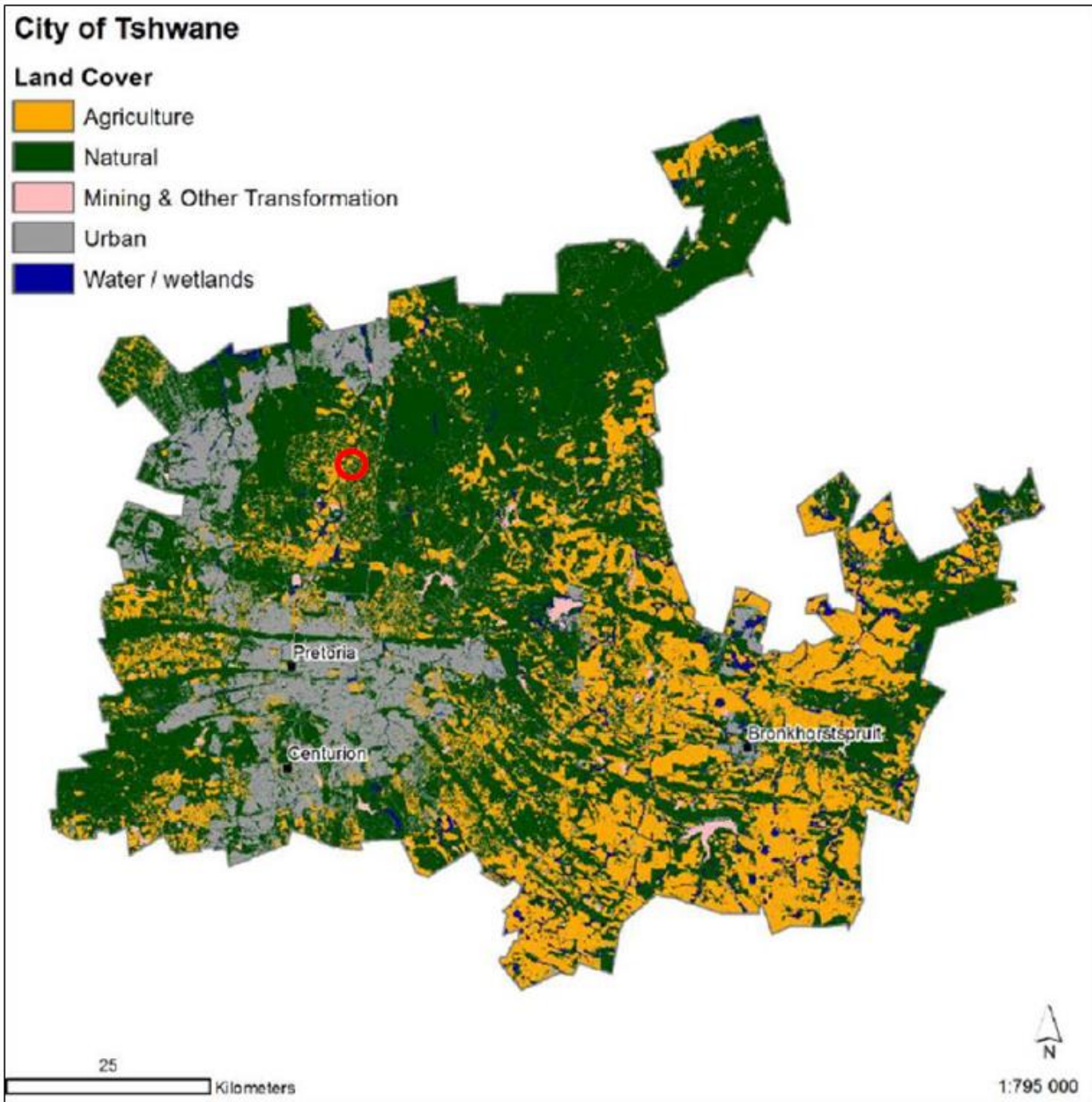


Figure 5: Map showing land cover within the City of Tshwane

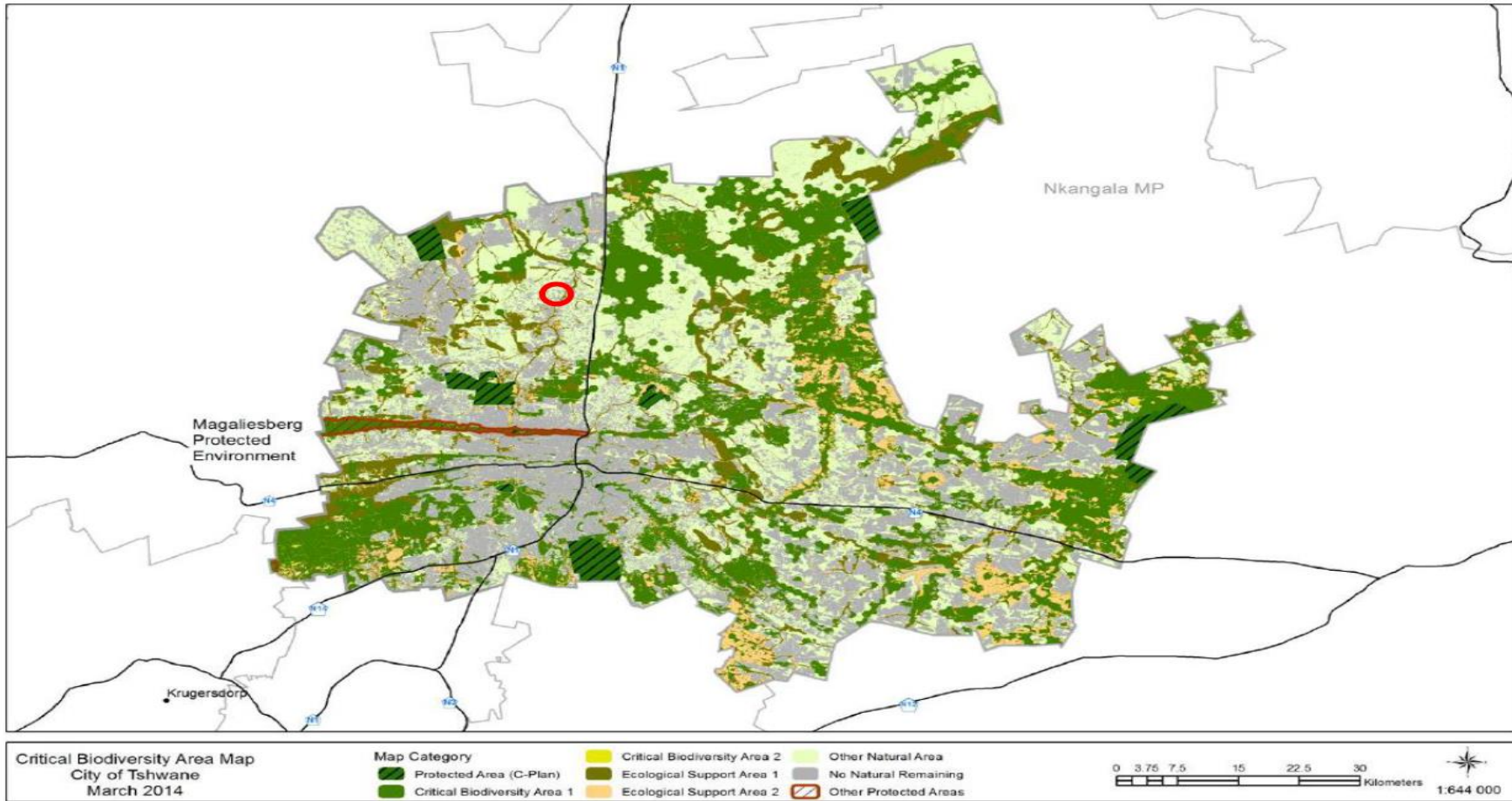


Figure 6: Map showing critical biodiversity areas within the City of Tshwane

Threatened ecosystems

The list of threatened terrestrial ecosystems has been published by the Minister of Environmental Affairs in December 2011, following terms of the National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) (hereafter referred to as the “National List of Threatened Ecosystems”), was based largely on South African vegetation types and the extent to which they have been irreversibly modified.

According to this list, Tshwane has a total of 15 threatened ecosystems, six (6) of which are considered critically endangered, four (4) are endangered and five (5) vulnerable (figure 5). Although much of this habitat has now been irreversibly modified, the historical extent of the threatened habitat types covers 59% of Tshwane

8.2 Field flora assessment

Floral assessment results presented in this report, have been obtained from the terrestrial and aquatic units associated with the subject area of the site. A total six (6) NT, nine (9) EN and 19 VU red listed plants species were also searched in the site areas (see table 7).

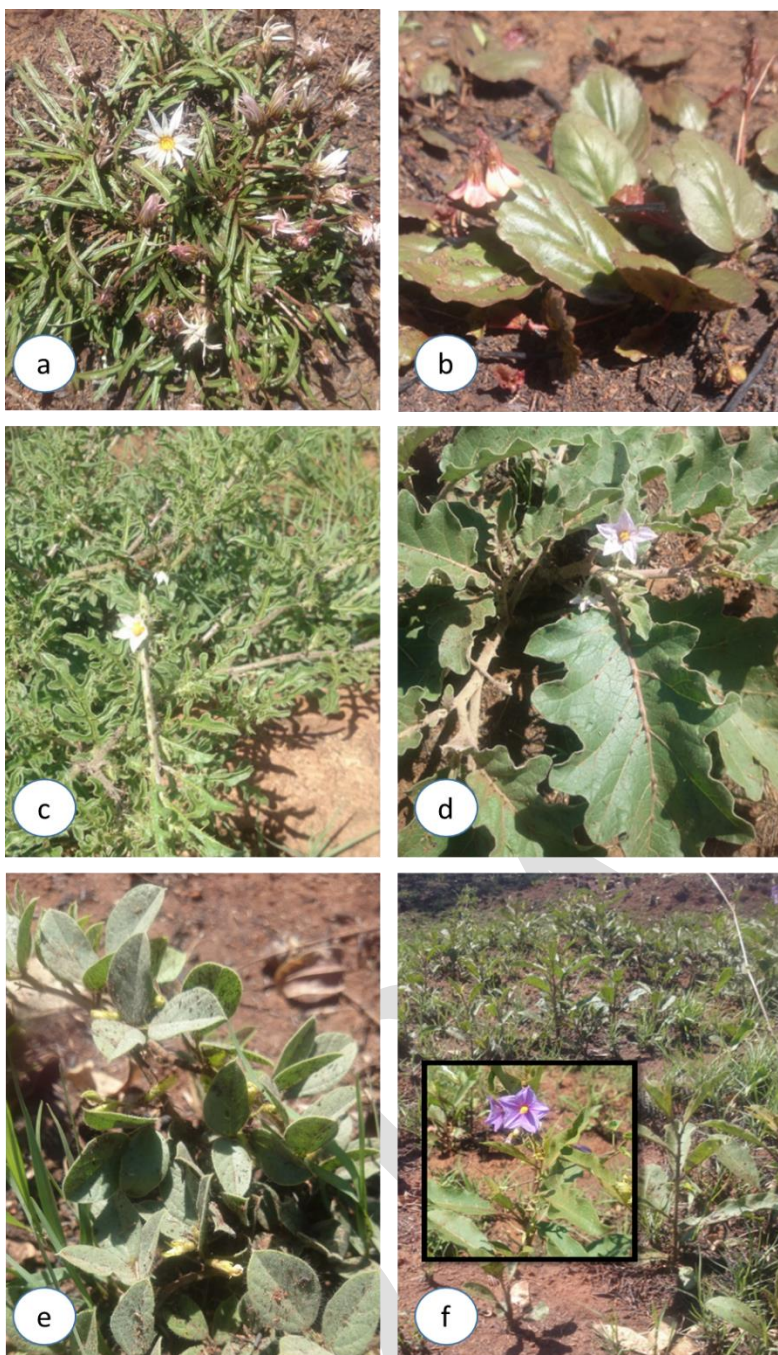


Figure 7: Example of herbaceous plants species recorded in the vicinity. a= *Senecio* sp., b= Vine species, c= *Solanum sisymbriifolium*, d= *Solanum* sp., e= Vine species, f= *Solanum elaeagnifolium*

(a) Alien invasive plants species

A total of five (5) alien invasive plants was encountered scattered throughout the subject site area (listed in table 8). However, the density of alien invasive species was prominent on forbs than tree plants species. In addition, assessment was conducted on recovering site after being burnt down, therefore, other alien invasive plants species could have been missed out, particularly herbaceous and tubers plants species. Therefore, following Conservation of Agricultural Resource Act (CARA, 1983) and section 28 of the National Environmental Management of

Biodiversity Act (NEM:BA, 1998), all these plants species should be controlled, either through chemical, mechanical or biological control measures.

(b) Medicinal and indigenous plants species

According to SANBI (2006), medicinal plants species are viewed as problematic from a conservation perspective, and can also be seen as a positive conservation opportunity, as these plants have increased value in terms of healthcare, income or cultural identity. These factors can be used as a motivator for conservation of these species and their habitats. Plant part substitution can be an important strategy for the conservation of medicinal plants, and traders should be encouraged to consider this strategy (Moeng & Potgieter, 2011). It is also well known that mining and agricultural activities encourage destruction of these plants species as well with their habitats.

As part of this assessment, a total of one (1) plants species, *Aloe* sp. (Asphodelaceae) was distinguished as a popular medicinal plant species (see figure 9c).

(c) Forb and grass plants species

A total of 14 forb plants species (including invasive, indigenous, medicinal) and one (1) grass species (table 8). These plants species were recorded in the both terrestrial and aquatic units. Since the herbaceous plants may be annuals, biennials or perennials, some could have been missed out during assessment, due to the fire disturbance triggered in the site.

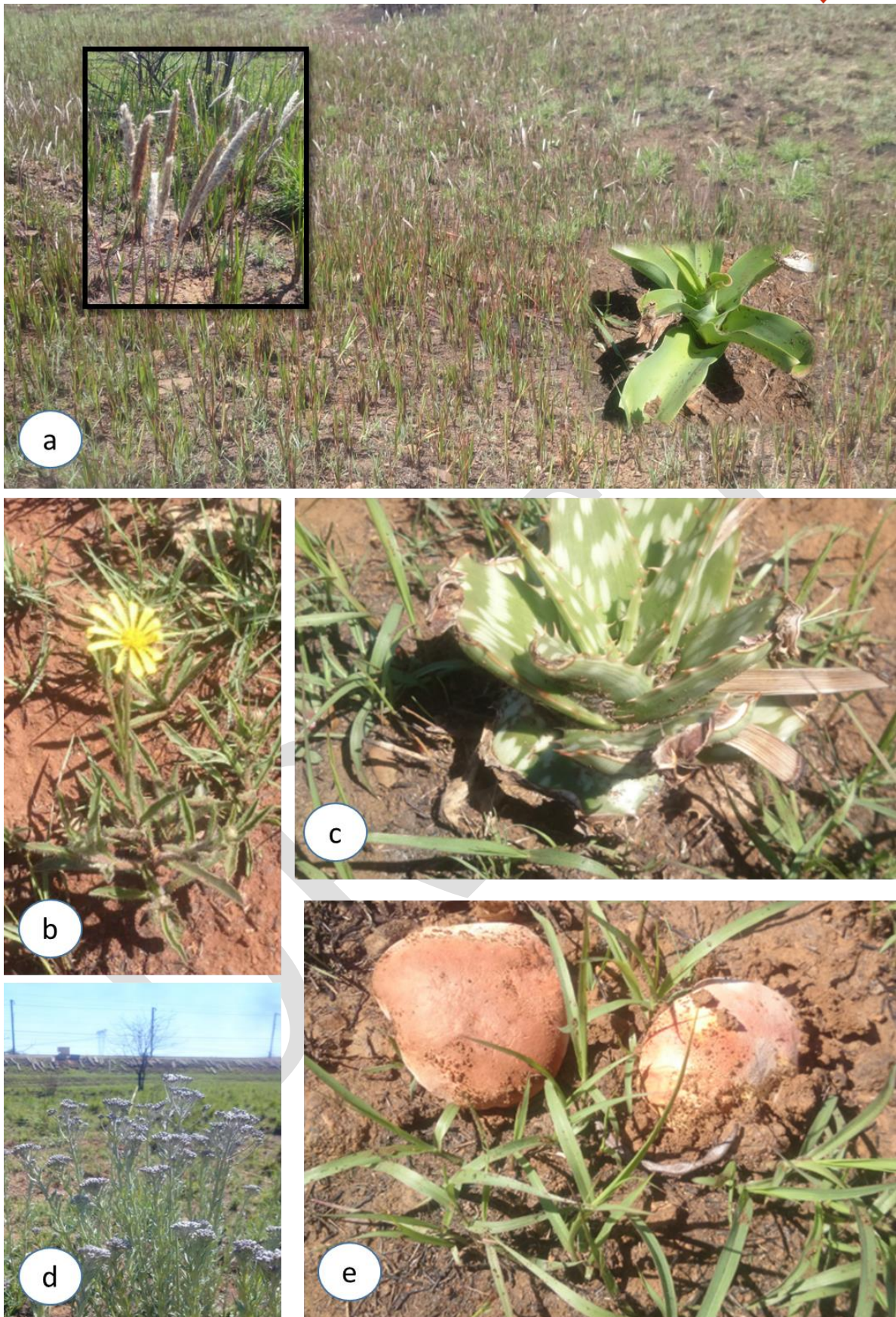


Figure 8: Examples of herbaceous plants species recorded in the vicinity. a= Poacea sp, b= Senecio sp., c= Aloe sp, d= Senecio sp., e= Mushroom species.



Figure 9: Examples of plants species associated with the wetland in the site. a= *Argemone mexicana*, b= *Cyperus textilis*, c= *Combretum* sp., d= *Typha* sp.

(d) Flora species of special conservation concern

Following the Gauteng, City of Tshwane C-Plan, the IUCN Red List of Threatened Species and NEM:BA assessments, are declared to be of Least Concern (LC), while some are CARA listed . The results obtained in the both terrestrial and aquatic units suggest that, there was no plant Species of Conservation Concern (SCC) that requires translocation prior commencement of the project activities. Furthermore, the PRECIS SANBI database reflected no SCC plants associated with the subject site area.



Figure 10: Tree species recorded in the vicinity. a = *Tipuana tipu*; b = stem bark of *T. tiputa*; c = fruit of *T. tiputa*; d = diagnostic features of *A. karroo*; e = *Acacia karroo*.

Table 8: List of different types of plants species recorded in wetland and terrestrial units

Family	Species	Conservation status ^{R, N} ; IUCN	CARA Listed	National Protection Forestry Listed
Fabaceae	<i>Acacia karoo</i>	LC	No	No
Fabaceae	<i>Tipuana tipu</i>	Not assessed	Yes, 1b	No
Papaveraceae	<i>Argemone Mexicana</i> **	Not assessed	Yes, 1b	No
Solanaceae	<i>Solanum elaeagnifolium</i> **	Not assessed	Yes, 1b	No
Solanaceae	<i>Solanum sisymbriifolium</i> **	Not assessed	Yes, 1b	No
Solanaceae	<i>Solanum sp. (x3)</i> **	Not assessed	Yes, 1b	No
Asteraceae	<i>Senecio telekii</i>	LC	No	No
Asteraceae	<i>Senecio aureus</i>	LC	No	No
Russulaceae	Mushroom plant species	LC	No	No
Cyperaceae	<i>Cyperus textilis</i>	LC	No	No
Typhaceae	<i>Typha sp.</i>	LC	No	No
Combretaceae	<i>Combretum sp.*</i>	LC	No	No
Asphodelaceae	<i>Aloe sp.#</i>	LC	No	No
?	Vine plant species (x2)	LC	No	No

N= national protected; R= regionally protected; CARA=conservation of agricultural resource act; 0=no; 1=yes; *=endemic/indigenous;#=medicinal; alien invasive=**; the IUCN Red List of Threatened Species [Least Concern (LC), Vulnerable (VU), Near Threatened (NT), Critically Endangered (CR), Critical (C), Endangered (E); Rare (R)].

8.3 Field fauna assessment

A total of two faunal habitat types were distinguished as terrestrial and wetland units (see figure 12 a & b) existing in the subject site areas. The observed wetland has been regarded as permanent water body, with accurate indicators such as plant and soil types. There was no form of rocky outcrops observed, and this has limited breeding sites for many rock dwelling, terrestrial fauna species. Although the both wetland and terrestrial units shown natural fauna and flora occurrence, these units were small and highly exposed to edge effects. Ecologically, terrestrial mammals and some other herperetofauna species may only utilize the unit for occasional feeding only.

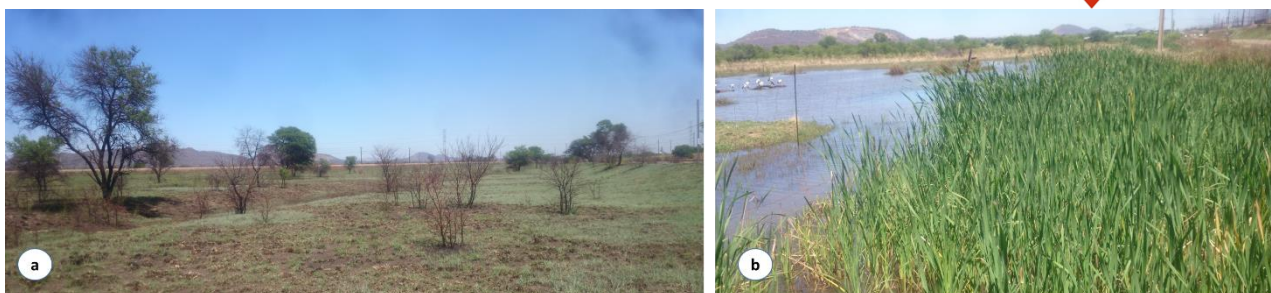


Figure 12. Faunal habitat units. a= terrestrial habitat unit, b= wetland habitat unit.

(a) Mammal species

A total of 13 mammal species (table 3) were identified within the site, through direct visual observation, spoor, tracks, bones and faeces (see figures 13 a-f; 14 d & e). There was no form of burrows observed on the terrestrial unit, and notably, hiding and resting grass patches were distinguished on the wetland unit. This observation has suggested that, breeding was being avoided on the terrestrial unit, as it is highly exposed to predation.

Based on the mammal indicators subjected to extensive analysis (by means of using mammal guide of Southern Africa and analysis of the contents of faeces) identity of the responsible mammal species were established (see table 3). Subjection of these mammal species to International Union for the Conservation of Nature (IUCN) Red List of Threatened Species and SANBI databases, as well with the City of Tshwane C-Plan, has shown five (5) Near Threatened and 10 Least Concern of the recorded species are utilizing the terrestrial and wetlands units (see figures 13 a-f; 14 d & e). These results further suggest that, relevant authorization or permit would be required prior commencement of the project activities, as the units were being utilized for feeding and breeding by SCC/ Red Data Listed species.

Table 9: List of mammal species recorded in the wetland and terrestrial units

Family	Species	Conservation status ^R	IUCN Red List of Threatened Species	Occurrence level
Felidae	<i>Caracal caracal</i> *	LC	LC	1*
Felidae	<i>Leptailurus serval</i> **	NT	LC	1*
Hyaenidae	<i>Crocuta crocuta</i>	NT	LC	1*
Hyaenidae	<i>Parahyaena brunnea</i> ****	NT	NT	1*
Mustelidae	<i>Aonyx capensis</i> ****	LC	NT	2****

Mustelidae	<i>Lutra maculicollis</i> **	NT	NT	1*
Bovidae	<i>Aepyceros melampus melampus</i>	LC	LC	1
Bovidae	<i>Tragelaphus scriptus</i>	LC	LC	1*
Bovidae	<i>Redunca arundinum</i>	LC	LC	1*
Bovidae	<i>Raphicerus campestris</i>	LC	LC	2***
	<i>Sylvicpra grimmia</i>	LC	LC	1***
Suidae	<i>Phacochoerus africanus</i>	LC	LC	2
Hystriidae	<i>Hystrix africaeaustralis</i>	LC	LC	1
Leporidae	<i>Lepus saxatilis</i>	LC	LC	2

N= national protected; R= regionally protected; CARA=conservation of agricultural resource act; 0=no; 1=yes; E=endemic/indigenous; the IUCN Red List of Threatened Species [Least Concern (LC), Vulnerable (VU), Near Threatened (NT), Critically Endangered (CR), Critical (C), Endangered (E); Rare (R)]. Mammal indicators matching rating: * = less likely; **= partially likely; ***= likely; ****= highly likely

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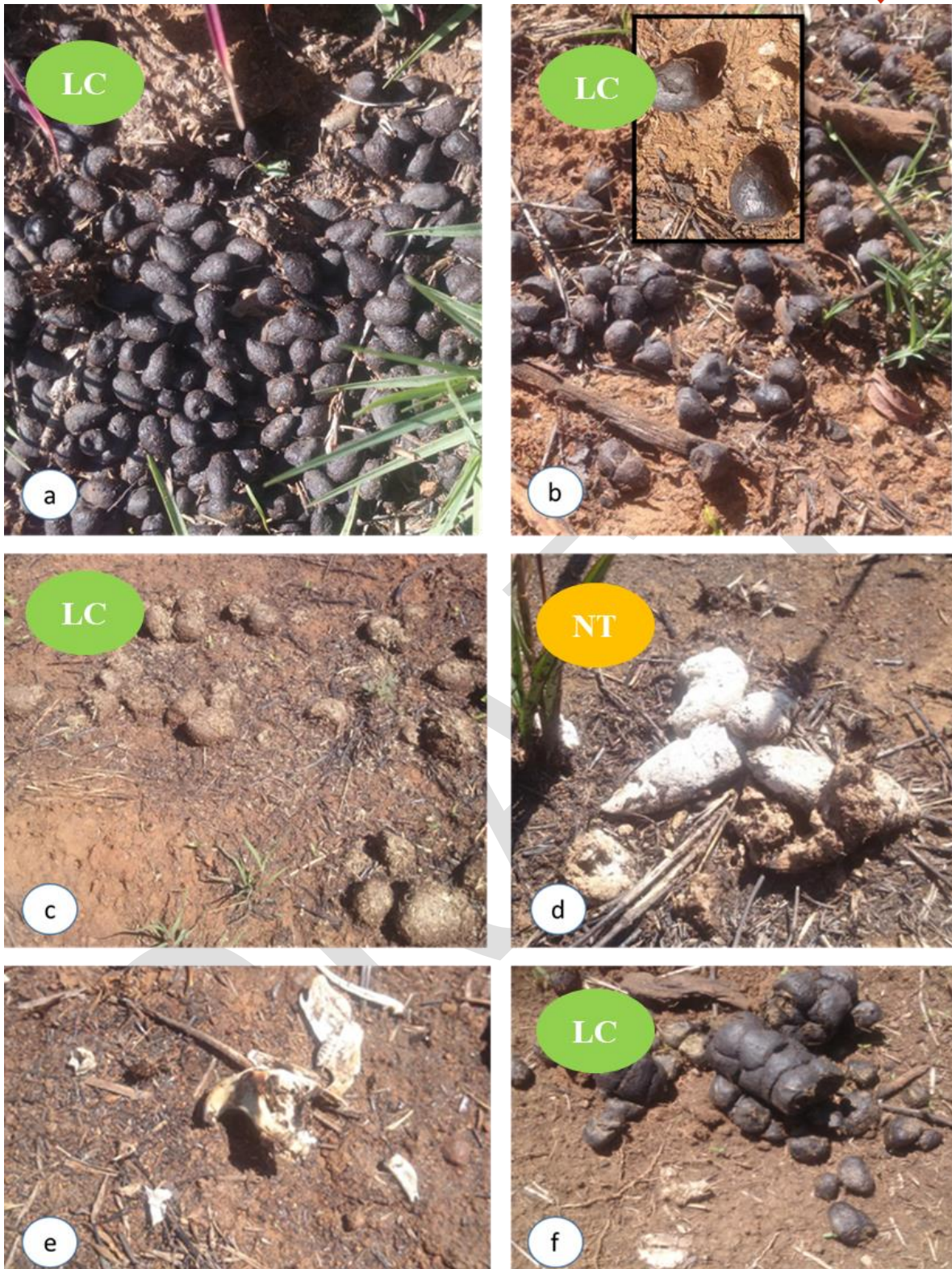


Figure 11: Indicators of mammal species recorded in the vicinity. a= *Raphicerus campestris*; b=; c= *Phacochoerus africanus*; d=likely to be *Parahyaena brunnea*, *Leptailurus serval*, *Crocuta crocuta* & *Caracal caracal*; e= Mice species; f= Antelope faeces?

(b) Avifauna

The site has provided a limited avifaunal habitat types namely, wetland and open veld (terrestrial) units of small size patches. Based on visual observations, both units hosted different species. Species occurrence levels were higher on wetland than terrestrial units. A total of five (5) birds species (table 4) were established in the both units (see figure 13 a & c). Following the IUCN Red List of Threatened Species, NEMBA (Act 4 of 2004) and City of Tshwane C-Plan, these birds' species are highly diverse in the country, South Africa, and are regarded as of Least Concern species.

Table 10: List of avifaunal species recorded in the wetland and terrestrial units

Family	Species	Conservation status ^{R, N}	IUCN Red Listed Species	CARA Listed
Charadriidae	<i>Vanellus coronatus</i>	LC	LC	No
Motacillidae	<i>Anthus cinnamomeus</i>	LC	LC	No
Numididae	<i>Helmeted guineafowl</i>	LC	LC	No
Ploceidae	<i>Ploceus velatus</i>	LC	LC	No
Threskiornithidae	<i>Threskiornis aethiopicus</i>	LC	LC	No

N= national protected; R= regionally protected; CARA=conservation of agricultural resource act; 0=no; 1=yes; E=endemic/indigenous; the IUCN Red List of Threatened Species [Least Concern (LC), Vulnerable (VU), Near Threatened (NT), Critically Endangered (CR), Critical (C), Endangered (E); Rare (R)].

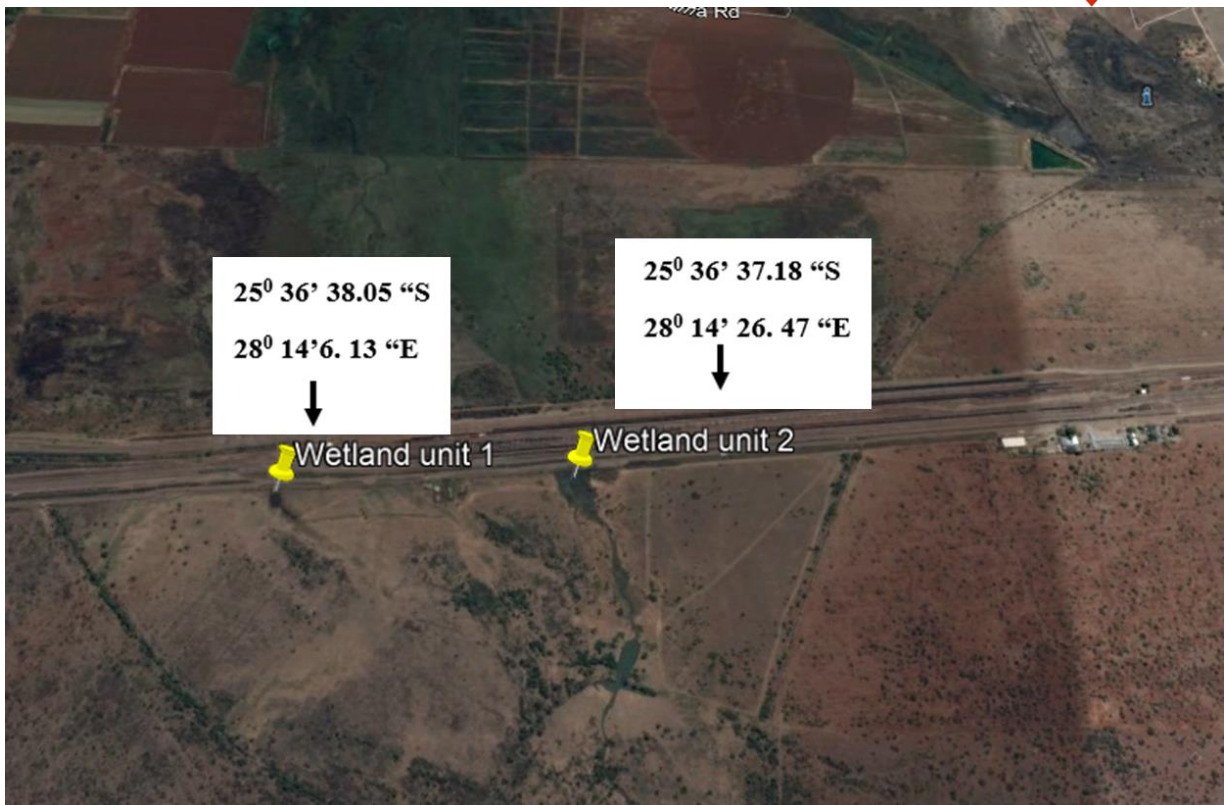


Figure 12: Wetland unit with Near Threatened Otters species

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Figure 13: Faunal species recorded on the wetland within the site. a= *Threskiornis aethiopicus*, b= *Ictaluridae* sp. prey species of *L. maculicollis*, c= *Ploceus velatus* nest, d= *Lutra maculicollis* spoor (35mm wide), e= *L. maculicollis* faeces

(c) Invertebrates, arachnids and scorpion, amphibian and reptile species

(i) Invertebrates

Although this group of fauna species is highly neglected, it is the driver of all natural systems on land. Based on species diversity assessments done, the City of Tshwane C-Plan (2016) has listed a Vulnerable (VU) invertebrate species, *Ichnestoma stobbiai* (Coleoptera: Cetoniidae) which is a ground and low lying fruit feeding beetle. However, ground traps and sweep netting assessment measure conducted in this study, have shown no existence indicators of *I. stobbiai* species. This could be due to the limited occurrence of plants species that produce potential fruits for feeding.

In addition, a total nine (9) invertebrate's species (table 12) was sampled and recorded in the terrestrial and wetland units (see figure 16). Therefore, according to the IUCN Red List of Threatened Species, NEMBA (Act 4 of 2004) and City of Tshwane C-Plan, these invertebrates' species are highly diverse in the country and elsewhere, and were regarded as of Least Concern species for conservation purposes.

(ii) Arachnids, scorpion and reptile species

These groups of faunal species are highly secretive and shy. They restrict their feeding and movement activities during the day, to decrease chances of being vulnerable to predation. However, there was no suitable habitats on terrestrial unit to be of a potential niche. This has led to no species detected and recorded. Although none of these species were not observed in the wetland unit, some could still be occurring.

(iii) Amphibian species

The suitable and potential wetland unit was observed and recorded. Unfortunately, there was no amphibian species observed within this unit. Although some could be existing.



Figure 14: Invertebrate's species recorded in the terrestrial and wetland units

Table 11: List of invertebrates' and herpetofauna species recorded in the terrestrial and wetland units

Order	Family	Species	Conservation status ^R	IUCN Red Data Listed
Odonata	Aeshnidae	<i>Anax imperator</i>	LC	LC
Odonata	Libellulidae	<i>Trithemis arteriosa</i>	LC	LC
Orthoptera	Acrididae	<i>Zenocerus elegans</i>	LC	LC
Orthoptera	Acrididae	<i>Acanthacris ruficonis</i>	LC	LC
Orthoptera	Acrididae	<i>Oedaleus sp.</i>	LC	LC
Hemiptera	Lygaeidae	<i>Spilostethus pandurus</i>	LC	LC
Hemiptera	Pentatomidae	<i>Nezara viridala</i>	LC	LC
Coleoptera	Coccinellidae	<i>Cheilomenes lunata</i>	LC	LC
Lepidoptera	Pterophoridae	<i>Trichoptilis wahlbergi</i>	LC	LC

N= national protected; R= regionally protected; The IUCN Red List of Threatened Species [E=endemic/indigenous; the IUCN Red List of Threatened Species [Least Concern (LC), Vulnerable (VU), Near Threatened (NT), Critically Endangered (CR), Critical (C), Endangered (E); Rare (R)].

9 RECOMMENDATIONS AND CONCLUSION

It is the Environmental Assessment Practitioner's opinion that this project be granted Environmental authorisation because the project will play a role in economic development in the mining industry, Tshwane and South Africa. All impacts identified have been assessed and mitigation measures were also identified for each impact to avoid loss of aesthetic, fauna and flora to the natural environment.

The EMP must be implemented and an ECO appointed during the construction phase of the project. Key mitigation measures are highlighted below for inclusion in the environmental authorisation.

General Ecology

- A search and rescue operation for protected species within the final development footprint should be conducted prior to construction and the necessary permits for removal obtained.
- Cleared areas which are not being used should be revegetated using plants or seed of locally occurring species.
- Any vegetation clearing that needs to take place as part of maintenance activities, should be done in an environmentally friendly manner, including avoiding the use of herbicides and using manual clearing methods wherever possible.

Alien Plant Invasion Risk

- Soil disturbance and vegetation clearing should be kept to minimum.

- Biannual monitoring and clearing of alien vegetation during operational phase.

Increased Erosion Risk

- Service roads and tracks running down the slope must be designed to limit erosion, as far as possible.
- Any extensive cleared areas that are not required after construction activities are complete should be re-seeded with locally-sourced seed of suitable species. Bare areas can also be packed with brush removed from other parts of the site to encourage natural vegetation regeneration and limit erosion.
- All construction vehicles should remain on properly demarcated roads.
- Regular post-construction monitoring for erosion to ensure that no erosion problems are occurring at the site because of the roads and other infrastructure. Erosion problems observed should be rectified as soon as possible.

Impact on Local Economy

- Transnet's recruitment and procurement policy will set reasonable targets for the employment of residents/suppliers (originating from the City of Tshwane Municipality) and promote the employment of women as a means of ensuring that gender equality is attained. Criteria will be set for prioritising, where possible, local (City of Tshwane Municipality) residents/suppliers over regional or national people/suppliers.
- All contractors will be required to recruit and procure in terms of Transnet's recruitment and procurement policy.
- Transnet will work closely with relevant local authorities, community representatives and organisations to ensure that the use of local labour and procurement is maximised.
- No employment will take place at the entrance to sites. Only formal channels for employment will be used.
- Ensure that the appointed project contractors and suppliers have access to Health, Safety, Environmental and Quality training as required by the Project. This will help to ensure that they have future opportunities to provide goods and services to the sector.
- Transnet will implement a public complaints procedure that is easily accessible to City of Tshwane Municipality, through which complaints related to contractor or employee behaviour can be lodged and responded to.

Increased Noise Generation

- The need for noise barriers (in the form of walls or earth berms) at sites where the acceptable noise limits (85dBA) are exceeded at sensitive social receptors (such as brick making industry), will be investigated during the detailed design of the relevant railway lines, with the aim of reducing the noise impact caused by the additional trains.
- A noise monitoring program will be established at sensitive social receptors during the construction phase. The purpose of this program will be to establish a base level of the noise caused by the existing rail traffic.

- Should significant incremental increases in the noise levels be observed after operation has started, appropriate measures will be implemented to mitigate these using, amongst others, the noise attenuation strategies described above.

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