BASIC ASSESSMENT PROCESS

for

THE PROPOSED CONSTRUCTION OF LOUWSBURG TELECOMMUNICATION RADIO TOWER WITHIN ABAQULUSI LOCAL MUNICIPALITY, KWAZULU-NATAL PROVINCE

DRAFT BASIC ASSESSMENT REPORT

Public Review

31 August 2023 to 02 October 2023

COMPILED BY:
Envirolution Consulting (Pty) Ltd
PO Box 1898
Sunninghill
2157
Tel: (0861) 44 44 99
Fax: (0861) 62 62 22
E-mail: info@envirolution.co.za
Website: www.envirolution.co.za

PREPARED FOR:
Eskom Holdings SOC Ltd.
Eskom Transmission
P.O.Box 1091
Johannesburg
2001
Tel: (011) 800 2706
Fax: 086 662 2236

PROJECT DETAILS

DFFE Reference No.	**:**	Not assigned as yet
Title	**:**	Basic Assessment Process for the Proposed Construction of **Louwsburg Telecommunication Radio Tower** within AbaQulusi Local Municipality, KwaZulu-Natal Province
Report compiled by	:	**Envirolution Consulting Pty (Ltd)** Contact person: Gesan Govender Postal Address: P.O. Box 1898, Sunninghill, 2157 Telephone Number: 0861 44 44 99 Fax Number: 0861 62 62 22 Email: gesan@envirolution.co.za
Client		**Eskom Holdings SOC Ltd**
Status	**:**	Draft Basic Assessment Report
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Reviewed By:		Gesan Govender

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ABBREVIATIONS AND ACRONYMS

BAR	Basic Assessment Report
CBA	Critical Biodiversity Area
DFFE	Department of Forestry, Fisheries and Environment
DoE	Department of Energy
DMR	Department of Mineral Resources
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
EIS	Ecological Importance & Sensitivity
EMPr	Environmental Management Programme
EIA	Environmental Impact Assessment
ERA	Electricity Regulation Act (No. 4 of 2006)
ESA	Ecological Support Area
GN	Government Notice
Ha	Hectares
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
IDP's	Integrated Development Plans
Km	Kilometres
Kv	kilovolts
KZN	Kwa-Zulu Natal
KZN EDTEA	KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs
m	Meters
MW	Megawatts
NEMA	National Environmental Management Act (No. 107 of 1998) (as amended)
NHRA	National Heritage Resources Act (No. 25 of 1999)
NWA	National Water Act (No 36 of 1998)
PES	Present Ecological State
SACAA	South African Civil Aviation Authority
SAHRA	South African Heritage Resources Agency
SSRVR	**Site Sensitivity Verification Report**
SDF	Spatial Development Framework
VAC	Visual Absorption Capacity
ZMVE	Zone of Maximum Visual Exposure
ZVI	Zone of Visual Influence

EXECUTIVE SUMMARY

INTRODUCTION

Transnet is South Africa's sole provider of rail transport infrastructure for coal transportation. One of South Africa's largest foreign exchange earners is the export of high-quality coal products to China. The Transnet rail link between the coal fields in Mpumalanga Province and the export node, the Richards' Bay Coal Terminal, is one of the busiest railway links in South Africa. The increase in demand for South Africa's high-quality coal necessitates the increase in production, which in turn has demands on the railway network infrastructure. In response to the increased demand for South Africa's coal in the global market place, Transnet needs to increase the volume of coal that is being transported between the Mpumalanga coal fields and the Richard's Bay Coal Terminal. This increase will be facilitated through capital expenditure on two fronts, the supporting infrastructure, i.e. the electrical network supplying the locomotives and the locomotives themselves. In order for Transnet to accomplish the above they need to upgrade their power supply to their various traction substations between Ermelo and Richards Bay to facilitate the introduction of the new, larger locomotives that will be added to increase the volume of coal being transported and exported. Eskom Holdings SOC Ltd being one of the main suppliers of electrical energy in South Africa has been tasked by Transnet to supply the additional energy requirements to these traction substations.

In order to address this request, various projects were proposed including the Construction of Nzalo and Duma 400kV Main Transmission Stations and the associated 88kV and 400kV Turn in Powerlines in Kwazulu Natal Province. Transnet Freight Rail Coal Line Upgrade Project Overview as shown in Figure 1 can be summarised as follows:

3 x New Transmission Main Transmission Substations (MTSs) (Madlanziniin Mpumalanga, Nzalo and Duma in KZN) received Environmental Authorisationsin 2015.

•Eskom Telecoms required to provide communication services for the three MTSs.

- 4 x New Radio Sites required:
- Two new Greenfield sites for Duma Ss; and
- Louwsbergand Paulpietersbergsites for NzaloSs.
- Duma RS (within approved Duma Substation footprint)
- Upgrade 2 x Existing RSs

The proposed telecommunication mast would serve as voice, data as well as other telecommunications and ancillary services for Eskom staff and contractors for the Nzalo Substationwhich is positioned 27 36 31.11 S and 30 52 30.22 E, this is a new substation to be built by Transmission (Tx) Telecommunications in order to strengthen the TX grid so that Eskom can provide services to Transnet. In order for Eskom to provide the necessary it is imperative that there are reliable and effective communications systems in place to provide the necessary services to the substation. Services like tele-protection, tele-control, switched voice, direct voice and hot lines as well as data services like Ethernet connectivity. The mast will be located within AbaQulusi Local Municipality in Kwazulu-Natal (Figure 2). The Masts will be approximately 60m (Louwsberg CCS site); and 70m (Louwsberg DPW site) in height requiring a foot print of 30m X 30m.

REQUIREMENT FOR A BASIC ASSESSMENT PROCESSNTRODUCTION

The proposed project is subject to the requirements of the Environmental Impact Assessment Regulations of 2014 EIA Regulations (as amended) in terms of the National Environmental Management Act (NEMA, Act 107 of 1998, as amended). NEMA is national legislation that provides for the authorisation of certain controlled activities known as "listed activities". In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be considered, investigated, assessed, and reported on to the competent authority (the decision-maker) charged by NEMA with granting of the relevant environmental authorisation. Eskom requires an Environmental Authorisation for this project which includes the proposed construction of an overhead powerline, underground cables and substations. Application for authorisation in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and GNR 326, 327, 325 & 324 of the Environmental Impact Assessment Regulations, 2014 as amended (07 April 2017) a Basic Assessment (BA) Process is required for this project.

An environmental impact assessment is an effective planning and decision-making tool for the applicant as it provides the opportunity for the applicant to be fore-warned of potential environmental issues and assess if potential environmental impacts need to be avoided, minimised or mitigated to acceptable levels. The Basic Assessment process includes certain feasibility studies for a proposed project and will inform the final design process in order to ensure that environmentally sensitive areas are avoided to an acceptable level as confirmed by the Environmental Assessment Practitioner (EAP). Comprehensive, independent environmental studies elaborated by specialists are required in accordance with the EIA Regulations to inform the EAP of its comprehensive recommendation and provide the competent authority with sufficient information in order to make an informed decision.

As the applicant for the project is Eskom Holdings SOC Ltd which is a State-Owned-Company (SOC), therefore the National Department of Forestry Fisheries and Environment (DFFE) is the competent authority and the KwaZulu-Natal Department of Economic Development and Environmental Affairs (KZNEDTEA) will act as a commenting authority. Eskom has appointed Envirolution Consulting (Pty) Ltd, as independent environmental consultants, to undertake the BA process and compile the BA Report and Environmental Management Programme (EMPr). Furthermore, Envirolution Consulting does not have any interests in secondary developments that may arise out of the authorisation of the proposed project. Envirolution Consulting is a specialist environmental consulting company providing holistic environmental management services, including environmental impact assessments and planning to ensure compliance with environmental legislation and evaluate the risk of development; and the development and implementation of environmental management tools Envirolution Consulting benefits from the pooled resources, diverse skills and experience in environmental field held by its team. We offer solutions to environmental issues that are key during our clients' planning and decision-making processes. The Envirolution Consulting team have considerable experience in environmental impact assessments and environmental management, and have been actively involved in undertaking environmental studies, for a wide variety of projects in South Africa, including those associated with linear developments.

PROJECT NEED AND DESIRABILITY

The proposed telecommunication mast is required to serve as voice, data as well as other telecommunications and ancillary services for Eskom staff and contractors. The proposed mast installation project will align with Eskom's objectives to improve service levels and efficiencies to ensure volume growth, to meet core telecommunication specifications in support of maintenance standards.

Eskom Holdings SOC Ltd considers this area to be highly preferred for the development for the following reasons:
This spot is required because it best suits the needs to integrate back into the Eskom telecommunication's network. In order for Eskom to provide the necessary services it is imperative that there are reliable and effective communications systems in place to provide the necessary services to the substation.

The proposed project is part of a suite of projects collectively known as the Ermelo-Richards Bay Coal Link Upgrade. These suits of projects will impact positively on the local, provincial and national economies and ensure that South Africa continues to improve its national transport system, hereby increasing economic output and revenue. The AbaQulusi Local Municipality which have high levels of unemployment and this project may provide a much-required capital injection to the area, along with a number of job opportunities during the construction and operational phases.

CONCLUSION (IMPACT STATEMENT)

As summarised in Table 14, it's been noted that the majority of the negative impacts associated with the construction of the proposed Duma Telecommunication Radio Tower are short-term (i.e. during the construction phase), **majority of the negative impacts identified can be mitigated to low significance** if all mitigation measures identified and included in the Environmental Management Programme (EMPr) attached in Appendix F. Environmental constraints as listed on section 8.3 and shown in the environmental sensitivity map (**Figure 38**) includes are features that could be avoided during the detail design phase of the project, by careful placing of tower footprint. Owing to the fact that the project is for the provision of the requirement to serve as voice, data as well as other telecommunications and ancillary services for Eskom staff and contractors which are meant to improve service levels and efficiencies to ensure volume growth, to meet core telecommunication specifications in support of maintenance standards, most of the impacts resulting from the project aspects are anticipated to be positive more so in the long-term of the implementation of the project, these benefits of the project are expected to occur beyond the local area therefore the benefits partially offset the localised environmental costs of the project.

This assessment considered two site alternatives and design alternatives as discussed in section 2.3 of this report. According to a comparative analysis undertaken for the sites by the different studies as summarised in Table 15, the **proposed site (i.e. Louwberg CCS RS) is the preferred option.** In terms of the design options, the most significant impact flagged is the tower collision mortality risk posed to threatened bird species, as this area supports threatened bird species including vultures vulnerable to collisions with such elevated structures and their associated infrastructure**.** Technically, Eskom prefers the lattice structures as they have moved away from monopole towers type as it is very difficult to maintain during its lifetime, Eskom have also found that Lattice structures are more robust and durable for their network needs. However, due to high impact associated with Lattice Towers, it is recommended that the Eskom team uses an option that will have the least impact on collision mortality risk to threatened bird species. The only relevant mitigation measure would be to ensure that the tower not require lateral support cables/ guy wires, therefore **a monopole structures is preferred.**

The findings this report indicate that there are **no significant environmental fatal flaws** associated with the proposed development, the proposed project is regarded to be feasible and sustainable with the implementation of the above site and design options as well as with responsible environmental management on site, during the planning and construction phases of the project. It is therefore the opinion of the EAP that the proposed development could proceed as all impacts identified are localised and manageable provided that the mitigation measures set out in this report and in the EMPr (Appendix F) are diligently implemented to limit the potential impacts on sensitive ecological and visual aspects of the project during construction and operation of the development.

RECOMMENDATIONS

The EAP recommends that the construction of the proposed Louwsburg Telecommunication Radio Tower be authorised with the preferred site and design options.

The construction activities and relevant rehabilitation of disturbed areas should be monitored against the approved EMPr, the Environmental Authorisation, specialist report recommendations and all other relevant environmental legislation. The following relevant conditions would be required to be included within an authorisation issued for the project.
The construction activities and relevant rehabilitation of disturbed areas should be monitored against the approved EMPr, the Environmental Authorisation, specialist report recommendations and all other relevant environmental legislation. The following relevant **conditions would be required** to be included within an authorisation issued for the project.

- An independent Environmental Control Officer (ECO) should be appointed to monitor compliance with the specifications of the EMPr for the duration of the construction period.
- The following mitigation measures to reduce the occurrence of bird collisions with towers must be adhered to:
    - Co-locate the new communication equipment on existing towers at the site, and if this is not possible, that no lateral support cable nor guy wires be used in the tower design, preferably a monopole structure be implemented.
    - Security lighting for on-ground facilities, equipment, and infrastructure should be avoided. If not possible, lighting should be motion or heat-sensitive, down-shielded, and of a minimum intensity to reduce night-time bird attraction and eliminate constant night-time illumination while still allowing safe night-time access to the site.
- Creation of new access roads should be minimised as far as possible. Rock outcrop habitats must be avoided by access / service roads
- Stormwater Management Plan is established for the Service Road. All erosion protection measures must be established to reflect the natural slope of the surface and located at the natural ground-level.
- Threatened and Protected Plant Search and Rescue: Prior to construction commencing, the following must be undertaken:
    - Once the location of the tower and access road footprints are confirmed, a botanist must re-visit the footprint sites prior to construction at the appropriate time of year (i.e. earlier in the summer window) to identify and map the location of all threatened and protected plants. It is an Endangered vegetation type, retains modest species

diversity and some unusual species were present. As this type hosts rare and red listed plants, not all may have been seen due to seasonality (i.e. the lateness of the field assessment). A follow-up will be able to more certainly identify whether all have been detected and also if more plants need to be relocated.

  - Thereafter, all protected and red listed individuals within and in the vicinity of the development footprint must be relocated to a suitable area of primary grassland by a person with suitable horticultural experience, and in particular experience in relocating indigenous plants within natural habitats.
  - Once the identity and location of all threatened and protected plants are confirmed, permits to remove and translocate such species must be acquired and a search and rescue plan must be compiled and implemented.
- Detailed method statement for the construction activities within all primary grasslands must be compiled and appended to the construction (EMPr) prior to construction commencing. The final method statement must be reviewed by the ECO prior to commencement and must include all measures provided in this section where relevant and applicable Demarcation of 'No-Go' areas and construction corridors
- Should any archaeological artefacts be exposed during excavation, work on the area where the artefacts were found, shall cease immediately and the ECO shall be notified as soon as possible. Any archaeological sites exposed during construction activities may not be disturbed prior to authorisation by the South African Heritage Resources Agency.
- All relevant practical and reasonable mitigation measures detailed within this report and within the EMPr must be implemented. The implementation of this EMPr for all life cycle phases of the proposed project is considered key in achieving the appropriate environmental management standards as detailed in this report
- All declared alien plants must be identified and managed in accordance with the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983). The implementation of a monitoring programme in this regard is recommended.
- Care must be taken with the topsoil during and after construction on the site. If required, measures to reduce erosion to be employed until a healthy plant cover is again established.
- Contractors must be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites.
- The developer should obtain all necessary permits prior to the commencement of construction.
- On-going monitoring of the development sites must be undertaken to detect and restrict the spread of alien plant species.

INVITATION TO COMMENT ON THE DRAFT BA REPORT

A draft Basic Assessment Report (DBAR) was released for public review in June 2021 for a 30-day public review period. Ezemvelo Wildflife raised some Issues & concerns that the applications (1) have severe impacts on important biodiversity features (of particular concern are threatened vulture species and other avifaunal species) and Protected Areas, (2) the inadequacy of the Visual Impact Assessments, and (3) a recommended that the use of existing tower sites be investigated (See **Appendix E4** for the full correspondences).

The current Draft Basic Assessment Report (BAR) has been prepared by Envirolution Consulting (Pty) Ltd in order to i) address issues and concerns previously raised by Ezemvelo and to assess the potential environmental impacts associated with the proposed construction of the **LouwsburgTelecommunication Radio Tower**. The report is again made available for public review for 30-day review period from **31 August 2023 to 02 October 2023** at the following place:

LOUWSBURG LIBRARY
615 Queen Street, Louwsburg
034 907 5013

In order to obtain further information or submit written comments please contact:

Environmental Assessment Practitioner

Name:	Sheila Bolingo
Physical Address:	Vista Place, Suite 1a & 2, No 52, Cnr Vorster Avenue & Glen Avenue, Glenanda
Postal Address:	PO Box 1898, Sunninghill, 2157
Telephone Number:	(0861) 44 44 99
Fax Number:	(0861) 62 62 22
E-mail:	sheila@envirolution.co.za

The due date for comments on the Draft Basic Assessment Report is Monday, 02 October 2023.

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1 INTRODUCTION

1.1 Project Background

The proposed construction of Louwsburg Telecommunication Radio Tower Project within the AbaQulusi Local Municipality is part of a suite of projects collectively known as the Transnet Coal Link Upgrade.

Transnet is South Africa's sole provider of rail transport infrastructure for coal transportation. One of South Africa's largest foreign exchange earners is the export of high-quality coal products to China. The Transnet rail link between the coal fields in Mpumalanga Province and the export node, the Richards' Bay Coal Terminal, is one of the busiest railway links in South Africa. The increase in demand for South Africa's high-quality coal necessitates the increase in production, which in turn has demands on the railway network infrastructure. In response to the increased demand for South Africa's coal in the global market place, Transnet needs to increase the volume of coal that is being transported between the Mpumalanga coal fields and the Richard's Bay Coal Terminal. This increase will be facilitated through capital expenditure on two fronts, the supporting infrastructure, i.e. the electrical network supplying the locomotives and the locomotives themselves. In order for Transnet to accomplish the above they need to upgrade their power supply to their various traction substations between Ermelo and Richards Bay to facilitate the introduction of the new, larger locomotives that will be added to increase the volume of coal being transported and exported. Eskom Holdings SOC Ltd being one of the main suppliers of electrical energy in South Africa has been tasked by Transnet to supply the additional energy requirements to these traction substations.

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- Eskom Telecoms required to provide communication services for the three MTSs.
- 4 x New Radio Sites required:
    - Two new Greenfield sites for Duma Ss; and
    - Louwsbergand Paulpietersbergsites for NzaloSs.
    - Duma RS (within approved Duma Substation footprint)
    - Upgrade 2 x Existing RSs

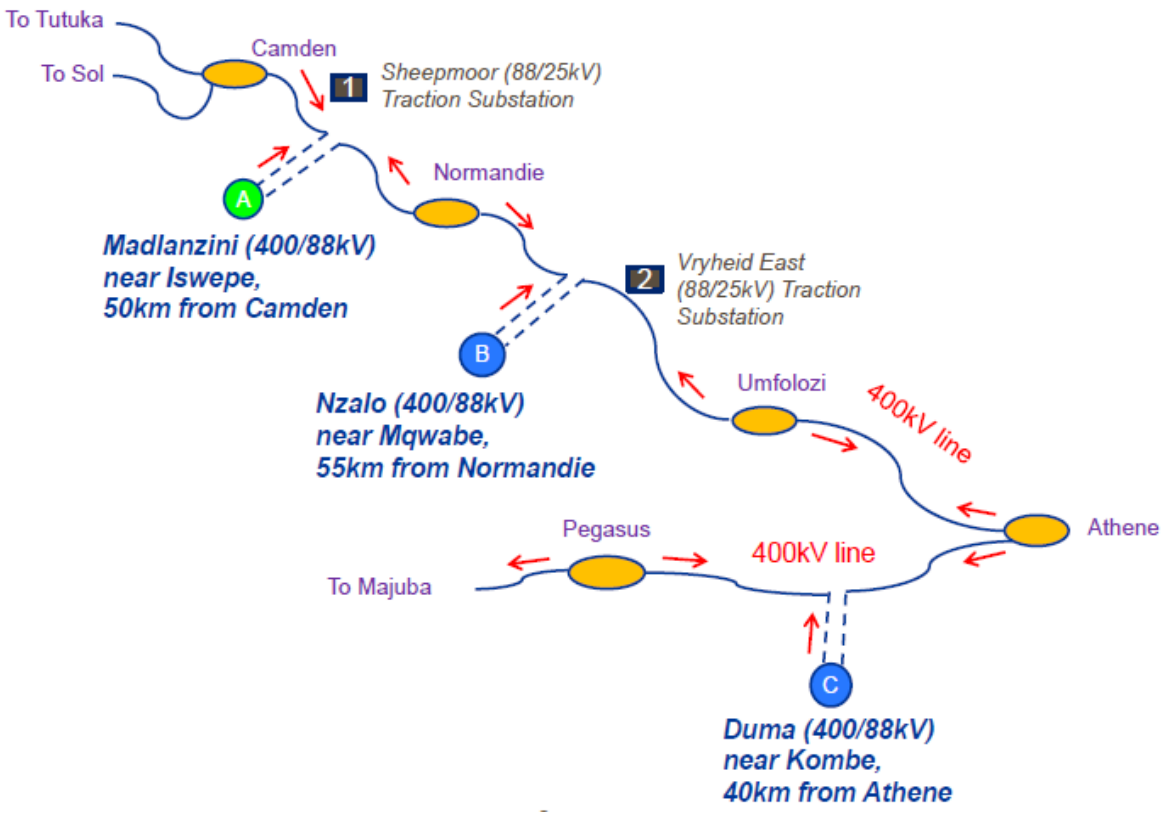

Figure 1: Transnet Project Overview

The proposed telecommunication mast would serve as voice, data as well as other telecommunications and ancillary services for Eskom staff and contractors for the Nzalo Substationwhich is positioned 27 36 31.11 S and 30 52 30.22 E, this is a new substation to be built by Transmission (Tx) Telecommunications in order to strengthen the TX grid so that Eskom can provide services to Transnet. In order for Eskom to provide the necessary it is imperative that there are reliable and effective communications systems in place to provide the necessary services to the substation. Services like tele-protection, tele-control, switched voice, direct voice and hot lines as well as data services like Ethernet connectivity. The mast will be located within AbaQulusi Local Municipality in Kwazulu-Natal (**Figure 2**). The Masts will be approximately 60m (Louwsberg CCS site); and 70m (Louwsberg DPW site) in height requiring a foot print of 30m X 30m.

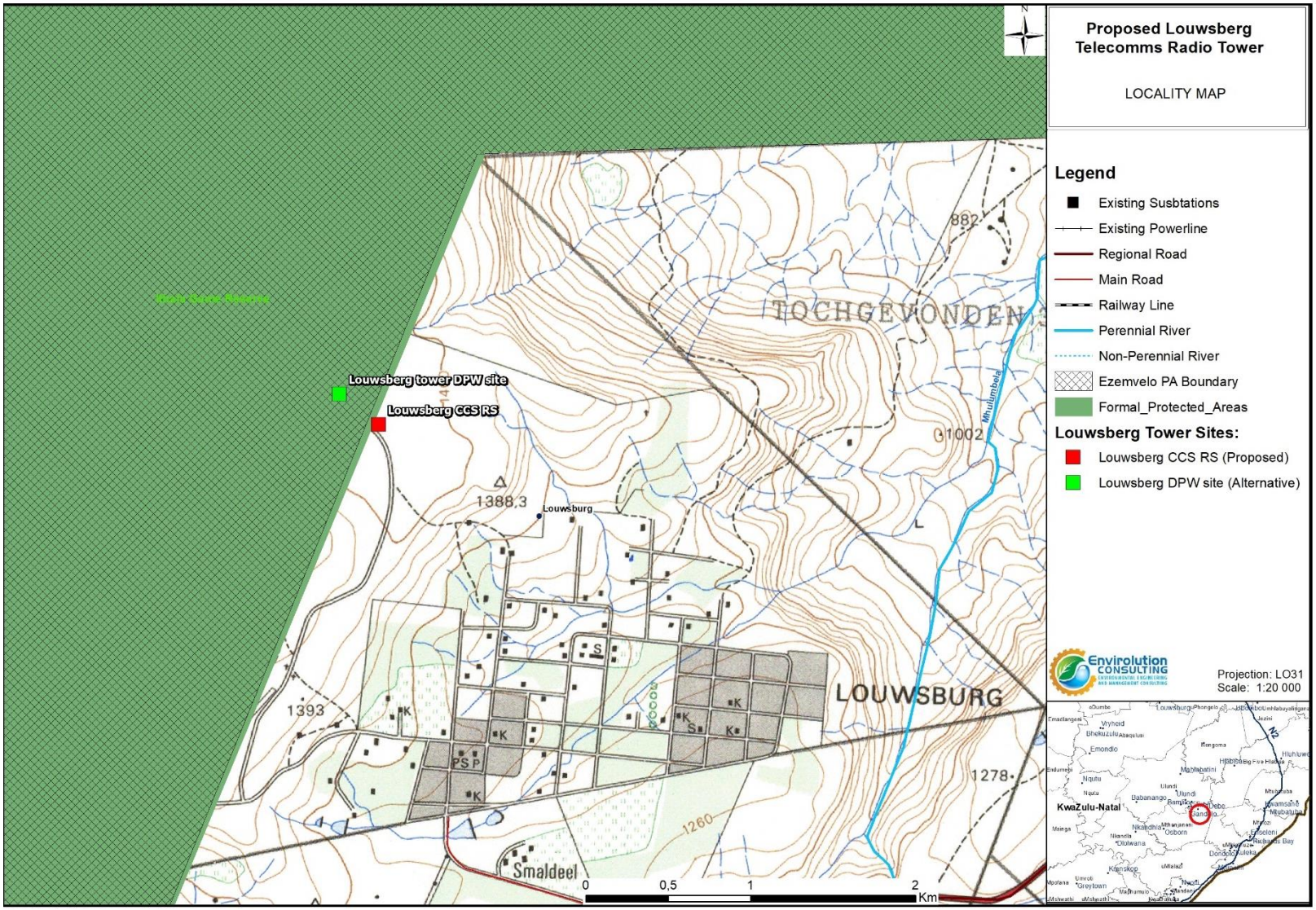

Figure 2: Locality map showing the proposed Louwsburg Telecommunication Radio Tower site alternatives

1.2 Requirement for a Basic Assessment Process

The proposed project is subject to the requirements of the Environmental Impact Assessment Regulations of 2014 EIA Regulations (as amended) in terms of the National Environmental Management Act (NEMA, Act 107 of 1998, as amended). NEMA is national legislation that provides for the authorisation of certain controlled activities known as "listed activities". In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be considered, investigated, assessed, and reported on to the competent authority (the decision-maker) charged by NEMA with granting of the relevant environmental authorisation. Eskom requires an Environmental Authorisation for this project which includes the proposed construction of an overhead powerline, underground cables and substations. Application for authorisation in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and GNR 326, 327, 325 & 324 of the Environmental Impact Assessment Regulations, 2014 as amended (07 April 2017) a Basic Assessment (BA) Process is required for this project. Environmental Authorisation (EA) is required for a 10 years period, according to Eskom, the planned construction date for the Duma radio tower is in 2025 for a duration of six months, should the EA validity expire, an extension of its validity will be applied for with the relevant authority.

An environmental impact assessment is an effective planning and decision-making tool for the applicant as it provides the opportunity for the applicant to be fore-warned of potential environmental issues and assess if potential environmental impacts need to be avoided, minimised or mitigated to acceptable levels. The Basic Assessment process includes certain feasibility studies for a proposed project and will inform the final design process in order to ensure that environmentally sensitive areas are avoided to an acceptable level as confirmed by the Environmental Assessment Practitioner (EAP). Comprehensive, independent environmental studies elaborated by specialists are required in accordance with the EIA Regulations to inform the EAP of its comprehensive recommendation and provide the competent authority with sufficient information in order to make an informed decision.

As the applicant for the project is Eskom Holdings SOC Ltd which is a State-Owned-Company (SOC), therefore the National Department of Forestry Fisheries and Environment (DFFE) is the competent authority and the KwaZulu-Natal Department of Economic Development and Environmental Affairs (KZNEDTEA) will act as a commenting authority. Eskom has appointed Envirolution Consulting (Pty) Ltd, as independent environmental consultants, to undertake the BA process and compile the BA Report and Environmental Management Programme (EMPr). Furthermore, Envirolution Consulting does not have any interests in secondary developments that may arise out of the authorisation of the proposed project. Envirolution Consulting is a specialist environmental consulting company providing holistic environmental management services, including environmental impact assessments and planning to ensure compliance with environmental legislation and evaluate the risk of development; and the development and implementation of environmental management tools Envirolution Consulting benefits from the pooled resources, diverse skills and experience in environmental field held by its team. We offer solutions to environmental issues that are key during our clients' planning and decision-making processes. The Envirolution Consulting team have considerable experience in environmental impact assessments and environmental management, and have been actively involved in undertaking environmental studies, for a wide variety of projects in South Africa, including those associated with linear developments.

1.3 Project Team

Envirolution Consulting (Pty) Ltd was contracted by Eskom Holdings SOC Ltd as the independent environmental consultant to undertake the Environmental Basic Assessment process for the proposed project. Envirolution Consulting (Pty) Ltd is not a subsidiary of, or affiliated to Eskom Holdings SOC Ltd. Furthermore, Envirolution Consulting does not have any interests in secondary developments that may arise out of the authorisation of the proposed project.

I. APPLICANT DETAILS

Name of applicant:	Eskom Holdings SOC Ltd
Applicant representative:	Madinare Mukhuba
Position:	Programme Manager: Land Development
Contact number/s:	011 516 7350
Physical address:	Transmission Division Grid Planning & Development Megawatt Park D1X37 Maxwell Drive Sunninghill Sandton
E-mail:	mukhubdm@eskom.co.za

II. ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)'s DETAILS

Environmental Assessment Practitioner (EAP):	Karthigesan Govender		
Contact person:	Karthigesan Govender		
Postal address:	PO Box 1898, Sunninghill		
Postal code:	2157		
Telephone:	087 898 5000	Cell:	083 419 8905
E-mail:	sheila@envirolution.co.za; gesan@envirolution.co.za	Fax:	(086) 162 62 22
EAP Qualifications	BSc (Hons) in Botany		
EAP Registrations/ Associations	Registered with the South African Council for Natural Scientific Professions (No: 400049/12)		

Details of the EAP's expertise to carry out Basic Assessment procedures

The EAPs from Envirolution Consulting who are responsible for this project are (refer to **Appendix G1** for CVs):

- **Karthigesan Govender** The Environmental Assessment Practitioner (EAP) is a registered Professional Natural Scientist and holds an Honours degree in Botany. He has over 18 years of experience within the field of environmental management. His key focus is on strategic environmental assessment and advice; management and co-ordination of environmental projects, which includes integration of environmental

studies and environmental processes into larger engineering-based projects and ensuring compliance to legislation and guidelines; compliance reporting; the identification of environmental management solutions and mitigation/risk minimising measures; and strategy and guideline development. He is currently responsible for the project management of EIA's for several diverse projects across the country.

- **Sheila Bolingo,** the principle author of this Report holds an Msc degree in Environmental Management with 12 years of experience in the consulting field. Her key focus areas are on strategic environmental assessment and advice on environmental impact assessments; public participation; environmental management programmes, and mapping through ArcGIS for variety of environmental projects. She is currently involved in several diverse projects across the country.

III. SPECIALIST DETAILS

In order to adequately identify and assess potential environmental impacts associated with the proposed project, Envirolution Consulting has appointed the following specialists to conduct specialist impact assessments:

- Aquatic and wetland impact assessment – Ryan Edwards of Verdant Environmental
- Terrestrial ecological –Ryan Edwards & team of Verdant Environmental
- Avifauna - David Allan & Robyn Phillips of Cossypha Ecological
- Heritage - Johan van Schalkwyk of Johan Heritage Consultant
- Palaeontology - Heidi Fourie
- Visual – Mader van den Berg of Skets
- Agricultural Potential – Joshua Oluokun of Environet Consulting

Specialist declarations are included in **Appendix G2**

2 PROJECT DESCRIPTION

2.1 Project Location

The proposed telecommunication mast would serve as voice, data as well as other telecommunications and ancillary services for Eskom staff and contractors. In order for Eskom to provide the necessary it is imperative that there are reliable and effective communications systems in place to provide the necessary services to the substation. Services like tele-protection, tele-control, switched voice, direct voice and hot lines as well as data services like Ethernet connectivity.

The proposed Towers will be located approximately 2km north of the town of Louwsburg next to the Ithala Game Reserve within the AbaQulusi Local Municipality (Ward 1) in the Zululand District Municipality of KwaZulu-Natal, (**Figure 3).** Access to the site is to comprise a single-lane gravel access road; this will be approximately 2000m long from the town of Louwsburg.

The proposed mast will be located on the following property:

SITES OPTIONS	Co-ordinates	Local Municipality (LM) & District	Farm & Portion, SG code	Ward	Height (m)
CCS RS	Lat: 27°33'46.44"S Long: 31°16'33.58"E	AbaQulusi LM Zululand District Municipality	RE of ERF 603 Louwsburg N0HU018900000603000000.	1	60
DPW site	Lat: 27°33'40.60"S Long: 31°16'24.70"E	AbaQulusi LM Zululand District Municipality	RE of ERF 603 Louwsburg N0HU018900000603000000	1	70

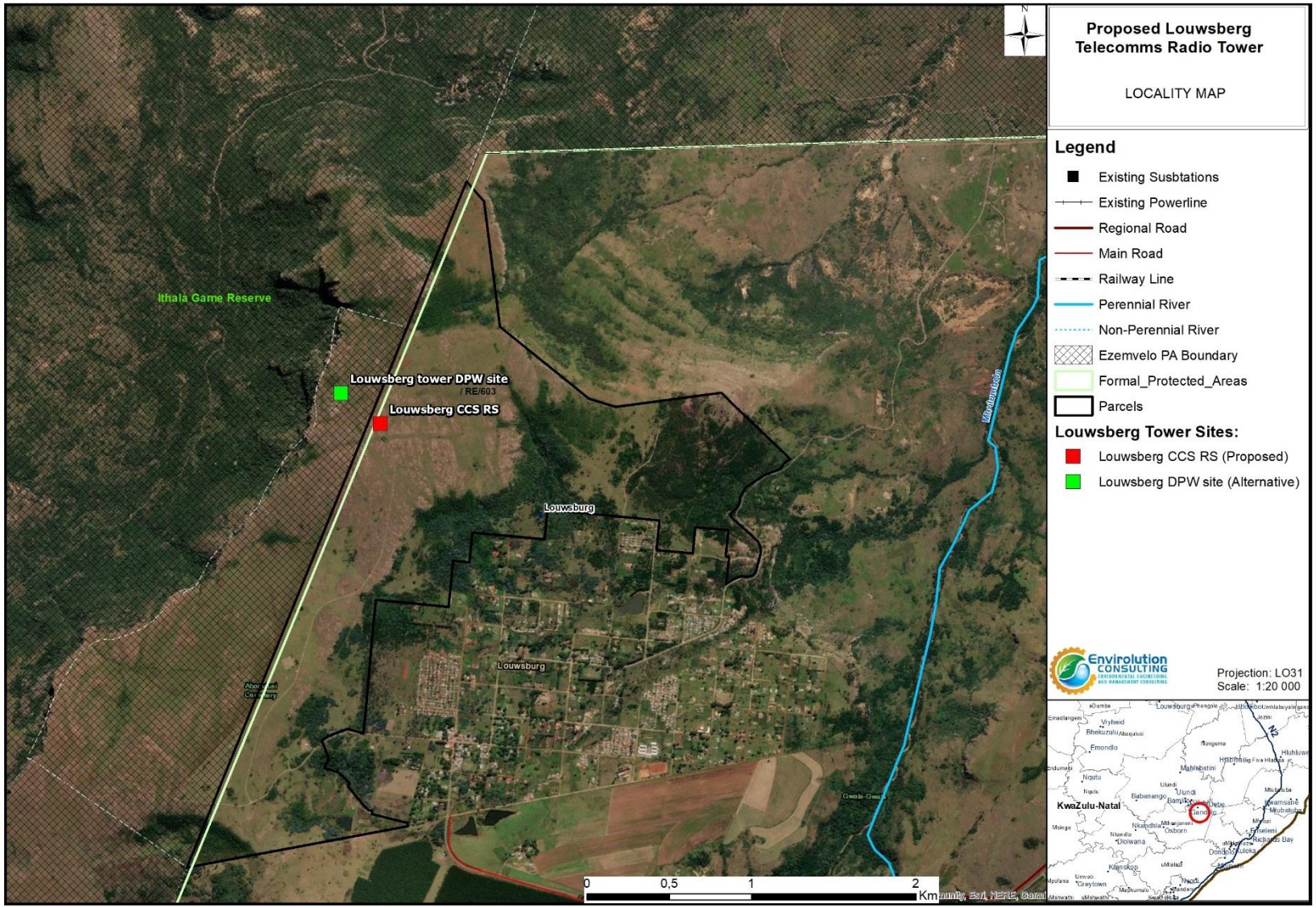

Figure 3: Map showing the proposed Louwsburg Telecommunication Radio Tower property details

2.2 Technical Details

The proposed development entails the following:

- The erection of an approximately. 60m/70m Telecommunications tower Mast in height
- The size of the site will occupy a 30m X 30m foot print
- Fenced off with a fence as per the current Eskom specification at time of build.
- There will either be a brick building or container built on site as per Eskom requirements to house the indoor equipment.

2.3 Alternatives Description

2.3.1 Site Alternatives

An intensive investigation was carried out by Telecomms planning engineer together with a qualified land surveyor over a period of 18 months. Sites visits were done to verify any man-made physical structures and the actual terrain on sites as shown in **Figure 4.** Even though there were other sites in the vicinity most of them could not offer solution because of the obstructed Line of Site (LOS) since the link path profile design requires a clear line of sight between the two ends of a microwave link for it to be successful. A site closer to Lowsberg was investigated however there was a third party tower blocking LOS to Duma and Eskom cannot use third party tower due to critical services. Therefore only two Feasible Alternative Sites were investigated for the Louwsberg towers are as follows:

Proposed Site: Louwsberg CCS RS
and
Alternative Site: Louwsberg DPW site

Figure 4: Telecoms Site alternative investigations

2.3.2 Design/Layout alternative

Lattice Towers: Also referred to as "self-supporting towers", lattice towers are typically made from steel and constructed in a triangular or square shape. These towers often offer the most stability and flexibility as compared to other cell tower types. The preferred tower type by Eskom is a self-supporting steel lattice tower (**Figure 5** for example).

Monopole Towers: A single tubular mast comprises this type of cell tower; because of the instability that comes with the use of a single pole, the height of these structures will not exceed 200 feet. A benefit of this tower type is that it requires little ground space to erect, and the antennae are simply mounted to the top-exterior of the mast.

Preferred Alternative: *Eskom has moved away from monopole towers type as it is very difficult to maintain during its lifetime. Eskom currently don't have access to well proven technology in SA to ascertain the technical properties of the structure over its lifespan due to degradation that may occur due to any external factors. Eskom have also found that Lattice structures are more robust and durable for our network needs*

Figure 5: Typical telecom tower

2.3.3 No-go alternative

The No-Go alternative in the context of this project implies that the telecommunication mast would not be constructed and the current land use would persist. If the project does not proceed the negative impacts such as risk of collisions of birds would be avoided. However, it would also mean that the project would not provide the

requirement to serve as voice, data as well as other telecommunications and ancillary services for Eskom staff and contractors which are meant to improve service levels and efficiencies to ensure volume growth, to meet core telecommunication specifications in support of maintenance standards.

Based on above points, the 'No-go' alternative is therefore not considered to be a feasible alternative and will not be considered further within the EIA process.

2.4 Need and Desirability

The proposed telecommunication mast is required to serve as voice, data as well as other telecommunications and ancillary services for Eskom staff and contractors. The proposed mast installation project will align with Eskom's objectives to improve service levels and efficiencies to ensure volume growth, to meet core telecommunication specifications in support of maintenance standards.

Eskom Holdings SOC Ltd considers this area to be highly preferred for the development for the following reasons: This spot is required because it best suits the needs to integrate back into the Eskom telecommunication's network. In order for Eskom to provide the necessary services it is imperative that there are reliable and effective communications systems in place to provide the necessary services to the substation.

The proposed project is part of a suite of projects collectively known as the Ermelo-Richards Bay Coal Link Upgrade. These suits of projects will impact positively on the local, provincial and national economies and ensure that South Africa continues to improve its national transport system, hereby increasing economic output and revenue. The AbaQulusi Local Municipality which have high levels of unemployment and this project may provide a much-required capital injection to the area, along with a number of job opportunities during the construction and operational phases.

2.5 Construction & Operation of the Tower Procedure

The proposed telecommunication radio tower project is considered a medium scale development that will require specialist construction methods to erect it. The footprint of the tower is only 30mx30m, but its vertical dimension reaches 60m/70m. Limited detail and descriptive information are available, but one can assume the following typical construction phases may occur:

- Surveying of the site;
- Establishment of a temporary construction camp and material stockyard that could be on- or off site depending on suitability;
- Installation of a power supply (no details available);
- Civil works which include an access road if not already present, foundation casting and erection of the tower;
- Construction of security features such as a fence; and
- Commissioning and rehabilitation.

The establishment of a construction camp is usually one of the first interventions on a construction site and is normally located on or near the site. Temporary site offices and ablution facilities may be required next to a material laydown yard. Due to its temporary nature and practical function, aesthetic considerations are less of a concern which could result in an unsightly terrain that may cause visual intrusion.

Earthworks for foundation purposes will be one of the most intrusive activities and will presumably consist of excavation via appropriate machinery followed by foundation casting. The erection of the tower could involve the use of a mobile crane or even helicopters, depending on site conditions.
No clear construction period has been determined. One can expect a relatively short construction period of a few months

The final project will entail a 60m/70m tall lattice tower, typically painted with white and red, or as per aviation authority requirements. It will be equipped with radios and dishes near the top. A red blinking light is expected to be installed at the top, as a notice to air traffic at night. Once the tower is constructed a routine maintenance program will be followed. No additional visual impacts are expected.

3 LEGAL FRAMEWORK AND REQUIREMENTS

3.1 Listed Activities

In terms of sections 24(2) and 24D of the National Environmental Management Act (Act No. 107 of 1998), as read with the Environmental Impact Assessment (EIA) Regulations of GNR 326, 327, 325 & 324 (as amended), a Basic Assessment process is required for the proposed project. **Table 1** contains the listed activities in terms of the EIA Regulations (as amended) and includes a description of those project activities which relate to the applicable listed activities.

Table 1: BA Listed Activities Applicable applied for to be authorise

Listed activities	Description of project activity that triggers listed activity
Activity 3 of Listing Notice 3 (GNR 324, 07 April 2017): The development of masts or towers of any material or type used for telecommunication broadcasting or radio transmission purposes where the mast or tower— (a) is to be placed on a site not previously used for this purpose; and (b) will exceed 15 metres in height— **(d) KwaZulu-Natal:** viii. Critical biodiversity areas or ecological support areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; xi Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority i. Outside urban areas: (aa) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any terrestrial protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve; or	The mast will be 60m/70m in height, thereby exceeding the 15m threshold; and falls within a Critical Biodiversity Area and Sensitive area and next to a terrestrial protected area identified in terms of NEMPAA
Activity 12 of Listing Notice 3 (GNR 324, 07 April 2017): The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of Indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan **(d) KwaZulu-Natal:** v. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; xii. Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority	The mast will require an area of 30m x30m i.e. 900 square metres clearance of indigenous vegetation in Critical Biodiversity Areas and in an area deemed Sensitive area by the competent authority

3.2 Legislation and Guidelines that have informed the preparation of this BA Report

Several other Acts, standards or guidelines have also informed the project process and the scope of issues assessed in this report. A listing of relevant legislation is provided in **Table 2**, where the level of applicability of the legislation or policy to the activity/project is detailed.

Table 2: Relevant legislative and permitting requirements applicable to the proposed project

LEGISLATION	APPLICABLE REQUIREMENTS	RELEVANT AUTHORITY
National Environmental Management Act (Act No 107 of 1998)	The EIA Regulations have been promulgated in terms of Chapter 5 of the Act. Listed activities which may not commence without an environmental authorisation are identified within these Regulations. In terms of S24(1) of NEMA, the potential impact on the environment associated with these listed activities must be assessed and reported on to the competent authority charged by NEMA with granting of the relevant environmental authorisation. In terms of GNR 982 of 2014 (as amended), a Basic Assessment Process is required to be undertaken for the proposed project. • ***An application for Environmental Authorisation (as triggered by the EIA Regulations 2014 (as amended) will be required. In terms of Section 28, every person who causes, has caused, or may cause significant pollution or degradation of the environment, must take reasonable measures to prevent pollution or rectify the damage caused. The undertaking of various specialist studies, in order to identify potential impacts on the environment and to recommend mitigation measures to minimise these impacts, complies with Section 28 of NEMA. The developer must apply the NEMA principles, the fair decision-making and conflict management procedures that are provided for in NEMA. The developer must apply the principles of Integrated Environmental Management and consider, investigate and assess the potential impact of existing and planned activities on the environment, socio-economic conditions and the cultural heritage.*** • ***In terms of the EIA regulations, the construction of the proposed telecommunication mast will trigger the need for a Basic Assessment process under the NEMA EIA Regulations of 2014 (as amended) in Listing Notice 3 (refer to Section 4.1 for a detailed description of the listed activity applied for).***	Department of Forestry Fisheries and Environment (DFFE) – competent authority KwaZulu-Natal Department of Economic Development and Environmental Affairs (KZN EDTEA)
National Environmental Management Act (Act No 107 of 1998)	In terms of the Duty of Care Provision in S28(1) the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to ensure that any pollution or degradation of the environment associated with this project is avoided, stopped or minimised. In terms of NEMA, it has become the legal duty of a project proponent to consider a project holistically, and to consider the cumulative effect of a variety of impacts. ***While no permitting or licensing requirements arise directly by virtue of the proposed project, this section will find application during the BA phase and will continue to apply throughout the life cycle of the project.***	DFFE KZN EDTEA
National Water Act (Act No 36 of 1998)	The development also triggers activities that require a Water Use License (WUL) because it crosses several water courses. Therefore, before construction activities may take place, the activity will require a Water Use License as per requirement in the National Water Act (Act No.36 of 1998) (NWA) under Section 21 Water Uses. In terms of the NWA, this development requires a Water Use License for the following water uses: • Section 21(c) impeding or diverting the flow of water in a watercourse	Department of Water and Sanitation (DWS)

LEGISLATION	APPLICABLE REQUIREMENTS	RELEVANT AUTHORITY
	and; • Section 21 (i) altering the bed, banks, course or characteristics of a watercourse. ***Considering the negligible to likely non-existent impacts, it is debatable whether the project activities even constitute a Section 21(c) and 21(i) water use. This will need to be confirmed with the DWS. If the project activities are considered a water use, A General Authorisation will be applicable.***	
National Environmental Management: Air Quality Act (Act No 39 of 2004)	S18, S19, and S20 of the Act allow certain areas to be declared and managed as "priority areas." Declaration of controlled emitters (Part 3 of Act) and controlled fuels (Part 4 of Act) with relevant emission standards. GN R 827 – National Dust Control Regulations prescribes general measures for the control of dust in all areas	DFFE Local Municipality
National Heritage Resources Act (Act No 25 of 1999)	» S38 states that Heritage Impact Assessments (HIAs) are required for certain kinds of development including » The construction of a road, power line, pipeline, canal or other similar linear development or barrier exceeding 300 m in length; » Any development or other activity which will change the character of a site exceeding 5 000 m^2 in extent » The relevant Heritage Authority must be notified of developments such as linear developments (i.e. roads and power lines), bridges exceeding 50 m, or any development or other activity which will change the character of a site exceeding 5 000 m^2; or the re-zoning of a site exceeding 10 000 m^2 in extent. This notification must be provided in the early stages of initiating that development, and details regarding the location, nature and extent of the proposed development must be provided. » Stand-alone HIAs are not required where an EIA is carried out as long as the EIA contains an adequate HIA component that fulfils the provisions of S38. In such cases only those components not addressed by the EIA should be covered by the heritage component. ***The Tower site is 30m x 30m hence an HIA is not required as the development which will not change the character of a site exceeding 5 000 m2. However, a permit may be required should identified cultural/heritage sites on site be required to be disturbed or destroyed as a result of the proposed development***	South African Heritage Resources Agency (SAHRA) AMAFA
National Environmental Management: Biodiversity Act (Act No 10 of 2004)	In terms of S57, the Minister of Environmental Affairs has published a list of critically endangered, endangered, vulnerable, and protected species in GNR 151 in Government Gazette 29657 of 23 February 2007 and the regulations associated therewith in GNR 152 in GG29657 of 23 February 2007, which came into effect on 1 June 2007. In terms of GNR 152 of 23 February 2007: Regulations relating to listed threatened and protected species, the relevant specialists must be employed during the EIA Phase of the project to incorporate the legal provisions as well as the regulations associated with listed threatened and protected species (GNR 152) into specialist reports in order to identify permitting requirements at an early stage of the EIA Phase. The Act provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), vulnerable (VU) or protected. The first national list of threatened terrestrial ecosystems has been gazetted, together with supporting information on the listing process including the	DFFE KZN EDTEA

LEGISLATION	APPLICABLE REQUIREMENTS	RELEVANT AUTHORITY
	purpose and rationale for listing ecosystems, the criteria used to identify listed ecosystems, the implications of listing ecosystems, and summary statistics and national maps of listed ecosystems (National Environmental Management: Biodiversity Act: National list of ecosystems that are threatened and in need of protection, (GG 34809, GN 1002), 9 December 2011). GNR 598: The Alien and Invasive Species (AIS) Regulations provides for the declaration of weeds and invader plants. ***An ecological study has been undertaken as part of the BA process, as such the potential occurrence of critically endangered, endangered, vulnerable, and protected species and the potential for them to be affected has been considered within this report***.	
National Forests Act (Act No. 84 of 1998)	In terms of S5(1) no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a license granted by the Minister to an (applicant and subject to such period and conditions as may be stipulated" GN 908 provides a list of protected tree species. ***While no permitting or licensing requirements arise from this legislation, and this Act will find application during the construction and operational phase of the project.***	Department of Forestry Fisheries and Environment
National Veld and Forest Fire Act (Act 101 of 1998)	In terms of S13 the landowner would be required to burn firebreaks to ensure that should a veldfire occur on the property, that it does not spread to adjoining land. In terms of S13 the landowner must ensure that the firebreak is wide and long enough to have a reasonable chance of preventing the fire from spreading, not causing erosion, and is reasonably free of inflammable material. In terms of S17, the applicant must have such equipment, protective clothing, and trained personnel for extinguishing fires. ***While no permitting or licensing requirements arise from this legislation, and this Act will find application during the construction and operational phase of the project.***	Department of Forestry Fisheries and Environment
Hazardous Substances Act (Act No 15 of 1973)	This Act regulates the control of substances that may cause injury, or ill health, or death due to their toxic, corrosive, irritant, strongly sensitising or inflammable nature or the generation of pressure thereby in certain instances and for the control of certain electronic products. To provide for the rating of such substances or products in relation to the degree of danger; to provide for the prohibition and control of the importation, manufacture, sale, use, operation, modification, disposal or dumping of such substances and products. » Group I and II: Any substance or mixture of a substance that might by reason of its toxic, corrosive etc, nature or because it generates pressure through decomposition, heat or other means, cause extreme risk of injury etc., can be declared as Group I or Group II substance » Group IV: any electronic product; and » Group V: any radioactive material. The use, conveyance, or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate license being in force. ***It is necessary to identify and list all the Group I, II, III, and IV hazardous substances that may be on the site and in what operational context they are***	Department of Health

LEGISLATION	APPLICABLE REQUIREMENTS	RELEVANT AUTHORITY
	used, stored or handled. If applicable, a license is required to be obtained from the Department of Health	
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)	The Minister may by notice in the *Gazette* publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment. The Minister may amend the list by – » Adding other waste management activities to the list. » Removing waste management activities from the list. » Making other changes to the particulars on the list. In terms of the Regulations published in terms of this Act (GN 921), A Basic Assessment or Environmental Impact Assessment is required to be undertaken for identified listed activities (Category A and B) while Category C Activities (such as storage of waste) must be undertaken in accordance with the necessary norms and standards. Any person who stores waste must at least take steps, unless otherwise provided by this Act, to ensure that: » The containers in which any waste is stored, are intact and not corroded or in » any other way rendered unlit for the safe storage of waste. » Adequate measures are taken to prevent accidental spillage or leaking. » The waste cannot be blown away. » Nuisances such as odour, visual impacts and breeding of vectors do not arise; and » Pollution of the environment and harm to health are prevented. ***As no waste disposal site is to be associated with the proposed project, no permit is required in this regard. Waste handling, storage and disposal during construction and operation is required to be undertaken in accordance with the requirements of the Act, as detailed in the EMPr. The volumes of waste to be generated and stored on the site during construction and operation of the facility will not require a waste license***.	DFFE: Chemicals and Waste Management KZN EDTEA: General waste
National Road Traffic Act (Act No 93 of 1996)	» The technical recommendations for highways (TRH 11): "Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads" outline the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed. » Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges, and culverts. » The general conditions, limitations, and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power/mass ratio, mass distribution, and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the National Road Traffic Act and the relevant Regulations. ***An abnormal load/vehicle permit may be required to transport the various components to site for construction.***	Provincial Department of Transport
Conservation of Agricultural Resources Act (Act No 43 of 1983)	The Conservation of Agricultural Resources Act (CARA) (Act 43 of 1983) has categorised a large number of invasive plants together with associated obligations of the land owner. Invasive plant species that should be removed or maintained only	DFFE

LEGISLATION	APPLICABLE REQUIREMENTS	RELEVANT AUTHORITY
	under certain commercial situations are identified in terms of the CARA. This Act will be applicable to the project if and where such plants arise within or adjacent to the project area. Notably most listed alien invasive species are propagated and driven by the disturbance of land during and following construction. ***While no permitting or licensing requirements arise from this legislation, this Act will find application during the BA process and will continue to apply throughout the life cycle of the project.***	
Telecommunications Act, 1966 (Act No. 103 of 1966)	Transnet has authority to operate its Private Telecommunication Network (PTN) in terms of Section 41(1)(c) of the Telecommunications Act.	
Aviation Act, 1962 (Act No. 74 of 1962): 13th Amendment of the Civil Aviation Regulations 1997	Any communications structure, building or other structure, whether temporary or permanent, which has the potential to endanger aviation in navigable airspace, or has the potential to interfere with the operation of navigation or surveillance systems or Instrument Landing Systems, including meteorological systems for aeronautical purposes, is considered an OBSTACLE and shall be submitted to the Commissioner for Civil Aviation for evaluation (refer SA-CAR Part 139.01.33) ***Due to requirements of the Act to ensure the safety of aircrafts, the developer must engage directly with the Civil Aviation Authority regarding the structural details of the facility. The developer must ensure that aviation impacts are prevented by ensuring that the mast is clearly visible to air traffic. The mast will be equipped with navigations lights. The mast will not be located in close proximity to any runways that could affect safety of planes approaching/leaving a runway.***	
PROVINCIAL		
KwaZulu-Natal Nature Conservation Management Amendment Act, 1997 (No 5 of 1999)	The KZN Conservation Management Amendment Act (1999) provides for the establishment of the KZN Conservation and prescribes its powers, duties and functions which include • Direct Nature management; and • Direct protected areas management ***The ecological Impact Assessment is being undertaken to confirm presence of projected plan under the Act, this will guide whether permit is required for the destruction of removal of certain species.***	KZN EDTEA Ezemvelo KZN wildfire (EKZNW)
KwaZulu-Natal Environmental Biodiversity Protected Areas Management Bill, 2014	The KZN Environmental Biodiversity Protected Areas Management Bill of 2014 provides for the establishment, functions and powers of the Ezemvelo KZN Wildfire the protection and conservation of indigenous species, ecological communities, habitats and ecosystems, the sustainable use of indigenous biological resources and the declaration and management of protected areas; • Schedule 3, 7 and 8 of includes the lists of protected fauna and flora species. ***The ecological Impact Assessment is being undertaken to confirm presence of projected plan under the Act, this will guide whether permit is required for the destruction of removal of certain species. The ecological Impact Assessment is being undertaken to confirm presence of projected plan under the Act, this will guide whether permit is required for the destruction of removal of certain species.***	KZN EDTEA Ezemvelo KZN wildfire (EKZNW)
KwaZulu-Natal Systematic Conversation Plan (KZNSCP, 2012)	The process of conservation planning involves extensive mapping of vegetation types, transformation, species data, ecological processes and threats. ***The proposed development needs to consider the future conservation planning of the area in order to ensure that no conflict in the future land-use will occur.***	Ezemvelo KZN wildfire (EKZNW)
Ithala Game Reserve (IGR) Integrated Management	The purpose of the IGR includes, but in no order of priority, the following: • Protect and conserve endangered, rare and endemic species indigenous to the area as listed.	Ezemvelo KwaZulu-Natal Wildlife

LEGISLATION	APPLICABLE REQUIREMENTS	RELEVANT AUTHORITY
Plan: 2009-2013	• Protect, conserve and restore the ecological integrity of the area. • Safeguard the archaeological, historical, palaeontological and living cultural heritage of the area. • Promote expansion of Ithala Game Reserve's ecological footprint as a regional anchor for biodiversity, business and benefit. • Promote awareness and conserve representative examples of the natural beauty and outstanding aesthetic value of the area. • Promote access by the public, to the area and its resources, both natural and cultural. • Contribute to the achievement of Provincial and National conservation targets through protection of a representative portion of Northern Zululand Mistbelt Grassland. • To provide a sophisticated protected area destination for the tourist industry in the Northern KwaZuluNatal of South Africa ***The proposed development needs to consider the future conservation planning of the Ithala Game Reserve (IGR) in order to ensure that no conflict in the future land-use will occur.***	

3.3 Guidelines documents and standards

The following Guideline documents have been considered in the preparation of this report:

- South African National Standards (SANS) 10328 (Methods for environmental noise impact assessment in terms of Nema 107 of 1998);
- The Equator Principles (June 2003);
- Department of Environmental Affairs (DEA) Integrated Environmental Management Guideline Series 7, Public Participation in the EIA Process as published in Government Gazette No. 33308, 18 June 2010; and
- KwaZulu-Natal Spatial Development Framework
- District and Local municipality Integrated Development Plans (IDPs) and Spatial Development Frameworks (SDFs).
- Municipal by-laws and guidelines.

3.4 **Summary** of the Requirements of Appendix 1 of the 2014 NEMA Eia Regulations

Table 3 below details how the legal requirements of **APPENDIX 1** of the 2014 EIA Regulations **(as amended, GNR326)** have been addressed within this report.

Table 3: Legal requirements in terms of the 2014 EIA regulations

Appendix 1: CONTENT OF BASIC ASSESSMENT REPORTS	**Cross-reference in this BAR report**
Scope of assessment and content of basic assessment reports	
3. (1) A basic assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include— **(a)** details of— (i) the EAP who prepared the report; and (ii) the expertise of the EAP, including a curriculum vitae;	Appendix G1
(b) the location of the activity, including: i. the 21 digit Surveyor General code of each cadastral land parcel; ii. where available, the physical address and farm name; iii. where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	Appendix G3
(c) a plan which locates the proposed activity or activities applied for as well as associated structures and infrastructure at an appropriate scale; or, if it is- i. a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or ii. on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	Appendix A & Appendix G3
(d) a description of the scope of the proposed activity, including— i. all listed and specified activities triggered and being applied for; and ii a description of the activities to be undertaken including associated structures and infrastructure;	Section 3.1 Section 2.2
(e) a description of the policy and legislative context within which the development is proposed including— iii. an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and iv. how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments;	Section 3.2
(f) a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;	Section 2.3
(g) a motivation for the preferred site, activity and technology alternative;	Section 2.3)
(h) a full description of the process followed to reach the proposed preferred alternative within the site, including— i. details of all the alternatives considered; ii. details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs; iii. a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them; iv. the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; v. the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of	i. Section 2.4 ii. Chapter 4 & Appendix D iii. Appendix D: Public Participation Process iv. Chapter 5 v. Chapter 6 vi. Chapter 7 vii. Chapter 7 viii. Chapter 7 ix. Chapter 7 x. Section 2.4 xi. Section 8.4

	the impacts, including the degree to which these impacts— (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated; vi. the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives; vii. positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; viii. the possible mitigation measures that could be applied and level of residual risk; ix. the outcome of the site selection matrix; x. if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and xi. a concluding statement indicating the preferred alternatives, including preferred location of the activity;	
(i)	a full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including— (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;	Chapter 7
(j)	an assessment of each identified potentially significant impact and risk, including— (i) cumulative impacts; (ii) the nature, significance and consequences of the impact and risk; (iii) the extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring; (v) the degree to which the impact and risk can be reversed; (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) the degree to which the impact and risk can be avoided, managed or mitigated;	Chapter 7
(k)	where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report;	Chapter 8 (section 8.1)
(l)	an environmental impact statement which contains— (i) a summary of the key findings of the environmental impact assessment (ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas tha should be avoided, including buffers; and (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;	Chapter 8 (section 8.4)
(m)	based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management outcomes for the development for inclusion in the EMPr;	Appendix E
(n)	any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;	Chapter 8
(o)	a description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Chapter 6 (Section 6.7)
(p)	a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any	Chapter 8 (Section 8.4)

	conditions that should be made in respect of that authorisation;	
(q)	where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised;	N/A
(r)	an undertaking under oath or affirmation by the EAP in relation to— (i) the correctness of the information provided in the reports; (ii) the inclusion of comments and inputs from stakeholders and I&APs; (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties; and	Appendix G1
(s)	where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	N/A
(t)	any specific information that may be required by the competent authority[1]; and	N/A
(u)	any other matters required in terms of section 24(4)(a) and (b) of the Act.	N/A
(2) Where a government notice *gazetted* by the Minister provides for the basic assessment process to be followed, the requirements as indicated in such a notice will apply		N/A

4 PUBLIC PARTICIPATION/STAKEHOLDER ENGAGEMENT PROCESS

The Public Participation Process (PPP) was conducted in accordance with **Chapter 6 of the Environmental Impact Assessment Regulations, Published in Government Notice R326 (as amended)**. In addition, the PPP was guided by the Integrated Environment Management Guidelines Series 7, Public Participation in the EIA process, published in Government Gazette no. 33308, 18 June 2010 **as well the approved PPP Plan from DFFE (attached in appendix E4).**

4.1 Purpose of Public Participation

The engagement of Interested and Affected Parties (I&AP's) and the Stakeholder Engagement Process is an important part of any environmental Impact assessment. The main objectives of the Stakeholder Engagement / Public Participation Process include amongst others:

- Informing the adjacent landowners, tenants, residents' associations, ward councillors, the local municipality and other organs of state of the proposed project;
- Establishing lines of communication between the stakeholders, I&AP's and the project team;
- Providing all parties with an opportunity to exchange information and to express their views and concerns regarding the proposed project;
- Obtaining comments/input from stakeholders and I&AP's, and ensuring that all views, issues, concerns and queries raised are fully documented; and
- Identifying all the significant issues associated with the proposed project

4.2 Public Participation Undertaken

In terms of the requirement of Chapter 6 of the EIA Regulations of December 2014, the following key public participation tasks are required to be undertaken:

- Fixing a notice board at a place conspicuous to the public at the boundary or on the fence of—
  - (i) the site where the activity to which the application relates is or is to be undertaken; and
  - (ii) any alternative site mentioned in the application;
- Giving written notice to:
  - (i) the owner or person in control of that land if the applicant is not the owner or person in control of the land;
  - (ii) the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
  - (iii) owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
  - (iv) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;
  - (v) the municipality which has jurisdiction in the area;
  - (vi) any organ of state having jurisdiction in respect of any aspect of the activity; and
  - (vii) any other party as required by the competent authority.
- Placing an advertisement in:
  - (i) one local newspaper; and

(ii) in at least one provincial newspaper.

- Open and maintain a register/ database of interested and affected parties and organs of state.

» Release of a Draft EIA Report for Public Review

» Preparation of a Comments and Responses Report which documents all of the comments received and responses from the project team.

In compliance with the requirements of Chapter 6 of the EIA Regulations, 2014, the following summarises the key public participation activities conducted to date.

4.2.1 **Stakeholder and land owner Identification**

Identification of I&APs was undertaken by Envirolution through existing contacts and databases, recording responses to site notices and the newspaper advertisement, as well as through the process of networking. The key stakeholder groups identified include authorities, local and district municipalities, public stakeholders, Parastatals and Non-Governmental Organisations (refer to **Table 4**).

Table 4: Key stakeholder groups identified during the EIA Process

Organisation	I&APs type	Designation	First Name Last Name
Department of Environment, Forestry & Fisheries		Biodiversity Directorate	Seoka Lekota
KZN Department of Economic Development, Tourism and Environmental Affairs.	Provincial Authority	EIA Coordinator:	Kacy Rengasamy
KZN Department of Economic Development, Tourism and Environmental Affairs (Zululand District Municipality)	Provincial Authority	Assistant Director: Environmental Impact Assessment Environmental Services	Sbusiso Ndwande
Ezemvelo KZN Wildlife	Provincial Authority	Conservation Planning	Nerissa Pillay/ Dinesree Thambu-Moodley
Department of Water & Sanitation (Pongola-Umzimkulu WMA)		Water Quality Management	Lwandle Sibango
Department of Water and Sanitation	Provincial Authority	Acting Deputy Director: Water Quality Management:	Mr Strini Govender.
Department of Agriculture, Forestry & Fisheries (DAFF)	Provincial Authority	Directorate: Forestry Regulations and Oversight	Wiseman Rozani Jeffrey Maivha Ayanda Mnyungula
KZN Department of Roads &Transport	Provincial Authority	Chief Director: TIRS: Ladysmith	Ms. B. Nogwanya
KZN Department of Roads &Transport	Provincial Authority	Manager : Road Infrastructure Develop & Management	Judy Reddy
KZN Department of Agriculture and Rural Development	Provincial Authority	Head of Department (personal assistant: Zakithi Mathenjwa)	Mr Siza Sibande

KZN Department of Cooperative Governance and Traditional Affairs	Provincial Authority	Head of Department	Mr T Tubane
KZN Department of Public Works	Provincial Authority		Xolile Ntanzi Meryl Naicker
KZN Provincial Heritage Authority (AMAFA)	Provincial Authority	Archaeology sites Impact Assessments Archaeology Permits	Bernadet Pawandiwa
KZN:COGTA (Zululand District)		DEPUTY DIRECTOR	
Zululand District Municipality	Local Authority	Development Planning Dept	Stefan Landman BP Mnguni
Zululand District Municipality	Local Authority	Municipal Manager:	SP Mosia
AbaQulusi Local Municipality	Local Authority	Municipal Manager:	Mr B. Ntanzi
AbaQulusi Local Municipality	Local Authority	Director: Development & Planning	Mr. S. Landman
AbaQulusi Local Municipality	Local Authority	Speaker Office	Mr. MB Khumalo PA: Nonkululeko Nzuza
AbaQulusi Local Municipality	Local Authority	Environmental officer Office	Ms Buyi Gumbi
AbaQulusi Local Municipality	Local Authority	Ward 1 Cllr	Cllr Thanduyise Zacheus Nkosi

4.2.2 **Stakeholder Database**

An I&AP's register was opened and maintained in terms of Regulation 42 and contains the names, contact details and addresses of:

i. all persons who, as a consequence of the public participation process conducted in respect of that application, have submitted written comments or attended meetings with the proponent, applicant or EAP;
ii. all persons who have requested the proponent or applicant, in writing, for their names to be placed on the register; and
iii. all organs of state which have jurisdiction in respect of the activity to which the application relates.

All relevant stakeholder and I&AP information has been recorded within a database of affected parties (refer to **Appendix E8**). While I&APs were encouraged to register their interest in the project from the onset of the process undertaken by Envirolution Consulting, the identification and registration of I&APs has been on-going for the duration of the BA process.

4.2.3 **Placement of Site Notices & Newspaper advertisement**

Site notices will be displayed in different points within the study area. Newspaper advertisement will be placed in two newspaper (local and regional) requesting Interested and Affected Parties (I&APs) to register, and submit their comments.

Proof is included in **Appendix E1 & E2**

4.2.4 Written notifications

A Background Information Document was produced and distributed during the initial PPP phase in March 2021 in the form of an email distribution to registered I&APs prior to the release of the Draft Report for review.

These are all included in **Appendix E2.**

4.2.5 Public Review of the Draft Basic Assessment Report

i. Stakeholder:
English and isiZulu Adverts were placed in two Newspapers notifying registered IAPs of the availability of the draft BAR. The draft BA Report was publicly made available to all registered I&AP's from from **31 August 2023 to 02 October 2023** at the following places:

- **Louwsburg Library**
- **Dropbox** link sent to registered I&APs via email
- **Email** copy of the BAR document (without appendices) sent to registered I&APs via email

ii. Authority: The Draft BA Report was sent to (amongst others):
- Department of Forestry, Fisheries and Environment (Biodiversity Directorate).
- KZN Department of Economic Development, Tourism and Environmental Affairs
- Department of Water and Sanitation
- Ezemvelo KZN Wildlife
- Zululand District Municipality
- AbaQulusi Local Municipality

4.2.6 Public consultation

In order to provide information regarding the proposed project and the BA process, a background information document (BID) for the project was compiled at the outset of the process. In order to accommodate the varying needs of stakeholders and I&APs within the study area, as well as capture their views, issues and concerns regarding the project, various opportunities will be provided in order for I&APs to have their issues noted. I&APs will be consulted through the following means:

- Written, faxed or e-mail correspondence
- Virtual meetings,
- One-on-one Telephonic consultation with directly affected or surrounding landowners;
- Focus Group Meetings will be held with different parties (i.e. landowner, local municipalities etc..) with limited number of participants in order to adhere to the current Level 1 Covid-19 safely measures.

Any minutes of meeting held will be captured within **Appendix E6**.

4.2.7 Comments and Responses Report

At the end of the announcement phase, all comments/input from stakeholders and I&AP's, will be captured in the Issues and Response Report (IRR) which formed part of the Final BA Report. The Comments and Response Report includes responses from members of the EIA project team and/or the project proponent. This is included in **Appendix E7.**

4.3 Summary of Issues Raised by I&AP's

Issues raised during the previous EIA Process: A draft Basic Assessment Report (DBAR) was **first released for public review in June 2021** for a 30-day public review period., Ezemvelo Wildflife raised the following Issues & concerns on the application:

1. **Correspondence dated 11 August 2021**: The applications as currently proposed have the potential to (1) have severe impacts on important biodiversity features (of particular concern are threatened avifaunal species and vegetation) and Protected Areas, and thereby negatively impact upon the province's conservation goals and targets, and (2) foreclose upon opportunities for securing critically important habitats for the purpose of biodiversity conservation. Given the above, it is strongly recommended that the DBAR be Rejected as:
   i. the DBARs have failed to appropriately assess the significance of the abovementioned impacts, particularly from a cumulative impact point of view and especially with regards to the cumulative visual impact upon Wilderness areas within a protected area;
   ii. insufficient/no effort has been made to assess appropriate alternatives, for example: the use of existing towers, alternative tower locations, several shorter towers, etc;
   iii. the proposed mitigatory measures are inappropriate and do not adequately safeguard critically important biodiversity, as further investigations are still required; and
   iv. the proposed mitigatory measures are considered weak, in that they are not specific and would result in a conditional authorisation (if authorised), as the outcomes of additional investigations are unknown. To propose further investigation of tower design and additional vegetation assessments after authorisation, as mitigation, is flawed, as different designs have different impacts to birds and the identification of more threaten plants could render the site fatally flawed. If these impacts are not known upfront it may have an impact on not only avifauna, vegetation and Protected Areas, but also the financial feasibility of the project and aviation safety.
2. Subsequently comment dated: 12 October 2021, Ezemvelo submitted further comments Louwsberg and Paulpietersberg Towers that:

   "*Ezemvelo cannot support any new disturbance and/or transformation within a Protected Area and therefore cannot condone the use of the Department of Public Works Site as proposed in Grace Mashabela's e-mail of 23 September 2021. In addition, due to the proposed tower height within the Louwsberg area (i.e. 70m) the tower will still require lights for aviation safety purposes and will therefore still pose a significant visual impact. It is therefore critical that alternative tower locations be identified and a revised viewshed analysis be undertaken to determine the extent of the visual impact into the wilderness areas of Ithala Nature Reserve (reference is made to Section 2, pg. 2 of our previous correspondence dated 11 August 2021 which highlights the critical importance of wilderness). Ezemvelo will only be in a*

position to make a final decision on these applications upon the receipt and review of alternative sites that have a significantly reduced impact on Ithala Nature Reserve and a revised viewshed analysis. Please be informed that the revised viewshed analysis must include a map which superimposes the extent of the visual impact over the wilderness zones within Ithala Game Reserve to allow for informed and defensible decision-making. However, please note that Ezemvelo will not be in a position to support any additional impacts into wilderness areas." Additional Comments: Do the unparalleled value and significance of wilderness, Eskom is urged to contact services providers/third parties for existing towers to develop site specific MoAs/MoUs that would address the concerns around sharing of towers, particularly with regards to emergencies and joint access. However please note that if taller towers are required at existing tower sites, the increased visual impact would have to be assessed (in the same manner as described above).

5 DESCRIPTION OF THE AFFECTED ENVIRONMENT

This section provides a description of the environment that may be affected by the proposed project, as stipulated in the EIA Regulations (Appendix 3 Section (h) iv). The requirement is that the description of the footprint should focus on the Geographical, physical, biological, social, economic, heritage and cultural aspects. The environmental specialist studies that were undertaken to inform this section of the BA Report and have focussed on significant environmental issues of the project.

5.1 Land use and Landcover

The study area has varied vegetation types and extends over densely vegetated riverine valleys, high lying grassland plateaus, ridges and cliff faces. The higher lying areas are typically Paulpietersburg Moist Grassland & Northern Zululand Mist belt grassland vegetation types. The lower laying areas consist of Swaziland Sour Bushveld, Northern Zululand Sourveld and Ithala Quartzite Sourveld (National vegetation types from Vegetation map for South Africa, Lesotho and Swaziland (2018)).

The study area is mostly in a pristine condition and is protected within the confines of the Ithala Nature Reserve. The nature reserve occupies approximately 30 000ha extending from the top of the Ngotshe Mountain to the north where it meets the Phongolo River. Louwsburg is a small town with a population of between 4000-5000 inhabitants, nestled along the eastern and southern foot slopes of the Ngotshe Mountain. Forestry, small scale crop cultivation and cattle farming occur along the southern outskirts of Louwsburg, and extend south of the R69.

Existing towers are present on the Ngotshe Mountain near the two locations for this project..Tourism is mainly supported by the Ithala Nature Reserve which occupies most of the northern and western part of the study area. Lookout points, 4x4 tracks, picknick sites and hiking trails are hosted inside the nature reserve and offer visitors expansive panoramic views and intimate encounters with fauna and flora. The Madaka Game Ranch and Sanyati Nature Farm is located south west of Ithala Nature Reserve, and east of Louwsburg, respectively. Both offer accommodation and nature experiences through game drives and hiking trails.

The study area can be divided into two categories namely the protected areas with its pristine natural character and high scenic value, and the rural area to the south which provides a mixed character of fragmented forestry, small-scale farming and the town of Louwsburg, all within a greatly varied landscape with lofty peaks, cliffs and ridges. In general, the study area provides picturesque views that is supported by dramatic topographic variation, large expanses of pristine natural vegetation and limited human development.

5.2 Screening Report

- **Proposed Development Area Environmental Sensitivity:** Screening has been undertaken on the DFFE website to determine the sensitivities of the locations for both substation options. According to the Screening Report for Substation Options attached as **Appendix G3**, Specialist assessments identified

Table 5 and 6 below shows the result of the Screening has been undertaken on the DFFE website to determine the sensitivities of the locations for both telecom radio site options.

Table 5: Environmental Sensitivities Identified for the **Proposed Site (Louwsberg CCS RS)**

Theme	Very High Sensitivity	High Sensitivity	Medium Sensitivity	Low Sensitivity
Agriculture Theme	X			
Animal Species Theme		X		
Aquatic Biodiversity Theme	X			
Archaeological and Cultural Heritage Theme				X
Civil Aviation Theme		X		
Defence Theme				X
Palaeontology Theme		X		
Plant Species Theme	X			
Terrestrial Biodiversity Theme	X			

Table 6: Environmental Sensitivities Identified for the **Alternative Site (Louwsberg DPW site)**

Theme	Very High Sensitivity	High Sensitivity	Medium Sensitivity	Low Sensitivity
Agriculture Theme			X	
Animal Species Theme			X	
Aquatic Biodiversity Theme				X
Archaeological and Cultural Heritage Theme				X
Civil Aviation Theme			X	
Defence Theme				X
Palaeontology Theme		X		
Plant Species Theme	X			
Terrestrial Biodiversity Theme	X			

- **Specialist assessments identified:** Based on the selected classification shown in Table 4 and the environmental sensitivities of the proposed development footprint, the following specialist assessments have been identified for inclusion in the assessment report (see **Table 7**).

Table 7: Specialist assessments identified by the screening tool

No:	Theme	Has this been undertaken? Yes ✔ /No (**X**)
1	Landscape/Visual Impact Assessment	✔
2	Archaeological and Cultural Heritage Impact Assessment	✔
3	Palaeontology Impact Assessment	✔
4	Terrestrial Biodiversity Impact Assessment	✔
5	Aquatic Biodiversity Impact Assessment	✔
6	Civil Aviation Assessment	**X**
7	Defence Assessment	**X**
8	RFI Assessment	**X**
9	Geotechnical Assessment	**X**
10	Plant Species Assessment	✔
11	Animal Species Assessment	✔

- **Site Verification Report:** A site verification report and motivation for the exclusions of any specialist studies identified by the screening tool in Table 7 is included in **Appendix G4.**

5.3 Biophysical Attributes/Features of the Study Area

Geographical features are man-made or naturally-created features of the Earth. Natural geographical features consist of landforms and ecosystems.

5.3.1 Climate

The Climate data was obtained from the national Land Type Survey (Turner et al, 1986). The climatic profile of the area can be described warm and temperate. The mean monthly rainfall is the highest in the months of February and November at 182 mm and lowest in the month of June at 17 mm of rainfall. About, 992 mm, or 85.37% of the annual average rainfall of 1162 mm falls in the summer growing season (September to March).

5.3.2 Topography and Geology

The natural topography is considered mountainous with large elevational variation ranging between 1400m and 400m. The Ngotshe Mountain is a prominent high point in the study area and is also the location of the tower sites. The topography slopes down in all directions, with an escarpment type drop towards the north where it meets the Phongolo (Pongola) River. Rivers and streams create deep depressions in the landscape, often producing high cliffs and lofty peaks (**Figure 6**).

The two tower sites are located on top of the Ngotshe Mountain, on the boundary of the Ithala Nature Reserve and near the town of Louwsburg. The Ngotshe Mountain is considered a prominent topographic feature which presents a picturesque backdrop to the Ithala Game Reserve and creates a cove in which Louwsburg is located. Due to the elevated location of the sites and the height of the proposed towers, it is expected to have an extended area of

potential impact. The varied topography will play a role in screening the tower and a medium screening potential is expected as is illustrated by the fractured visibility pattern.

According to the viewshed analysis for the CCS RS site, the visual exposure in the zone <2 km is mostly limited to the plateau on top of the Ngotshe Mountain with some visibility towards the south in the direction of Louwsburg. The zone between 2-5 km experiences a high degree of screening with partial visibility towards the west into the Ithala Nature Reserve. The elevated terrain to the southeast will experience a high degree of visual exposure but few visual receptors are located in this area. The zone between 5-7 km will have the potential of partial to full visual exposure, but the viewshed pattern is fractured. The Ithala Nature Reserve will experience a high potential for visual exposure, although the distance factor will cause a significantly reduced detectability.

The DPW site's viewshed is similar to the CCS RS towards the east and south, but a much greater visual exposure is expected in the west. The visibility pattern occupies a large area in the Ithala Nature Reserve from 1-8 km. In this zone there are no accommodation facilities but the Ngubhu Loop route crosses through this region. The Phuzamya view site is 6 km from the tower site and is expected to have full exposure, although the distance factor will significantly reduce detectability.

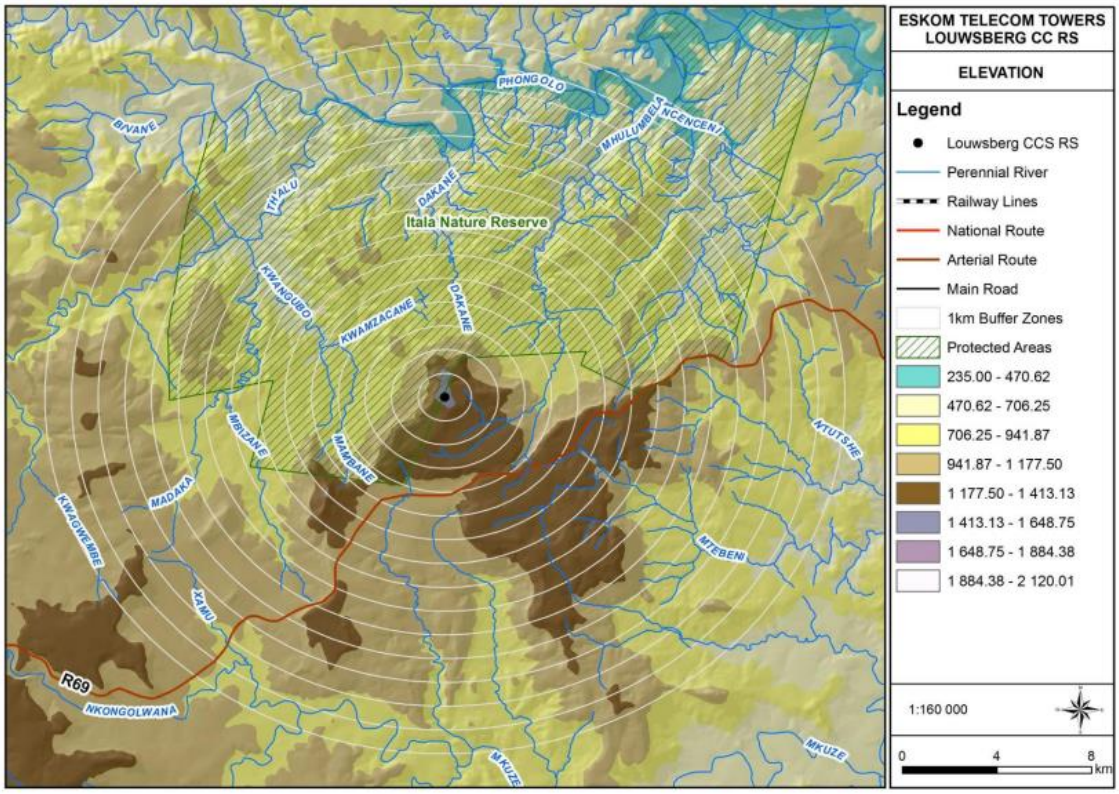

Figure 6: Regional elevation map

Large areas of the southern African continent are covered by the Karoo Supergroup (**Figures 7**). It covers older geological formations with an almost horizontal blanket. Several basins are present with the main basin in the central part of south Africa and several smaller basins towards Lebombo, Springbok Flats and Soutpansberg. An estimated age is 150 – 180 Ma. And a maximum thickness of 7000 m is reached in the south. Three formations overlie the Beaufort Group, they are the Molteno, Elliot and Clarens Formations. The Elliot Formation is also known as the Red Beds and the old Cave Sandstone is known as the Clarens Formation. At the top is the Drakensberg Basalt Formation with its pillow lavas, pyroclasts, etc. (Kent 1980, Snyman 1996). The Beaufort Group is underlain by the Ecca Group which lies on the Dwyka Group.

Figure 7: Geological Setting of the study area

5.3.3 Soils

The project site falls under the land class type Ac122 which comprises of red and yellow dystrophic and / or mesotrophic soils.

6.3% of soils under the Ac122 soil classification can be classified as Rocks, while 11% can be classified as Mispah (Ms10), 42.8% as Farningham Hu17, Balmoral Hu18 and 13.3% of soils under the Ac122 soil classification can be classified as Oatsdale (Cv16), etc.

The soils have clay content varying between 6% and 60% with the average clay content of the site at 35.3%. The soil depth of the area varies between 100mm and 1200mm with the average depth of the site at 843.9mm.

5.4 Water Resources of the study area

5.4.1 Drainage and River Setting

The **Louwsburg CCS RS** tower site is located on a flay topped plateau of Louwsburg Mountain. According to the national quaternary catchment dataset, the site is located within catchment W42H and thus is assumed to drain in a westward direction towards the eastern escarpment. However, in reality the site drains in an easterly direction towards the western escarpment edge. The plateau is located along the drainage divide between the Mbizane and Mhulumbela River catchments with the site located on the Mhulumbela River catchment (Quaternary Catchment W42J) (**Figure 8**). The Mhulumbela River is a right-bank tributary of the Phongolo River.

The **Louwsburg DPW tower site** is located on a plateau/ridge. According to the national quaternary catchment dataset, the site is located within catchment W42H that is drained by the perennial iThalu River. The plateau is located along the catchment divide between quaternary catchments W42J and W42H. Although according to the national dataset the site occurs within quaternary catchment W42H, upon interrogation of the contours available, the site occurs just within W42J and drains towards the east. The tower site and associated gentle to moderate slopes drain into a small ephemeral headwater stream located approximately 600m downslope and northeast of the tower. The ephemeral stream grades into a larger seasonal stream that ultimately drains into the Mhulumbela River which is a right-bank tributary of the Phongolo River.

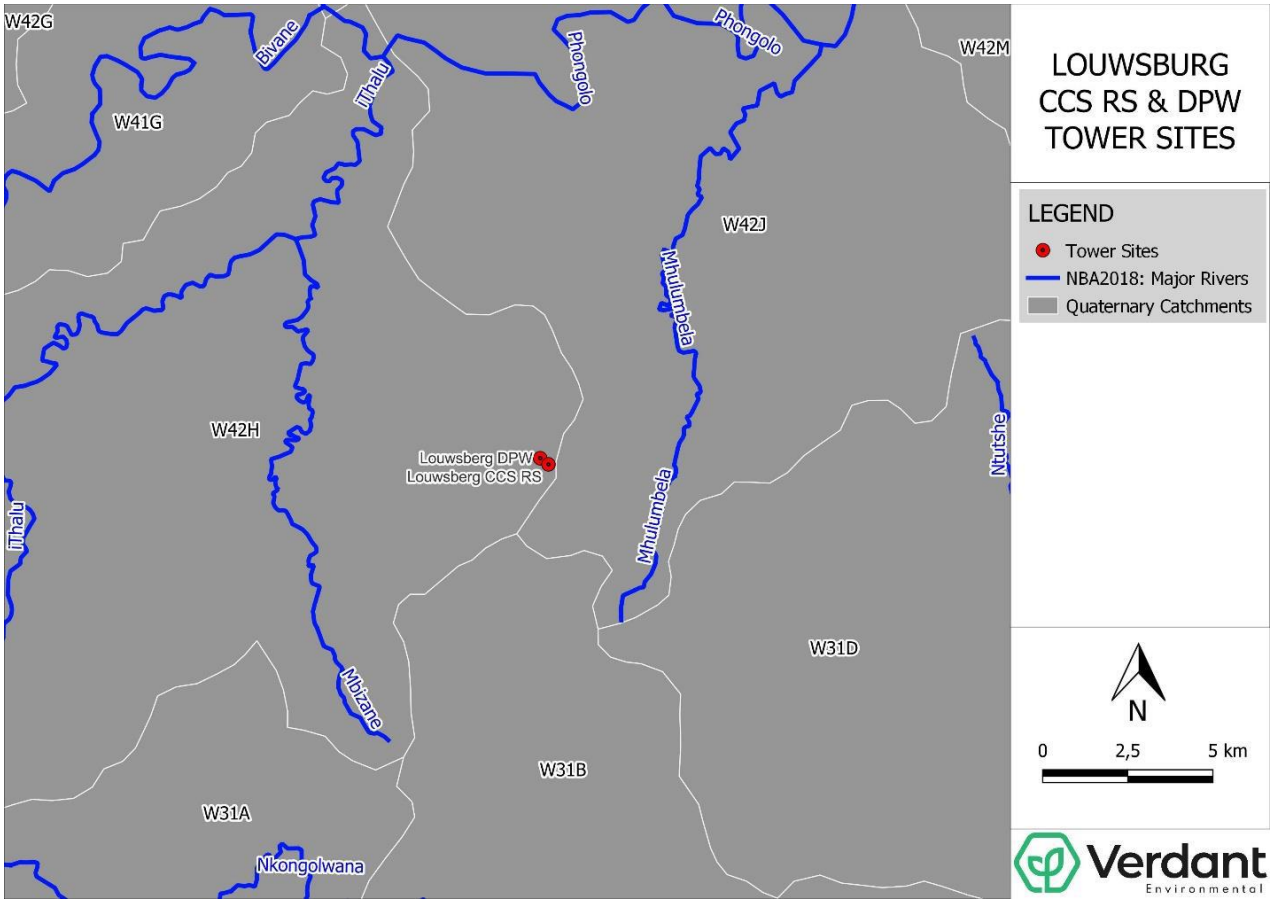

Figure 8: Drainage setting of the study area.

5.4.2 National Wetland Mapping

In terms of the National Wetland Map Version 5, no wetlands have been modelled to occur within a 3km radius the tower site. In terms of the National Freshwater Ecosystem Priority Areas (NFEPA) Project wetland inventory (CSIR, 2011), likewise no wetland has been modelled to occur within a 1km radius of the tower site.

5.5 Terrestrial Biodiversity

5.5.1 Vegetation

The vegetation is shown in National Vegetation Mapping (SANBI, 2018) as Northern Zululand Mistbelt Grassland (Mucina & Rutherford 2006, p. 417). The main occurrence is on the crests and slopes of the Ngome Mountain range, the Ngoje Mountain surrounding Louwsburg and smaller mountainous areas of Langkrans, KwaCeza, KwaNtimbankulu and Nhlazatshe. These authors describe it as comprising: "Gentle to steep upper slopes of mountains formed by hard dolerite dykes dominated by relatively forb-rich, tall sour Themeda triandra grasslands." The threat status of this vegetation type is Endangered (Skowno et al. 2018) and it is poorly protected.

5.5.2 Conservation Context:

A summary of the conservation planning and threat status of the ecological features in the study area is provided in **Table 8 and 9**. Noteworthy features include:

- The terrestrial vegetation type of the study area, Northern Zululand Mistbelt Grassland, is currently listed as **Endangered** in the NBA (SANBI, 2018).
- The sub-quaternary catchment within which the study area is located is classified as a **River FEPA** (CSIR, 2011).

- The site and a 100m radius have been earmarked as **Critical Biodiversity Area3: Optimal** and an **Ecological Support Area (ESA)** in the KZN Terrestrial Systematic Conservation Plan (EKZNW, 2015). No important flora or fauna have been flagged for the CBA.
- The centre point of the site is approximately 80 metres east of the boundary of the **Ithala Game Reserve**.
- The Ithala Game Reserve is an **Important Bird area (IBA)**.

Table 8:. Key conservation context details for the study area associated with Louwsburg CCS site

NATIONAL LEVEL CONSERVATION PLANNING CONTEXT				
Conservation Planning Dataset		**Relevant Conservation Feature**	**Conservation Planning / Threat Status**	**Location in Relation to Project Site**
National Freshwater Ecosystem Priority Areas (NFEPA) (CSIR, 2011)	Rivers	**Catchment Planning Unit 2546**	River FEPA	n/a
2018 National Biodiversity Assessment (SANBI, 2018)	Terrestrial	**Northern Zululand Mistbelt Grassland**	Endangered	Entire study area
	Rivers	**Mhulumbela River**	Endangered	850m east of the site
PROVINCIAL AND REGIONAL LEVEL CONSERVATION PLANNING CONTEXT				
Conservation Planning Dataset		**Relevant Conservation Feature**	**Conservation Planning Status**	**Location in Relation to Project Site**
KZN Aquatic Systematic Conservation Plan (EKZNW, 2007)		Planning Unit 1519	Available	Entire project site
KZN Terrestrial Systematic Conservation Plan (EKZNW, 2015)		CBA: Optimal	CBA: Optimal	Eastern half of study area
		ESA	ESA	Western half pf study area

Table 9:. Key conservation context details for the study area associated with Louwsburg DPW site

NATIONAL LEVEL CONSERVATION PLANNING CONTEXT				
Conservation Planning Dataset		**Relevant Conservation Feature**	**Conservation Planning / Threat Status**	**Location in Relation to Project Site**
National Freshwater Ecosystem Priority Areas (NFEPA) (CSIR, 2011)	Rivers	Catchment Planning Unit 2397	FEPA Catchment	Entire study area
2018 National Biodiversity Assessment (SANBI, 2018)	Terrestrial	Northern Zululand Mistbelt Grassland	Endangered	Entire study area
	Rivers	Mhulumbela River	Least Threatened	±5.6km downstream
PROVINCIAL AND REGIONAL LEVEL CONSERVATION PLANNING CONTEXT				
Conservation Planning Dataset		**Relevant Conservation Feature**	**Conservation Planning Status**	**Location in Relation to Project Site**
KZN Vegetation Map Threat Assessment (Jewitt, 2018)		Northern Zululand Mistbelt Grassland	Vulnerable	Entire study area
KZN Aquatic Systematic Conservation Plan (EKZNW, 2007)		Planning Unit 1519	Available	Entire project site
KZN Terrestrial Systematic Conservation Plan (EKZNW, 2015)		CBA: Optimal	CBA: Optimal	320m east of the project site
		ESA	ESA	50 – 100m surrounding the project site.

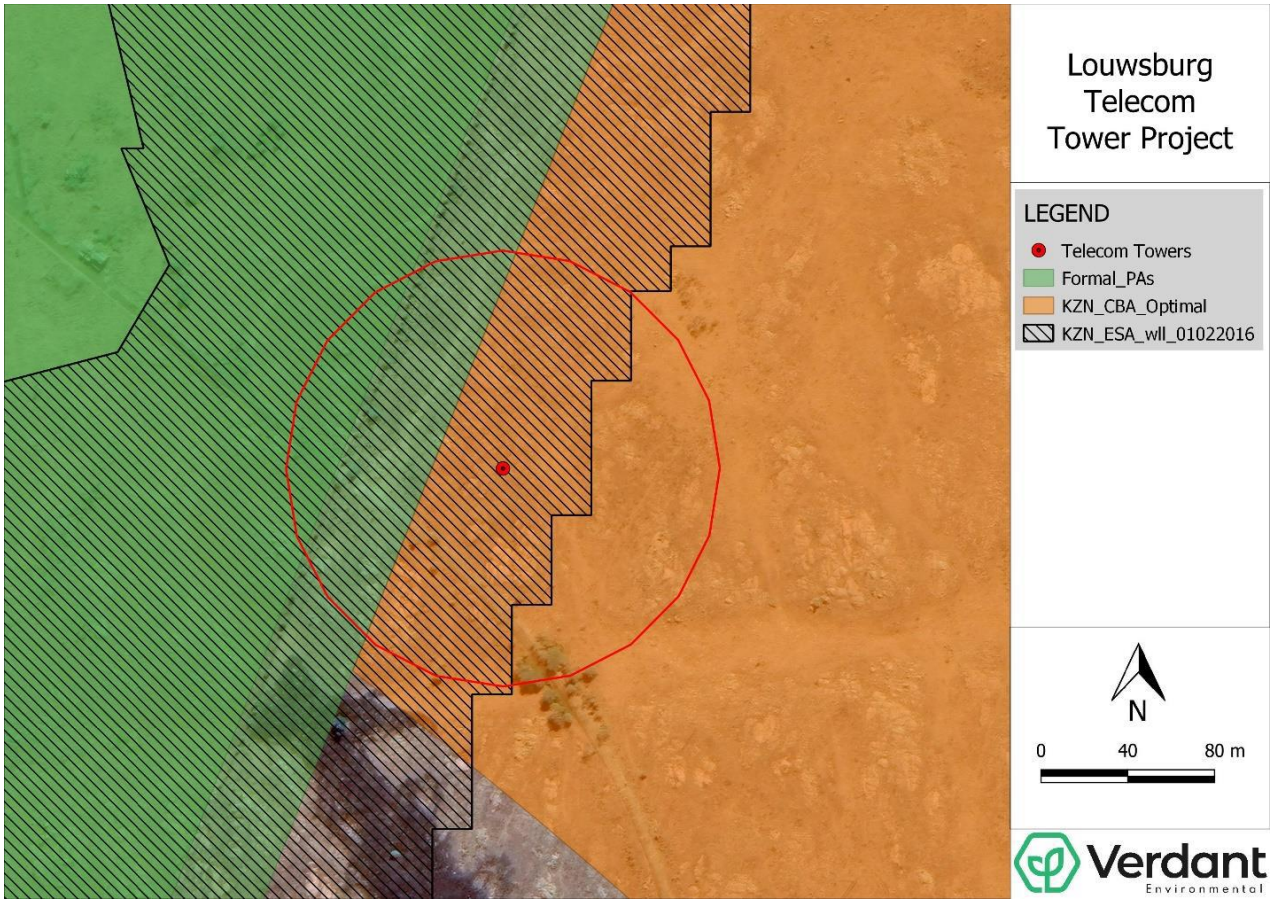

Figure 9: KZN terrestrial systematic conservation plan (SCP) CBAs in relation to the Louwsburg CCS site.

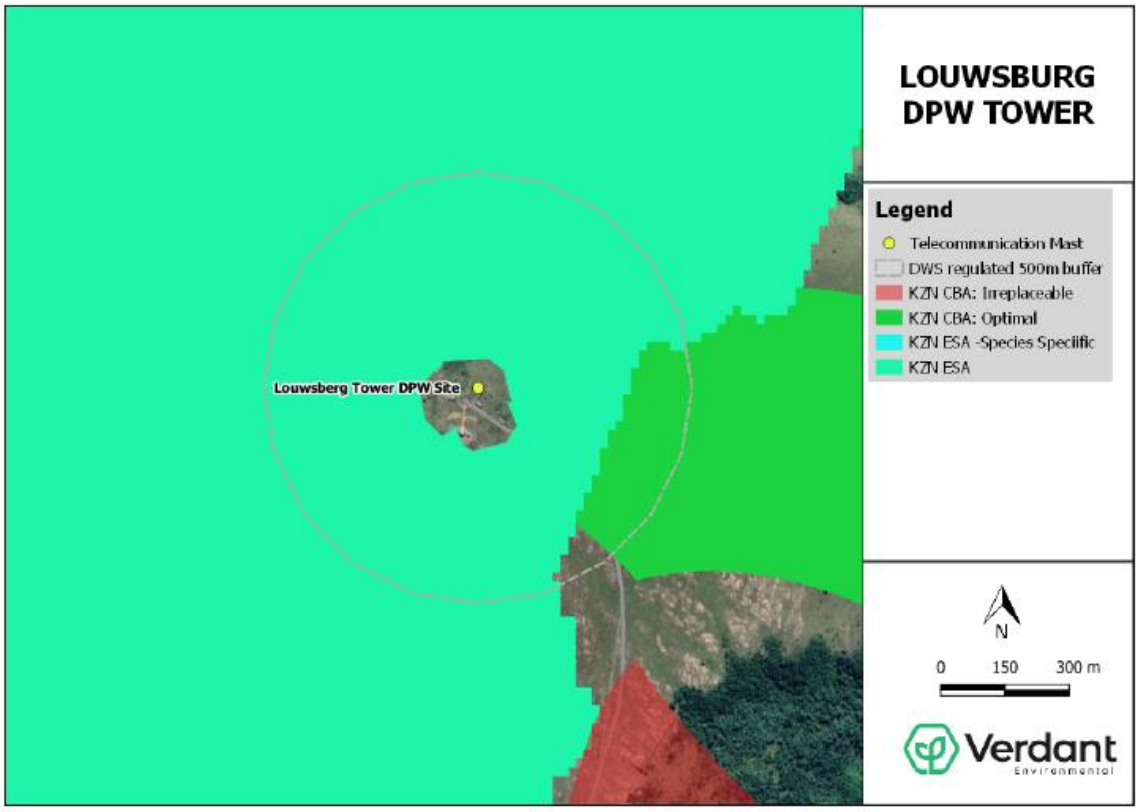

Figure 10: KZN terrestrial systematic conservation plan (SCP) CBAs in relation to the Louwsburg DPW site.

5.5.3 Description of Vegetation:

Louwsburg CCS RS Tower: Disturbed primary grassland representative of the Northern Zululand Mistbelt Grassland type was identified onsite. The centre point of the site is approximately 80 metres east of the boundary of the Ithala Game Reserve (**Figure 11**), which is demarcated by a game proof fence. Outside the fence, grassland appears to have suffered severe grazing impacts and *Themeda triandra* is not a significant component of the grass cover. While it has evidently suffered a reduction in herbaceous species richness, many species still occur upon and on the edges of extensive rock outcropping.

A small number of a *Moraea*, possibly *Moraea graminicola* subsp. *graminicola* (<10) (Near Threatened), not in flower, were seen within 20 metres of the centre point of the footprint. Again, it will only be possible to confirm the identity of the plants when they flower from spring. Due to autumn conditions, this site deserves further follow-up earlier in the summer window as it could potentially still host other species of conservation concern. The location of all protected and red listed species within 100m of the tower site are shown in Figure 11 below and noteworthy species discussed are shown in **Figure 12** below.

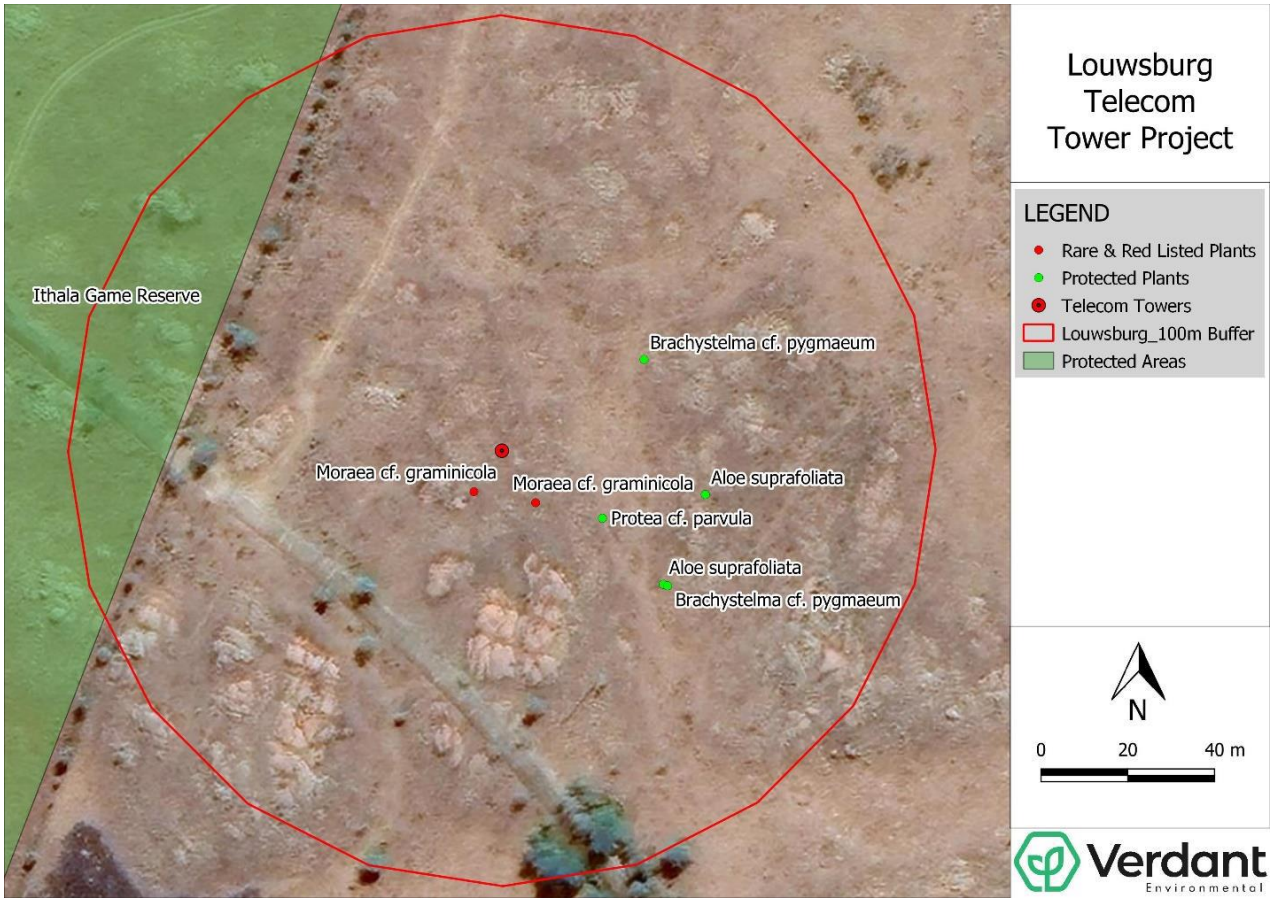

Figure 11: Protected plants within 100m of the Louwsburg CCS RS Tower

Overview of the grassland and dolerite outcrops at the tower site.

Photo of *Aloe suprafoliata* at the site.

Photo of Anisotoma peducularis at the site.

Photo of unidentified *Brachystelma* at the site.

Photo of Selago barbula at the site.

Figure 12: Noteworthy species at Louwsburg CCS RS Tower

Louwsburg DPW site: The site comprised Northern Zululand Mistbelt grassland, an Endangered Vegetation Type and Ecosystem Type, which at least in good condition is associated with a number of endemic and threatened species, some of which are also indicated by the National Screening Tool. Rare and endemic species continue to be described from this vegetation type, such as *Ceropegia heidukii* (Critically Endangered) (Styles *et al.* 2021) and *Ceropegia stylesii* (Heiduk *et al.* 2023).

The area in which the mast is proposed is close to existing infrastructure and this includes abandoned buildings in various states of disrepair. These historical features and associated activity around appear to have created some disturbance for a distance which extends into the site. As a result, there have been some changes in species composition within the affected area in the form of over expression of some scrubby or weedy species, but in which some herbaceous plant diversity persists (**Figure 13**).

With some management, it should be possible to rehabilitate this grassland to better condition, approximating the condition of grassland seen at a further distance on this plateau. The cliff edges, which are approximately 100m or slightly more than 100 metres away from the mast centre point, also host a distinctive flora in excellent condition including a number of succulents

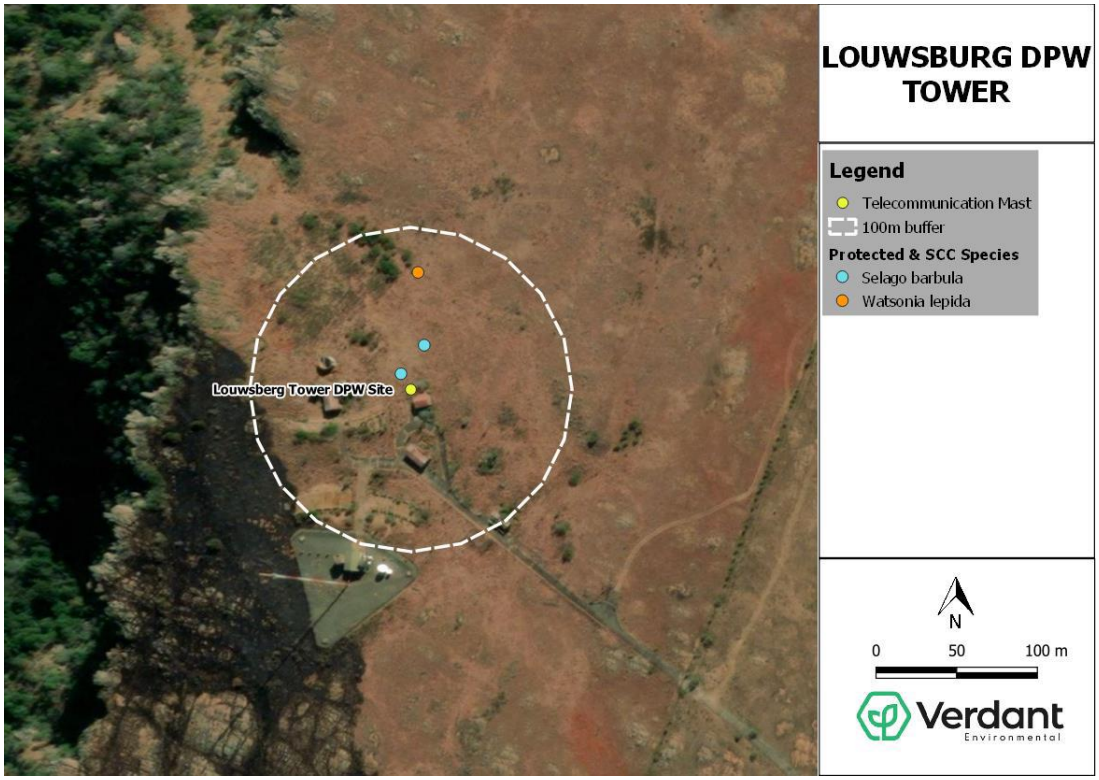

Figure 13: Protected plants within 100m of the Louwsburg DPW tower site

On the left a photo of Selago barbula which is a south African endemic with a limited distribution and on the right a photo of Aloe suprafoliata which is a protected species at the Louwsburg mast site (Option 1)  ..	View at Louwsburg mast site (Option 1) looking west across shallow rock outcrops. 
View of Louwsburg DPW mast site (Option 2) looking south towards existing derelict buildings in the background. 	View of Louwsburg DPW mast site (Option 2) looking north-east towards the open grassland on the plateau in the background. 

Figure 14: Noteworthy species at the Louwsburg DPW site:

5.5.4 Rare, Threatened and Protected Species

Red Listed Species:

Louwsburg CCS RS Tower: Plants resembling *Moraea graminicola* subsp. *graminicola* were identified that are listed as Vulnerable. The populations at the sites are small (approximately 10 plants at each site) and there are a greater number outside any disturbance footprint. Furthermore, *Moraea* species are avoided by cattle, especially *Moraea graminicola* subsp. *graminicola*, and are likely to persist in spite of heavy grazing. The main reason for red listing appears to be habitat transformation, particularly commercial forestry and small-scale farming. In addition, several potentially rare and noteworthy species were encountered that included:

- • Selago barbula
- • An extensive population of *Anisotoma peducularis*
- • An unidentified species of *Syncolostemon*.

Louwsburg DPW Tower: Although no species of conservation concern were seen in the footprint area, due to vegetation type, its good quality further away, protection from grazing, and known historical occurrence in the area, the likelihood of occurrence of at least some species listed as Sensitive Species in the National Screening Tool on this plateau, beyond the footprint is likely. Examples are: *Dierama erectum* - Endangered, *Dracosciadium italae* - Vulnerable, *Lotononis amajubica* – Rare and *Protea comptonii* - Vulnerable.

Orange Category Species:

Louwsburg CCS RS Tower: These species are not in higher threat categories such as Critically Endangered, Endangered or Vulnerable. They are in the broad category of Least Concern, but populations are considered to be Declining. This is mainly because of medicinal collection.
Protea cf. *parvula* is listed as Near Threatened.
Although not seen, there is a good possibility of *Boophone disticha* occurring. This was not seen, but occurs in small numbers in many grasslands in eastern South Africa. It is likewise Declining, due to medicinal over-exploitation.

Louwsburg DPW Tower: No Orange Category species

Protected Species: A number of species at the sites are protected by provincial conservation legislation. These all require a permit from Ezemvelo KZN Wildlife before they can be disturbed, or relocated. The species are as follows, ordered by plant family.

- *Brachystelma* cf. *pygmaeum* (2 plants seen). Plants cannot be certainly identified until in flower. *B. pygmaeum* is spring flowering.
- Aloe suprafoliata
- *Moraea graminicola* subsp. *graminicola*
- *Protea* cf. *parvula*

At the Louwsburg DPW Tower *a Watsonia lepida* was encountered within 100m of the mast site (**Figure 13**), Therefore, a permit from Ezemvelo KZN Wildlife will be required before any plants on site can be disturbed, or relocated.

5.6 Fauna

5.6.1 Site Characteristics and Habitat Description:

Louwsburg CCS RS Tower: The study area falls within the Grassland Biome5. The site is largely flat and sits upon a rocky outcrop. The area is sparsely vegetated and dominated by numerous rocks that offer refuge to number of small faunal species (**Figure 14**). Only one major habitat unit is found onsite, namely rocky outcrop. The site borders on Ithala game reserve. The major habitat units observed onsite are presented below (**Figure 15**).

Figure 15: Habitat units identified at the Louwsberg telecommunication site.

Figure 16: Rocky habitat present at the Louwsberg site.

Louwsburg DPW Tower: The proposed footprint area and part of the surrounding 100m buffer to the south of it, has previously been transformed, and contains structures and some secondary vegetation, and is considered of low value for fauna. North of this, the remainder of the buffer area, and beyond this, supports rocky grassland in good condition, and is considered of high value for fauna.

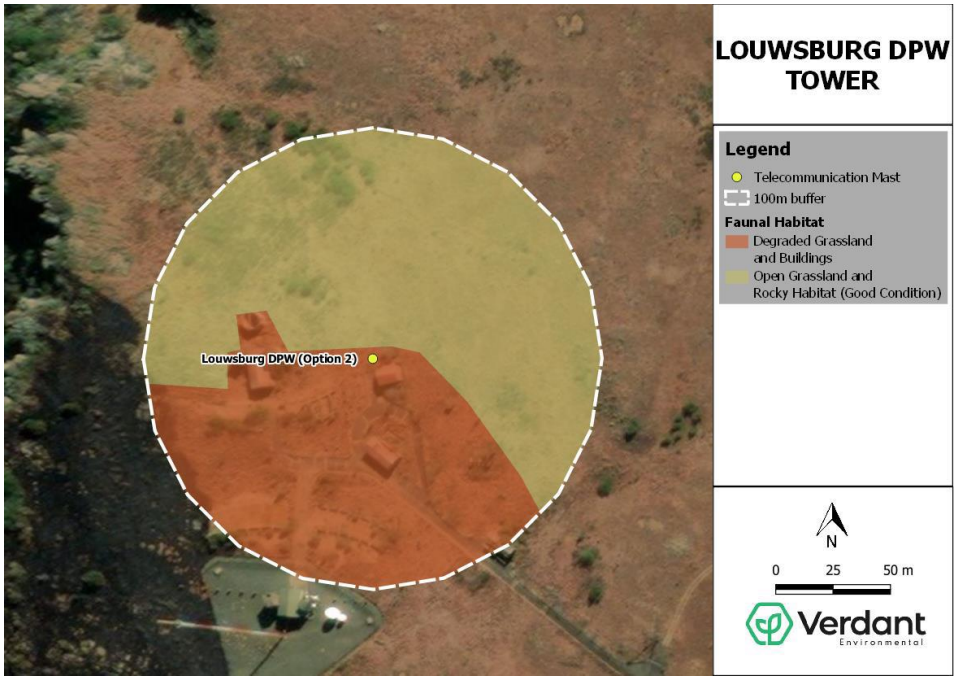

Figure 17: Habitat units identified at the Louwsburg DPW mast site

5.6.2 Mammals

of the 86 terrestrial mammal species known to occur in the region, 19 are Red List species - three are Endangered, ten are Near Threatened and six are Vulnerable. None of these species, nor any evidence of these, were noted during the

site visit. Given the proximity of the study area to the Ithala Game Reserve, it is likely that the majority of these species were recorded within this protected area. Each Red List species, their conservation status, and their likelihood of occurrence within the study area is presented in Table 10 & 11 **of Appendix 2**.

5.6.3 Reptiles

Due to the rocky nature of the site, which offers a range of crevices in which to take refuge, it is anticipated that a range of reptile species will occur onsite. None of the 63 species recorded in the region are Red List species.

5.6.4 Amphibians

Due to the lack of aquatic habitat onsite, it is unlikely that the site is of major importance for amphibian species.

5.6.5 Invertebrate Diversity

Although an extensive invertebrate study was not undertaken at the site, it was noted that there was a moderate invertebrate diversity present. Most invertebrates observed onsite were Orthoptera. No species of Diplopoda were observed, although suitable habitat is present for such species.

5.7 Avifauna

The planned locations of the proposed Louwsberg tower alternatives (Louwsberg DPW and Louwsberg CCS RS) are on the summit plateau of a hill just west/northwest of Louwsburg town. These two sites were visited on 3 May 2023. The DPW site was found to already support a tall, lattice tower with six long lateral support cables (**Figure 18**). It was noted that a single bird diverter 'flapper' was attached to one of the support cables, with perhaps the remnants of the attachment's points of up to five other such devices attached to the other five support cables. The surrounding habitat comprises open high-altitude natural grassland.

Figure 18: The existing lattice tower at the Louwsberg DPW site

The weather conditions during this visit were partially misty with very low cloud at times. Figure 18 shows two photographs taken during the visit showing how the existing tower, relatively conspicuous when viewed under clear conditions, became far less obvious when mist/low cloud obscured the tower, especially as relates to the lateral support cables.

The surrounding habitat comprises open high-altitude natural grassland at both the DPW and CCS RS sites (**Figure 19**), although the vegetation at the former site inside the protected area is in a better condition that that at the latter site outside the reserve.

Figure 19: The open high-altitude natural grassland characteristic of both the Louwsberg DPW and CCS RS sites.

Both of the existing Louwsberg tower sites have powerlines routed into them (**Figure 20**). Bird markers are not fitted to these lines but it was noted that raptor protector devices to avoid electrocution hazard to birds perched on the poles are fitted to some the wooden pylons entering the nature reserve area.

Figure 20: The powerline routed into the Louwsberg CCS RS site.

Southern African Bird Atlas Project 2 information

Bird atlas data for the pentad 2730_3115 was extracted from the online resource of the Southern African Bird Atlas Project 2 (SABAP2, see: https://sabap2.birdmap.africa/). A pentad covers an area of 5 mins X 5 mins resolution, i.e. about 9 X 8 km. Both of the proposed tower options, Louwsberg DPW and Louwsberg CCS RS, are situated within this pentad. A total of 309 bird species have been recorded in the pentad (**Error! Reference source not found.**) from a total of 105 cards, a high level of coverage likely related to the main rest-camp of Ithala Game Reserve occurring in this pentad, with the surrounding pentads having much lower levels of coverage.

Red Data species

A total of 309 bird species has been recorded during SABAP2 in the relevant pentad covering the proposed Louwsberg DPW and Louwsberg CCS RS tower options (as well as the apparently not technically feasible Louwsberg Tower Alt). Twenty of these are Red Data species (**Table 10**).

Table 10[2]:. Details of the 20 Red Data bird species that have been recorded in the relevant pentad during SABAP2 relative to the proposed Louwsberg DPW and Louwsberg CCS RS tower options

Common name	Scientific name	Full protocol reporting rate (%)	Ad hoc reporting rate (%)	Red Data status nat./glob.
Bateleur	*Terathopius ecaudatus*	3.8	0.0	EN, EN
Blackcap, Bush	*Sylvia nigricapillus*	2.9	0.0	VU, VU
Bustard, Denham's	*Neotis denhami*	1.9	0.0	VU, NT
Crane, Blue	*Grus paradisea*	30.5	20.0	NT, VU
Eagle, Crowned	*Stephanoaetus coronatus*	9.5	8.6	VU, NT
Eagle, Martial	*Polemaetus bellicosus*	7.6	5.7	EN, EN
Eagle, Tawny	*Aquila rapax*	8.6	0.0	EN, VU
Eagle, Verreaux's	*Aquila verreauxii*	32.4	22.9	VU, LC
Falcon, Lanner	*Falco biarmicus*	25.7	0.0	VU, LC
Harrier, African Marsh	*Circus ranivorus*	1.9	0.0	EN, LC
Harrier, Black	*Circus maurus*	1.0	0.0	EN, EN
Ibis, Southern Bald	*Geronticus calvus*	10.5	0.0	VU, VU
Kingfisher, Half-collared	*Alcedo semitorquata*	2.9	0.0	NT, LC
Korhaan, White-bellied	*Eupodotis senegalensis*	11.4	2.9	VU, LC
Pipit, Yellow-breasted	*Anthus chloris*	1.0	0.0	VU, VU
Secretarybird	*Sagittarius serpentarius*	55.2	34.3	VU, EN
Swallow, Blue	*Hirundo atrocaerulea*	1.0	0.0	CR, VU
Vulture, Cape	*Gyps coprotheres*	7.6	2.9	EN, VU
Vulture, Lappet-faced	*Torgos tracheliotos*	2.9	0.0	EN, EN
Vulture, White-backed	*Gyps africanus*	14.3	8.6	CR, CR

Of these 20 Red Data species, 16 are large birds that are vulnerable to collisions in flight with artificial structures, especially overhead cables. These species are: Bateleur, Denham's Bustard, Blue Crane, Crowned, Martial, Tawny and Verreaux's eagles, Lanner Falcon, African Marsh and Black harriers, Southern Bald Ibis, White-bellied Korhaan, Secretarybird and Cape, Lappet-faced and White-backed vultures.

The reporting-rate information (Table 10), however, suggests that the following five species are rare in this area and likely only vagrants (reporting rates less than 5%): Bateleur, Denham's Bustard, African Marsh and Black harriers, and Lappet-faced Vulture. Five species show relatively high reporting rates (14-55%) and are thus relatively common in these pentads: Secretarybird, Verreaux's Eagle, Blue Crane, Lanner Falcon and White-backed Vulture.

5.8 Cultural Heritage Aspects of the area

5.8.1 Heritage Aspect

- **Stone Age period:** Over time the amount of exchange items seems to decline, as is evidenced form the material recovered from the various shelters that Mazel excavated. This is seen as symptomatic of a society beginning to

[2] Red Data status (nat. – national, glob. – global): CR = Critically Endangered, EN = Endangered, VU = Vulnerable, LC = Least concern.

experience a greater level of stability, where they need not to invest so heavily in servicing extended social relations. However, a parallel increase and intensifying in ritual activity can also be seen during this time.

- **Iron Age period:** The Hluhluwe area was originally a royal hunting ground for the Zulu kingdom, but was established as a park in 1895. The Umfolozi and Hluhluwe reserves were established primarily to protect the white rhinoceros, then on the endangered species list.
- **Historic period:** After the annexation of Natalia by the British in 1843, many of these early white settlers left the area and moved onto the central plateau area to settle in what was to become the Orange Free State Republic and the South African Republic (ZAR). Rev. Aldrin Grout started the Inkanyeza Mission in April 1841. This first white settlement in the area was abandoned during tribal hostilities fifteen months later. White settlers returned in 1851 when the Norwegian mission was established and by 1894 the lower Umfolozi Magistry was established in Empangeni which was becoming an active trading centre.
- **Site specific review**: The area in which the development of the RS towers will take place can be described as a very slowly evolving farming landscape. Change that was brought about was an expansion from grazing to larger agricultural fields. Over time, the number of built features, mostly homesteads, expanded into small villages. Old maps and aerial photographs indicate that the site where the tower is to be constructed was always vacant and used as agricultural fields. This would effectively have destroyed much of any archaeological remains that might have occurred here in the past.

5.8.2 Palaeontological overview of the area:

The Ecca Group, Vryheid Formation may contain fossils of diverse non-marine trace, *Glossopteris* flora, mesosaurid reptiles, palaeoniscid fish, marine invertebrates, insects, and crustaceans (Johnson 2009). *Glossopteris* trees rapidly colonised the large deltas along the northern margin of the Karoo Sea. Dead vegetation accumulated faster than it could decay, and thick accumulations of peat formed, which were ultimately converted to coal. It is only in the northern part of the Karoo Basin that the glossopterids and cordaitales, ferns, clubmosses and horsetails thrived (McCarthy and Rubidge 2005).

The Glossopteris flora is thought to have been the major contributor to the coal beds of the Ecca. These are found in Karoo-age rocks across Africa, South America, Antarctica, Australia and India. This was one of the early clues to the theory of a former unified Gondwana landmass (Norman and Whitfield 2006).

Fossils are generally absent from the Pietermaritzburg Formation although trace fossils have been recorded from the upper layers (AMAFA Palaeotech).

Trace fossils are relatively abundant in the shales occurring near the top of the Dwyka Group. Lycopods (*Leptophloem australe*) have been described from the northern Free State (Mac Rae 1999). Spores and acritarchs have been reported from the interglacial mudrocks of the Dwyka Group, also pollen, wood, and plant remains in the interbedded mudrocks as well as the diamictite itself, while anthropod trackways and fish trails are present in places on bedding planes (Visser *et al.* 1990).

Fossils in South Africa mainly occur in rocks of sedimentary nature and not in rocks from igneous or metamorphic nature. Therefore, if there is the presence of Karoo Supergroup strata the palaeontological sensitivity is generally **LOW** to **VERY HIGH**.

5.9 Visual Characteristics of the area

5.9.1 Sense of Place

The sense of place is largely dictated by the predominantly natural character of the study area and the great elevational differences that provides variation in vegetation types and ultimately contributes to a distinct observer experience. Town and settlement developments are unpretentious and nestled between the mountains. Large areas are still considered natural, and views of high scenic quality is experienced in the study area.

5.9.2 Study Area Photographic Record

As shown in **Figure 21**

- Panoramic view (1): This photograph is taken on top of the Ngotshe Mountain plateau overlooking the Ithala Nature Reserve. This is close to the Horace Rall lookout point and the proposed tower sites. In the foreground is the Louwsburg Cemetery and the middle ground is an existing telecommunication radio tower at the end of the paved road. This photo illustrates the topographical variation and the large drop towards the Phongolo River.
- Panoramic view (2): This photo is taken from the entrance road to Louwsburg. It illustrates the farming activities in the foreground and Ngotshe Mountain horizon line in the background. Existing towers are located on two sites on the Ngotshe Mountain indicated with the green arrows. The existing towers on the ridgeline are indicated by green arrows and also indicate the location of the two alternative sites. The lefthand arrow points to alternative 2 site and is already occupied by two towers. The righthand arrow points to alternative 1 site which also has a telecommunication radio tower.
- Panoramic view (3): This photo indicates the two existing towers near alternative 2 site. It also shows the landscape character on top of the Ngotshe Mountain.
- Panoramic view (4): This photo shows the town of Louwsburg nestled in the southern foot slope of the Ngotshe Mountain. The two towers at alternative 2 site are located on the left.
- Panoramic view (5): This photo shows the town of Louwsburg nestled in the southern foot slope of the Ngotshe Mountain. The two existing towers indicated by the lefthand arrow in Figure 10 are located on the left.

Panoramic view (1)

Panoramic view (2)

Panoramic view (3)

Panoramic view (4) and (5)

Figure 21: Study Area Photographic Records

5.9.3 Viewshed Analysis

Several views were assessed during the site investigation as illustrated in **Figure 21.** In addition, visibility mapping through a Geographical Information System (GIS) software is also done to determine a preliminary Zone of Visual Influence (ZVI). The mapping indicates the extent of the potential ZVI based on the topography alone, thereby not considering the screening effect of vegetation or other anthropogenic elements. It calculates a cumulative viewshed for a series of Project points stacked at 10m vertical intervals, on the tower location. It presents a coloured map where red indicates the areas that could experience a full view of the entire tower. The colours change as the tower is partially screened, usually from the bottom up. Only the top is visible from the light red areas.

The conclusion is that the study area generally provides a high degree of screening from certain locations if only the topography is considered. The landcover, for example plantations and other natural or anthropogenic features, do provide an additional screening capacity from specific locations. One can assume that the dense vegetation cover on the lower lying areas of the Ithala Nature Reserve will provide additional screening, as will the forested areas to the south.

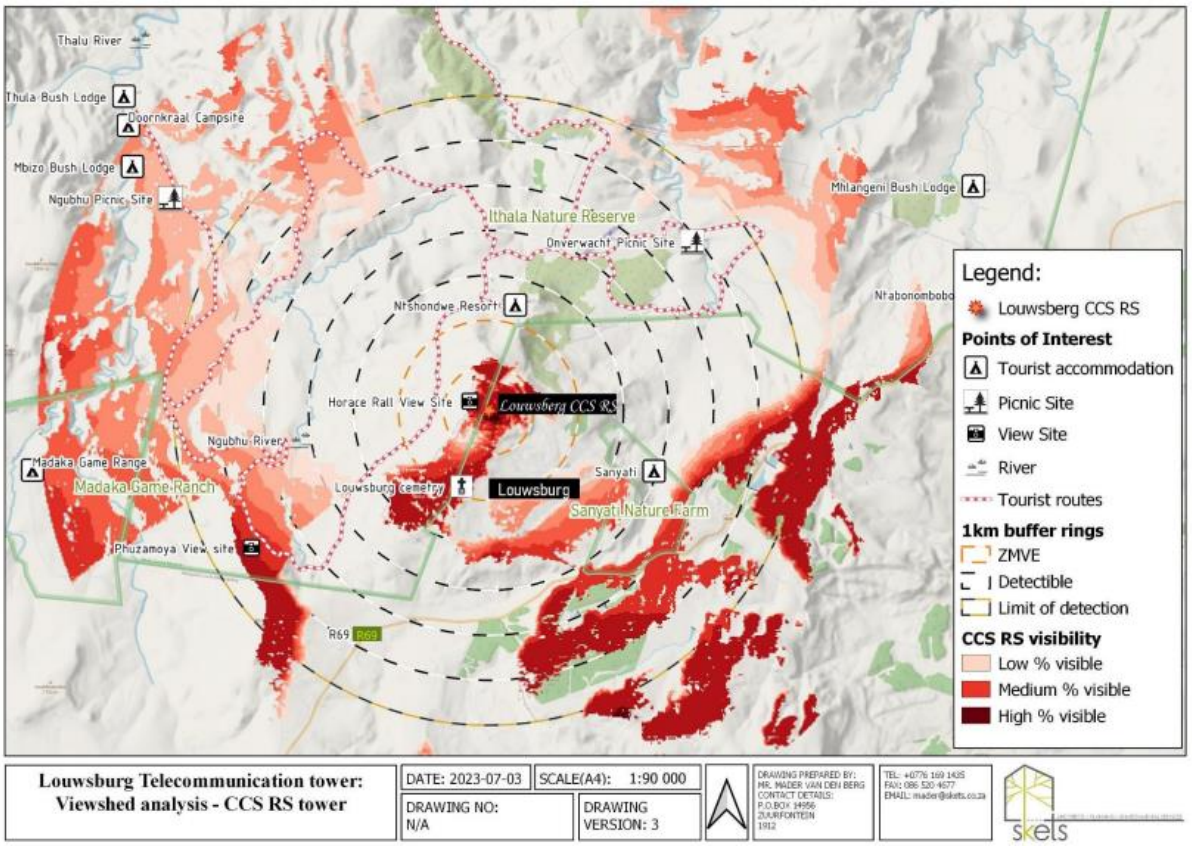

Figure 22: Viewshed map-CCS RS tower site

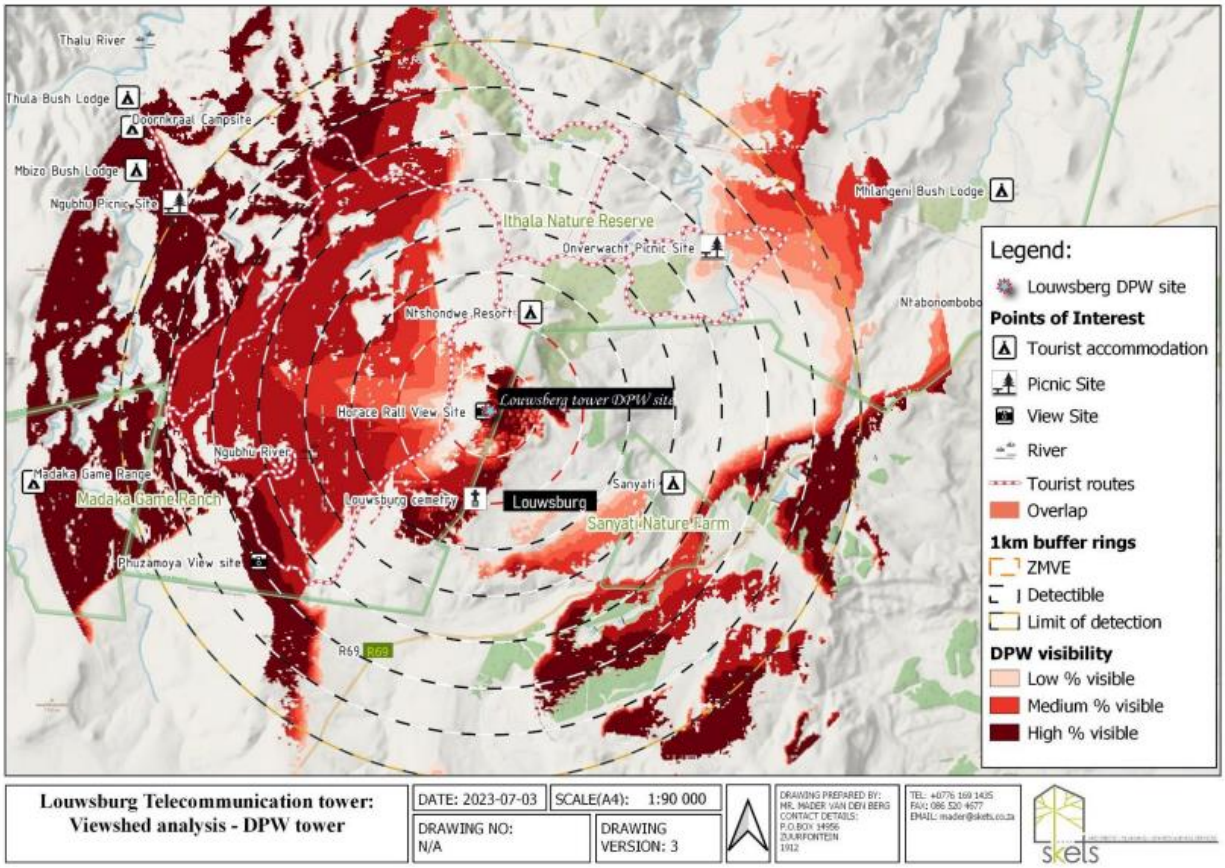

Figure 23: Viewshed map-DPW tower site

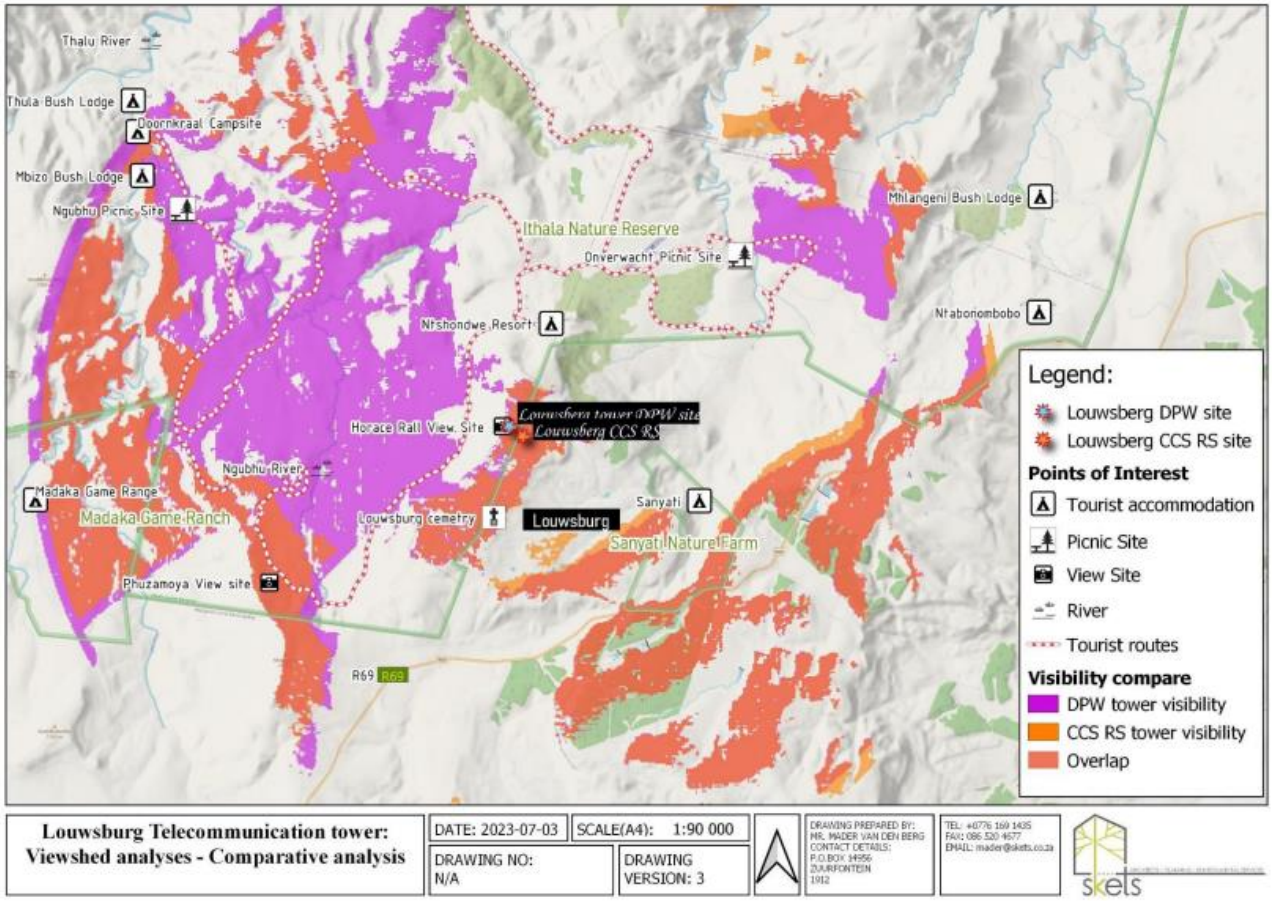

Figure 24: Comparative viewshed overlay

5.10 Social Characteristics of the Study Area and Surrounds

General

Abaqulusi Municipality is approximately 4 185 km² in extent with Vryheid being the main hub of the Municipality. Abaqulusi is made up of the following main areas: Vryheid, Louwsburg, Hlobane, Coronation, eMondlo, Bhekuzulu, Swart Mfolozi, Enyathi, etc., and consists of 22 wards and 436 rural settlements/villages. The Municipality is traversed by the regional routes, R 33 the north, the R 69 to the east and the R 34 to the west and south-east. These regional routes connect the surrounding municipalities to the Abaqulusi Municipality. The R 33 creates a linkage to Paulpietersburg, while the R 69 connects to Pongola and the R 34 connects to Dundee to the west and Request to the south.

Demographics:

Figure 25 depicts the population distribution per ward the highest number of people is found in ward 13, which accounts for 6.75% of the municipality. This is followed by Wards 22, 12 and 21 representing 6.08%, 6.02% and 5.97% of the population, respectively. According to Stats SA 2011 Census, over the last year, the Municipality has seen a 1% population growth. The expected population growth and its location, presents the area with a unique set of challenges including addressing the need of the growing population in terms of labour tenants, land restitution and land redistribution. In essence, it may lead to the growth of settlements on agricultural land, which could result negatively on agricultural production.

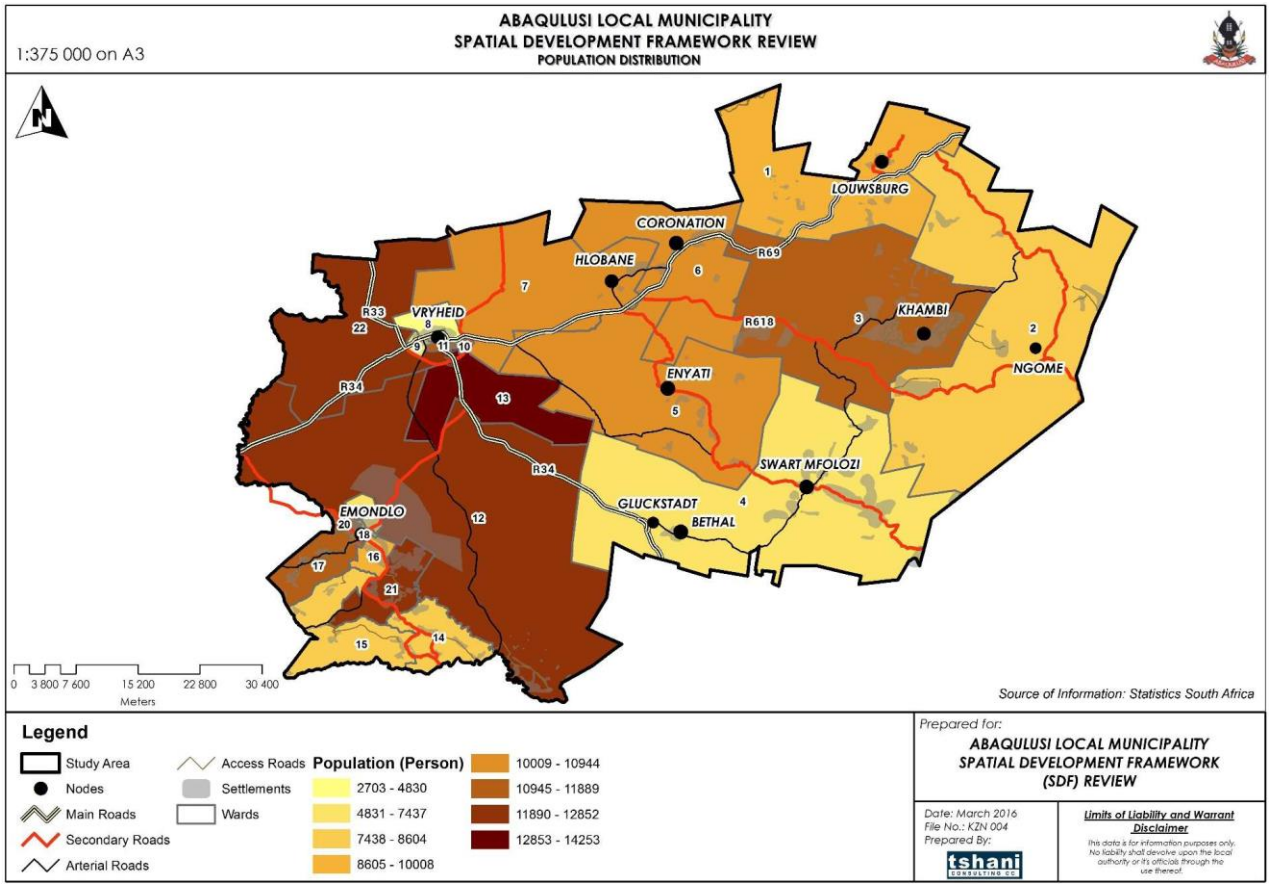

Figure 25: Abaqulusi Local Municipality Population

Socio-Economic Profile

The Zululand District has three main types of land use and settlements: traditional authority areas, commercial farms and towns/urban areas. The overall income level within the District is low, as it is very difficult for the various municipalities to build a proper tax base, which can be utilised for the provision and maintenance of services. There is a high social grant dependency and only a small portion of the population qualifies for payment of taxes, which leaves a huge burden on the current taxpayers to fund the grants as well as the maintenance of services. The region will not be able to implement or maintain any services with external funding. Therefore, it is essential that the district implement initiatives to grow its tax base through the successful implementation of economic development initiatives.

The biggest employment sector in the District Municipality is the Community, Social and Personnel sector that relates to the high dependency on government services provided to the communities. Thereafter, it's Agriculture, hunting, forestry and fishing sector, which depicts the high rural nature. The wholesale and retail trade industries followed by the private households depicted the dependency of the rural areas for in the domestic environment. The remaining sectors are aimed that the smaller urban areas.

Economic Context

The region is somewhat isolated from the national economy due to its location, its relation to transportation routes and its distance from the major centres of Durban, Johannesburg, and Richards Bay. Moreover, raw materials required for manufacturing purposes are scarce and raw materials found with the District relate directly to coal and the mining thereof. Agricultural activities including maize, beef, timber and sugar production are prevalent in the District. There is no further beneficiation of the products as the raw materials are transported to economic nodes in KZN, Gauteng, etc.

Abaqulusi is the biggest contributor to the District economy, accounting for 35.7% of the total Zululand District GVA. The Municipality's economic structure is more diverse than other local municipalities. Wholesale and retail trade were the biggest contributor to the municipal GVA in 2010, which was followed by manufacturing, finance, and general government, thereafter, by agriculture and transport. Currently, mining and quarrying is the smallest economic sector in the municipality.

Source: Abaqulusi Final Spatial Development Framework 2020-2021.

6 DESCRIPTION OF POTENTIAL IMPACTS AND ISSUES

The activities that are associated with the construction, maintenance and operation of the proposed Towers, which could potentially have an impact on the environment, are also highlighted in this section. In addition, the Department of Forestry, Fisheries and Environment guide on assessing cumulative effects[3] describes that it is not practical to analyse the cumulative effects of an action on every environmental receptor. Therefore, for cumulative effects analysis to help the decision-maker and inform interested and affected parties, it must be limited to effects that can be evaluated meaningfully. This chapter will highlight potential impacts and issues that can be evaluated.

6.1 Aquatic and Wetland impacts

Potential impacts and the relative significance of the impacts are summarised below (refer to **Appendix E1** – Aquatic and Wetland Impact Assessment Report for more details).

6.1.1 Results of the Wetlands Assessment

Desktop Mapping within 500m and Confirmation of the Study Area

All the potential watercourses occurring within 500m of the tower site were mapped as shown in **Figure 26** below. A total of two watercourse units were identified and mapped within 500m of the Louwsburg CCS RS site and a total of nine watercourse units were identified and mapped within 500m of the Louwsburg DPW site.

Considering the large distance between the tower site and the two watercourses and the very small impact footprint of the tower project, the risk of the project to activities to these watercourses are negligible and the project stands to have no measurable impacts on the local watercourses. For this reason, the assessment approach was to undertake site visits to confirm and verify the location of the watercourses and the above impact screening results. Formal delineation and PES, ecosystem services and EIS assessments were not undertaken.

[3] *DEAT (2004) Cumulative Effects Assessment, Integrated Environmental Management, Information Series 7, Department of Environmental Affairs and Tourism (DEAT), Pretoria*.

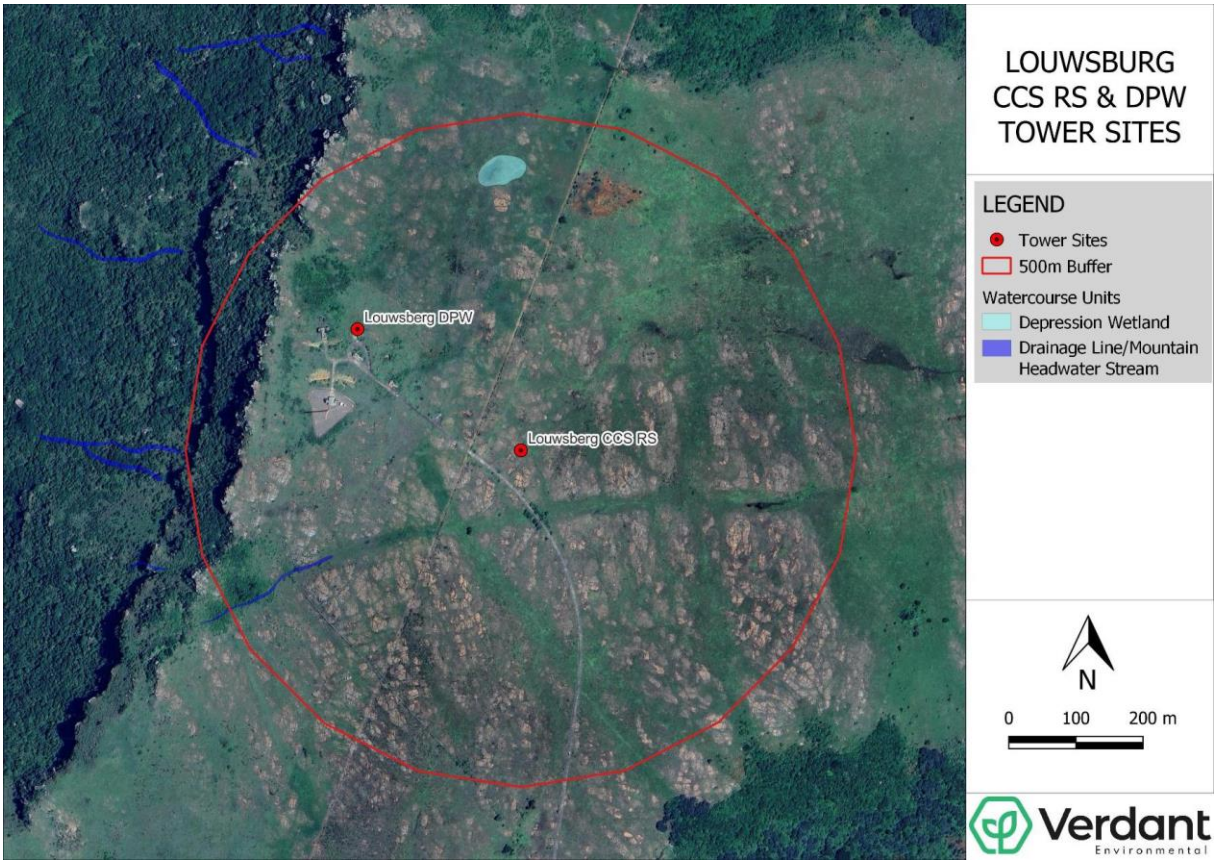

Figure 26: Watercourses within 500m of the site activities classified according to HGM type.

- **Louwsburg DPW:** All the potential watercourses occurring within 500m of the tower site were mapped as shown in **Figure 27** below. A total of nine watercourse units were identified and mapped within 500m of the site. The proximity of the identified watercourses to the tower site is summarised as follows:
    - The nearest watercourse to the tower site is located 268m to the west and comprises an ephemeral headwater mountain stream/drainage line. The site does not drain in the direction of this stream.
    - A drainage line/ ephemeral headwater mountain stream is located 300m south-west of the site. The site does not drain in this direction.
    - A drainage line/ ephemeral headwater mountain stream is located 350m south-west of the site. The site does not drain in this direction.
    - A drainage line/ ephemeral headwater mountain stream is located 440m south-west of the site. The site does not drain in this direction.
    - A drainage line/ ephemeral headwater mountain stream is located 330m south of the site. The site does not drain in this direction.
    - A drainage line/ ephemeral headwater mountain stream is located 280m north-west of the site. The site does not drain in this direction.
    - A drainage line/ ephemeral headwater mountain stream is located 400m north-west of the site. The site does not drain in this direction.
    - A drainage line/ ephemeral headwater mountain stream is located 435m north-west of the site. The site does not drain in this direction.
    - A depression wetland is located 271m to the north-east of the site. The site drains in this direction.

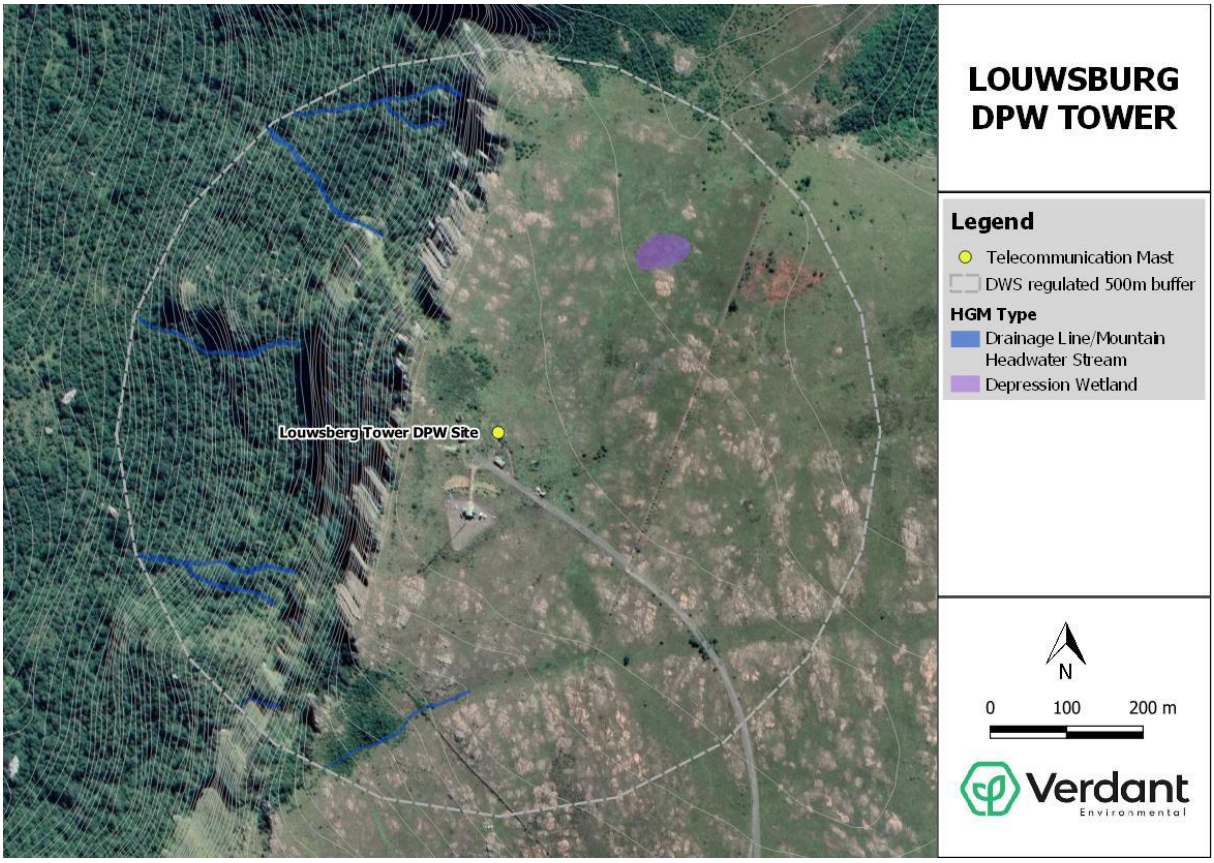

Figure 27: Watercourses within 500m of the Louwsburg DPW activities classified according to HGM type.

6.1.2 Description of Impacts:

Louwsburg CCS RS: All the potential watercourses occurring within 500m of the tower site were mapped as shown in **Figure 28** below. A total of two watercourse units were identified and mapped within 500m of the site. The proximity of the identified watercourses to the tower site is summarised as follows:

- a depression wetland located 395m to the north; and
- a stream / drainage line 321m to the south-west.

Considering the large distance between the tower site and the two watercourses and the very small impact footprint of the tower project, the risk of the project to activities to these watercourses are negligible and the project stands to have no measurable impacts on the local watercourses. For this reason, the assessment approach was to undertake site visits to confirm and verify the location of the watercourses and the above impact screening results. Formal delineation and PES, ecosystem services and EIS assessments were not undertaken.

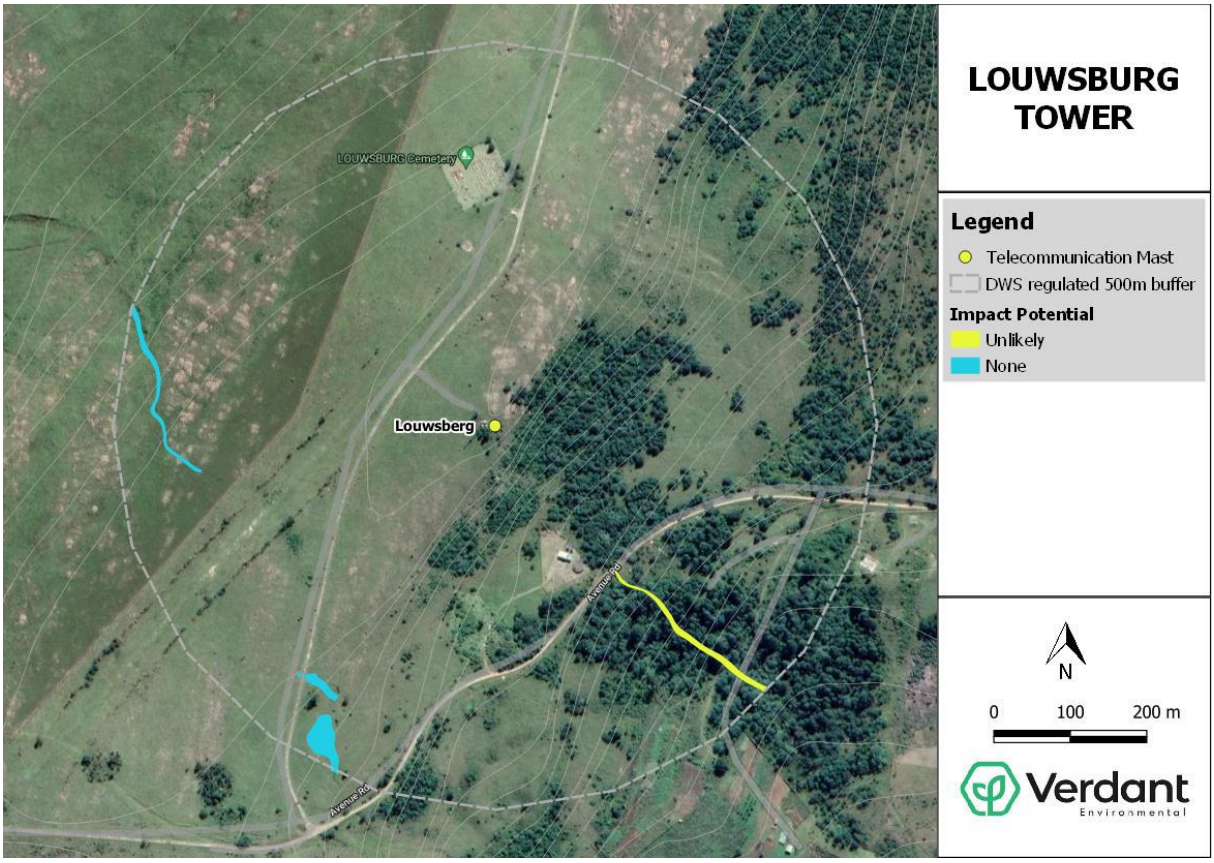

Figure 28: Watercourses within 500m of the Louwsburg CCS RS activities with an indication of the likelihood of impact.

Louwsburg DPW: Considering the large distance between the tower site and the eight watercourses and the very small impact footprint of the tower project, the likelihood of impact ratings for each of the watercourses were screened as follows (**Figure 29**):

- An ephemeral headwater mountain stream/drainage line 268m to the west – None
- A drainage line/ ephemeral headwater mountain stream 300m to the south-west – None
- A drainage line/ ephemeral headwater mountain stream 350m to the south-west – None
- A drainage line/ ephemeral headwater mountain stream 440m to the south-west – None
- A drainage line/ ephemeral headwater mountain stream 330m to the south – None
- A drainage line/ ephemeral headwater mountain stream 280m to the north-west - None
- A drainage line/ ephemeral headwater mountain stream 400m to the north-west - None
- A drainage line/ ephemeral headwater mountain stream 435m to the north-west – None

Considering the large distance between the tower site and the two watercourses and the very small impact footprint of the tower project, the risk of the project to activities to these watercourses are negligible and the project stands to have no measurable impacts on the local watercourses. For this reason, the assessment approach was to undertake site visits to confirm and verify the location of the watercourses and the above impact screening results. Formal delineation and PES, ecosystem services and EIS assessments were not undertaken.

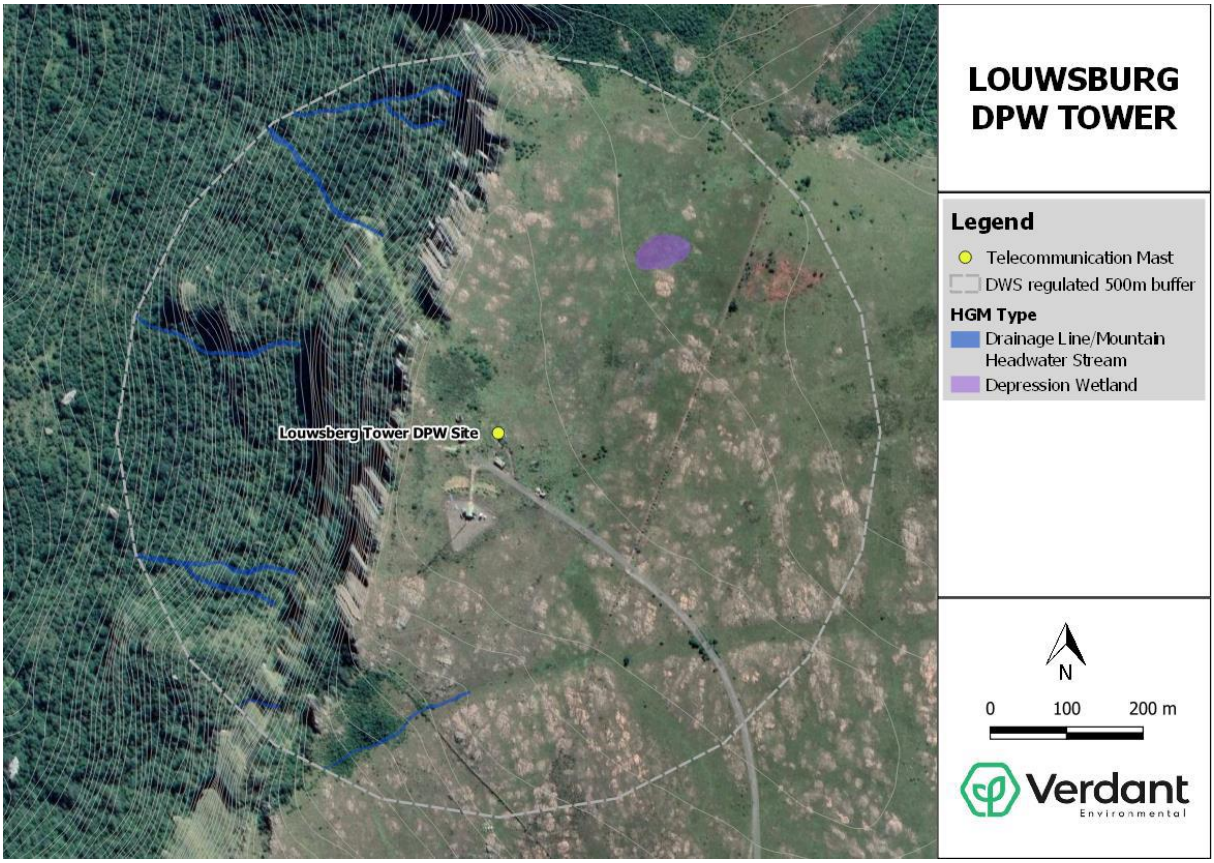

Figure 29: Watercourses within 500m of the Louwsburg DPW activities with an indication of the likelihood of impact.

6.2 Vegetation impacts summary

6.2.1 Results of the Vegetation Study

Louwsburg CCS RS Tower: the disturbed primary grassland within the study area is representative of the endangered Northern Zululand Mistbelt Grassland and is of **high** importance and sensitivity (**Figure 30**).

Although degraded it comprises Northern Zululand Mistbelt Grassland, an Endangered vegetation type. It nonetheless retains a modest diversity of species, including one Red Data species, several protected and some unusual species. Northern Zululand Mistbelt Grassland is known to host several endemic and many red listed species, often associated with rock outcropping such as on this site. Although not seen, the lateness of the season counsels that not all plants present were still visible. *Brachystelma ingomense* or *Helichrysum ingomense* were not seen, but these are known from closer to Ngome. However, in the autumn, *B. ngomense* retreats to its tuber which is submerged and so cannot be detected at this time. Furthermore, the grassland hosts some threatened Red Data species i.e. *Moraea graminicola* subsp. *graminicola* (identification still to be confirmed). Further contributing to the grassland's importance, the study area grassland is classified as both a CBA and ESA in terms of the KZN Systematic Conservation Plan and is located 80m from the fence of the Ithala Game Reserve, an important protected area managed by Ezemvelo KZN Wildlife.

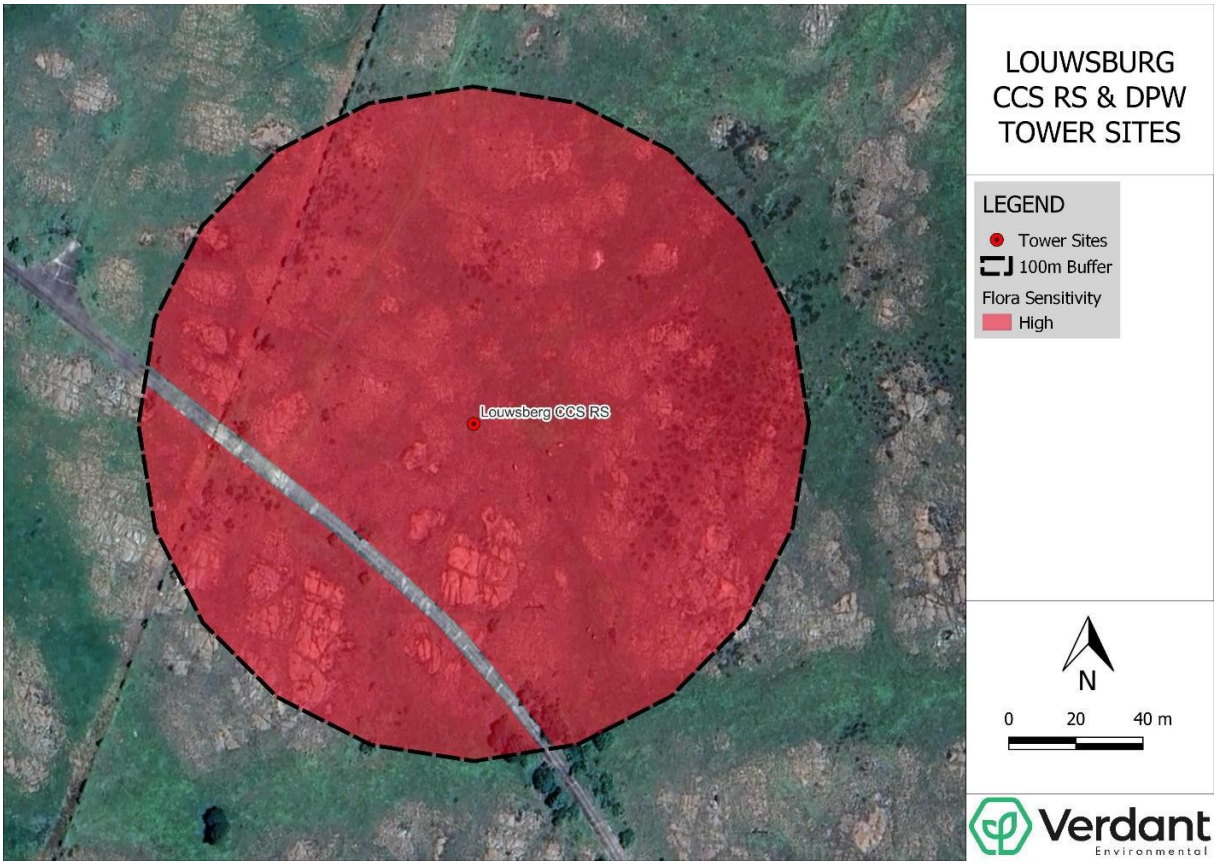

Figure 30: Vegetation sensitivity map at the Louwsburg CCS RS Tower site

Louwsburg DPW Tower: Despite the disturbance and some deterioration of vegetation at the proposed site, the vegetation communities at the **site are rated as High Sensitivity** (**Figure 31**) for the following reasons:

- Representative of a threatened primary grassland type with good potential for recoverability.
- High likelihood of occurrence of threatened and rare flora.
- Located within a protected area (i.e. Ithala Game Reserve).

Impacts to this vegetation can be mitigated by reducing the construction and work footprint as much as possible and minimizing distance from existing built or more disturbed parts.

Although no species of conservation concern were seen in the footprint area, due to vegetation type, its good quality further away, protection from grazing, and known historical occurrence in the area, the likelihood of occurrence of at least some species listed as Sensitive Species in the National Screening Tool on this plateau, beyond the footprint is likely. Examples are: *Dierama erectum* - Endangered, *Dracosciadium italae* - Vulnerable, *Lotononis amajubica* – Rare and *Protea comptonii* - Vulnerable.

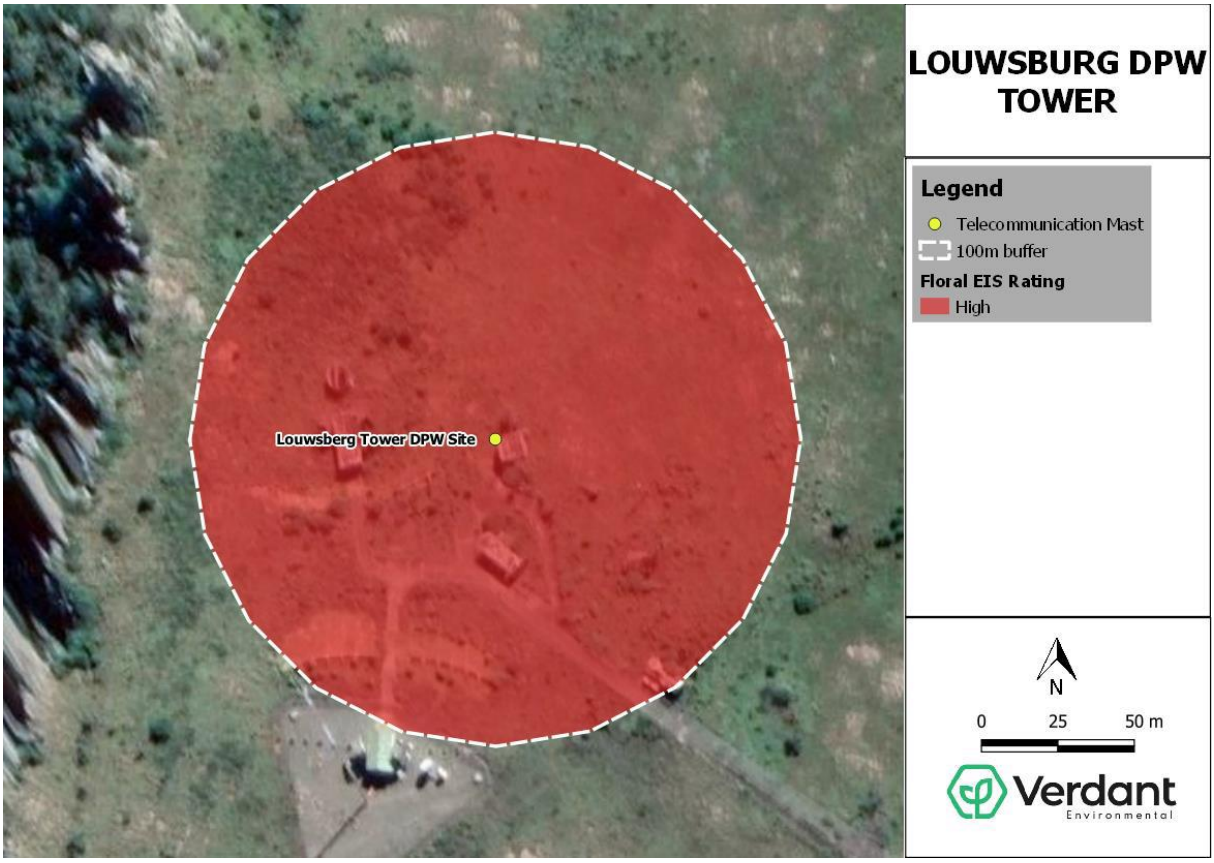

Figure 31: Vegetation sensitivity map at the Louwsburg DPW tower site

6.2.2 Description of Impacts:

For the purposes of this assessment, the potential impacts to the terrestrial flora and local terrestrial biodiversity resulting from the proposed activities can be grouped into the following impact categories:

- **Direct ecosystem destruction and modification impacts** – This impact refers to the direct physical destruction and/or modification of terrestrial vegetation communities and habitat during the construction and operational phases of the project and incudes habitat loss impacts, biota fatalities and population reductions, habitat fragmentation, habitat patch size reduction, and the occurrence of barriers to propagule and animal movement.
- • **Indirect ecosystem disturbance impacts** – This impact refers to the indirect impacts to the biota and vegetation communities as a result of activities within close proximity that result in the following impacts: (i) alteration of abiotic soil and moisture conditions, (ii) increased rates of erosion and sedimentation, (iii) alteration of the chemical and biological characteristics of soil and water, (iv) increased alien invasive plant invasion, (v) noise pollution, (v) vibrations and (vi) light pollution, and (vii) expanded edge effect.

Impact Assessment

- Impacts to terrestrial vegetation communities and habitat: The direct physical impact of the tower will be small in relation to the greater grassland community and patch. The moderately-high intensity is driven by the direct impacts to some small areas of primary grassland that is of moderate high importance and has an 'Endangered' national threat status. Under a realistic good mitigation scenario where the tower footprint

design minimises the direct disturbance footprint and where the construction of the tower is carefully planned to minimize

- Impacts to local and regional landscape ecological processes: Under both a realistic poor and good mitigation scenario, the significance of construction Impact was assessed as **being low and generally acceptable.** This is because the degree of ecosystem fragmentation and impacts to existing levels of ecological connectivity will be negligible due to the small and localised physical on the ground impacts to vegetation and habitat as a result of the tower and access/ service road establishment.

6.3 Fauna impacts summary

6.3.1 Results of the Faunal Study:

Louwsburg CCS RS Tower Based on the habitat type and terrestrial fauna present at the site, the Louwsberg site can be classified as having a medium sensitivity (**Figure 32**).

Figure 32: Habitat sensitivity for terrestrial fauna at the Louwsburg CCS RS Tower site

Louwsburg DPW Tower: the proposed footprint area and immediate vicinity are already disturbed, and considered of low value for fauna. However, immediately beyond this, are habitats in better condition, and are considered high value. The footprint area and adjacent areas, primarily to the south, are of low value for fauna. The proposed footprint area has been transformed or fairly heavily degraded, and will be of much reduced value to fauna in its current state. Areas immediately surrounding this in the north are in better condition, and are considered high value for fauna, as they will support more natural communities, may have sensitive species and are classified as ESA corridor areas, buffer a protected area, form part of NPAES and a support threatened

ecosystems in good condition. Given this, it is considered that the proposed development footprint is suitable for appropriate development. It is important that the development does not impinge upon or impact areas of high value in any way. Alien plant infestations should be monitored and managed during construction and operation. There is currently some alien infestation around the footprint and existing structures, which may be exacerbated by any work in the area, so this should be considered important.

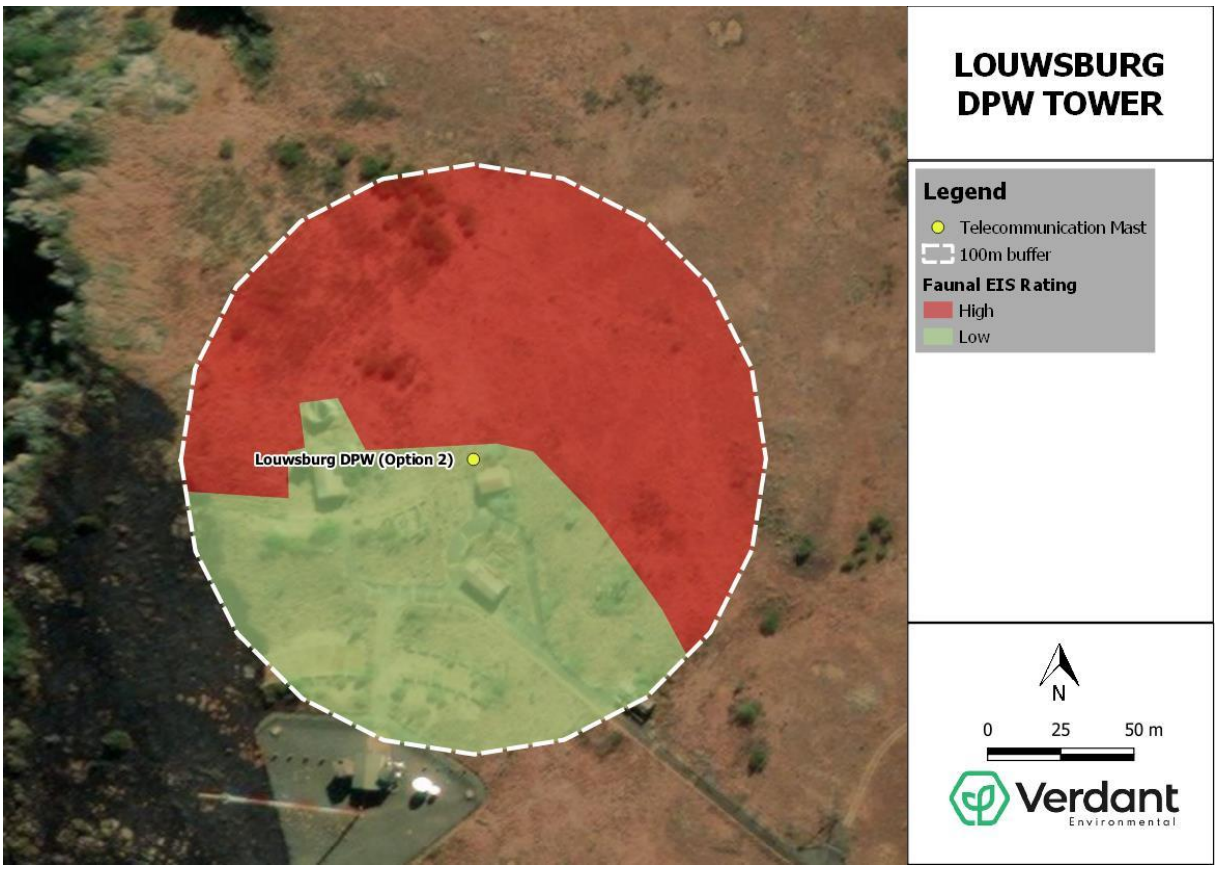

Figure 33:. Habitat sensitivity for terrestrial fauna at the Louwsburg DPW tower site

6.3.2 Description of Faunal Impacts

This impact refers to the direct physical destruction and/or modification of terrestrial vegetation communities and habitat during the construction and operational phases of the project and incudes habitat loss impacts, biota fatalities and population reductions, habitat fragmentation, habitat patch size reduction, and the occurrence of barriers to propagule and animal movement.

Impact Assessment

For the purposes of this assessment, the potential impacts to the terrestrial flora and fauna and local terrestrial biodiversity resulting from the proposed activities can be grouped into the following impact categories:

- **Direct ecosystem destruction and modification impacts** – This impact refers to the direct physical destruction and/or modification of terrestrial vegetation communities and habitat during the construction and operational phases of the project and incudes habitat loss impacts, biota fatalities and population reductions, habitat fragmentation, habitat patch size reduction, and the occurrence of barriers to propagule and animal movement.

- **Indirect ecosystem disturbance impacts** – This impact refers to the indirect impacts to the biota and vegetation communities as a result of activities within close proximity that result in the following impacts: (i) alteration of abiotic soil and moisture conditions, (ii) increased rates of erosion and sedimentation, (iii) alteration of the chemical and biological characteristics of soil and water, (iv) increased alien invasive plant invasion, (v) noise pollution, (v) vibrations and (vi) light pollution, and (vii) expanded edge effect.

6.4 Avifauna

6.4.1 Results of the Avifaunal Study

The time available for fieldwork associated with this investigation was limited. All eight of the proposed tower locations or location options were visited over a three-day period 2-4 May 2023 (Paulpietersburg ALT RS on 2 May, Louwsberg DPW, CCS RS and Tower Alt, Greenfields GF3A and Duma RS on 3 May, Greenfields VGF1 on both 3 and 4 May, and Greenfields NGF2 and GF1A on 4 May). The remote nature of the sites accessed typically on poor roads and widely separated across northern KwaZulu-Natal further limited the amount of time that could be spent at each site. Nevertheless, the site visits were highly informative in assessing the proposed tower locations relevant to the potential threat they may pose to large flying birds through collisions. At the sites with existing towers (Paulpietersburg ALT RS, Louwsberg DPW and Louwsberg Tower Alt) cursory searches were made below and around the existing towers, especially under any lateral support cables, for evidence of bird mortalities caused by collisions, e.g. carcasses, feathers, bones, etc. No such evidence was found. Scavenger action though is known to typically remove any such evidence in many cases. Particular attention was paid when visiting each potential tower location to searching for and noting details of any large birds found flying in at these locations, including photographing these birds where possible.

During the field investigation of the Louwsberg tower options on 3 May 2023, an adult Verreaux's Eagle ('Vulnerable') and an adult Jackal Buzzard were observed soaring along the edge of the escarpment overlooking the Ithala Nature Reserve close to the potential tower options, especially the Louwsberg DPW site. A Brown Snake Eagle (**Error! Reference source not found.**4) and a Rock Kestrel were observed perching on the existing towers situated at the apparently not technically feasible Louwsberg Tower Alt site.

Figure 34. A Brown Snake Eagle perched on an existing telecommunications tower at the proposed Louwsberg CCS RS tower option on 3 May 2023.

6.4.2 Description of Avifaunal Impacts:

The potential threat to birds stemming from collisions with telecommunication-tower infrastructure lies within the broader problem of bird collisions with elevated anthropogenic structures generally (Kerlinger 2000, Anderson 2003, Erickson et al. 2005). This issue has achieved greatest prominence relevant to collisions with overhead electricity power transmission and distribution lines (Bernardino et al. 2018) and, more recently, with the blades of wind turbines (Drewitt & Langston 2008). The problem however extends to elevated structures generally, e.g. cables associated with telephone lines, cable-cars, ski-lifts, zip-lines, fence-lines, etc., and buildings, particularly those with bright night lighting and reflective glass windows, especially tall skyscrapers.

- ***Avian vision relevant to collisions:*** Structures that seem clearly visible and hence avoidable under typical calm-weather daylight conditions, may become far less visible or at least avoidable by birds flying under conditions of poor visibility, e.g. at night or dusk/dawn, when flying into the direction of the sun which negatively effects forward vision, in conditions associated with rain, mist, fog, or low-hanging cloud, and under strong wind conditions, as well as when being pursued or otherwise distracted by other avian predators, competitors, while searching for food, indulging in territorial display flights, etc. (Benson & Dobbs 1984, Anderson 2003, Drewitt & Langston 2008). There is also now clear evidence that elevated structures that would seem obvious to the human eye are easily overlooked by some bird species, including vultures, in flight due to factors such as eye placement and hence field of view, as well as the direction in which some birds typically direct their view (often downwards and to the side rather than to the front) based on an ancestral evolutionary scenario that totally lacked the types of dangerous elevated anthropogenic structures that now populate landscapes (Martin et al. 2012). An aerial cable is also likely to be more visible when seen from the typical human position, i.e. from below and against the open sky, compared with the view of a flying bird, where the cable may be viewed from above or the side and against the ground and hence far less contrasting (Benson & Dobbs 1984)

- ***Collisions by nocturnal migrants with telecommunication-tower infrastructure:*** Relevant to telecommunications towers, the primary avian concerns have related to mortality ('towerkill') of nocturnal migrants (typically passerines/songbirds) associated with these structures (Kerlinger 2000, Anderson 2003, Erickson et al. 2005, Drewitt & Langston 2008, Gehring et al. 2011, Lundstrom et al. 2013). The issue has received most attention in North America. The worst-case scenarios of mass mortality seem associated with such nocturnal migrants becoming 'trapped' within the (typically aviation) lighting characteristic of these structures. This results in the birds fluttering around the tower either succumbing to collisions with the tower infrastructure, especially any lateral support cables but also sometimes the structures themselves, or to exhaustion, predation, etc. The situation is particularly aggravated during (indeed apparently largely restricted to) misty/foggy conditions, when the birds tend to fly lower and are more vulnerable to the light attraction and trapping effects. Wind direction may also be implicated in some circumstances, as well as phases of the moon. Tower elevation is also highly relevant (with those less than about 150 m in height rarely being problematic), with the problem disproportionately worsening with increasing tower height, bearing in mind also that telecommunication towers are typically located on the highest points in the landscape effectively raising their actual height above the primary surrounding landscape. Tower lighting, usually mandatory due to civil aviation requirements, seems a critical component of this problem, attracting and trapping the birds to within the illuminated area. Constant lighting seems worst, especially where red lighting is employed, with flashing lights being less problematic and the longer the time periods between the flashes the better (Drewitt & Langston 2008, Gehring et al. 2009).

Unlike the situation in temperate North America however, the sub-tropical South African avifauna is not dominated by migratory species to anywhere near the same extent. In particular, South Africa lies largely at the end point of the migrations of the migratory birds visiting the region from further north and hence unlikely to support the extensive migratory pathways and bottlenecks characteristic of other global regions more centrally situated relevant to avian migratory routes. Indeed, such problems of mass mortality at telecommunication-tower infrastructure by nocturnally migrating birds appear not to have been reported in South Africa.

- ***Collisions by large diurnal birds with telecommunication-tower infrastructure:*** In contrast to the apparent position relative to small avian nocturnal migrants, telecommunication-tower infrastructure in South Africa can pose a real collision threat to large diurnal birds in flight. This issue is of especial concern as the construction of communication towers has increased exponentially worldwide (Anderson 2003, Erickson et al. 2005), including in South Africa. The vulnerability of these birds, including birds of prey such as eagles and vultures, to collisions with elevated structures is widely appreciated, especially as relevant to overhead electricity cables (Bernardino et al. 2018) but the general principle extends to all overhead cabling.

Telecommunication towers are typically placed on high points in the landscape, usually associated with mountain- and hill-tops, and long the edges of tall escarpments, in order to maximize transmission distances. Large flying birds, especially soaring species, are also typically attracted to such sites due the advantages they provide in terms of providing lift in flight associated with wind patterns around these elevated areas (e.g. Khoury 2017). This increases the vulnerability of large flying birds to collisions with infrastructure associated with these towers. This situation is very similar to that relevant to wind turbines which are also typically placed in elevated positions to take advantage of enhanced wind conditions at such sites, and which similarly increases the danger of collisions of large flying birds with the turbine blades. It should be emphasised that diurnally flying birds are vulnerable to collisions not only with overhead cables and moving wind-turbine blades but also with elevated wind towers themselves as tall structures in potentially sensitive locations (Choi et al. 2020).

Strong headwinds and low cloud ceilings tend to force birds to fly at lower heights and hence be more susceptible to collisions with structures such as communication towers, and air temperature and humidity also effect flight height (Drewitt & Langston 2008). Soaring raptors typically fly at lower heights during cool compared with hot weather (Khoury 2017).

Drewitt & Langston (2008) provide specific recommendations relevant to communication towers to minimize the danger of bird collisions:

- the construction of towers should be avoided in area characterised by regular low cloud or mist/fog,
- the construction of towers should also be avoided in areas which support appreciable populations of threatened birds vulnerable to collisions with the infrastructure associated with such towers,
- towers should be clustered as close to one another as possible in discrete ‘tower farms’,
- as far as possible, new communication equipment should be co-located on existing towers, even if owned by other entities,
- towers should be kept to below about 60 m in height,

- towers should comprise tubular monopoles similar to those used in modern wind turbines, rather than being lattice structures,
- lateral support cables should not be used, and
- where lateral support cables are present, these should carry clear marking devices, especially in areas inhabited by birds of prey (see also Bernardino et al. 2019).

  The best documented case of mass mortality to vultures at a South African tower site relates to 55 Cape Vultures reported as having died in collisions with the lateral support cables of a particularly tall (235 m) radio and television transmission tower operated by the South African Broadcasting Service (SABC)/Sentach (Benson & Dobbs 1984). This tower is situated on the summit of a peak in the Waterberg Mountains in Limpopo Province, within the Marakele National Park. The tower locality is situated in close proximity and directly above one of the two largest colonial breeding colonies of the Cape Vultures on cliff faces situated below the tower. The high mortality is related to this proximity of the tower to, and situated above, the colony. Young, recently fledged and inexperienced vultures are particularly vulnerable to these collisions. The lateral support cables of the tower have been marked to render them more visible but the problem persists, e.g. seven dead Cape Vulture collision victims were found during a search on 14 December 2012 (P.C. Benson unpublished

- ***Other interactions of large birds with telecommunication-tower infrastructure:*** Large birds are regularly attracted to tall structures such as telecommunication towers as attractive perches and even as nest sites (e.g. Washburn 2014). As local examples, Pied Crow's nest extensively on cellular communication towers (Senoge & Downs 2023) and Verreaux's Eagles nest on microwave towers on hilltops in the Northern Cape Province (Anderson 2000). These structures may thus be of some benefit to these birds as perches and nest sites but this attraction to these sites also increases the risk of collisions with the tower infrastructure.

  Use of the structures for perching and nesting can also cause problems to the tower communication, electrical and other components through the accumulated droppings of the birds and the placement of nesting material, which can include lengths of metal wiring, on the structure (Washburn 2014). These issues and conflicts are particularly well known relevant to electricity pylons, substations and other electrical infrastructure. It follows that all electrical components incorporated in telecommunication-tower infrastructure should be comprehensively insulated to avoid potential electrocution risks with associated bird mortality and potential communication-component failures (Kerlinger 2000). The use of tubular monopoles as opposed to lattice structures largely or totally eliminates the attractiveness of such structures to perching or nesting large birds (Saidur *et al*. 2011).

- ***Electricity pylons servicing telecommunication towers:*** Telecommunication towers typically require electrical power facilitated by electrical poles and associated overhead electrical cables routed to these sites. As alluded to above, these can also pose collision and electrocution risks to birds, particularly large species (Bernardino et al. 2018). These potential problems are likely to be particularly acute due to the remote and elevated situation of these sites, which, as mentioned above, are likely to attract disproportionately large numbers of such birds, including formally threatened species. It is therefore essential to pay conservation attention to this issue as well in the planning of telecommunication towers. This is similar to the situation relevant to wind and solar farms, which also require pylons connecting these facilities to the electrical grid

and which thus need also to be included in the assessment and planning for such facilities (Ledec *et al.* 2011).

The powerlines servicing the tower should be of a 'bird-friendly' nature to eliminate or at least reduce by the maximum extent possible all dangers from collisions and electrocution (Bernardino et al. 2018). The relevant mitigation measures include careful routing of the powerlines to the site to avoid vulnerable areas, marking of the lines to render them of maximum visibility to birds using 'bird flappers' or bird 'spirals'/'pigtails' (Bernardino et al. 2019), and configuring/insulating the electrical infrastructure against electrocution risk (e.g. by deploying 'raptor-protector devices on particular power-pole configurations). These measures should be implemented proactively as they are typically far more expensive to ameliorate post-construction. In particularly vulnerable areas, consideration should be given to burying power lines approaching tower sites (although this is typically expensive).

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6.5 Cultural Heritage Aspects of the area and Palaeontological Resources

6.5.1 Results of the Heritage Study

It seems as if little development took place in the region and that it was always used for grazing. A large community cemetery is located in the area (**Figure 35**), but would not be impacted on by the proposed development.

Figure 35: The local cemetery

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

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

6.5.2 Results of the Paleo Study

The Ecca Group, Vryheid Formation may contain fossils of diverse non-marine trace, *Glossopteris* flora, mesosaurid reptiles, palaeoniscid fish, marine invertebrates, insects, and crustaceans (Johnson 2009). *Glossopteris* trees rapidly colonised the large deltas along the northern margin of the Karoo Sea. Dead vegetation accumulated faster than it could decay, and thick accumulations of peat formed, which were ultimately converted to coal. It is only in the northern part of the Karoo Basin that the glossopterids and cordaitales, ferns, clubmosses and horsetails thrived (McCarthy and Rubidge 2005).

Fossils in South Africa mainly occur in rocks of sedimentary nature and not in rocks from igneous or metamorphic nature. Therefore, if there is the presence of Karoo Supergroup strata the palaeontological sensitivity is generally **LOW** to **VERY HIGH**.

Table 11: Taken from Palaeotechnical Report (Groenewald 2012) (**1cA)**.

Volksrust (Pvo)		Dark Grey Shale	Trace Fossils
Vryheid (Pv)		Light grey coarse- to fine-grained sandstone and siltstone. Dark coloured siltstone due to presence of carbon enrichment and coal beds	Abundant plant fossils of *Glossopteris* and other plants. Trace fossils. The reptile *Mesosaurus* has been found in the southern part of the Karoo Basin
Pietermaritzburg (Pp)		Dark Grey Shale	Trace Fossils
Dwyka (C-Pd / Pd)		Tillite, diamictite	None recorded in KwaZulu-Natal to date. the basin

Table 12: Criteria used (Fossil Heritage Layer Browser/SAHRA) **(1cB)**:

Rock Unit	Significance/vulnerability	Recommended Action
Vryheid Formation	**Very High**	Field assessment and protocol for finds is required
Pietermaritburg F	**Moderate/ Orange**	Desktop survey and Phase 1 PIA is recommended
Dwyka Group	**Moderate/ Orange**	Desktop survey and Phase 1 PIA is recommended

Impact: **MODERATE**, **VERY HIGH** for the Dwyka Group, Pietermaritzburg Formation, and Vryheid Formation, Karoo Supergroup. There are significant fossil resources that may be impacted by the development (mudstone, shale) and if destroyed are no longer available for scientific research or other public good (Almond, *et al.* 2009).

The palaeontological sensitivity is as stated above and here in colour for the Option:

An area outlined in red balloons for the **radio towers**, power lines in green (south) and red (north) close to Paulpietersberg, Vryheid, Louwsburg and Ulundi. The approximate size of the towers ranges from 16 and 30 m^2.
Paul-Pietersburg tower – Vryheid Formation, Dolerite.
Vryheid north – Dolerite, Pietermaritzburg Formation.
Louwsberg tower – Dolerite, Vryheid Formation.
Vryheid south – Vryheid Formation.
3 x Ulundi Telecomms towers present on the Dwyka Group.

All the land involved in the development was assessed **(ni,nii)** and none of the property is unsuitable for development. **Fossils are generally absent from the Pietermaritzburg Formation although trace fossils have been recorded from the upper layers (AMAFA Palaeotech).**

The threats are:-

- Earth moving equipment/machinery (front end loaders, excavators, graders, dozers) during construction,
- The sealing-in or destruction of fossils by development, vehicle traffic, and human disturbance. See Description of the Geological Setting (F) above.

6.6 Visual Impact

6.6.1 Sensitivity of observers: The following observer groups have been identified in the study area:

- Tourists;
- Residents; and
- Motorists utilising the local road network.

Tourists: are generally classified as observers with a **high** sensitivity when their reason for visiting the area is focussed on enjoying the visual quality and engaging in outdoor activities that are offered by the study area's natural landscape. The Ithala Nature Reserve offers tourist opportunities to enjoy panoramic scenery and engage with nature. A prominent backdrop and ridgeline are created by the Ngotshe Mountain along the southern boundary of the reserve. Lodges and other forms of accommodation provide overnight facilities along with game drives and hikes. Two look out points are located in the reserve, namely Phuzamoya and Horace Rall. Both overlook the reserve, and due to the elevated location, offers panoramic views across large parts of the study area. The closest tourist accommodation and dedicated lookout points to the proposed tower sites, are the Ntshondwe Resort (± 2 km from tower sites) and the Horace Rall lookout point (very near to tower location DPW and approximately 300m west of the CCS RS location). The Ntshondwe Resort will not experience a direct line-of-sight to the proposed towers as indicated on **Figure 22 & Figure 23**, due to the screening capacity of the Ngotshe Mountain. Tourists visiting the Horace Rall look out point or the Louwsburg Cemetery will have full view of the proposed towers, and will also be encountered by views of the existing towers on the plateau. These tourists/visitors will be in close proximity to the proposed tower sites for a brief period and will mostly enjoy the view to the north and therefore not have the proposed tower in their sight line.

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Some game drive routes in Ithala Nature Reserve are expected to have partial views of the proposed tower, but will only experience visual exposure outside the ZMVE. Also, thick vegetation is expected to add to the screening capacity of the landscape, thereby reducing visual exposure. Game drive routes in the 2-5 km zone may

experience partial visual exposure for the alternative 1 tower, but even less for alternative 2. Distances greater than 5 km will have a much-reduced visual exposure as a result of the distance factor.
The CCS RS site is further away from the edge of the mountain and game drive routes are only expected to experience some exposure at 5 km and further. Also, thick vegetation will add to the screening capacity of the landscape, thereby reducing visual exposure.

Other tourist attractions such as campsites and picnic spots in Ithala Nature Reserve are located outside the detection zone. This is also applicable to Makada Game Ranch west of Ithala. Sanyati Nature Farm is inside 5 km of the tower sites, but will be screened to a large extent due to a ridge along its western boundary. A direct-line-of-sight is possible from the eastern boundary, but the distance from the tower sites will exacerbate detectability and these tourists are considered to have a medium sensitivity. The Phuzamoya look out point is located ± 5 km from the sites and is expected to have a direct-line-of-sight to both tower sites. However, the distance from the tower sites will exacerbate detectability and these tourists are considered to have a **medium sensitivity.**

Residents: in the study area are generally classified as visual receptors of **high** sensitivity owing to their sustained visual exposure and attentive interest towards their living environment. The highest concentration residents are present in Louwsburg which is within the ZMVE. Both sites will cause some areas to experience partial views of the towers as a result of topographic screening. CCS RS site indicates a marginally higher visual exposure in the town of Louwsburg due to its location nearer to the town. Garden vegetation is expected to provide significant localised screening, which will potentially reduce visual exposure. The surrounding farms are sparsely populated and spread out with a few farmsteads located outside the ZMVE. Their exposure to the potential visual impacts will be much reduced due to their distance from the source of impact and their sensitivity is expected to be **medium**.

Motorists: are considered the least sensitive group of observers due to the speed at which they travel and their brief exposure to impacts. This group is mostly limited to road users on the R69. Intermitted views of the proposed tower are expected as motorists travel through the study area. Their location is outside of the ZMVE and brief exposure to the source of impact lowers their sensitivity to **very low**.

6.6.2 Sensitivity of the Landscape Character:

Despite the elevated location of the tower sites and the physical height of the proposed towers, the study area is considered to have a high VAC, mostly as a result of the high level of topographical screening as indicated in Figure 22 & Figure 23. Topographical screening and additional screening from the landcover elements, minimise visual exposure of some sensitive viewers inside the ZMVE and between 2-5 km from the source of impact, with the exception of Louwsburg residents, tourists visiting Horace Rall lookout point, and tourists on a game drive on the Ngubhu Loop route in the DPW site scenario. Dense natural vegetation in the low-lying areas of the Ithala Nature Reserve and the established gardens in the town of Louwsburg and surroundings provide localised screening. These factors will increase the screening capacity of the landscape and reduce visual exposure to the tower.

A high degree of inter-visibility between adjacent landscapes are expected due to the elevated location of the tower sites. This is also confirmed by the viewshed analyses, although the argument with regards to the

increased screening capacity due to the land cover conditions, also applies in this case. The reduced visibility of objects over distance as discussed in Section 3.2, will also reduce the effect of the degree of inter-visibility.

Towers or masts are familiar objects in the South African landscape. For example, cellular towers are dotted across the rural and urban landscapes and have a resemblance to the proposed telecommunication radio tower with regards to its visual characteristics. The proposed tower will be placed in a location on the Ngotshe Mountain that is close to existing towers/masts. Therefore, an additional tower is considered familiar with the existing context, although an altered horizon line will cause further visual conflict with the prominent ridgeline of the mountain from the perspective of a tourist visiting the Ithala Nature Reserve or residents from Louwsburg. The location of the DPW site is inside the Ithala Nature Reserve boundary and although the site is already impacted by existing buildings and a tower, it is within a conservation area which adds to the sensitivity of the site. The CCS RS site is placed outside the reserve and is considered marginally more appropriate due to its location, from a conservation point of view.

The landscape character sensitivity is considered high and is accredited to the generally high scenic quality of the study area and high value landscape attributes associated with the pristine natural character and dramatic elevation variation. A tower will be highly exposed due to its elevated location, therefore resulting in a large ZVI, but topographic screening plays an important role in limiting visibility from sensitive viewpoints inside the ZMVE. The pristine natural areas that occur to the north and west, as well as the general rural characteristics to the east and south contribute to pleasing visual attributes and high to very high scenic qualities.

6.7 Agricultural Potential Impact

6.7.1 Results of the Agriculture Study

Louwsberg Tower CCS RS Site: Although, the area has high potential for agriculture based on the classification indicated in the **Figure 36** below, the agricultural value of the area is low due to lack of commercial agricultural productivity in the area. The site also has rock forms based on the image above, which will make cultivation difficult.

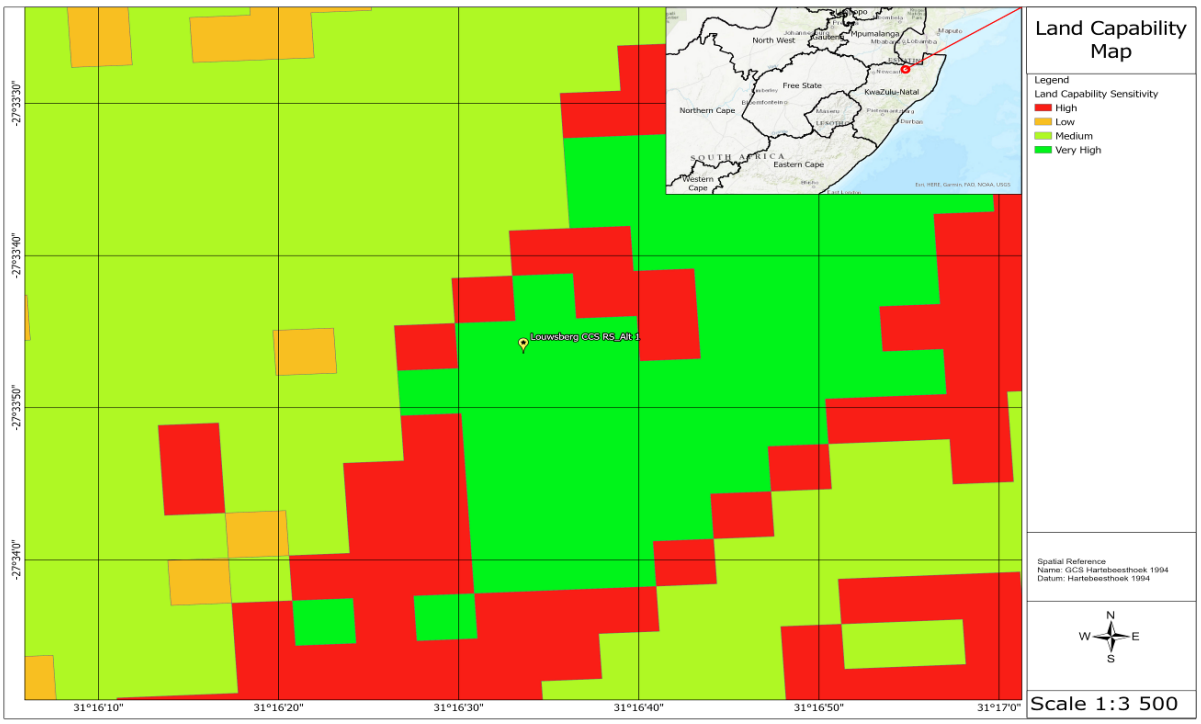

Figure 36: Louwsberg CCS RS Land Capability Map

Louwsberg Tower DPW Site : There is no evidence of cultivated areas across the project site based on the Google imagery below. Also based on the land use map of the area, there are no commercial agricultural activities in the area. The area has low potential for agriculture based on the classification, the agricultural value of the area is low due to lack of commercial agricultural productivity in the area. The site also has rock forms based on the image above, which will make cultivation difficult.

Therefore, because the site area has low agricultural productivity level based on **Figure 37** below. The land can be utilized for the proposed Louwsberg Tower construction as an alternative site. The area required (900 m2) for constructing the tower will not have significant impact on the area available for agriculture.

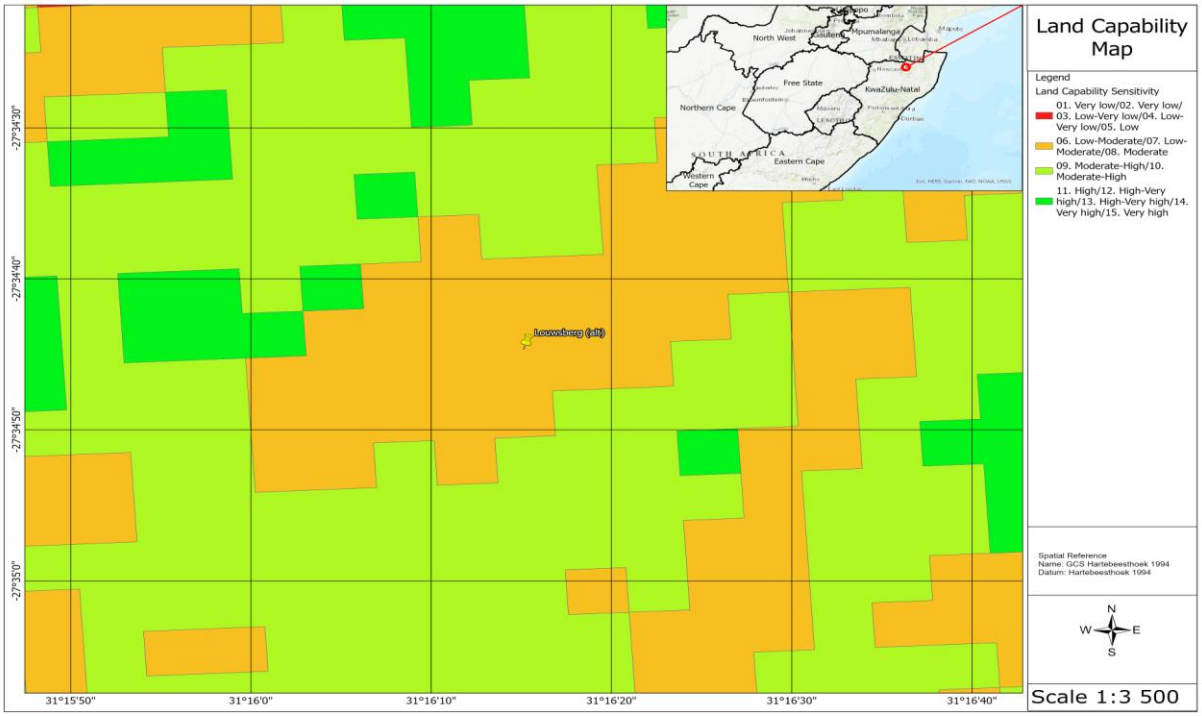

Figure 37: Louwsberg Tower DPW Site Land Capability Map

6.7.2 Description of Impacts:

Based on the fact that the site area has low agricultural productivity level although the land has high agricultural potential, the land can be utilized for the proposed Louwsberg Tower construction. The area required (900 m2) for constructing the tower will not have significant impact on the area available for agriculture.

6.8 Social environment Impacts

The following impacts are identified as the major impacts associated with the development of the project the construction and operational phases of the development.

- Inflow of Workforce and Jobseekers
- Employment Opportunities and Local Procurement
- Impact on Sense of Place
- Impact on Tourism:

6.9 Assumptions, uncertainties, and gaps in knowledge of the study

A number of limitations and assumptions, as described below, are noted for this environmental impact assessment.

- A Visual Impact Assessment is not a purely objective science and often integrates qualitative evaluations based on human perceptions. It is the visual specialist's aim to utilise as much quantitative data and scientific research as possible, to substantiate professional judgement and to motivate subjective opinions
- The realistic poor mitigation scenario assumes the following:
    - The tower location as currently planned will be implemented.

  - Access and haulage roads during the construction phase will be poorly planned and regulated.
  - All towers will be established outside of river and wetland units and a 30m buffer zone.
- The realistic good mitigation scenario assumes the following:
  - All the planning and design measures recommended will be adhered to.

7 ASSESSMENT OF POTENTIAL IMPACTS

7.1 Assessment of alternatives

- **Site Alternatives:** The two Feasible Alternative Sites investigated for the Louwsberg towers are as follows:

  Proposed Site: **Louwsberg CCS RS**
  OR
  Alternative Site: **Louwsberg DPW site**

- **Design/Layout alternative**: Two tower designs are considered for this project (i.e. Lattice vs Monopole structure).

NB: *The above-mentioned alternatives considered for this project do not differ considerably in their significance as far as the majority of the Environmental Impacts are concerned, therefore potential impacts discussed in this section of the report are relevant for all alternatives considered for this project however,* ***where applicable, the differences are highlighted in red for the Proposed Site (Louwsberg CCS RS) and green for the Alternative Site (Louwsberg DPW site)***

7.2 Methodology of the Impact Assessment

The identification of potential impacts includes impacts that may occur during the construction, operational and decommissioning phases of the proposed development. The assessment of impacts includes direct, indirect as well as cumulative impacts. In order to identify potential impacts (both positive and negative) it is important that the nature of the proposed projects is well understood so
that the impacts associated with the projects can be assessed. The process of identification and assessment of impacts includes:

- Determining the current environmental conditions in sufficient detail so that there is a baseline against which impacts can be identified and measured;
- Determining future changes to the environment that will occur if the activity does not proceed;
- Develop an understanding of the activity in sufficient detail to understand its consequences; and
- The identification of significant impacts which are likely to occur if the activity is undertaken.

The impact assessment methodology has been aligned with the requirements for BA Reports as stipulated in Appendix 1 (3) (1) (j) of the 2014 NEMA EIA Regulations (as amended), which states the following:

"A BA Report must contain the information that is necessary for the Competent Authority to consider and come to a decision on the application, and must include an assessment of each identified potentially significant impact and risk, including –
(i) cumulative impacts;
(ii) the nature, significance and consequences of the impact and risk;
(iii) the extent and duration of the impact and risk;
(iv) the probability of the impact and risk occurring;
(v) the degree to which the impact and risk can be reversed;

(vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and
(vii) the degree to which the impact and risk can be mitigated".

As per the DEAT Guideline 5: Assessment of Alternatives and Impacts, the following methodology is applied to the prediction and assessment of impacts and risks. Potential impacts and risks have been rated in terms of the direct, indirect and cumulative:

- **Direct impacts** are impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity. These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable.
- **Indirect impacts** of an activity are indirect or induced changes that may occur as a result of the activity. These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place as a result of the activity.
- **Cumulative impacts** are impacting that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities. therefore, assuming worst case scenario.

In addition to the above, the impact assessment methodology includes the following aspects whereby the significance of the impact is calculated as follows and rating significance is explained below.

» The **nature**, a description of what causes the effect, what will be affected, and how it will be affected.

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

» The **duration**, wherein it is indicated whether:

* The lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
* The lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
* Medium-term (5–15 years) – assigned a score of 3;
* Long term (> 15 years) - assigned a score of 4; or;
* Permanent - assigned a score of 5.

» The **magnitude**, quantified on a scale from 0-10, where a score is assigned:

* 0 is small and will have no effect on the environment;
* 2 is minor and will not result in an impact on processes;
* 4 is low and will cause a slight impact on processes;
* 6 is moderate and will result in processes continuing but in a modified way;
* 8 is high (processes are altered to the extent that they temporarily cease); and
* 10 is very high and results in complete destruction of patterns and permanent cessation of processes.

» The **probability** of occurrence, which describes the likelihood of the impact actually occurring. Probability is estimated on a scale, and a score assigned:

* Assigned a score of 1–5, where 1 is very improbable (probably will not happen);
* Assigned a score of 2 is improbable (some possibility, but low likelihood);
* Assigned a score of 3 is probable (distinct possibility);
* Assigned a score of 4 is highly probable (most likely); and
* Assigned a score of 5 is definite (impact will occur regardless of any prevention measures).

» The **significance**, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high.

- The **status**, which is described as positive, negative or neutral.
- The degree to which the impact can be reversed.
- The degree to which the impact may cause irreplaceable loss of resources.
- The degree to which the impact can be mitigated.

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

S= (E+D+M) P; where

S = Significance weighting
E = Extent
D = Duration
M = Magnitude
P = Probability

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

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

7.3 Impact Assessment

The specialist findings presented in this section represents a summary of the detailed and original specialist studies contained in the relevant appendices to this report **(Appendices E1 to E6).** The current summary of specialist findings is provided in the interest of brevity and with a view to facilitating public facilitating public participation; as contemplated in the NEMA principles. The Competent Authority, with its mandate of substantive review of the EIA report, is therefore urged to also read the original specialist studies in the relevant appendices to this report with the aim of discharging its decision-making function.

7.3.1 Aquatic and Wetland Impact Assessment

NATURE OF POTENTIAL IMPACT/RISK	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
CONSTRUCTION PHASE IMPACTS			
Impact 1: Physical Disturbance, Erosive water and/ or eroded sediment and Pollutants **Nature**: Changing the quantity and fluctuation properties of the watercourse by for example diverting or obstructing flow. **Activity**: The sources of this impact include the compaction of soil, the removal of vegetation, surface water redirection, changes to watercourse morphology or input of high energy surface water which could occur during construction and operation of the residential development. ***Residual Risks: Considered to be low given that optimal design is followed***	**LOW**	• Stormwater generated by the upgraded and new roads should be discharged at regular intervals and many small outlets should be favoured over few large. • Stormwater outlets must not be established within wetlands or riparian zones. • As far as practically possible, stormwater conveyance should be via open drains rather than pipes and conveyance from the road drains to the outlets should via open drains with vegetated or rough surfaces that are armoured with erosion protection. • All outlets must be designed to dissipate the energy of outgoing flows to levels that present a low erosion risk. In this regard, suitably designed energy for gravel roads will need to be installed at appropriate locations. • All erosion protection measures must be established to reflect the natural slope of the surface and located at the natural ground-level.	**LOW**
OPERATIONAL PHASE			
Impact 1: Physical Disturbance, Erosive water and/ or eroded sediment and Pollutants **Nature**: Changing the quantity and fluctuation properties of the watercourse by for example diverting or obstructing flow. **Activity**: The sources of this impact include the compaction of soil, the removal of vegetation, surface water redirection, changes to watercourse morphology or input of high energy surface water which could occur during construction and operation of the	**LOW**	• Wherever possible, existing vegetation cover on the development site should be maintained during the construction phase. The unnecessary removal of groundcover from slopes must be prevented, especially on steep slopes which will not be developed. • Clearing activities must only be undertaken during agreed working times and permitted weather conditions. If heavy rains are expected, clearing activities should be put on hold. In this regard, the contractor must be aware of weather forecasts. • All bare slopes and surfaces to be exposed to the elements during clearing and earthworks must be protected against erosion using rows of hay-bales, sandbags and/or silt fences aligned along the contours and spaced at regular intervals (e.g. every 2m) to break the	**LOW**

NATURE OF POTENTIAL IMPACT/RISK	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
residential development. ***Residual Risks: Considered to be low given that optimal design is followed***		energy of surface flows. • Once shaped, all exposed/bare surfaces and embankments must be re-vegetated immediately. • If re-vegetation of exposed surfaces cannot be established immediately due to phasing issues, temporary erosion and sediment control measures must be maintained until such a time that re-vegetation can commence. • All temporary erosion and sediment control measures must be monitored for the duration of the construction phase and repaired immediately when damaged. All temporary erosion and sediment control structures must only be removed once vegetation cover has successfully recolonised the affected areas. • After every rainfall event, the contractor must check the site for erosion damage and rehabilitate this damage immediately. Erosion rills and gullies must be filled-in with appropriate material and silt fences or fascine work must be established along the gulley for additional protection until vegetation has re-colonised the rehabilitated area.	

7.3.2 Terrestrial ecological (Flora & Fauna): Impact Assessment

NATURE OF POTENTIAL IMPACT/RISK	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
CONSTRUCTION PHASE IMPACTS			
Impact 1: Impacts to terrestrial vegetation communities and habitat **(Louwsburg CCS RS Tower)** **Nature:** **a) Direct ecosystem destruction and modification impacts** • Planned direct impacts to primary Grassland for tower establishment. • Planned direct impacts to primary Grassland for access road establishment. • Accidental direct impacts to primary Grassland / by heavy machinery during construction i.e. poorly planned access roads. **b) Indirect ecosystem disturbance impacts** • Erosion and/or sedimentation of primary Grassland due to soil and vegetation clearing and landcover disturbance during construction. • Pollution of primary Grassland due to the mishandling of hazardous substances and/or improper maintenance of machinery during construction e.g. oil and diesel leaks and spills. **Residual Impacts**: Small impacts to primary grassland.	**MEDIUM**	**Refer to section 7of Appendix E2 for general mitigations on:** • 7.1.1 Tower Location and Design Recommendations • 7.1.2. Tower Access and Service Roads • 7.2.1. Tower Access and Haulage Roads • 7.2.3. Demarcation of 'No-Go' areas and construction corridors • 7.2.4. Method Statements for working in sensitive ecosystems • 7.2.10. General rehabilitation guidelines • 7.2.11. Construction phase monitoring measures **Refer to section 7of Appendix E2 for general mitigations on:** • 7.2.4. Method Statements for working in sensitive ecosystems • 7.2.5. Runoff, erosion and sediment control • 7.2.6. Hazardous substances / materials management • • 7.2.7. Invasive Alien Plant control • • 7.2.9. Noise, dust and light pollution minimisation • • 7.2.10. General rehabilitation guidelines • • 7.2.11. Construction phase monitoring measures	**LOW**
Impact 1: Impacts to terrestrial vegetation communities and habitat **(Louwsburg DPW Tower)** **Nature:** **c) Direct ecosystem destruction and modification impacts** • Planned direct impacts to Northern Zululand Mistbelt Grassland for tower establishment. • Planned direct impacts to Northern Zululand Mistbelt Grasslandfor access road establishment.	**MEDIUM-HIGH**	**Refer to section 7of Appendix E2 for general mitigations on:** • 7.1.1 Tower Location and Design Recommendations • 7.1.2. Tower Access and Service Roads • 7.2.1. Tower Access and Haulage Roads • 7.2.3. Demarcation of 'No-Go' areas and construction corridors • 7.2.4. Method Statements for working in sensitive ecosystems • 7.2.10. General rehabilitation guidelines 7.2.11. Construction phase monitoring measures	**MEDIUM**

NATURE OF POTENTIAL IMPACT/RISK	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
• Accidental direct impacts to primary Grassland / by heavy machinery during construction i.e. poorly planned access roads. **d) Indirect ecosystem disturbance impacts** • Erosion and/or sedimentation of Northern Zululand Mistbelt Grassland due to soil and vegetation clearing and landcover disturbance during construction. • Pollution of Northern Zululand Mistbelt Grassland due to the mishandling of hazardous substances and/or improper maintenance of machinery during construction e.g. oil and diesel leaks and spills. **Residual Impacts**: Small, localised impacts to Northern Zululand Mistbelt Grassland.	**MEDIUM**	**Refer to section 7of Appendix E2 for general mitigations on:** • 7.2.4. Method Statements for working in sensitive ecosystems • 7.2.5. Runoff, erosion and sediment control • 7.2.6. Hazardous substances / materials management • • 7.2.7. Invasive Alien Plant control • • 7.2.9. Noise, dust and light pollution minimisation • • 7.2.10. General rehabilitation guidelines • • 7.2.11. Construction phase monitoring measures	**LOW**
Impact 2: Impacts to terrestrial biota / species **(Louwsburg CCS RS Tower)** **Nature:** **a) Direct ecosystem destruction and modification impacts** • Fauna displacement and/or flora and fauna fatalities during planned direct impacts to Northern Zululand Mistbelt Grassland habitat for pylon establishment. • Fauna displacement and/or flora and fauna fatalities during planned direct impacts to Northern Zululand Mistbelt Grassland/secondary grassland habitat for access road establishment. • Fauna displacement and/or flora and fauna fatalities as a result of accidental direct	**MEDIUM**	**Refer to section 7of Appendix E2 for general mitigations on:** • 7.1.1 Tower Location and Design Recommendations • 7.1.2. Tower Access and Service Roads • 7.2.1. Tower Access and Haulage Roads • 7.2.2. Threatened and Protected Plant Search and Rescue • 7.2.3. Demarcation of 'No-Go' areas and construction corridors • 7.2.4. Method Statements for working in sensitive ecosystems • 7.2.8. Prohibitions related to animals • 7.2.10. General rehabilitation guidelines • 7.2.11. Construction phase monitoring measures	**MEDIUM-LOW**

NATURE OF POTENTIAL IMPACT/RISK	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
impacts to Northern Zululand Mistbelt Grassland habitat by heavy machinery during construction i.e. poorly planned access roads. **b) Indirect ecosystem disturbance impacts** • Erosion and/or sedimentation of Northern Zululand Mistbelt Grasslanddue to soil and vegetation clearing and landcover disturbance during construction. • Pollution of Northern Zululand Mistbelt Grasslanddue to the mishandling of hazardous substances and/or improper maintenance of machinery during construction e.g. oil and diesel leaks and spills. **Residual Impacts**: Negligible residual impacts if all mitigation measures are implemented effectively and important biota effectively rescued and removed.		**Refer to section 7of Appendix E2 for general mitigations on:** • 7.2.4. Method Statements for working in sensitive ecosystems • 7.2.5. Runoff, erosion and sediment control • 7.2.6. Hazardous substances / materials management • • 7.2.7. Invasive Alien Plant control • • 7.2.9. Noise, dust and light pollution minimisation • • 7.2.10. General rehabilitation guidelines • • 7.2.11. Construction phase monitoring measures	**LOW**
Impact 2: Impacts to terrestrial biota / species **(Louwsburg DPW Tower)** **Nature:** **c) Direct ecosystem destruction and modification impacts** • Fauna displacement and/or flora and fauna fatalities during planned direct impacts to Northern Zululand Mistbelt Grassland habitat for pylon establishment. • Fauna displacement and/or flora and fauna fatalities during planned direct impacts to Northern Zululand Mistbelt Grassland/secondary grassland habitat for access road establishment. • Fauna displacement and/or flora and fauna fatalities as a result of accidental direct impacts to Northern Zululand Mistbelt Grassland habitat by heavy machinery during construction i.e. poorly planned access roads. **d) Indirect ecosystem disturbance impacts** • Erosion and/or sedimentation of Northern Zululand Mistbelt Grasslanddue to soil and vegetation clearing and landcover disturbance during construction. • Pollution of Northern Zululand Mistbelt Grasslanddue to the mishandling of hazardous	**MODERATELY HIGH**		**MEDIUM**

NATURE OF POTENTIAL IMPACT/RISK	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
substances and/or improper maintenance of machinery during construction e.g. oil and diesel leaks and spills. **Residual Impacts**: Negligible residual impacts if all mitigation measures are implemented effectively and important biota effectively rescued and removed.			
Impact 3: Impacts to local and regional landscape ecological processes **Nature:** **1. Direct ecosystem destruction and modification impacts** • Ecosystem fragmentation during planned direct impacts to Northern Zululand Mistbelt Grassland for tower establishment. • Ecosystem fragmentation during planned direct impacts to Northern Zululand Mistbelt Grassland for access road establishment. • Fauna displacement and/or fatalities as a result of accidental direct impacts to Northern Zululand Mistbelt Grassland by heavy machinery during construction i.e. poorly planned access roads. **2. Indirect ecosystem disturbance impacts** • Flora and fauna stress and/or fatalities as a result of erosion and/or sedimentation of Northern Zululand Mistbelt Grassland due to soil and vegetation clearing and landcover disturbance during construction. • Flora and fauna stress and/or fatalities as a result of pollution of Northern Zululand Mistbelt Grassland due to the mishandling of hazardous substances and/or improper maintenance of machinery during construction e.g. oil and diesel leaks and spills. **Residual Impacts**: none	**LOW**	**Refer to section 7of Appendix E2 for general mitigations on:** • 7.1.1. Tower Location and Design Recommendations • 7.1.2. Tower Access and Service Roads • 7.2.1. Tower Access and Haulage Roads • 7.2.2. Threatened and Protected Plant Search and Rescue • 7.2.3. Demarcation of 'No-Go' areas and construction corridors • 7.2.4. Method Statements for working in sensitive ecosystems • 7.2.8. Prohibitions related to animals • 7.2.10. General rehabilitation guidelines • 7.2.11. Construction phase monitoring measures	**LOW**

NATURE OF POTENTIAL IMPACT/RISK	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
OPERATIONAL PHASE			
Impact 1: Impacts to terrestrial vegetation communities and habitat **(Louwsburg CCS RS Tower)** **Nature** **1a) Direct ecosystem destruction and modification impacts** Accidental direct impacts to Grassland by heavy machinery during repair and maintenance i.e. poorly planned access roads. **1b) Indirect ecosystem disturbance impacts** • Erosion and/or sedimentation of Grassland due to soil and vegetation clearing and landcover disturbance during repair and maintenance. • Pollution of Grassland due to the mishandling of hazardous substances and/or improper maintenance of machinery during repair and maintenance. **Cumulative Impacts**: Negligible residual impacts to primary grassland if the recommended mitigation measures are effectively implemented.	**MEDIUM-LOW**	**Refer to section 7of Appendix E2 for general mitigations on:** • 7.3.1. Maintenance and management • 7.3.2. Monitoring	**LOW**

NATURE OF POTENTIAL IMPACT/RISK	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
Impact 1: Impacts to terrestrial vegetation communities and habitat **(Louwsburg DPW Tower)** **Nature** **1a) Direct ecosystem destruction and modification impacts** Accidental direct impacts to Northern Zululand Mistbelt Grassland by heavy machinery during repair and maintenance i.e. poorly planned access roads. **1b) Indirect ecosystem disturbance impacts** • Erosion and/or sedimentation of Northern Zululand Mistbelt Grassland due to soil and vegetation clearing and landcover disturbance during repair and maintenance. • Pollution of Northern Zululand Mistbelt Grassland due to the mishandling of hazardous substances and/or improper maintenance of machinery during repair and maintenance. **Cumulative Impacts**: Negligible residual impacts to Northern Zululand Mistbelt Grassland if the recommended mitigation measures are effectively implemented.	**MEDIUM-HIGH**	**Refer to section 7of Appendix E2 for general mitigations on:** • 7.3.1. Maintenance and management • 7.3.2. Monitoring	**MEDIUM**

NATURE OF POTENTIAL IMPACT/RISK	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
Impact 2: Impacts to terrestrial biota / species (Louwsburg CCS RS Tower) **Nature** **a) Direct ecosystem destruction and modification impacts** Fauna displacement and/or fatalities as a result of accidental direct impacts to Northern Zululand Mistbelt Grassland habitat by heavy machinery during repair and maintenance i.e. poorly planned access / service roads. **b) Indirect ecosystem disturbance impacts** • Flora and fauna stress and/or fatalities as a result of erosion and/or sedimentation of Northern Zululand Mistbelt Grassland habitat due to soil and vegetation clearing and landcover disturbance during repair and maintenance. • Flora and fauna stress and/or fatalities as a result of pollution of Northern Zululand Mistbelt Grassland habitat due to the mishandling of hazardous substances and/or improper maintenance of machinery during repair and maintenance. **Residual Impacts**: Negligible residual impacts if all mitigation measures are implemented effectively.	**MEDIUM-LOW**	**Refer to section 7of Appendix E2 for general mitigations on:** • 7.1.1. Tower Location and Design Recommendations • 7.1.2. Tower Access and Service Roads • 7.3.1. Maintenance and management • 7.3.2. Monitoring	**LOW**

NATURE OF POTENTIAL IMPACT/RISK	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
Impact 2: Impacts to terrestrial biota / species (Louwsburg DPW Tower) **Nature** **a) Direct ecosystem destruction and modification impacts** Fauna displacement and/or fatalities as a result of accidental direct impacts to Northern Zululand Mistbelt Grassland habitat by heavy machinery during repair and maintenance i.e. poorly planned access / service roads. **b) Indirect ecosystem disturbance impacts** • Flora and fauna stress and/or fatalities as a result of erosion and/or sedimentation of Northern Zululand Mistbelt Grassland habitat due to soil and vegetation clearing and landcover disturbance during repair and maintenance. • Flora and fauna stress and/or fatalities as a result of pollution of Northern Zululand Mistbelt Grassland habitat due to the mishandling of hazardous substances and/or improper maintenance of machinery during repair and maintenance. **Residual Impacts**: Negligible residual impacts if all mitigation measures are implemented effectively.	**MEDIUM-HIGH**	**Refer to section 7of Appendix E2 for general mitigations on:** • 7.1.1. Tower Location and Design Recommendations • 7.1.2. Tower Access and Service Roads • 7.3.1. Maintenance and management • 7.3.2. Monitoring	**MEDIUM-LOW**
Impact 3: Impacts to local and regional landscape ecological processes **Nature:** **a) Direct ecosystem destruction and modification impacts** • Fauna displacement and/or fatalities as a result of accidental direct impacts to Northern Zululand Mistbelt Grassland by heavy machinery during dismantling and rehabilitation i.e. poorly planned access roads. **b) Indirect ecosystem disturbance impacts** • Flora and fauna stress and/or fatalities as a result of erosion and/or sedimentation of	**LOW**	• 7.1.1. Tower Location and Design Recommendations • 7.1.2. Tower Access and Service Roads • 7.3.1. Maintenance and management • 7.3.2. Monitoring	**LOW**

NATURE OF POTENTIAL IMPACT/RISK	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
Northern Zululand Mistbelt Grassland due to soil and vegetation clearing and landcover disturbance during repair and maintenance. • Flora and fauna stress and/or fatalities as a result of pollution of Northern Zululand Mistbelt Grassland due to the mishandling of hazardous substances and/or improper maintenance of machinery during repair and maintenance. **Residual Impacts**: none		• 7.1.3. Service Road Stormwater Management • 7.3.2. Monitoring	

7.3.3 Avifauna Impact Assessment

NATURE OF POTENTIAL IMPACT/RISK	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
CONSTRUCTION PHASE IMPACTS			
Impact 1: Displacement of SCC and non-SCC priority species as a result of disturbance. Excavation and construction activities are a source of significant disturbance particularly as a result of the machinery and construction personnel that are present on site for the duration of the construction. For most bird species, construction activities are likely to be a cause of temporary disturbance impacting on foraging, and roosting behaviours but in more extreme cases, construction may impact on the breeding success of certain species particularly if the disturbance happens during a critical part of the breeding cycle, resulting in temporary breeding failure or permanent nest abandonment. The development area is already subjected to a degree of disturbance in the form of settlement, and pastoral activities, the existing power line network, in addition to vehicle and pedestrian traffic. Construction activities within the study are likely to result in the temporary displacement as opposed to permanent displacement of species from the area.	**MEDIUM**	• Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of priority species. • Measures to control noise should be applied according to current best practice in the industry.	**LOW**
OPERATIONAL PHASE IMPACTS			
Impact 1: Potential collisions with the Towers **(Louwsberg CCS RS tower)** **Nature:** Potential collision hazard posed to large flying birds, especially threatened species in an area characterized by a high diversity and large numbers of such species, by the construction of a 60 m tall telecommunication tower on a 'greenfields' site on a hilltop adjacent to Ithala Game Reserve near Louwsberg, KZN.	**HIGH**	It would seem fatally flawed from an avifaunal perspective to contemplate erecting a new tower at this 'greenfields' location which is situated directly adjacent to Ithala Nature Reserve (70 m from the border), close to a sheer escarpment (400 m distant), in an area characterised by low cloud and mist, and which supports a high diversity and large numbers of large flying birds, including threatened species, attracted to flying along such elevated escarpments and vulnerable to collisions. It would also fly in the face of the recommendation that such towers should be clustered together in 'tower farms', as it would create a third separate tower location on the Louwsberg Mountain.	**MEDIUM**

NATURE OF POTENTIAL IMPACT/RISK	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
Residual risks: There would still be some residual risk even if the mitigation measure of ensuring the absence of lateral support cables was implemented, a measure considered insufficient in any event, as large flying birds could still collide with the tower itself especially under conditions of low visibility, e.g. in mist.		**The only potentially relevant mitigation measure would be to ensure that the tower not require lateral support cables, which would still be considered an insufficient measure.**	
Impact 2: Potential collisions with the Towers **(Louwsberg DPW tower)** **Nature:** Potential collision hazard posed to large flying birds, especially threatened species in an area characterized by a high diversity and large numbers of such species, by the construction of a 70 m tall telecommunication tower at a site with an existing tower on a hilltop within Ithala Game Reserve near Louwsberg, KZN. **Residual risks**: Co-location of the communication equipment on the existing tower at this site would eliminate any danger of residual risks.	**HIGH**	• The only sustainable way this site option can be used is to place the communication equipment on the existing tall tower at this site ('co-location'). • It would seem fatally flawed from an avifaunal perspective to contemplate erecting a new tower at this location which is situated in Ithala Nature Reserve, directly adjacent to a sheer escarpment, in an area characterised by low cloud and mist, and which supports a high diversity and large numbers of large flying birds, including threatened species, attracted to flying along such elevated escarpments and vulnerable to collisions. • This is despite the advantage of 'clustering' this tower next to an existing tower in a 'tower farm'. The only other potentially relevant mitigation measure would be to ensure that the tower not require lateral support cables, which would still be considered an insufficient measure.	**MEDIUM**
Impact 3: Potential hazard from servicing powerline **Nature:** Potential collision and electrocution hazard posed to large flying birds, especially threatened species in an area characterized by a high diversity and large numbers of such species, by the existing or any new powerline constructed to service a telecommunication tower at site with an existing tower on a hilltop in Ithala Nature Reserve, near Louwsberg, KZN. **Residual risks:** There will be some residual risk even if the mitigation measures are implemented as large flying birds could still collide with the overhead lines, especially under conditions of low visibility, e.g. in mist. Placing the powerlines underground though would carry no residual risk.	**MEDIUM**	• Mitigation against collison would involve fitting bird diverters ('flappers' and/or 'coils' to the overhead lines at 2 m intervals. Mitigation against electrocution would involve careful pylon design and insulation, e.g. the use of 'raptor protector' devices. Consideration could also be given to burying the powerline, especially in the higher-altitude section of the line closest to the existing tower. • Cumulative impacts: Potential cumulative impacts that could translate into population level impacts on affected populations of large birds, especially threatened species, are indeed of great relevance and concern here due to the widespread and accelerating proliferation of powerlines, including those servicing communication towers situated on highly sensitive elevated positions in the landscape, across the South African landscape. This renders the mitigation measures even more imperative.	**LOW**

7.3.4 Heritage & Palaeontological Impact Assessment

NATURE OF POTENTIAL IMPACT/RISK	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
CONSTRUCTION PHASE IMPACTS			
Impact 1: Direct or physical impacts, implying alteration or destruction of heritage features **Nature**: As no sites, features or objects of cultural heritage significance were identified on the project area, there would be no impact as a result of the proposed development	**LOW**	• Known sites should be clearly marked in order that they can be avoided during construction activities. • The contractors and workers should be notified that archaeological sites might be exposed during the construction activities. • Should any heritage artefacts be exposed during excavation, work on the area where the artefacts were discovered, shall cease immediately and the Environmental Control Officer shall be notified as soon as possible; • All discoveries shall be reported immediately to a heritage practitioner so that an investigation and evaluation of the finds can be made. Acting upon advice from these specialists, the Environmental Control Officer will advise the necessary actions to be taken; • Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site; and • Contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or palaeontological artefacts, as set out in the National Heritage Resources Act (Act No. 25 of 1999), Section 51. (1).	**LOW**
Impact 2: Destruction, Damage & Loss of fossil material The sources of these impacts include the, the removal of vegetation, sealing-in or destruction of fossils, and digging of foundations. This activity is particularly significant where tower is constructed.	**LOW**	• Footprint of tower foundation should be as small as possible • The following should be conserved: if any palaeontological material is exposed during clearing, digging, excavating, drilling or blasting, SAHRA must be notified. All development activities must be stopped and a palaeontologist should be called in to determine proper mitigation measures. • Condition in which development may proceed: It is further suggested that a Section 37(2) agreement of the Occupational, Health and Safety Act 85 of 1993 is signed with the relevant contractors to protect the environment (fossils) and adjacent areas as well as for safety and	**LOW**

NATURE OF POTENTIAL IMPACT/RISK	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
		security reasons.	
OPERATIONAL PHASE IMPACTS			
Impact 1: Loss or damage to sites, features or objects of cultural heritage significance **Nature:** A number of historic features are known to exist in the project area. These, irrespective of their state of conservation, enjoy general protection under the Heritage Act as they might be older than 60 years	**MEDIUM**	• (1) Avoidance/Preserve: It is recommended that the tower site is moved at least 100m to the west, north or south of the present position. • The burial site should be fenced off by means of a wire fence or danger tape with a buffer zone of at least 50m for the duration of construction activities.	**LOW**

7.3.5 Visual Impacts Assessment

NATURE OF POTENTIAL IMPACT/RISK	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
CONSTRUCTION PHASE IMPACTS			
Impact 1: Severity of impacts on 1) observers (OB) i.e. Residents inside Zone of Maximum Visual Exposure (ZMVE) and Tourists inside ZMVE **Nature of impact**: Residents in the study area are generally classified as visual receptors of high sensitivity owing to their sustained visual exposure and attentive interest towards their living environment. The highest concentration residents are present in Louwsburg which is within the ZMVE. Both sites will cause some areas to experience partial views of the towers as a result of topographic screening. CCS RS site indicates a marginally higher visual exposure in the town of Louwsburg due to its location nearer to the town. Garden vegetation is expected to provide significant localised screening, which will potentially reduce visual exposure. Tourists are generally classified as observers with a high sensitivity when their reason for visiting the area is focussed on enjoying the visual quality and engaging in outdoor activities that are offered by the study area's natural landscape. The Ithala Nature Reserve offers tourist opportunities to enjoy panoramic scenery and engage with nature. A prominent backdrop and ridgeline are created by the Ngotshe Mountain along the southern boundary of the reserve. Lodges and other forms of accommodation provide overnight facilities along with game drives and hikes. Two lookout points are located in the reserve, namely Phuzamoya and Horace Rall. Both overlook the reserve, and due to the elevated location, offers panoramic views across large parts of the study area.	**MEDIUM**	• **1. Avoidance** 1.1. Avoid constructing a new tower by co-locating the telecommunication radio infrastructure on an existing tower thereby significantly reducing the risk sources and associated impacts. • **2. Reduction** 2.1. Minimise the disturbance footprint by clearly marking the working area and thereby limiting construction activities within a dedicated area. 2.2. Locate the lay-down area and construction camp in an area that is already disturbed, for example in the forested areas on the foot slopes of the mountain. • **3. Remediation** 3.1. Erect a 2-3m high, temporary screen around the construction site with a material that simulates the vegetation's colour and texture, for example camouflage netting, to restrict visibility. 3.2. Keep the construction site neat and clean. Dispose all waste material in suitably closed containers and remove off site at regular intervals. 3.3. Rehabilitate the disturbed area as soon as possible to minimise the impact of exposed soil and re-establish a vegetation cover.	**LOW**

NATURE OF POTENTIAL IMPACT/RISK	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
Residual Risks: Residual risks can be effectively reduced if the proposed mitigation measures are implemented, in particular the sharing of a single tower with other service providers. Other mitigation measures are cosmetic and will have limited effects.			
Impact 2: Severity of impacts on observers (OB) (i.e. Residents & tourist outside ZMVE & Motorist) **Nature of impact**: The construction phase will introduce new elements to the visual environment, for example construction equipment, which are otherwise uncharacteristic within the context of the site, in specific the top of the Ngotshe Mountain. The existing vegetation cover within the footprint of the construction operations, will be damaged/removed and the underlaying soil will be exposed due to earthworks. This will cause the removal of the plant cover that is part of the baseline character of the site. Unsightly scarring of the landscape will negatively impact on the visual quality of the visual resource and the pristine nature of the site. Visual intrusion can be expected due to unsightly construction activities and the interference with views by the surrounding observers. The early construction activities which involve the base preparations, are expected to have a limited ZVI and will only influence observers that visit the top of Ngotshe Mountain for example visitors to the Louwsburg cemetery or tourists to the Horace Rall lookout point. As the tower construction extends in height, the ZVI will increase and affect observers Louwsburg and Ithala Nature Reserve. Visual intrusion will be experienced as a result of uncharacteristic activities and features which is in contrast with the existing landscape character. The scenic attributes associated with the Ngotshe Mountain will be temporarily blemished until	**LOW**	• Minimise the disturbance footprint by clearly marking the working area and thereby limiting construction activities within a dedicated area. • Locate the lay-down area and construction camp in an area that is already disturbed, for example in the boundaries of the Duma Substation. • Construct the substation and tower at the same time to avoid extended construction phases. • Erect a 2-3m high, temporary screen around the construction site with a material that simulates the vegetation's colour and texture, for example camouflage netting, to restrict visibility. • Keep the construction site neat and clean. Dispose all waste material in suitably closed containers and remove off site at regular intervals.	**VERY LOW**

NATURE OF POTENTIAL IMPACT/RISK	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
construction is completed. **Residual Risks:** Residual risks will occur and remain as impacts, as the visual intrusion and impact on the landscape character cannot be effectively mitigated, unless major layout or design changes are made.			
Impact 3: Severity of impacts on the Landscape character (LC) **Nature of impact**: Despite the elevated location of the tower sites and the physical height of the proposed towers, the study area is considered to have a high VAC, mostly as a result of the high level of topographical screening as indicated in Figure 23 & Figure 24. Topographical screening and additional screening from the landcover elements, minimise visual exposure of some sensitive viewers inside the ZMVE and between 2-5 km from the source of impact, with the exception of Louwsburg residents, tourists visiting Horace Rall lookout point, and tourists on a game drive on the Ngubhu Loop route in the DPW site scenario. Dense natural vegetation in the low lying areas of the Ithala Nature Reserve and the established gardens in the town of Louwsburg and surroundings provide localised screening. These factors will increase the screening capacity of the landscape and reduce visual exposure to the tower. A high degree of inter-visibility between adjacent landscapes are expected due to the elevated location of the tower sites. This is also confirmed by the viewshed analyses, although the argument with regards to the increased screening capacity due to the land cover conditions, also applies in this case. The reduced visibility of objects over distance as discussed in Section 3.2, will also reduce the effect of the degree of inter-	**MEDIUM**	• Minimise the disturbance footprint by clearly marking the working area and thereby limiting construction activities within a dedicated area. • Locate the lay-down area and construction camp in an area that is already disturbed, for example in the boundaries of the Duma Substation. • Construct the substation and tower at the same time to avoid extended construction phases. • Erect a 2-3m high, temporary screen around the construction site with a material that simulates the vegetation's colour and texture, for example camouflage netting, to restrict visibility. • Keep the construction site neat and clean. Dispose all waste material in suitably closed containers and remove off site at regular intervals.	**MEDIUM**

NATURE OF POTENTIAL IMPACT/RISK	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
visibility.. **Residual Risks:** Residual risks can be effectively reduced if the proposed mitigation measures are implemented, in particular the sharing of a single tower with other service providers. Other mitigation measures are cosmetic and will have limited effects.			
OPERATIONAL PHASE			
Impact 1: Severity of impacts on observers (OB) and landscape character (LC) **Nature of impact**: The completed project will introduce another tower on the Ngotshe Mountain, thereby altering the horizon line and impacting on the landscape character. The horizon line will feature one additional tower thereby increasing the visual dominance of tower infrastructure by clustering two towers in close proximity. The presence of another tower will blemish the scenic attributes of the Ngotshe Mountain and contrast with its predominantly natural character, although the baseline character already features an existing tower. A visual change will be noticeable and will cause visual intrusion on the observers within the ZMVE. The tower is considered a relatively tall but slender structure and adding its elevated location, has a large potential ZVI. A mitigating factor is its slender, lattice structure that has a relatively small "visual footprint" and becomes increasingly more difficult to detect over distances further than 5km. **Residual Risks:** Residual risks will occur and remain as impacts as the visual intrusion and impact on the landscape character cannot be effectively mitigated, unless major layout or design changes are made.	**MEDIUM**	• **1. Avoidance** 1.1. Avoid erecting an additional tower on the Ngotshe Mountain by co-locating services on a single existing tower. This will cause a minimal visual change and therefore reduce impacts to insignificant levels; • **2. Reduction** 2.1. Erect the proposed tower but negotiate with other service providers to dismantle their tower/s and co-locate services on a single new tower. 2.2. Restrict the height of the tower to the minimum effective operating height. • **3. Remediation** 3.1. Consider painting the tower with muted colours of grey and blue to resemble the background colour of the sky. This can only be considered if it complies with South African Civil Aviation Authority regulations.	**MEDIUM**

NATURE OF POTENTIAL IMPACT/RISK	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
Risk of obtrusive lighting: Red lights will be installed at the top and halfway down the tower. The specification for these lights is according to SACAA requirements and specify low intensity lights on each leg of the tower at a luminous intensity of 32cd. The rural environment in which the towers are proposed have low lighting conditions due to the widely distributed and low-density development. The addition of more lights will cause a slight visual change, but no obtrusive lighting conditions will be created, therefore the risk of obtrusive lighting is very improbable. In addition, there is an inverse relationship between distance and light intensity - as the distance increases, light intensity decreases.			

7.3.6 Agriculture Potential Impact Assessment

NATURE OF POTENTIAL IMPACT/RISK	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
CONSTRUCTION PHASE IMPACTS			
Impact 1: Loss of agricultural land (land that is no longer able to be utilized due to construction) **Nature:** Construction activities, Vehicle operation on site, Dust generation and the creation of access roads. **Indirect Impacts:** Overall loss of farmland, income and change in livelihood **Cumulative Impacts:** Tower footprints are limited in spatial extent and once in place do not lead to additional spatial or land use impacts.	**LOW**	The site areas are not of commercial agriculture value. The project requires about 900 m2 footprint per project site which will not have any major significant impact on land availability for agricultural production in the future.	**LOW**
OPERATIONAL PHASE IMPACTS			
Operation of the Tower Loss of agricultural production	**LOW**	• Tower footprints and infrastructure are permanent and cannot be mitigated	**LOW**

7.3.7 Social Impacts Assessment

NATURE OF POTENTIAL IMPACT/RISK	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
CONSTRUCTION PHASE IMPACTS			
Construction and operation activities of the Tower **Direct Impacts:** Inflow of Workers **Indirect Impacts:** The influx of outsiders to an area is also almost always perceived to increase the crime levels in such an area. One could therefore assume that security concerns would be prevalent among the local residents. **Cumulative Impacts:** Construction workers remaining in the larger area once this development has been completed.	**LOW**	• Local labourers should be employed where possible. • Labourers should remain at their existing residences. No workers should thus be accommodated on site at night. The erection of a construction camp where workers would be housed would not be recommended. • Before construction commences, representatives from the municipality, other community leaders (e.g. councillors) and as well as management structures of the security villages and complexes, as well as residential areas should be informed of the details of the contractors, size of the workforce and construction schedules. • The contractor should make certain that the "outside" workforce carry identification tags or uniforms to be easily identifiable. It should furthermore be ensured that the inflow of workers and their presence in the local communities do not create conflict in the surrounding communities. • Local community organisations and policing forums / neighbourhood watches must be informed of the presence of an outside workforce (where relevant).	**LOW**
Construction and operation activities of the Tower **Direct Impacts:** Employment Opportunities **(positive)** **Indirect Impacts:** Construction workers remaining in the larger area once this development has been completed. **Cumulative Impacts:** Construction workers remaining in the larger area once this development has been completed.	**LOW**	Enhancements: • The use of local labour should be maximised where possible. • Local people could be employed during the construction phase as Community Liaison officers. • Eskom and the appointed contractors should promote capacity building through skills development. • Eskom and the appointed contractors should create conditions that are conducive for the involvement of entrepreneurs, small businesses and SMME's during the construction and operational process. • Tender documentation should contain guidelines for the involvement of labour, entrepreneurs, businesses and SMME's from the local sector.	**MEDIUM**

NATURE OF POTENTIAL IMPACT/RISK	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
Construction and operation activities of the Tower **Direct Impacts:** Impact on Sense of Place **Indirect Impacts:** Possible negative visual change in the landscape character **Cumulative Impacts:** Possible impact on overall visual environment due to various the presence of the Tower infrastructure within the study area	**LOW**	• Construction sites should be screened from the property owners and mtorists where possible. • Stockpiling of soil should be as short as possible and construction debris should be removed as soon as construction activities allow. • Construction sites should be rehabilitated as soon as planning allows • Tower placements should preferably be as far from dwellings as possible	**LOW**

7.4 Do Nothing Alternative Assessment

No go Alternative (compulsory). This is the alternative of not developing the 2x Greenfield Telecommunication Tower. This alternative will result in limited construction impacts already occurring in the study area. The proposed telecommunication mast would serve as voice, data as well as other telecommunications and ancillary services for Eskom staff and contractors for the Duma Substation However, should the infrastructure not be developed as proposed, Eskom cannot provide this service to Transnet., in order for Eskom to provide the necessary communication services for its infrastructures it is imperative that there are reliable and effective communications systems in place to provide the necessary services to the substation. Services like tele-protection, tele-control, switched voice, direct voice and hot lines as well as data services like Ethernet connectivity. This is an undesirable alternative for the project as it will pose negative impacts from the social and economic perspective and is not considered desirable. The negative impacts of the no go alternative are considered to outweigh the positive impacts of this alternative. The no go alternative is therefore not preferred.

Table 13: Do Nothing Alternative Assessment

Potential impacts:	**Significance rating of impacts (positive or negative):**	**Proposed mitigation:**	**Significance rating of impacts after mitigation:**	**Risk of the impact and mitigation not being implemented**
Impact to possible wetland – No-go would mean study site status quo is maintained.	P – High	There are no mitigation measures	P – Low	Low risk
Impacts to terrestrial vegetation communities and habitat: Destruction and modification of the Northern Zululand Mistbelt Grassland habitat – No-go would mean study site status quo is maintained.	P – High	There are no mitigation measures	P – Medium	Low risk
Impacts to terrestrial biota / species (flora and fauna): Fauna displacement and/or flora and fauna fatalities – No-go would mean study site status quo is maintained.	P – Medium	There are no mitigation measures	P – Medium	Low risk
Potential increase in alien and invasive vegetation – No-go would mean study site status quo is maintained.	P – Medium	There are no mitigation measures	P – Medium	Low risk
Impacts to local and regional landscape ecological processes through Ecosystem fragmentation to Northern Zululand Mistbelt Grassland and Fauna displacement and/or fatalities – No-go would mean study site status quo is maintained.	P – Low	There are no mitigation measures	P – Low	Low risk

Contamination of fauna environment through use and storage of hazardous substances, littering and dumping of waste – No-go would mean study site status quo is maintained.	P – Low	There are no mitigation measures	P – Low	Low risk
Displacement of SCC and non-SCC priority species as a result of habitat loss & transformation – No-go would mean study site status quo is maintained.	P – Low	There are no mitigation measures	P – Low	Low risk
Potential collisions with proposed Duma RS tower – No-go would mean study site status quo is maintained.	P – Low	There are no mitigation measures	P – Low	Low risk
Loss and disturbance of heritage sites due to the development – No-go would mean study site status quo is maintained.	P – Low	There are no mitigation measures	P – Low	Low risk
Loss and disturbance to palaeontology due to the development – No-go would mean study site status quo is maintained.	P – Low	There are no mitigation measures	P – Low	Low risk
Visual – No-go would mean study site status quo is maintained.	P – Low	There are no mitigation measures	P – Low	Low risk
Dust generation – No-go would mean study site status quo is maintained.	P – High	There are no mitigation measures	P – High	Low risk
Crime, safety and security: during construction – No-go would imply that the area remains as is.	P – High	There are no mitigation measures	P – High	Low risk
Noise – No-go would imply no construction noise.	P – High	There are no mitigation measures	P – High	Low risk
Traffic and accessibility – No-go would imply no impact to traffic and accessibility.	P – Medium	There are no mitigation measures	P – Medium	Low risk
Pollution due to inappropriate handling of generated waste on site – No-go would mean study site status quo is maintained.	P – High	There are no mitigation measures	P – High	Low risk
Hazardous substance spillages anticipated during the operational period – No-go would mean study site status quo is maintained.	P – High	There are no mitigation measures	P – High	Low risk
Socioeconomic impacts anticipated during the construction period – No-go would mean no local job opportunities for general and skilled labourers as well as no opportunities for local retailers.	N – High	The development of the substation will provide job opportunities for locals and for local retailers.	N – High	High risk
Socioeconomic impacts anticipated during the operational period – No-go would mean that	N – High	By providing electricity to the	N – High	High risk

overall community upliftment will not occur.		local communities in the area, overall upliftment in these areas will occur as a basic need is being met.		

7.5 Cumulative Impacts Assessment

From a visual perspective, a risk of cumulative impacts is highly likely as the CCS RS and DPW sites are in close proximity to an existing tower. A cluster of two towers will be introduced, thereby increasing the visual dominance of tower infrastructure and changes to the mountain's horizon line is expected. Cumulative impacts can only be effectively reduced with the implementation of co-locating which will have the greatest reduction in cumulative impacts.

In terms of the avifauna, Potential cumulative impacts that could translate into population level impacts on affected populations of large birds, especially threatened species, are indeed of great relevance and concern here due to the widespread and accelerating proliferation of communication towers across the South African landscape.

From a **Fauna & Flora perspective**, in terms of cumulative impacts, the grassland at and surrounding the new tower site is representative of Northern Zululand Mistbelt Grassland, and forms part of a buffer zone to the Ithala Game Reserve, as well as falls within a KZN CBA, highlighting it has conservation value. Therefore, a small deterioration in very small area of grassland is predicted.

In terms of cumulative impacts, the grassland in the vicinity of the existing towers and at the new tower site is disturbed but in fair condition and representative of Northern Zululand Mistbelt Grassland. Furthermore, the grassland is protected and currently contributes to meeting conservation targets. Therefore, a small impact to and localised degradation of primary grassland will take place that would result in a small deterioration in grassland that is currently meeting targets. It is however also important to note that there are already three towers present on the hilltop adjacent to the site and that there is a possibility of siting the new tower within the existing disturbance footprint. Nonetheless, a small impact is assumed.

8 CONCLUSIONS AND RECOMMENDATIONS

The previous chapters of this report together with the specialist studies contained within **Appendix E** provide a detailed assessment of the potential impacts that may result from the proposed project. This chapter concludes the Basic Assessment Report for the proposed Towers by providing a summary of the conclusions of the assessment of the proposed powerline. In so doing, it draws on the information gathered as part of the BA process and the knowledge gained by the environmental specialist consultants and presents an informed opinion of the environmental impacts associated with the proposed project. Potential impacts which could occur as a result of the proposed project are summarised in the sections which follows.

8.1. Summary of Specialists findings

The specialist findings are summarised as follows:

Aquatic and Wetland Impact Assessment

A total of two watercourses were identified and mapped within 500m of the Lowsburg CCS RS Tower site (proposed site) The closest stream is located 321m to the south-west of the tower site and the closest wetlands is located 395m to the north. These watercourses are unlikely to be impacted by the project activities for the following reasons: The very small impact footprint and radius of worst-case indirect impacts of the tower project; the large distance between the tower site and the nearest watercourses.

A total of nine watercourses were identified and mapped within 500m of the Louwsburg DPW site (Alternative site). The closest stream is located 268m to the west of the tower site and was not accessible due to steep topography. The site visit confirmed that no watercourses occurred within 100m of the development site. Watercourses within the larger 500m buffer are unlikely to be impacted by the project activities for the following reasons: The very small impact footprint and radius of worst-case indirect impacts of the tower project; the large distance between the tower site and the nearest watercourse. In line with the requirements of the Department of Water and Sanitation (DWS), a risk assessment was done to formally confirm the low risk status of the two tower options. For both options, all potential risks were assessed as being low under a good mitigation scenario. Considering a low risk, a General Authorisation will be applicable. This will need to be confirmed with the DWS.

Terrestrial Biodiversity (vegetation and Fauna)

The proposed site (Louwsburg CCS RS Tower) is located outside of Ithala Game Reserve, the proposed tower will likely result in small, localised direct and indirect impacts to disturbed primary grassland representative of the endangered Northern Zululand Mistbelt Grassland type, and possibly to several threatened, rare and protected plant species. Impacts to the vegetation and to threatened flora and fauna were assessed under a good mitigation scenario, can be **reduced to low.** The Alterative site (Louwsburg DPW Tower) located inside Ithala Game Reserve, impacts to the vegetation and to threatened flora and fauna were assessed as being of low to moderately high significance under a poor mitigation scenario. The moderately-high rating is driven by the presence of degraded but primary grassland within and surrounding the tower site that could recover with management. With strict and effective implementation of the mitigation measures recommended under a good mitigation scenario, the significance of direct impacts vegetation and threatened biota (excluding avifauna) can be **reduced to moderate** with the remaining impacts reduced to low or moderately low.

Avifauna Impact Assessment

The Louwsberg DPW and CCR RS tower options are both of significant avifaunal concern relevant to collisions, especially the former option due to its location directly adjacent to a sheer escarpment favoured as a flight path by large flying birds. Both towers are situated on highly elevated and hence sensitive positions in an area often subject to poor visibility due to low cloud and mist. This area supports threatened bird species, including vultures, vulnerable to collisions with such elevated structures and their associated infrastructure. The DPW option is situated within the Ithala Nature Reserve (and Important Bird and Biodiversity Area) and the CCS RS option is situated just outside (by 70 m) but directly adjacent to this protected area. The DPW option is situated at a location with an existing tower but the CCS RS option would be a 'greenfields' site. The DPW option is 70 m tall, 10 m taller than the CCS RS option, and hence less desirable in this regard. The proposed structures should ideally be tubular monopoles rather than the planned lattice structures but this is not an issue of over-riding concern.

The primary issue to be determined is whether the communication equipment can be co-located on the existing tower at the location of the DPW option. This would remove any cause for significant concern. The construction of new towers at either the DPW or CCS RS options seems fatally flawed due to their proximity to the escarpment edge (and hence increased hazard to flying birds) and their presence within or directly adjacent to a protect area/IBA supporting threatened, and other, bird species vulnerable to collisions. The CCS RS option may appear slightly less undesirable in this regard as it is more distant from the escarpment and is situated just outside the protected area/IBA (as well as being slightly lower in height). However, this is more than counter-balanced by it representing a 'greenfields' site and hence a third separate tower location on the Louwsberg Mountain, flying directly in the face of the recommendation that such towers be 'clustered' in 'tower farms'.

Heritage & Palaeontological Assessment:

This report describes the methodology used, the limitations encountered, the heritage features that were identified and the recommendations and mitigation measures proposed relevant to this. It should be noted that the implementation of the mitigation measures is subject to SAHRA/PHRA's approval.

The area in which the development of the tower will take place can be described as a slowly evolving farming landscape. During the survey no sites, features or objects of cultural heritage significance were identified in the project area. Impact analysis of cultural heritage resources under threat of the proposed development, is based on the present understanding of the development: For the current study, as no sites, features or objects of cultural significance were identified, no mitigation measures are proposed. The alternatives are rated as being either preferred, not-preferred, favourable or no preference.

Visual Assessment

Observers in the study area will be affected differently by the potential impacts, due to their distance away from the source of impact and their sensitivity towards their visual environment. Residents and tourists residing or entering the ZMVE are considered the most sensitive observers in the study area. These are limited to the residents of Louwsburg and visitors to the Ithala Nature Reserve, more particularly, tourists visiting Horace Rall view site or Louwsburg Cemetery.

When comparing the visibility analyses of the two locations **(Figure 24),** DPW site indicates a much larger ZVI in the western parts of the Ithala Nature Reserve as opposed to CCS RS site. This is created due to the location of the DPW site near the western edge of the Ngotshe Mountain, and CCS RS is located further east. None of the two towers will be visible from Ntshondwe Resort which is located at the foot of Ngotshe Mountain, 2 km north of the site locations, but the DPW site's ZVI intersects with a part of the Ngubhu Loop route inside the ZMVE and

again at distances further than 4 km . The other lodges and tourist attractions are located outside the detection zone.

The highest concentration residents are present in Louwsburg which is within the ZMVE of both tower sites. Partial views of a tower on both sites are possible from within Louwsburg, with the CCS RS site having a slightly larger ZVI. Trees and garden vegetation will provide localised screening, but some residents will potentially experience a medium visual exposure. Tourists visiting the Horace Rall look out point or Louwsburg Cemetery will have full views of both the proposed towers, but will also be encountered with views of the existing towers and buildings on the plateau. These tourists/visitors will be in close proximity to the proposed tower for a brief period and will mostly enjoy the view to the north and therefore not have the proposed tower in their sight line. The before mentioned observers will experience a moderate significant visual impact. Tourists visiting the Phuzamoya look out point is outside the ZMVE and although a direct-line-of-sight is possible, the detection of the tower will be exacerbated due to the distance factor. Residents and tourists outside the ZMVE and up to 5 km are expected to experience a moderate/minor impact significance, mainly due to the distance factor considerably reducing the level of visual intrusion. An inherent mitigating factor is the tower's slender, lattice structure that has a relatively small "visual footprint". Viewer incidence is very low due to the low population density outside the ZMVE.

The landscape character will experience a transformation as a result of the more frequent occurrence of tower infrastructure on the mountain top. It will alter the horizon line by introducing a structure that is in contrast with the prevailing natural character of the Ngotshe Mountain. The impact significance is expected to be moderate. It should be acknowledged that the DPW site is located inside the boundary of the Ithala Nature Reserve near the existing tower site. CCS RS is outside the boundary only separated by a fence line. The landscape character is not different between the two locations, but the area inside the reserve is managed according to conservation principles. Impacts can be marginally mitigated during the construction phase, but little can be done to mitigate impacts during the operational phase unless major design changes are considered. One such consideration is the avoidance of a new tower and the co-locating of the telecommunication radios on an existing tower. This is subject to technical and cost-benefit scrutiny by the applicant. An equally effective mitigation measure is the construction of the proposed tower, as well as negotiations with other service providers to dismantle their towers and co-locating services on the new tower. The last mitigation is relocating of the tower in a different location away from sensitive observers and landscapes. These are considered the most effective mitigation measure to address the potential impacts. No fatally flawed issues are identified, and as far as visual and landscape impacts are concerned, the projects do not cause excessive negative impacts. However, the recommended mitigation measures should be considered and implemented as far as possible.

Agricultural Potential Assessment

Although, the area has high potential for agriculture based on the classification indicated in the figure below, the agricultural value of the area is low due to lack of commercial agricultural productivity in the area. The site also has rock forms based on the image above, which will make cultivation difficult. Therefore, based on the fact that the site area has low agricultural productivity level although the land has high agricultural potential, the land can be utilized for the proposed Louwsberg Tower construction. The area required (900 m2) for constructing the tower will not have significant impact on the area available for agriculture.

Social-Economic Impact Assessment

The majority of the negative social impacts anticipated are of a low significance and are anticipated to respond to mitigation. Even though the impacts are thus of importance, mitigation could reduce the negative impacts to acceptable levels.

Although negative social impacts would be experienced, the necessary electrical input into the Transnet railway system is vital. In response to the increased demand for South Africa's coal in the global market place, Transnet needs to increase the volume of coal that is being transported between the Mpumalanga coal fields and the Richard's Bay Coal Terminal. This increase will be facilitated through capital expenditure on two fronts, the supporting infrastructure, i.e. the electrical network supplying the locomotives and the locomotives themselves. In order for Transnet to accomplish the above they need to upgrade their power supply to their various traction substations between Ermelo and Richards Bay to facilitate the introduction of the new, larger locomotives that will be added to increase the volume of coal being transported and exported

8.2. Summary of Impacts

A summary of the impact assessments is presented in **Table 14**; the tables cover the construction and operational impacts. An overall weighted score is provided in each case. Thus far each of the environmental issues are assigned equal weighting (I.e. the weighted score is the average of each of the individual scores. The impact scores are also colour coded according to the following:

< 30	**Low significance**
30 to 60	**Moderate significance**
>60	**High significance**

It must be noted that the impact scores in Table 14 below are not intended to be definitive measures of environmental impact, but they are a useful guide to evaluating the overall environmental performance of a new development and they assist in interpreting key influences of a development. **Most of the impact's significance for both alternatives are similar for the most part, where they differ, this is noted accordingly.**

Table 14: Impact Summary table

CONSTRUCTION PHASE	**Proposed site:** Louwsburg CCS RS Tower		**Alternative site:** Louwsburg DPW Tower	
Environmental Aspect	**Without Mitigation**	**With Mitigation**	**Without Mitigation**	**With Mitigation**
Aquatic and Wetland Impact Assessment				
Physical Disturbance, Erosive water and/ or eroded sediment and Pollutants	Low	Low		
Terrestrial Biodiversity Impact				
Impacts to terrestrial vegetation communities and habitat	Medium	Low	Medium-High	Medium
Impacts to terrestrial biota / species	Medium	Low	Medium-High	Medium
Impacts to local and regional landscape ecological processes	Low	Low		
Avifauna Impact				
Displacement of SCC and non-SCC priority species as a result of disturbance.	Medium	Low		
Heritage & Palaeontological Assessment				
Destruction, Damage & Loss of fossil material	Low	Low		
Visual Impacts				
Severity of impacts on observers (OB) i.e. Residents inside Zone of Maximum Visual Exposure (ZMVE) and Tourists inside ZMVE	Medium	Low		
Severity of impacts on observers (OB) (i.e. Residents & tourist outside ZMVE & Motorist)	Low	Low		
Severity of impacts on the Landscape character (LC)	Medium	Medium		
Agriculture Potential Impact				
Loss of agricultural land	Low	Low		
Social Impacts				
Inflow of Workers	Low	Low		
Employment Opportunities (positive)	Medium	Low		
Impact on Sense of Place	Low	Low		
OPERATIONAL PHASE				
Environmental Aspect	**Without Mitigation**	**With Mitigation**		
Aquatic and Wetland Impact Assessment				
Physical Disturbance, Erosive water and/ or eroded sediment and Pollutants	Low	Low		
Terrestrial Biodiversity Impact				
Impacts to terrestrial vegetation communities and habitat	Medium-Low	Low	Medium-High	Medium
Impacts to terrestrial biota / species	Medium-Low	Low	Medium-High	Medium
Impacts to local and regional landscape ecological processes	Low	Low	Low	Low
Avifauna Impact				
Potential collisions with the Towers	High	Medium	High	Medium

Potential hazard from servicing powerline	Medium	Low		
Heritage & Palaeontological Impact				
Direct or physical impacts, implying alteration or destruction of heritage features	Low	Low		
Loss or damage to sites, features or objects of cultural heritage significance	Low	Low		
Visual Impacts				
Severity of impacts on observers (OB) and landscape character (LC)	Medium	Medium		
Agriculture Potential Impact				
Loss of agricultural production	Low	Low		
Social Impacts				
Impact on Land Use and Future Developments	Low	Low		
Impact on Property Values	Low	Low		
Impact on Sense of Place	Low	Low		

8.3. Environmental Sensitivity Mapping

From the conclusions of the detailed studies undertaken, sensitive areas within the development 500m corridor were identified and flagged for consideration and avoidance (where possible) by the final alignment position of the tower. The following highly sensitive areas/environmental features as shown in **Figure 38** have been identified on the site:

- Protected and red listed plants within 100m of the tower sites.
- High Ecological Importance and Sensitivity
- Visual Receptors of High Sensitivity:
    - Tourists are generally classified as observers with a high sensitivity when their reason for visiting the area is focussed on enjoying the visual quality and engaging in outdoor activities that are offered by the study area's natural landscape. The Ithala Nature Reserve offer tourists' opportunities to enjoy panoramic scenery from lookout points. Lodges and other forms of accommodation provide overnight facilities along with game drives and hikes.
    - Residents the study area are generally classified as visual receptors of high sensitivity owing to their sustained visual exposure and attentive interest towards their living environment. The highest concentration residents are present in Louwsburg which is within the ZMVE. Some areas will experience full or partial views of the tower as a result of topographic screening.

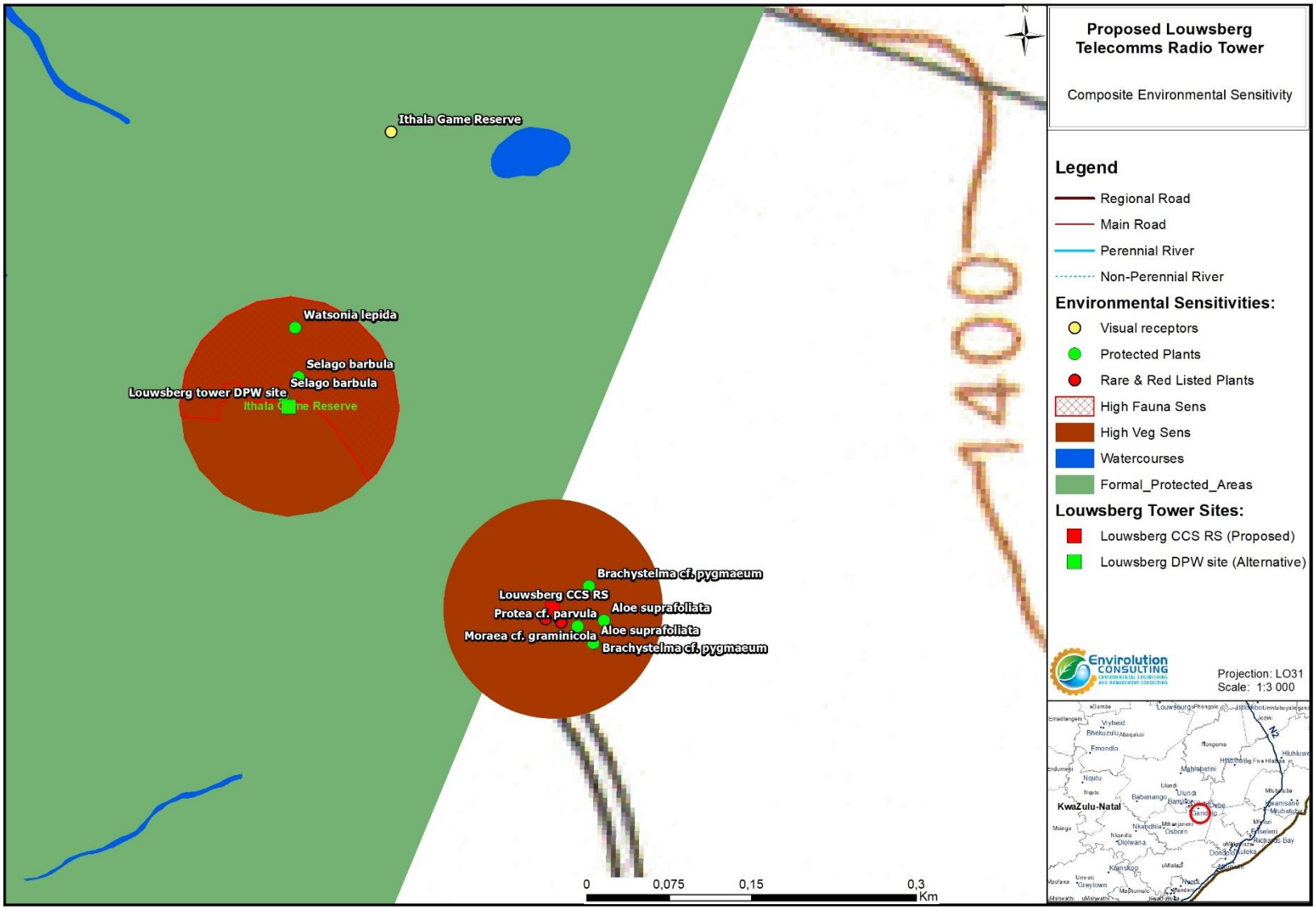

Figure 38: Composite Environmental Sensitivity Map for the proposed Louwsburg Telecommunication Radio Tower Sites.

8.4. Comparative analysis of Alternative Sites

The location of the DPW site is inside the Ithala Nature Reserve boundary and although the site is already impacted by existing buildings and a tower, it is within a conservation area which adds to the sensitivity of the site. The CCS RS site is placed outside the reserve and is considered marginally more appropriate due to its location, from a conservation point of view. Without mitigation, the CCS RS site is marginally more preferred due to the viewshed pattern affecting less observers in the Ithala Nature Reserve and its location outside the reserve boundary. The CCS RS tower will also be 10m shorter than the DPW tower, which reduces the visual detection zone with one kilometre and features a marginally smaller tower.

A comparative analysis of the options reveals that the Proposed site (Louwberg CCS RS) is the preferred alternative for development from a terrestrial biodiversity perspective. This is largely because the alternative site (Louwberg DPW site) is located within a managed protected area whereas Option 1 is located outside of the protected area in an area subjected to grazing impacts and a lack of formal management. Therefore, any further impacts to the important grassland within the Ithala Game Reserve should be avoided, despite the primary grassland at Option 1 being of equal conservation importance and the physical impact footprint to primary grassland being bigger than that of Option 2.

The DPW option is situated within the Ithala Nature Reserve (and Important Bird and Biodiversity Area) and the CCS RS option is situated just outside (by 70 m) but directly adjacent to this protected area. The DPW option is situated at a location with an existing tower but the CCS RS option would be a 'greenfields' site. The DPW option is 70 m tall, 10 m taller than the CCS RS option, and hence less desirable in this regard. The proposed structures should ideally be tubular monopoles rather than the planned lattice structures but this is not an issue of over-riding concern.

Table 15: Comparative Assessment Summary

Environmental Aspect	Proposed site (Louwberg CCS RS)	Alternative site (Louwberg DPW site)
Aquatic	Any	Any
Vegetation	**Preferred**	**Not preferred**
Fauna	**Preferred**	**Not preferred**
Avifauna	**Not Preferred**	**Not preferred**
Heritage	Any	Any
Palaeontology	Any	Any
Visual	**Preferred**	**Not preferred**
Social	Any	Any

8.5. Conclusion (Impact Statement)

As summarised in Table 14, it's been noted that the majority of the negative impacts associated with the construction of the proposed Duma Telecommunication Radio Tower are short-term (i.e. during the construction phase), **majority of the negative impacts identified can be mitigated to low significance** if all mitigation measures identified and included in the Environmental Management Programme (EMPr) attached in Appendix F. Environmental constraints as listed on section 8.3 and shown in the environmental sensitivity map (**Figure 38**) includes are features that could be avoided during the detail design phase of the project, by careful placing of tower footprint. Owing to the fact that the

project is for the provision of the requirement to serve as voice, data as well as other telecommunications and ancillary services for Eskom staff and contractors which are meant to improve service levels and efficiencies to ensure volume growth, to meet core telecommunication specifications in support of maintenance standards, most of the impacts resulting from the project aspects are anticipated to be positive more so in the long-term of the implementation of the project, these benefits of the project are expected to occur beyond the local area therefore the benefits partially offset the localised environmental costs of the project.

This assessment considered two site alternatives and design alternatives as discussed in section 2.3 of this report. According to a comparative analysis undertaken for the sites by the different studies as summarised in Table 15, the **proposed site (i.e. Louwberg CCS RS) is the preferred option.** In terms of the design options, the most significant impact flagged is the tower collision mortality risk posed to threatened bird species, as this area supports threatened bird species including vultures vulnerable to collisions with such elevated structures and their associated infrastructure**.** Technically, Eskom prefers the lattice structures as they have moved away from monopole towers type as it is very difficult to maintain during its lifetime, Eskom have also found that Lattice structures are more robust and durable for their network needs. However, due to high impact associated with Lattice Towers, it is recommended that the Eskom team uses an option that will have the least impact on collision mortality risk to threatened bird species. The only relevant mitigation measure would be to ensure that the tower not require lateral support cables/ guy wires, therefore **a monopole structures is preferred.**

The findings this report indicate that there are **no significant environmental fatal flaws** associated with the proposed development, the proposed project is regarded to be feasible and sustainable with the implementation of the above site and design options as well as with responsible environmental management on site, during the planning and construction phases of the project. It is therefore the opinion of the EAP that the proposed development could proceed as all impacts identified are localised and manageable provided that the mitigation measures set out in this report and in the EMPr (Appendix F) are diligently implemented to limit the potential impacts on sensitive ecological and visual aspects of the project during construction and operation of the development.

8.6. Recommendations

The EAP **recommends** that the **construction of the proposed Louwsburg Telecommunication Radio Tower be authorised** with the preferred site and design options.

The construction activities and relevant rehabilitation of disturbed areas should be monitored against the approved EMPr, the Environmental Authorisation, specialist report recommendations and all other relevant environmental legislation. The following relevant **conditions would be required** to be included within an authorisation issued for the project.

- An independent Environmental Control Officer (ECO) should be appointed to monitor compliance with the specifications of the EMPr for the duration of the construction period.
- The following mitigation measures to reduce the occurrence of bird collisions with towers must be adhered to:
    - Co-locate the new communication equipment on existing towers at the site, and if this is not possible, that no lateral support cable nor guy wires be used in the tower design, preferably a monopole structure be implemented.
    - Security lighting for on-ground facilities, equipment, and infrastructure should be avoided. If not possible, lighting should be motion or heat-sensitive, down-shielded, and of a minimum intensity to reduce night-time bird attraction and eliminate constant night-time illumination while still allowing safe night-time access to the site.

- Creation of new access roads should be minimised as far as possible. Rock outcrop habitats must be avoided by access / service roads
- Stormwater Management Plan is established for the Service Road. All erosion protection measures must be established to reflect the natural slope of the surface and located at the natural ground-level.
- Threatened and Protected Plant Search and Rescue: Prior to construction commencing, the following must be undertaken:
    - Once the location of the tower and access road footprints are confirmed, a botanist must re-visit the footprint sites prior to construction at the appropriate time of year (i.e. earlier in the summer window) to identify and map the location of all threatened and protected plants. It is an Endangered vegetation type, retains modest species diversity and some unusual species were present. As this type hosts rare and red listed plants, not all may have been seen due to seasonality (i.e. the lateness of the field assessment). A follow-up will be able to more certainly identify whether all have been detected and also if more plants need to be relocated.
    - Thereafter, all protected and red listed individuals within and in the vicinity of the development footprint must be relocated to a suitable area of primary grassland by a person with suitable horticultural experience, and in particular experience in relocating indigenous plants within natural habitats.
    - Once the identity and location of all threatened and protected plants are confirmed, permits to remove and translocate such species must be acquired and a search and rescue plan must be compiled and implemented.
- Detailed method statement for the construction activities within all primary grasslands must be compiled and appended to the construction (EMPr) prior to construction commencing. The final method statement must be reviewed by the ECO prior to commencement and must include all measures provided in this section where relevant and applicable Demarcation of 'No-Go' areas and construction corridors
- Should any archaeological artefacts be exposed during excavation, work on the area where the artefacts were found, shall cease immediately and the ECO shall be notified as soon as possible. Any archaeological sites exposed during construction activities may not be disturbed prior to authorisation by the South African Heritage Resources Agency.
- All relevant practical and reasonable mitigation measures detailed within this report and within the EMPr must be implemented. The implementation of this EMPr for all life cycle phases of the proposed project is considered key in achieving the appropriate environmental management standards as detailed in this report
- All declared alien plants must be identified and managed in accordance with the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983). The implementation of a monitoring programme in this regard is recommended.
- Care must be taken with the topsoil during and after construction on the site. If required, measures to reduce erosion to be employed until a healthy plant cover is again established.
- Contractors must be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites.
- The developer should obtain all necessary permits prior to the commencement of construction.
- On-going monitoring of the development sites must be undertaken to detect and restrict the spread of alien plant species.

9 APPENDICES

Appendix A: Maps

- Appendix A1: Locality Maps
- Appendix A2: Sensitivity Maps

Appendix B: Facility illustration(s)

Appendix C: **DFFE Correspondence**

Appendix D: Public Participation Process

- Appendix D1: Proof of Site Notice
- Appendix D2: Proof of newspaper advertisements
- Appendix D3: Written Notifications
- Appendix D4: Correspondences with I&APs
- Appendix D5: Comments from I&APs on Draft Report
- Appendix D6: Minutes of meetings
- Appendix D7: Comments and Responses Report
- Appendix D8: List of registered I&APs

Appendix E: Specialist reports

- Appendix E1: Aquatic and Wetland Impact Assessment
- Appendix E2: Terrestrial Ecological Impact Assessment
- Appendix E3: Avifauna Impact Assessment
- Appendix E4: Heritage Impact Assessment
- Appendix E5: Palaeontological (Desk-Top) Impact Assessment
- Appendix E6: Visual Impact Assessment
- Appendix E7: Agriculture Potential Assessment

Appendix F: Environmental Management Programme (EMPr)

Appendix G: Additional Information

- Appendix G1: Details of EAP (and expertise) and affirmation
- Appendix G2: Specialist's declaration of interest
- Appendix G3: Screening Report
- Appendix G4: Site Verification Report