



Final Environmental Impact Assessment Report (EIAR)

Eskom Westrand Strengthening phase II project

FINAL VERSION

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LIST OF ACRONYMS

BID	Background Information Document
CA	Competent Authority
CBD	Convention on Biological Diversity
DoE	Department of Energy
DEFF	Department of Environmental Affairs
DSR	Draft Scoping Report
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EHS	Environmental, Health, and Safety
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EMPr	Environmental Management Programme
IBA	Important Bird Areas
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
NEMA	National Environmental Management Act (No. 107 Of 1998)
NWA	National Water Act (Act No. 36 of 1998)
PPP	Public Participation Process
POPs	Persistent Organic Pollutants
POS	Plan of Study
READ	Rural, Environment and Agricultural Development
SADC	Southern African Development Community
SDF	Spatial Development Framework
ToR	Terms of Reference
WULA	Water Use Licence Application

TERMINOLOGY

Alternatives

In relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to the:

- (a) property on which or location where the activity is proposed to be undertaken;
- (b) type of activity to be undertaken;
- (c) design or layout of the activity;
- (d) technology to be used in the activity; or
- (e) operational aspects of the activity;

and includes the option of not implementing the activity.

Cumulative Impacts

Relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities.

Environmental Impact Assessment

Means a systematic process of identifying, assessing and reporting environmental impacts associated with an activity and includes basic assessment and S&EIR.

Interested and Affected Parties

In relation to an application, means an interested and affected party whose name is recorded in the register opened for that application in terms of regulation 42.

Mitigation

Means to anticipate and prevent negative impacts and risks, then to minimise them, rehabilitate or repair impacts to the extent feasible.

Public Participation Process

A process of involving the public in order to identify issues and concerns and obtain feedback on options and impacts associated with a proposed project, programme or development. Public Participation Process in terms of NEMA refers to: a process in which potential interested and affected parties are given an opportunity to comment on or raise issues relevant to specific matters.

Significant impact

Means an impact that may have a notable effect on one or more aspects of the environment or may result in non-compliance with accepted environmental quality standards, thresholds or targets and is determined through rating the positive and negative effects of an impact on the environment based on criteria such as duration, magnitude, intensity and probability of occurrence.

1 EXECUTIVE SUMMARY

This application relates to the development of electricity transmission infrastructure in the West Rand region. The need for the transmission infrastructure is based on strategic grid planning done by Eskom specifically for the West Rand region. According to the strategic planning, there is a significant load growth forecast to the west of Johannesburg in areas around Lenasia and Soweto. The load growth is expected to introduce high growth of power demand in the West Rand Customer Load network in the next 5 to 20 years. To timeously address this electricity, demand the development will be done by Eskom over three phases, namely:

- Phase 1: Upgrading and expansion of existing Eskom substations.
- Phase 2: Construction of new transmission lines.
- Phase 3: Construction of connector loops.

Based on the project description the screening of the proposed activities was done against the most recent 2014 Listed Activities (as amended) contained in the EIA Regulations. The following activities are potentially triggered, namely:

- GN R983 as amended (Listing Notice 1): Activities 12, 19, 24, 47
- GN R984 as amended (Listing Notice 2): Activity 9
- GN R985 as amended (Listing Notice 3): Activities 10, 12, 14

Being listed under Listing Notice 2 means a full EIA process will have to be followed, hence the submission of this EIA Report. The outcome of the scoping phase identified the following potential impacts which were assessed in more detail during the EIA phase, namely:

- Impacts on surface water resources
- Impacts on terrestrial biodiversity (fauna and flora)
- Impact on avifauna
- Visual impacts
- Impacts on human settlements
- Impact on heritage resources

Overall the project will have significant positive impacts which relates to job creation over the short term and regional electricity provision over the medium to long term. The negative impacts have a very low significance after mitigation. These impacts are manageable if the environmental management programme is implemented. Although some of the impacts are expected to have a high/ very high significance before mitigation, none of the impacts are expected to have high / very high significance after mitigation.

After submission of this final EIAR, the next step in the process is for the DEFFE to provide us with feedback and a decision on the application process.

2 INTRODUCTION

This section introduces the purpose of the EIA Report, provides a brief overview of the project background, the project team and lists the assumptions and limitations that pertain to the assessment. Finally, it defines the purpose of the report and explain the report structure.

2.1 APPLICATION BACKGROUND

This final EIAR forms part of a resubmitted application in terms of Regulation 21(2)(a). The previous application was finalized up to the acceptance of the final Scoping Report. This resubmitted application and EIAR comply with Regulation 21(2)(b), (c) and (d) of GN.R. 326 that reads:

“(b) on condition that regulation 16 is complied with and that such application is accompanied by proof that registered interested and affected parties, who participated in the public participation process conducted as part of the previous application, have been notified of this intended resubmission of the application prior to submission of such application;

(c) if the application contemplated in paragraph (b) is submitted by the same applicant for the same development, as applied for and lapsed or refused as contemplated in paragraph (a); and

(d) if an environmental impact assessment report inclusive of specialist reports and an EMPr, which must have been subjected to a public participation process of at least 30 days and which reflects the incorporation of comments received, including any comments of the competent authority, is submitted within a period of two years from the date of the acceptance of the scoping report contemplated in paragraph (a).”

2.2 PROJECT BACKGROUND

Eskom does continual projections for electricity supply and demand nationally through so-called grid planning. This application relates to the grid planning done by Eskom for the West Rand region contained in a Grid Plan Report (See Appendix H for the Grid Plan Report). According to the Grid Plan Report, there is a significant load growth forecast to the west of Johannesburg in areas around Lenasia and Soweto. The load growth is expected to introduce high growth of power demand in the West Rand Customer Load network in the next 5 to 20 years.

Moreover, City Power is also proposing to shift a substantial amount of load from Fordsburg substation to the proposed Quattro substation which is located outside Soweto. For these reasons, it is anticipated that West Rand network will be under pressure to supply the new loads. Grid Planning has undertaken a study to address the system constraints and the overall reliability of the substations in the West rand area emerging from the year 2026 onwards. The scope of this application is the proposed solution for the future electricity load growth and load shift in the West Rand. A detailed project description is provided in section 4 below.

2.3 PROJECT TEAM

This section provides a description of the different role players involved in this application with specific reference to the project proponent, EAP, specialists and the competent authority.

2.3.1 Project Proponent

As already mentioned, this application aims to give effect to the medium to long term strategic planning by Eskom, as the main project proponent (Table 1).

Table 1: Details of the project proponent

Details	South Africa
Company	Eskom SOC Ltd
Contact Person	Lindiwe Mbhele
Telephone	+27 11 800 8250
Fax	+27 44 805 5454
Email Address	MbheleLW@eskom.co.za
Physical address	Megawatt Park, Maxwell Drive, Sunninghill, Sandton, Johannesburg
Postal Address	PO Box 1091 Johannesburg 2000

2.3.2 Environmental Assessment Practitioner

In line with the South African Regulation 13 of the EIA Regulations (GN R326 of 2017) the proponent is required to appoint a registered Environmental Assessment Practitioner (EAP) to undertake the EIA process for any activities regulated in terms of the NEMA. Moreover, the requirements stipulated in Regulation 13(1)(a), the EAP must be independent. The requirement for independence of the environmental consultant is aimed at reducing the potential for bias in the outcome of the environmental assessment process. The details of the project EAP is listed in Table 2 below:

Table 2: Details of the project EAP

Details	South Africa
Company	Resolute Environmental Solutions (Pty) Ltd
Project Manager: Contact Person	Alfred Ayres
Telephone	+27 11 064 5696/ +27 72 146 6937
Email Address	alfred@resoluteenviro.co.za
Main EAP: Contact Person	Charlotte Cilliers
Professional registration	EAPASA SACPLAN
Project Contact	+27 72 573 8962
Email Address	charlotte@resoluteenviro.co.za

Fax	086 637 5440
Postal Address	Po Box 2817 Noordheuwel 1756
Physical address	Broadacres Spaces Centre Corner Cedar and 3rd Avenue Broadacres Sandton 2021

Resolute has selected a team of experienced specialists and multi-disciplinary practitioners in order to execute this project in a professional and objective manner. A synopsis of the qualifications and experience of the Environmental Assessment team for this application is provided in Table 3. CVs are attached in Appendix A.

Table 3: Details of the environmental assessment team

Name & Proposed Role	Company	Qualifications	Experience (Years)
Charlotte Cilliers: Lead EAP and SIA specialist	RESOLUTE	Masters in Environmental Management (M.Env.Man.), North West University, South Africa B. Art et Scien (Planning), North West University, South Africa	8
Prof Francois Retief: EAP and Specialist Reviewer	North West University (NWU)/ RESOLUTE	Doctor of Philosophy (Ph.D) in Environmental Assessment, University of Manchester, United Kingdom Masters in Environmental Management (M.Env.Man.), University of Free State, South Africa Masters in Town and Regional Planning (M.TRP), University of Free State, South Africa	20
Alfred Ayres: Director (Project Management)	RESOLUTE	BSc Natural and Environmental Sciences, endorsement Aquatic Health, University of Johannesburg, South Africa	9

Name & Proposed Role	Company	Qualifications	Experience (Years)
Dennis Komape: Biodiversity specialist (Flora)	RESOLUTE	B-Tech Degree in Nature Conservation (Tshwane University of Technology) MSc candidate in Environmental Sciences at North-West University.	6
Philip Ayres: Landscape ecologist and environmental specialist	RESOLUTE	Masters in Environmental Science (MSc), North West University, South Africa B.Sc. Honours in Ecological Remediation & Sustainable usage, North West University, South Africa B.Sc. Geography & Environmental Management, University of Johannesburg, South Africa	7
TL O'Donoghue: Specialist Consultant – Wetland & River Specialist.	RESOLUTE	Current: MSc in Nature Conservation at UNISA B – Tech: Nature Conservation, UNISA, 2014 National Diploma: Nature Conservation, TUT, 2003 SACNASP Certified Natural Scientist, Level B – Reg No: 300055/14	10
Daniël Düring: Environmental Legal specialist	RESOLUTE	Bachelor of Commerce in Economics and Law, North West University, South Africa LLB (Legum Baccalaureus), North West University, South Africa & Tilburg Law School, the Netherlands LLM (Masters) in Environmental Law and Governance, North West University, South Africa	5

Name & Proposed Role	Company	Qualifications	Experience (Years)
Wouter Fourie: Heritage Specialist	PGS Heritage	BA Archaeology, Geography and Anthropology ,University of Pretoria, South Africa BA [Hons] (Cum laude) Archaeology and Geography, University of Pretoria, South Africa MPhil – Conservation of Built Environment (Current), University of Cape Town, South Africa	15
Donovan Kruger: Fauna Specialist	North-west University (NWU)	Ph.D. Zoology, North-West University, South Africa M.Sc. Zoology, North-West University, South Africa B.Sc. Honours (Biodiversity), North-West University, South Africa B.Sc. Zoology and Physiology, North-West University, South Africa	11
Megan Diamond: Avifaunal Specialist	Feathers Environmental Services	B.Sc. Environmental Management, University of South Africa Cert.Sci.Nat	10
Dr Dirk Cilliers: VIA Specialist	North West University	PhD, Environmental Assessment, North West University	10

2.3.3 Competent Authority

The details of the Competent Authority (CA) that will handle or process the EIA applications for the project are listed in Table 4.

Table 4: Details of the Competent Authorities

Name	South Africa
Department	Department of Environment, Forestry and Fisheries (DEFF)

	(Director: Integrated Environmental Authorisations)
Contact Person	Thulisile Nyalunga
Telephone	(012) 399 9405
Email Address	TNyalunga@environment.gov.za
Postal Address	Private Bag X447 Pretoria 0001
Physical address	Environment House 473 Steve Biko Road Arcadia, Pretoria

2.4 ASSUMPTIONS, LIMITATIONS AND KNOWLEDGE GAPS

The following assumption(s) have been identified for the EIA Phase of the process:

- The information provided by Eskom is accurate, adequate and unbiased, and that no information that could change the outcome of the EIA process has been withheld.
- The information obtained from the specialist studies undertaken for this project is accurate and objective.
- The alignment will not deviate from the preferred route that has been assessed by the EAP and the specialists.
- Eskom will adhere to the conditions of the Environmental Authorisation (EA) and applicable legislation for the duration of the project.
- Impacts of the project on specific watercourses will be addressed in detail in the WULA process.
- The information, as presented in this document, only has reference to the study area(s) as indicated on the accompanying maps.
- It is important to note that the scope of impacts presented in this report could change, should additional information become available.
- The project team sourced the most recently available and adopted SDF and EMF information. In some cases, these strategic documents might be in the process of being revised.

2.5 PURPOSE OF THIS REPORT

This report aims to present the outcome of the EIA Phase and the identification of the significance of potential impacts before and after mitigation. In line with the NEMA requirements, the EIA Report must include, but not be limited to, the following aspects:

- EIA process and/or approach being undertaken for the proposed project;

- Legal and policy framework within which the project takes place;
- Description of the proposed project, motivation of the need for the project and description of the different alternatives considered;
- Description of the baseline receiving environment – both the biophysical and socio-economic context;
- Detailed assessment of potential impacts;
- Assessment methodology that were applied;
- The Public Participation Process (PPP) that has been conducted to date; and
- Recommendations and key procedural aspects going forward.

2.6 REPORT STRUCTURE

This report serves to document the outcome of the EIA Phase of the process and is structured in accordance with the prescribed contents stipulated in Appendix 3 of GN R982 as amended. It consists of 12 sections demonstrating compliance to the legislative requirements as indicated in Table 5 below.

Table 5: Structure of the report in line with legislative requirements

Requirements for the contents of a scoping report as specified in the Regulations		Section in report	Pages
Appendix 3, GN.R. 326:			
Scope of Assessment and content of environmental impact assessment report			
3 (1) An environmental impact 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-	2.2.2	12
	(i) the EAP who prepared the report; and		
	(ii) the expertise of the EAP, including a curriculum vitae;	Appendix A	
(b)	the location of the development footprint of the activity on the approved site as contemplated in the accepted scoping report, including:		
	(i) the 21-digit Surveyor General code of each cadastral land parcel;		
	(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;	5.1	29
(c)	a plan which locates the proposed activity or activities applied for as well as the 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;		

Requirements for the contents of a scoping report as specified in the Regulations		Section in report	Pages
	(ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;		
(d)	a description of the scope of the proposed activity, including—	3.1.1	20
	(i) all listed and specified activities triggered and being applied for; and		
	(ii) a description of the associated structures and infrastructure related to the development;	5.2	39
(e)	a description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context;	3	20
(f)	motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred development footprint within the approved site as contemplated in the accepted scoping report;	5.4	43
(g)	a motivation for the preferred development footprint within the approved site as contemplated in the accepted scoping report;	6	44
(h)	a full description of the process followed to reach the proposed development footprint within the approved site as contemplated in the accepted scoping report, including:	6	44
	(i) details of the development footprint 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;	6.2	44
	(iv) the environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	8	73
	(v) the impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts— (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated;	10	100
	(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;	7	58

Requirements for the contents of a scoping report as specified in the Regulations		Section in report	Pages
(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;	10	100
(viii)	the possible mitigation measures that could be applied and level of residual risk;	10	100
(ix)	if no alternative development footprints for the activity were investigated, the motivation for not considering such; and	NA	NA
(x)	a concluding statement indicating the location of the preferred alternative development footprint within the approved site as contemplated in the accepted scoping report;	11	104
(i)	a full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred development footprint on the approved site as contemplated in the accepted scoping report through the life of the activity, including—	10	100
(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;	10	100
(i)	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;		
(k)	where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report;	8	73
(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 development footprint on the approved site as contemplated in the accepted scoping report indicating any areas that should be avoided, including buffers; and		
(iii)	a summary of the positive and negative impacts and risks of the proposed activity and identified alternative;	10	100

Requirements for the contents of a scoping report as specified in the Regulations		Section in report	Pages
(m)	based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of Authorisation;	11.3	104
(n)	the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment;	11.3	104
(o)	any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;	11.3	104
(p)	a description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;	11.1	104
(q)	a reasoned opinion as to whether the proposed activity should or should not be authorized, and if the opinion is that it should be authorized, any conditions that should be made in respect of that authorization;	11.3	104
(r)	where the proposed activity does not include operational aspects, the period for which the environmental authorization is required and the date on which the activity will be concluded, and the post construction monitoring requirements finalized;	11.3	104
(s)	an undertaking under oath or affirmation by the EAP in relation to-	Appendix A	
(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 or affected parties;		
(t)	where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	NA	
(u)	an indication of any deviation from the approved scoping report, including the plan of study, including—	NA	
(i)	any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and		
i)	a motivation for the deviation;		
(v)	any specific information that may be required by the competent authority; and	NA	NA
(w)	any other matters required in terms of section 24(4)(a) and (b) of the Act.	NA	NA

3 LEGISLATIVE AND POLICY FRAMEWORK

This section provides an overview of the legal and policy framework within which the project takes place. Relevant guidelines and policies specific to the electricity sector are also listed under this section.

3.1 NATIONAL EIA LEGAL REQUIREMENTS

In order to justify the particular application and process to be followed the relevant listed activities need to be identified as well as other relevant legislation, guidelines and policies relevant to the activity.

3.1.1 Listed Activities

The project was screened against the Listed Activities contained in the most recently amended 2014 EIA Regulations. The outcome of the screening process confirmed that the following activities summarised in Table 6 are applicable and therefore the proposed development requires a full EIA process. The corridors were also assessed against the National Environmental Screening Tool which produced a screening report. The Environmental Screening Tool also confirm the activities included in Table 6 as well as the need for the various specialist studies required by the Plan of Study and included in this EIA report. See Appendix I for the Environmental Screening Report.

Table 6: EIA Regulations Listed Activities

Listed Activity ^[1]	Description of the Activity	Relevance to the project
GN R983 as amended (Listing Notice 1), activity 12	<p><i>“The development of—</i></p> <p><i>ii) infrastructure or structures with a physical footprint of 100 square metres or more;</i></p> <p><i>(a) within a watercourse;</i></p> <p><i>(b) in front of a development setback;</i></p> <p><i>or</i></p> <p><i>(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse...”</i></p>	The proposed activity will impact on watercourses, although avoidance options in terms of alignment and placing of tower structures are readily available.
GN R983 as amended (Listing Notice 1), activity 19	<p><i>“The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock from a watercourse...”</i></p>	Due to the length of the proposed transmission line, it will be necessary to cross various watercourses. The need to impact on a watercourse by removing soil, sand, pebbles or rock in order to erect towers will arise.
GN R983 as amended (Listing Notice 1), activity 24	<p><i>“The development of a road—</i></p> <p><i>with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres...”</i></p>	The proposed project will involve the construction of access roads to tower construction sites.

Listed Activity ^[1]	Description of the Activity	Relevance to the project
GN R983 as amended (Listing Notice 1), activity 47	<i>“The expansion of facilities or infrastructure for the transmission and distribution of electricity where the expanded capacity will exceed 275 kilovolts and the development footprint will increase.”</i>	<p>The proposed project includes:</p> <ul style="list-style-type: none"> • The expansion of Westgate, Princess, Taunus and Quattro substations with a total of 484 kilovolts additional shunt capacity banks. • The expansion of Westgate substation by installation of two 400 kilovolts transformers and run two 275 kilovolts transformers to end of life. • As part of the above expansion: development of a 400 kilovolts transmission line. • Expansion of the Taunus substation by installing 400 kilovolts transformer and looping into the Hera – Westgate line.
GN R984 as amended (Listing Notice 2), activity 9	<p><i>“The development of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is —</i></p> <p><i>(a) temporarily required to allow for maintenance of existing infrastructure;</i></p> <p><i>(b) 2 kilometres or shorter in length;</i></p> <p><i>(c) within an existing transmission line servitude; and</i></p> <p><i>(d) will be removed within 18 months of the commencement of development.”</i></p>	<p>The proposed transmission line is a 400 kilovolts line to be constructed within one of the three proposed corridors.</p>

Listed Activity ^[1]	Description of the Activity	Relevance to the project
GN R985 as amended (Listing Notice 3), activity 10	<p><i>"The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres.</i></p> <p><i>c. Gauteng</i></p> <p><i>iv. Sites identified as Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans;</i></p> <p><i>v. Sites identified within threatened ecosystems listed in terms of the National Environmental Management Act: Biodiversity Act (Act No. 10 of 2004);</i></p> <p><i>vi. Sensitive areas identified in an environmental management framework adopted by the relevant environmental authority;</i></p> <p><i>xii. Important Bird and Biodiversity Areas (IBA).</i></p>	<p>The construction phase will include the storage of hydrocarbons in the lay down areas for construction machinery and/or vehicles. According to the screening report the area is earmarked as a Critical Biodiversity Area, Ecological Support Area and is located within the Soweto Highveld Grassland threatened ecosystem (refer to Appendix B9 – B11 for the sensitivity maps)</p>
GN R985 as amended (Listing Notice 3), activity 12	<p><i>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.</i></p> <p><i>c. Gauteng</i></p> <p><i>i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;</i></p> <p><i>ii. Within Critical Biodiversity Areas or Ecological Support Areas identified in the Gauteng Conservation Plan or bioregional plans.</i></p>	<p>The proposed activity will in total clear 300 square metres or more of indigenous vegetation within sensitive environmental areas during the construction of the tower structures. According to the screening report the area is earmarked as a Critical Biodiversity Area, Ecological Support Area and is located within the Soweto Highveld Grassland threatened ecosystem (refer to Appendix B9 – B11 for the sensitivity maps)</p>

Listed Activity ^[1]	Description of the Activity	Relevance to the project
GN R985 as amended (Listing Notice 3), Activity 14	<p>The development of —</p> <p>(ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs—</p> <p>within a watercourse;</p> <p>(c) if no development setback has been adopted, within 32 meters of a watercourse, measured from the edge of a watercourse;</p> <p>c. Gauteng</p> <p>iv. Sites identified as Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans;</p> <p>v. Sites identified within threatened ecosystems listed in terms of the National Environmental Management Act: Biodiversity Act (Act No. 10 of 2004);</p> <p>vi. Sensitive areas identified in an environmental management framework adopted by the relevant environmental authority.</p>	<p>The proposed activity will impact on watercourses during the construction of tower and transmission line infrastructure. According to the screening report the area is earmarked as a Critical Biodiversity Area, Ecological Support Area and is located within the Soweto Highveld Grassland threatened ecosystem (refer to Appendix B9 – B11 for the sensitivity maps).</p>

3.1.2 Other Legislation

Given the extent of the project, there are numerous other pieces of legislation which should be considered in order to assess the potential applicability of these for the proposed activity. The relevant South African legislation and how the project is linked to the legislation is outlined in table 7.

Table 7: Legislation context to the project

Legislation	Reference	Comments / Description
Constitution of the Republic of South Africa (Act No. 108 of 1996)	EIA application	This application for Environmental Authorisation gives effect to the “environmental right” as outlined in Section 24 of the Constitution
National Environmental Management Act (Act 107 of 1998)	Refer to section 3 of this report	This application for Environmental Authorization is to give effect to NEMA.
Basic Conditions of Employment Act (Act No. 75 of 1997)	Refer to the EMPs attached as Appendix N	The construction and operational phases of the project should give effect to this Act when construction workers are employed.
National Environmental Management: Waste Act (Act No. 59 of 2008)	Refer to the EMPs attached as Appendix N	The construction and operational phases of the project should be managed to give effect to the waste act as stipulated in the EMPs.
National Environmental Management: Air Quality	Refer to the EMPs attached as Appendix N	The construction and operational phases of the project should be managed to give

Act, 2008 (Act No. 39 of 2008)		effect to the air quality act as stipulated in the EMPs.
National Water Act (Act No. 36 of 1998)	Refer to the EMPs attached as Appendix N	The construction and operational phases of the project should be managed to give effect to the water act as stipulated in the EMPs.
Electricity Regulation Act (Act No. 4 of 2006)	EIA application and EMPs attached as Appendix N	The proposed development enables Eskom to expand the supply of electricity in accordance with the national regulatory framework.
Occupational Health and Safety Act (Act No. 85 of 1993)	Refer to the EMPs attached as Appendix N	The construction and operational phases of the project should be executed to give effect to the OHS Act therefore measures are stipulated in the EMPs.
Hazardous Substances Act (Act No 15 of 1973)	Refer to the EMPs attached as Appendix N	The construction and operational phases, especially the substations (consisting of dangerous goods) will be executed to give effect to the Hazardous substances act. Therefore, various measures are stipulated in the EMPs.
National Environmental Management: Biodiversity Act (Act No. 10 of 2004)	Refer to the Fauna, Flora, Watercourse habitat and Avian Assessments included in Appendix F	The specialist studies were undertaken to ensure that the project gives effect to the NEMBA.
Conservation of Agricultural Resources Act (Act No. 43 of 1983)	Refer to Appendix G for the Eskom route selection report and section 8 of this report for the Impact Assessment results.	The route selection report provides a description of the proposed corridor alternatives. The preferred alternative and the impact assessment results gives effect to the conservation of agriculture resources act by minimizing the impact on agricultural resources.
National Heritage Resources Act (Act No. 25 of 1999)	Refer to the Heritage and Palaeontology Specialist Studies included in Appendix F	The specialist studies were undertaken to ensure that the project gives effect to the NHRA.

3.1.3 National Policies, Plans and Strategies

The following policies, plans, and strategies considered during the EIA as well as the project is linked to these policies, plans and strategies are outlined in table 8.

Table 8: National policies, plans and strategy context to the project

National policies, plans and strategies	Reference	Comments / Description
White Paper on the Energy Policy of the Republic of South Africa (1998)	EIA application and Appendix H – Eskom grid plan	The proposed development and this EIA application is submitted to enable Eskom to give effect to the White Paper.
Draft Post-2015 National Energy Efficiency Strategy (NEES) (2016)	EIA application and Appendix H – Eskom grid plan	The proposed development and this EIA application is submitted to enable Eskom to

		give effect to this strategy by improving energy efficiency.
Integrated Resource Plan for Electricity (IRP), 2010-2030 (2013)	EIA application and Appendix H – Eskom grid plan	In accordance with the IRP, Eskom identified the need for power generation capacity expansion in South Africa.
The National Development Plan 2030 (2012)	EIA application and Appendix H – Eskom grid plan	By implementation of the project, Eskom will contribute to the Development plan by giving effect to its main goals that refer to poverty elimination, growing an inclusive economy, building capabilities, enhancing the capacity of the state, etc.
Strategic Plan 2015-2020 – Department of Energy	Appendix H – Eskom grid plan	This project will give effect to the Strategic Plan by promoting energy security.
Relevant Integrated Development Plans (IDP)	Refer to Appendix F – Socio-Economic Impact Assessment	The proposed development gives effect to the relevant IDPs since the outcome of the SEIA indicated that the project would have an overall positive socio-economic impact. Therefore, the proposed development is coherent to IDPs in improving the quality of life for residence of the Westrand.

3.1.4 Guidelines

This EIA process is informed by the following series of national and international Environmental Guidelines, where applicable and relevant these are linked in table 9 to the project.

Table 9: Guidelines context to the project

Guideline	Reference	Comments / Description
Stakeholder Engagement, Integrated Environmental Management, Information Series 3 (DEFFT, 2002).	Refer to section 9 of this report for the Public Participation	The EIA public participation process gives effect to the Stakeholder Engagement Series by ensuring ongoing engagement throughout the EIA process.
Specialist Studies, Integrated Environmental Management, Information Series 4 (DEFFT, 2002).	Refer to Appendix F and section 8 of this report for the inclusion of Specialist Studies	Specialist studies included in the EIA application gives effect to the relevant information series.
Criteria for determining Alternatives in EIA, Integrated Environmental Management, Information Series 11 (DEFFT, 2004).	Refer to section 6 of this report for a description of Alternatives.	The inclusion and description of alternatives in this report gives effect to the relevant information series by providing route alternatives that were assessed in this report.
Environmental Management Plans, Integrated Environmental Management, Information Series 12 (DEFFT, 2004).	Refer to Appendix N for the EMPs	The attached EMPs gives effect to the relevant information series in providing management measures for the development.
Guideline for involving biodiversity specialists in EIA processes. Edition 1 (Brownlie, 2005).	Refer to Appendix F and section 8 of this report for the Biodiversity Specialist Study.	The biodiversity studies conducted in support of the EIA application gives effect to the relevant guideline.

Guideline for Environmental Management Plans (Lochner, 2005).	Refer to Appendix N for the EMPs	The attached EMPs gives effect to the relevant guideline in providing management measures for the development.
Guideline for determining the scope of specialist involvement in EIA processes: Edition 1 (Münster, 2005).	Refer to Appendix F and section 8 of this report for the inclusion of Specialist Studies. Also refer to Appendix R for the Site Sensitivity Report.	The scope of specialist involvement was carefully considered in the EIA Report and supplementary appendices to give effect to this guideline series.
Public Participation 2010, Integrated Environmental Management Guideline Series 7 (DEFF, 2010).	Refer to section 9 of this report for the Public Participation	The EIA public participation process gives effect to the guideline series by ensuring ongoing engagement throughout the EIA process.
Guidelines to minimise the impact on birds of Solar Facilities and Associated Infrastructure in South Africa (Smit, 2012).	Refer to Appendix F and section 8 of this report for the inclusion of an Avian Specialist Study	Mitigation measure proposed as part of the Avian Specialist Study gives effect to the guideline in minimising the impact of birds.
Guideline on Need and Desirability (Department of Environmental Affairs (DEFF, 2017).	Refer to section 5.5 for a description of the Need and Desirability of the project.	The need and desirability for the proposed development as discussed in section 5.5 gives effect to the relevant guidelines.
Guideline on Alternatives, EIA Guideline and Information Document Series (DEFF&DP 2013).	Refer to section 6 of this report for a description of Alternatives considered.	The inclusion and description of alternatives in this report gives effect to the relevant information series by providing route alternatives that were assessed in this report.

3.1.5 ESKOM environmental and social policy

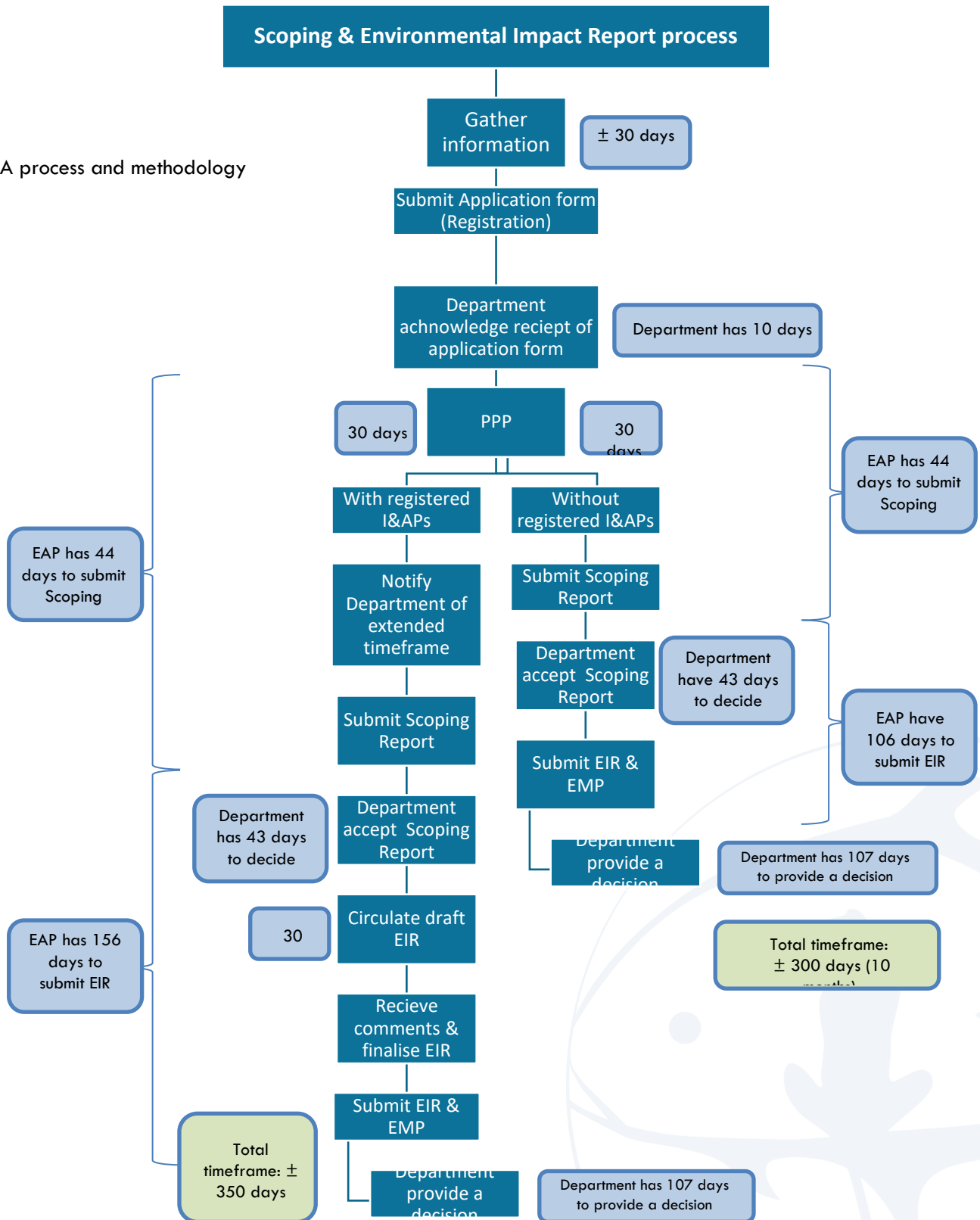
Eskom aims to provide affordable energy and related services sustainably through integrating and considering economic development, environmental quality and social equity into business practices. This allows the utility to take a long-term view and ensure that the scope of their work covers all relevant elements, assesses the practicality of implementation and includes issues such as technology development and deployment, quality, risk, safety and skills development (see Annexure L Eskom SHEQ Policy).

As a means to implementing this policy, Eskom commits to:

- Minimise pollution and environmental degradation and address safety and occupational health in management systems;
- Comply with legislative and policy requirements.
- Implementation of management systems in accordance with, but not limited to ISO 9001, ISO14001, and OHSAS 18001 requirements;
- Educate its employees in terms of occupational health, safety, and environmental issues;
- Engaging stakeholders by promoting open communication and engagement that is safety, health and environment and purpose-driven;

- Setting safety, health, environment and quality intended outcomes and measuring performance to ensure continual improvement;
- Ensuring Eskom's contractors meet Eskom's safety, health environment and quality requirements;
- Ensuring that adequate resources are available for safety, health, environment and quality management;
- Proactively managing Eskom's environmental footprint, prevention of pollution and environmental degradation, pursuing a low-carbon future, and prioritising energy and water efficiency and conservation within and outside Eskom by transitioning to cleaner energy mix;
- Ensuring the sustainable use of resources, climate change mitigation and adaptation and protection of biodiversity and ecosystems.

4 EIA PROCESS AND METHODOLOGY



This section describes the EIA process and approach followed. Section 4 provides a summary outline of the EIA process and timeframes as prescribed in the EIA Regulations.

4.1 PRE-FEASIBILITY AND SCREENING PHASE

A high-level assessment of the general study area (that includes the different corridor options) was undertaken as part of the screening and scoping processes to determine constraints and opportunities and to develop potential line route corridors. Three corridor routes were originally identified by Eskom which have been scoped down by the EIA project team to the most suitable and preferred corridor assessed in more detail in the EIA phase. Assessment of three alternative routes for the transmission line was undertaken using a Multi-Criteria Analysis (MCA) method. This allowed for the preferred corridor alternative to be selected in an integrated manner, based on technical, environmental and social criteria. This is the corridor route which had been taken forward into EIA phase. The corridor selection is described in detail in Section **Error! Reference source not found..**

The formal screening process is a high-level analysis undertaken to determine what, if any, environmental authorisations may be required for the proposed development. The activities proposed as part of the project, the prevailing legislation and the receiving environment were assessed to determine the level of assessment required. As already indicated in Section 2 a full EIA is required. A pre-application meeting was held with DEFF to introduce the project to the authorities and to confirm that a full EIA process will be required in line with the relevant legislation and listed activities. Minutes from the pre-application meeting with DEFF is included in Appendix 1 of the Application Form and as part of Appendix D to this report.

4.2 SCOPING PHASE

The activities listed below were undertaken as part of the Scoping Process (Details of Public Participation are provided in Section 9 and Appendix E):

- Identification and notification of relevant authorities and Interested and Affected Parties (I&APs) with the release of a **Background Information Document (BID)** for a period of 30-days in order to elicit their interest in the project.
- **Selection of the full range of feasible alternatives** to be taken through to the EIA phase.
- **Identification of key potential environmental and social issues** and potential mitigation measures.
- Development of the **Terms of Reference (ToR) for the specialist studies** to be carried out during the impact assessment phase, based on issues identified to ensure that studies are focused on key and relevant issues.
- Development of **Plan of Study (POS) for EIA and Scoping Report** from information gathered the Pre-feasibility and Screening process.

4.3 ASSESSMENT PHASE

The assessment stage involves the evaluation of the impacts identified in the scoping to determine their nature, temporal and spatial scale, reversibility, magnitude, likelihood, extent and subsequently design mitigation measures, in the context of baseline conditions. Such detailed impact analysis involves:

- Selective **walk through or site visit** of the proposed corridor by all the technical specialists.

- **Compilation of the EIA Report** incorporating the specialists' findings and recommendations.
- Circulation of the reports for **public comments** (if required).

4.4 CONSIDERATION OF ALTERNATIVES

NEMA requires that alternatives be considered during the EIA process. However, by identifying constraints in the early and/or planning stages of the project and doing a high-level assessment of alternatives at this stage, the project can be designed around the constraints and opportunities. This assists in ensuring a smoother transition through the project phases and prevents delays. Several aspects were taken into account when considering potential alternatives. The project alternatives considered as part of this application is described in detail in section 6 of this report.

4.5 ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)

The purpose of the Environmental and Management Programme (EMPr) is to provide a framework within which the environmental and social risks and liabilities identified during the EIA process are managed for the lifecycle of the Project. The EMPr will also outline a detailed implementation and monitoring costs associated with the activities planned and audit plan to measure compliance. The EMPr is used by the appointed contractor as a legal guideline for environmental best practice and will form part of the contract, supplementary to tender documentation.

The EMPr should be considered as a "live" document, applicable to the specific project and should be reviewed and amended in response to any change in the scope of works or nature of the construction activities to ensure applicability to the project.

4.6 ENVIRONMENTAL IMPACT REPORT (EIR)

This Environmental Impact Report (EIR) is one of the last steps of the process. Both the EIR and EMPr will be made available to the I&APs and public for comments. Taking into account all the comments received, the reports will be finalised and submitted to DEFF for approval.

5 PROJECT DESCRIPTION

The purpose of this section is to provide an overview of the proposed project and associated activities to be undertaken during different phases of the project. The phases, including the three transmission line corridors described in this section, shown in Figure 2: Westrand Strengthening Phase 2 (refer to Table 10 for coordinates), providing the initial basis for scoping and ultimately the identification of a preferred corridor. The preferred corridor is based on a Multi-Criteria Analysis (MCA) to determine the most environmentally, socially and technically suitable alternative. The results of the MCA suggest that Corridor 3 and loop 1 is the preferred option. The aim was to avoid areas of environmental and social concern. A detailed description of alternatives is provided in Section 6.

5.1 PROJECT DESCRIPTION IN RELATION TO THE LISTED ACTIVITIES

The Eskom Westrand strengthening phase 2 project will be described in the proposed three phases of development.

Phase 1:

The expansion of facilities and infrastructure for the transmission and distribution of electricity with more than 275 kilovolts and an increased footprint outside an urban area along with the storage and handling of a dangerous good (transformer oil) of more than 30 cubic metres. The latter refer to:

- a) Installation of additional shunt capacity banks at the existing Westgate substation, Princess substation, Taunus substation and Quattro substation;
- b) Installation of 2x 400kV/132kV 500MVA transformers at the existing Westgate substation and run the 2x275kVntransformers to end of life.

Phase 2:

The development and expansion, outside an urban area, of a 400kV power-line between Pluto substation and Westgate substation that will impact on watercourses along the way with the infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock from a watercourse. The proposed project will involve the construction of access roads to tower construction sites, whereas the road will be more than 8 metres. The development will also cause the clearance of more than 300 square metres or more of indigenous vegetation within sensitive areas. The following location alternatives will be considered:

Alternative 1: is the northern corridor and aligns along the N14 national road. The corridor is approximately 40km long.

Alternative 2: is the middle corridor and crosses along the southern section of the R41 road. The corridor is approximately 38km long.

Alternative 3: is the southern corridor that travers mostly over agricultural lands and is parallel to other transmission power-lines. The corridor is approximately 45km long.

Phase 3:

The expansion of facilities and infrastructure for the transmission and distribution of electricity with more than 275 kilovolts and an increased footprint outside an urban area that will impact on a watercourse with the infilling or depositing of any material of more than 10 cubic metres into, or the dredging,

excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock from a watercourse. The latter refer to:

Installation of a loop in and out of the existing Hera-Westgate 400kV line into the existing Taunus substation and installation of a 400/275kV 800MVA transformer at Taunus substation.

Further to the above, the construction related activities refer to the storage and handling of a dangerous good (fuels, oils and lubricants) of more than 30 cubic metres in the construction camp.

According to the screening report the area is earmarked as a Critical Biodiversity Area, Ecological Support Area and is located within the Soweto Highveld Grassland threatened ecosystem (refer to Appendix B9 – B11 for the sensitivity maps).

The site location and extent are discussed in section 5.2 below, however herewith a summary of the width and length of the proposed corridors:

- Corridor 1 would be ± 40 km in length and 2 km wide although only a 55m servitude will be registered.
- Corridor 2 would be ± 38 km long and 2 km wide although only a 55m servitude will be registered.
- Corridor 3, as the preferred alternative, would be ± 45 km long and 2 km wide although only a 55m servitude will be registered (refer to Appendix G for a full discussion on the length and width of the corridors.)

5.2 SITE LOCATION AND EXTENT

This section describes the site location and extent of the different phases of the project – see Figures 1 to 6. This section provides a mere high-level description of location and general affected land uses. A more detailed MCA analysis of the corridors is presented in section 6.

5.2.1 Phase 1: Substation expansion and improvement

Phase 1 includes two main components:

- Install additional shunt capacity banks as follows:
 - 1x 72 MVar 132-kV capacity bank at Westgate MTS
 - 1x 48 MVar 88-kV capacity bank at Princess MTS
 - 1x 72 MVar 132-kV capacity bank at Taunus MTS
 - 1x 72 MVar 132-kV capacity bank at Quattro MTS
- Install 2x 400-kV/132-kV 500-MVA transformers at Westgate MTS and run the 2x275-kV transformers to end of life

The scope of work associated with Phase 1 will be undertaken within existing Eskom property, with no significant further footprint expansion. Subsequently, the new impacts associated with the substation upgrades will be contained within the existing Eskom footprint designated for such expansion. Subsequently it would be reasonable to consider, even at this early stage, the impacts associated with the upgrading of the substations as being of low significance.

5.2.2 Phase 2: Pluto – Westgate 400kV powerline

Three high-level desktop corridors have been established between the Pluto substation and Westgate substation (Figure 2). The straight-line distance between the two substations is 31 km, however the three selected corridors are longer due to the physical constraints that had to be considered. Each corridor will now be discussed.

5.2.2.1 Pluto – Westgate Corridor 1

Corridor 1 is aligned along the along the N14 national road and it is approximately 40 km (Figure 3). The first 17 km of the corridor traverses along the N14 impacting mainly on agricultural land uses. The middle section of the corridor is approximately 13 km long. Along this section, the corridor traverses' small holdings with scattered structures. The structures will have to be avoided by re-aligning the corridors and adding bends in certain areas. In addition to the small holdings, there is also the potential future expansion of the Badirile township, which needs to be considered.

The middle section of the corridor is also uniquely characterised by intensive chicken farming. There are approximately 10 chicken farms along the middle section. It has in the past been a particular challenge for Eskom to acquire power-line servitudes in areas where chicken farms are affected. Moreover, to the north of N14 various irrigation pivots have been developed which has historically been a significant constraint for the construction of powerlines.

The last 10 km of this corridor is on the north-western side of the Westgate substation; north of Randfontein. The area is characterised by mining activities and related infrastructure (e.g. mine tailings, quarries, etc.). It might be that certain areas along this corridor might be unstable due to historic mining and haulage activities.

5.2.2.2 Pluto – Westgate Corridor 2

Corridor 2 is the middle corridor of the three and is approximately 38 km in extent (Figure 4). The corridor traverses along the southern section of the R41 road. The corridor exits the Pluto substation on the north-eastern side, parallel to the existing Marang - Midas and the Matimba – Midas 400kV powerlines for approximately one kilometre. The first 18 km of the corridor traverses south of the R41 road, over agricultural land uses and a small number of small holdings.

The middle section of corridor 2 is approximately 13 km long. Along this section, the corridor traverses through the available open areas, in-between several developments. Open areas include areas between Randfontein Rural and Middelvlei holdings, south of Aereus industrial area and between Toekomsrus and Mohlakeng townships. These open areas are wide enough for the establishment of a 400kV powerline, however planning for future residential expansion needs to be considered as a particular restriction to this project.

The last 7 km of Corridor 2 is parallel to the Hera – Westgate 400-kV powerline, which is currently in the servitude acquisition stage. During the planning of the Hera – Westgate 400 kV, it was established that Eskom Distribution is planning two Randfontein - Westgate 88 kV powerlines. The proposed

Distribution powerlines will also run parallel to the Hera- Westgate power-line and therefore integration between Distribution and Transmission will be vital for the section.

Within this corridor, the expansion of Azaadville Township and the mining activities on the western side of the township must be considered as there is currently only enough space for the proposed Eskom infrastructure (i.e. Hera – Westgate 400 kV power-line, two Randfontein – Westgate 88 kV power-lines and the proposed Pluto – Westgate 400-kV power-line). An expansion of either the mine or the township will be a constraint for the corridor. There is however an alternative option of having a multi circuit that can carry both Transmission and Distribution along this constrained section.

5.2.2.3 Pluto – Westgate Corridor 3

Corridor 3 is the southern-most corridor that is approximately 45 km long (Figure 5). The first 13 km of the corridor traverses southerly out of Pluto substation. The corridor traverses over agricultural land use parallel to other transmission powerlines for the entire 13 km.

There is also a vacant servitude along this section of the corridor, however the vacant servitude is on the western side the existing powerlines, while the proposed corridor is on the eastern side of the existing powerlines. To be able to make use of the vacant servitude, the proposed powerline will exit the substation on the eastern side and will need to cross the existing lines to utilise the servitude on the western side and after 13 km, cross over the existing lines again to easterly towards Westgate substation. An alternative option can also be line-swap to avoid crossings or alternatively new acquisitions.

The middle section of corridor 3 is approximately 25 km long. Along this section, the corridor traverses over land used for grazing. There is evidence of wetlands and watercourses running parallel to the Wonderfontuinspruit for about 16 km. The current alignment is approximately 400 m away from the river and there seems to be sufficient room to avoid the water features. Westonaria Town, Bekkersdal and Mohlakeng Townships are in close proximity to corridor 3 and future expansion needs to be considered. The last 7 km of corridor 3 is the same as for corridor 2. This is the section that is parallel to the Hera – Westgate 400kV powerline and it is common for both corridor 2 and corridor 3.

5.2.3 Phase 3: Taunus Loop In and Out Corridors

Two corridors have been selected for the Hera – Westgate Loop In and Out of Taunus substation (see Figure 2). The capacity of the Taunus loop is 400kV line.

Taunus loop corridor 1 is approximately 6 km long (Figure 6). This corridor is aligned between the R559 road and the mining area, which is also used for grazing.

Taunus loop corridor 2 is approximately 9 km long (Figure 7). The entire corridor falls within areas used for grazing. Approximately half of the corridor is parallel to existing distribution powerlines.

Table 10: Coordinates for the different project areas (GPS Points correlate to numbers within Figure 3, Figure 4, Figure 5, Figure 6, and Figure 7)

Area	GPS Point	Latitude	Longitude	Area	GPS Point	Latitude	Longitude	Area	GPS Point	Latitude	Longitude
Corridor 1	1 (Start)	-26.224775	27.452173	Corridor 2	1 (Start)	-26.225	27.452183	Corridor 3	1 (Start)	-26.2248	27.45218
	2	-26.210129	27.45537		2	-26.215	27.458686		2	-26.2152	27.45869
	3	-26.205916	27.466114		3	-26.218	27.465906		3	-26.218	27.46591
	4	-26.202188	27.473517		4	-26.23	27.473028		4	-26.2298	27.47303
	5	-26.196221	27.478446		5	-26.225	27.513672		5	-26.2425	27.473
	6	-26.186117	27.480839		6	-26.223	27.53351		6	-26.2702	27.49971
	7	-26.176908	27.484123		7	-26.222	27.565571		7	-26.2991	27.5357
	8	-26.154542	27.559277		8	-26.204	27.584206		8	-26.2963	27.59834
	9	-26.146576	27.581466		9	-26.202	27.603181		9	-26.2816	27.65401
	10	-26.140786	27.592033		10 (Middle)	-26.196	27.61542		10	-26.2701	27.69187
	11 (Middle)	-26.11578	27.625232		11	-26.196	27.667941		11 (Middle)	-26.2687	27.70085
	12	-26.117944	27.662972		12	-26.211	27.687681		12	-26.2331	27.72073
	13	-26.107744	27.692578		13	-26.215	27.7092		13	-26.216	27.71754
	14	-26.124519	27.719198		14	-26.215	27.721979		14	-26.215	27.71746
	15	-26.143714	27.716221		15	-26.21	27.730779		15	-26.2151	27.72195
	16	-26.151293	27.720053		16	-26.206	27.734103		16	-26.2097	27.73071
	17	-26.153228	27.727308		17	-26.199	27.736468		17	-26.2059	27.73412
	18	-26.154456	27.735175		18	-26.184	27.735533		18	-26.1994	27.73642
	19	-26.154404	27.736819		19	-26.174	27.738271		19	-26.184	27.73551

	20	-26.15295	27.746925		20 (End)	-26.143	27.758755		20	-26.174	27.73829	
	21	-26.15247	27.747699						21 (End)	-26.1435	27.7587	
	22	-26.14743	27.754961									
	23 (End)	-26.143389	27.758947									
Area	GPS Point	Latitude	Longitude	Area	GPS Point	Latitude	Longitude					
Tanus loop Corridor 1	1 (Start)	-26.245213	27.720712	Tanus loop Corridor 2	1 (Start)	-26.276	27.782859					
	2	-26.244672	27.734268		2	-26.264	27.776337					
	3 (Middle)	-26.253781	27.755301		3	-26.244	27.774338					
	4	-26.263892	27.776239		4 (Middle)	-26.229	27.77151					
	5 (End)	-26.27574	27.782862		5	-26.218	27.755836					
					6	-26.21	27.742333					
					7 (End)	-26.199	27.728515					

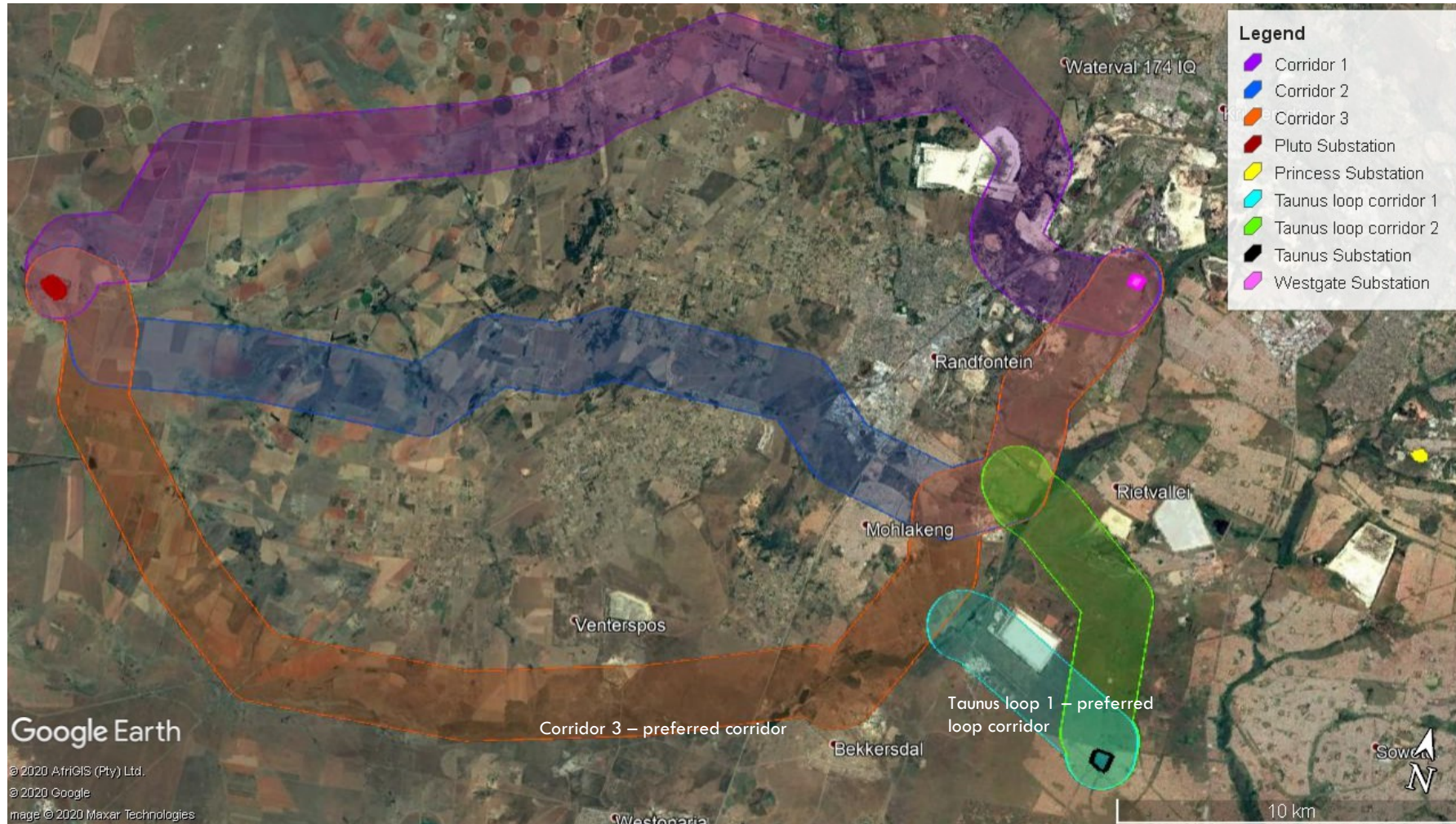


Figure 2: Westrand Strengthening Phase 2 (refer to Table 10 for coordinates)



Figure 3: Corridor 1 (refer to Table 10 for coordinates)



Figure 4: Corridor 2 (refer to Table 10 for coordinates)

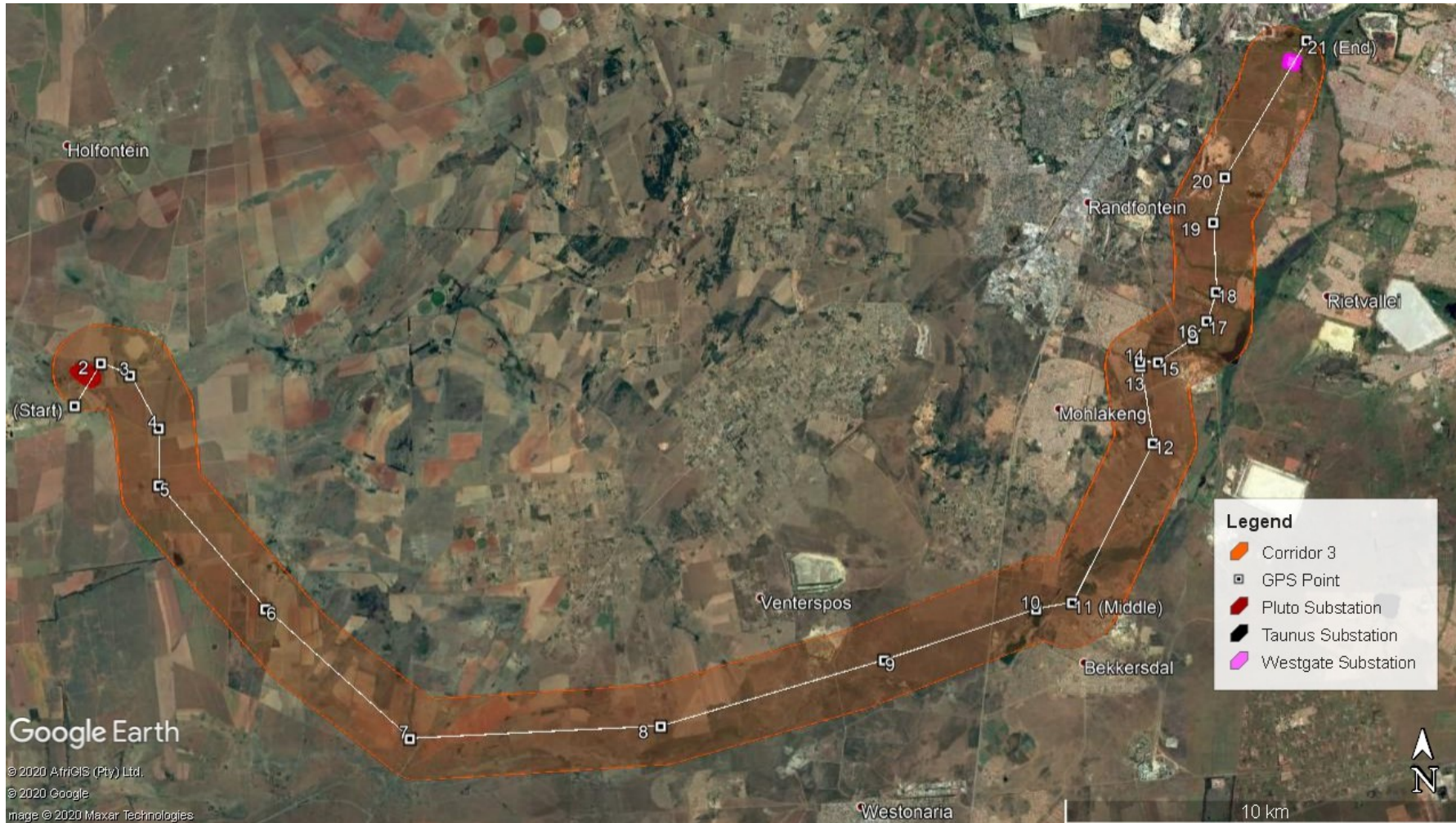


Figure 5: Corridor 3 (refer to Table 10 for coordinates)

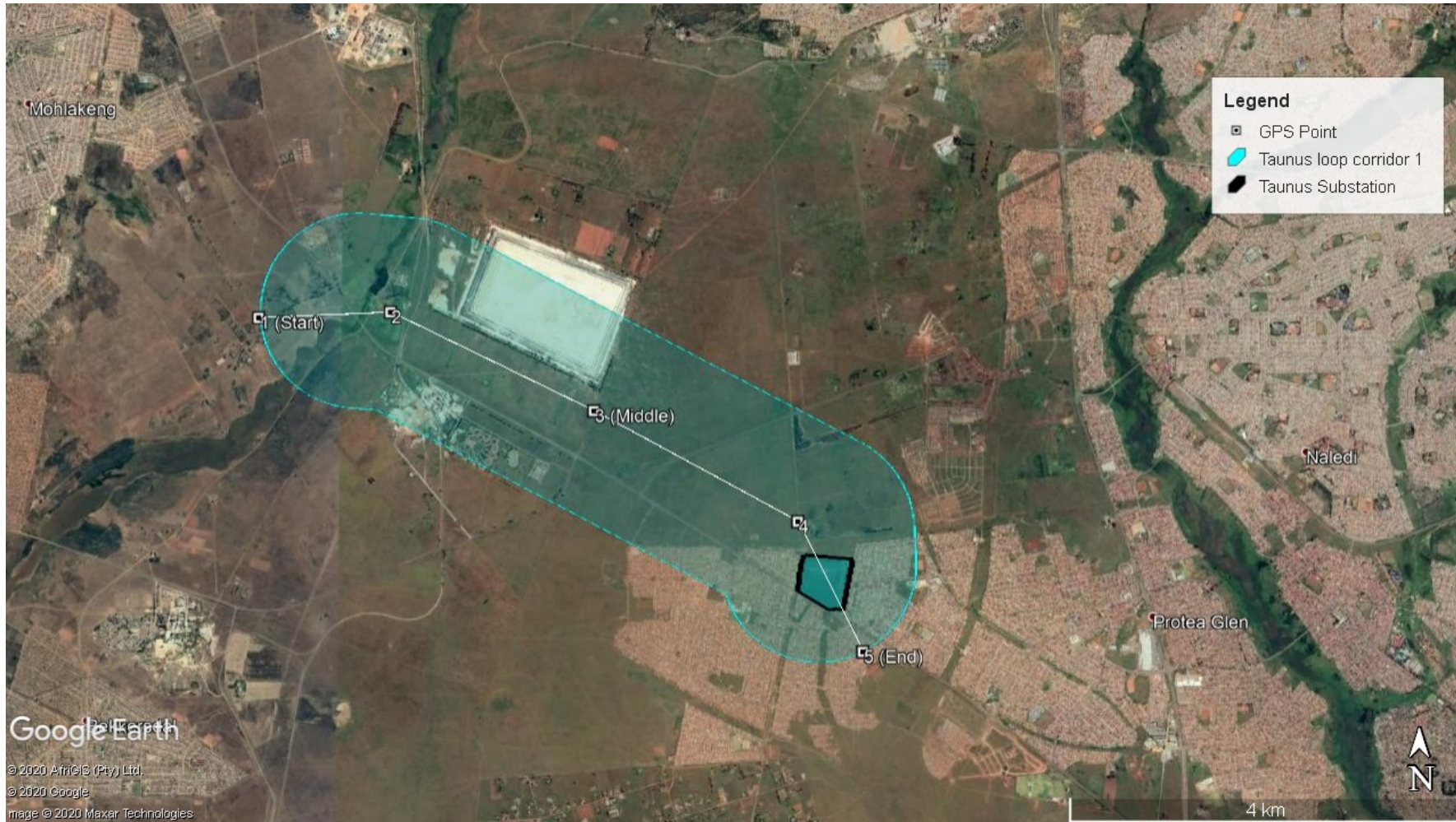


Figure 6: Taurus loop Corridor 1 (refer to Table 10 for coordinates)



Figure 7: Taunus loop Corridor 2 (refer to Table 10 for coordinates)



Figure 8: Taunus substation



Figure 9: Pluto substation



Figure 10: Westgate substation



Figure 11: Princess substation

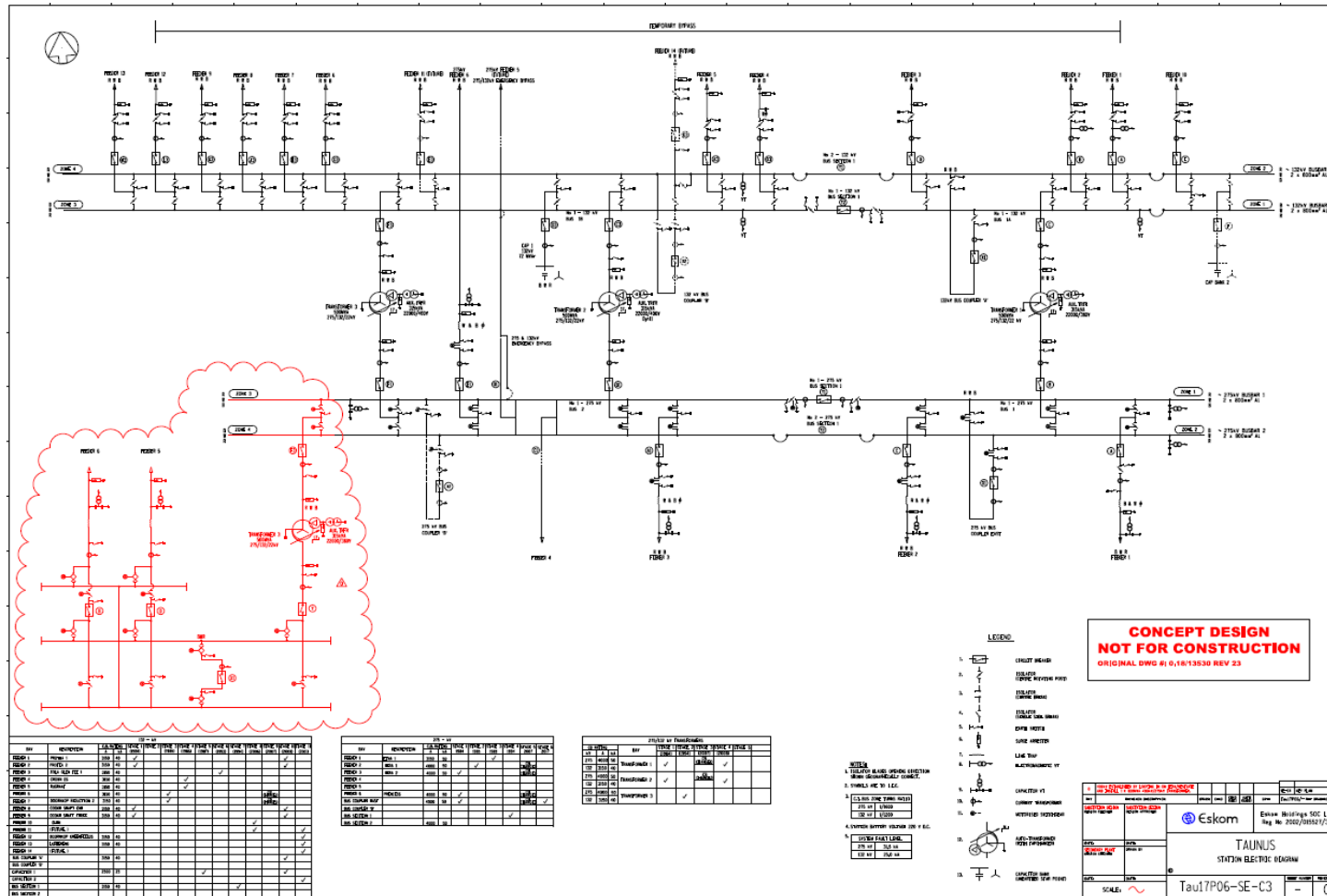


Figure 12: Substation expansion illustration

5.3 PROJECT INFRASTRUCTURE

Infrastructure associated with the project that require environmental authorisation was assessed as part of the EIA phase. The following infrastructure is associated with the project:

5.3.1 Substations

- Additional shunt capacity banks as follows:
 - 1x 72 MVar 132-kV capacity bank at Westgate MTS (Figure 16 and **Error! Reference source not found.**)
 - 1x 48 MVar 88-kV capacity bank at Princess MTS (**Error! Reference source not found.** and Figure 17)
 - 1x 72 MVar 132-kV capacity bank at Taunus MTS (Figure 14 and Figure 15)
 - 1x 72 MVar 132-kV capacity bank at Quattro MTS (Figure 18)
- 2x 400-kV/132-kV 500-MVA transformers at Westgate MTS and run the 2x275-kV transformers to end of life

Power is brought to the sub-station on 400kV transmission lines that end on a large steel structure called a terminal tower. Power is then transferred into the main electrical switchgear inside the Substation perimeter.

These include:

- Transformers.
- Reactors.
- Busbars.

After passing through the switchgear, power out of the sub-station is fed into the 400kV outgoing transmission lines that start from large steel terminal towers outside the perimeter fence.

5.3.1.1 Conductor Selection

The proposed 1 X Bull conductor specified to string the 3 X 132kV Capbank bays at Westgate, Taunus and Quattro as well as the 1 x 88kV Capbank bay at Princess MTS, is adequate since the maximum expected load of 400Amps (including a provision for harmonic currents), is less than the normal (986A) and emergency (1353A) ratings of single Bull conductor. Besides, 1 X Bull conductor is bigger than the minimum conductor size requirement in accordance with the SLDG in order to prevent the inception of corona at 88kV and 132kV.

5.3.1.2 Insulator Type

Silicone rubber composite type insulators or glass insulators will be used to insulate the conductors from the steel structures where stringers are to be installed (Westgate and Taunus) while ceramic or silicone rubber composite insulators will be used for Tubular busbar installations (Quattro). It depends on which type is available on ENC at the time of procurement during the execution phase.

Equipment insulators at Westgate, Princess, Taunus and Quattro will either be ceramic or silicone rubber composite type depending on the type available during the procurement of primary plant equipment.

Westgate/Princess and Taunus MTS's

Glass type insulators have been used to insulate the conductors from the steel structures at 275kV, 132kV and 88kV except for Quattro MTS which has not yet been constructed. At Quattro all the insulators that are to be used to insulate the conductors from steel structures at 275(400)kV and 132kV, will be composite insulators.

All the existing primary plant equipment on site and the proposed primary plant equipment consists or will consist predominantly of ceramic and some silicone rubber composite types.

The technology of the equipment to be used in this design will be based on the Eskom National contract at the time of procurement. As far as practicable, the designs of the proposed works at Westgate, Princess, Taunus and Quattro will ensure that no failure leads to life threatening situations for any person or to unacceptable damage to the environment or the installation. A Safety assessment is aimed at ensuring that a safe, practicable concept design is carried forward to more detailed design.

The safety considerations are inherent in the design layout. The more common dangers include electric shocks, arc-flash incidents, and transformer explosions. Following the design guide as specified in the Substation Layout Design Guide [3] mitigates the aforementioned dangers. Only standard and proven equipment are envisaged to be utilised during the execution of the applicable scope of work at these substations (Westgate, Princess, Taunus and Quattro). The equipment will be supplied off Eskom National Contracts in place at the time of procurement and execution or where ENC's do not exist; Eskom Commercial will procure the required Primary Plant equipment by going out on tender with the existing HV Plant Specifications and associated Tender Technical Strategies.

Dangerous Goods Installation

The hazardous/dangerous substances referred to comprise of fuels, oils (notably transformer oil), and lubricants that will be stored and dispensed at the construction camp. Specifications for the storage and dispensing of fuels, oils, and lubricants include the following:

- Specifically designated areas.
- All storage of fuels, oils, and lubricants shall be stored above ground and under cover.
- All designated areas will be bunded.
- Each designated area will be equipped with adequate fire protection equipment appropriate for the nature of the fuels, oils, and lubricants that are stored and dispensed.
- All areas shall be properly signed in all applicable languages.
- All employees must be properly trained in the storage and dispensing of specific fuels, oils, and lubricants.
- A specific procedure for emergency situations, including accidental spills, must be formulated and must be available on site at all times.

400kV/132kV 500MVA Transformers containing transformer oil (volume/capacity of transformers depends on final design but does not exceed the minimum thresholds as allowed by the department) will be installed at Westgate MTS and at Taunus MTS. Bund walls will be built around each of these transformers

to contain oil in the event of an oil spillage emanating from these transformers. The Bund wall area will also be connected via underground concrete pipes to an Oil holding dam located within the boundary of the Substation footprint. Formerly, polychlorinated biphenyl (PCB) was used around transformer windings as it was not a fire hazard in indoor power transformers, and it is highly stable. However, PCB by-products are unstable and toxic, and also accumulate in the environment. These products are, therefore, no longer permitted and will not be used. Instead, transformer oil, a highly refined mineral oil that is stable at high temperatures will be used.

See Figure 13: Example of Transformer installation with bund wall.



Figure 13: Example of Transformer installation with bund wall

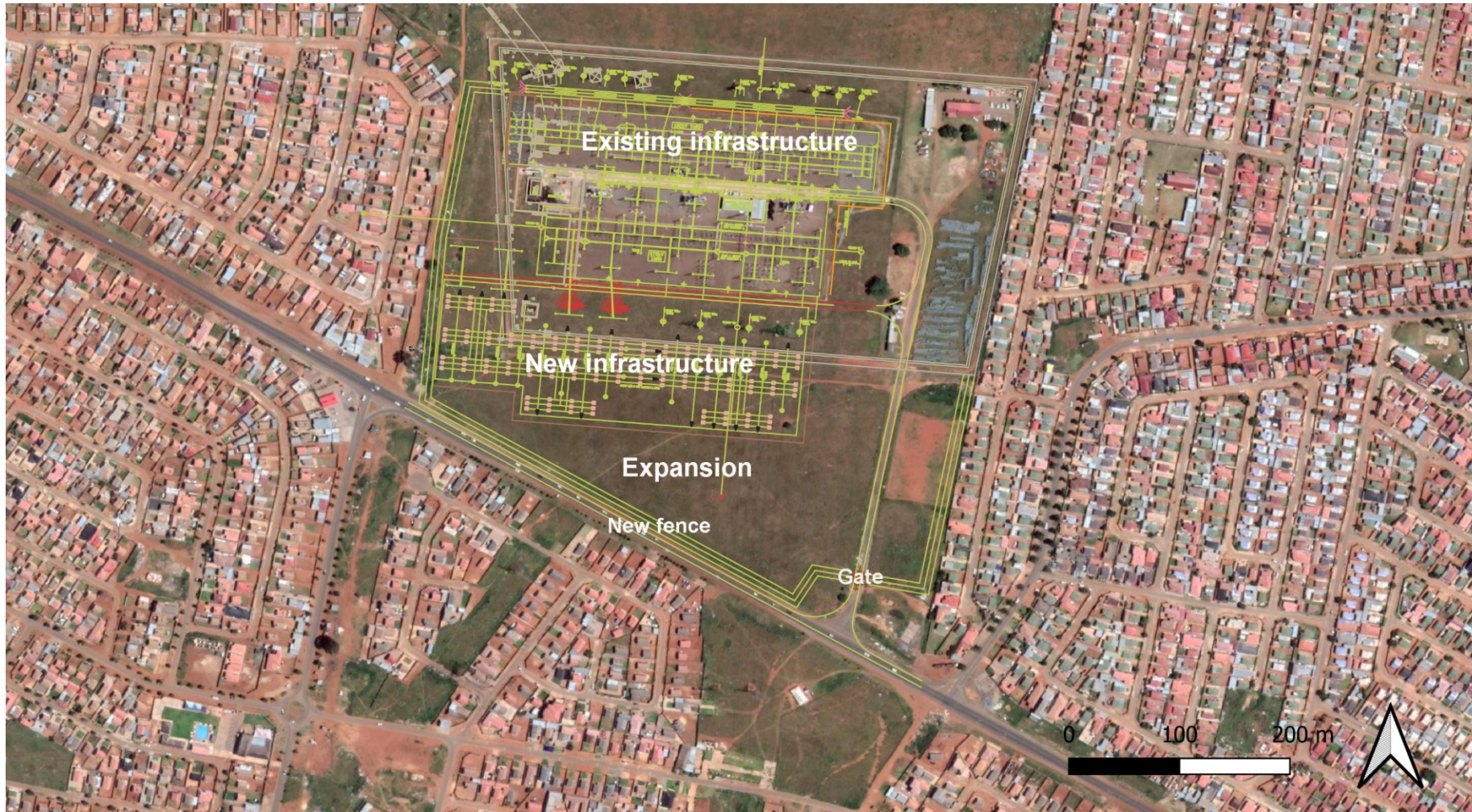


Figure 14: Taurus substation infrastructure layout

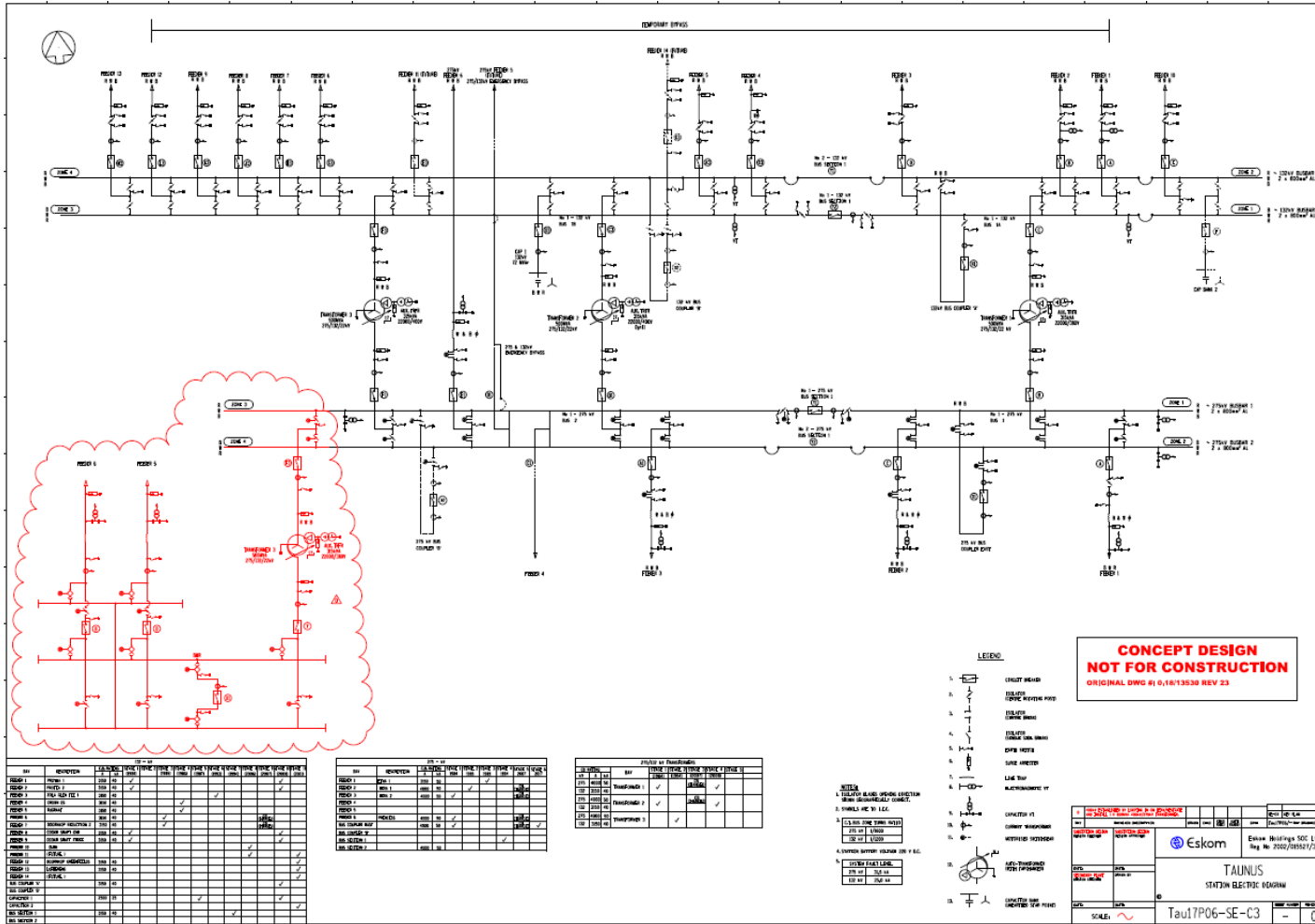


Figure 15: Taurus substation electric diagram

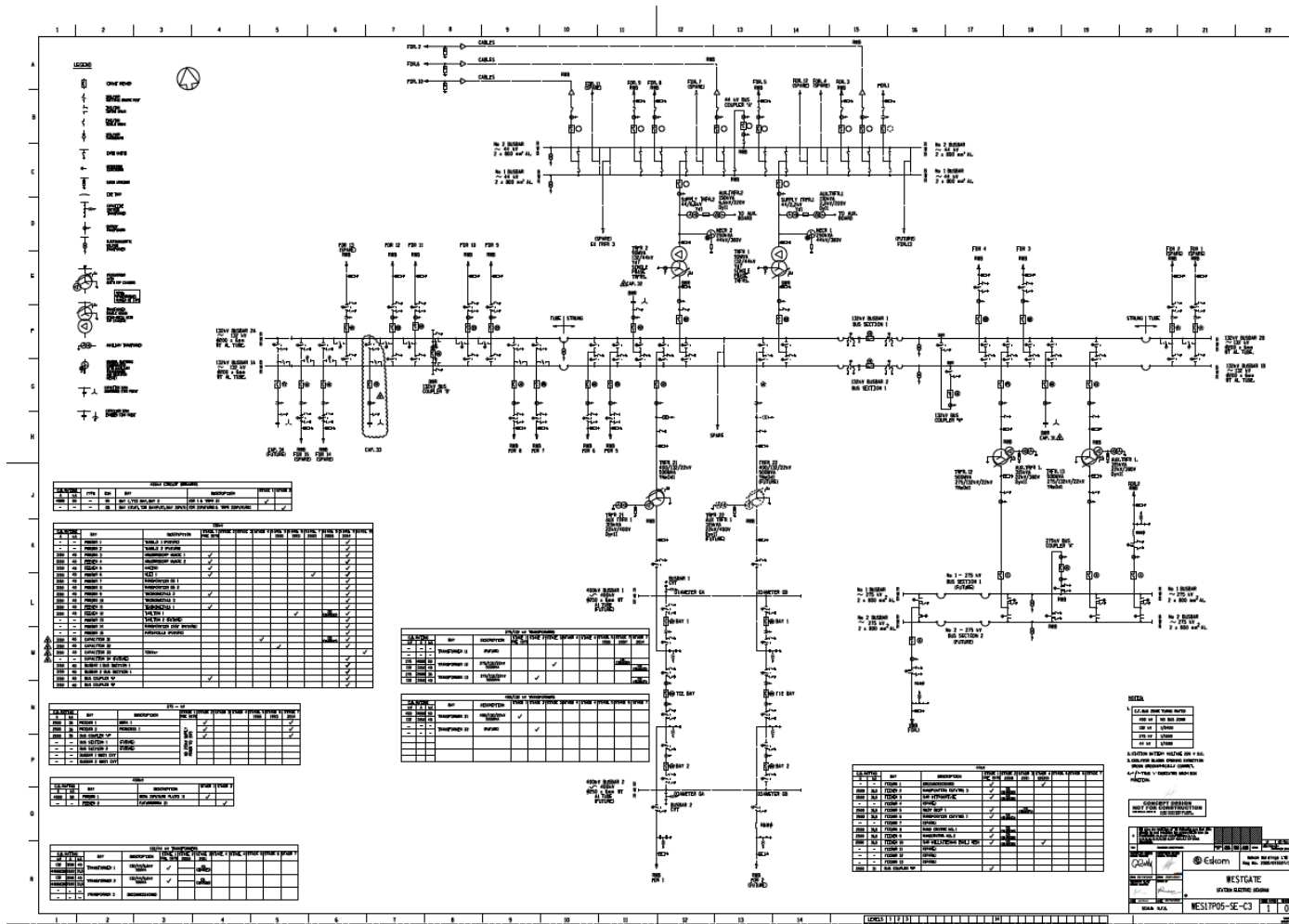


Figure 16: Westgate substation electric diagram

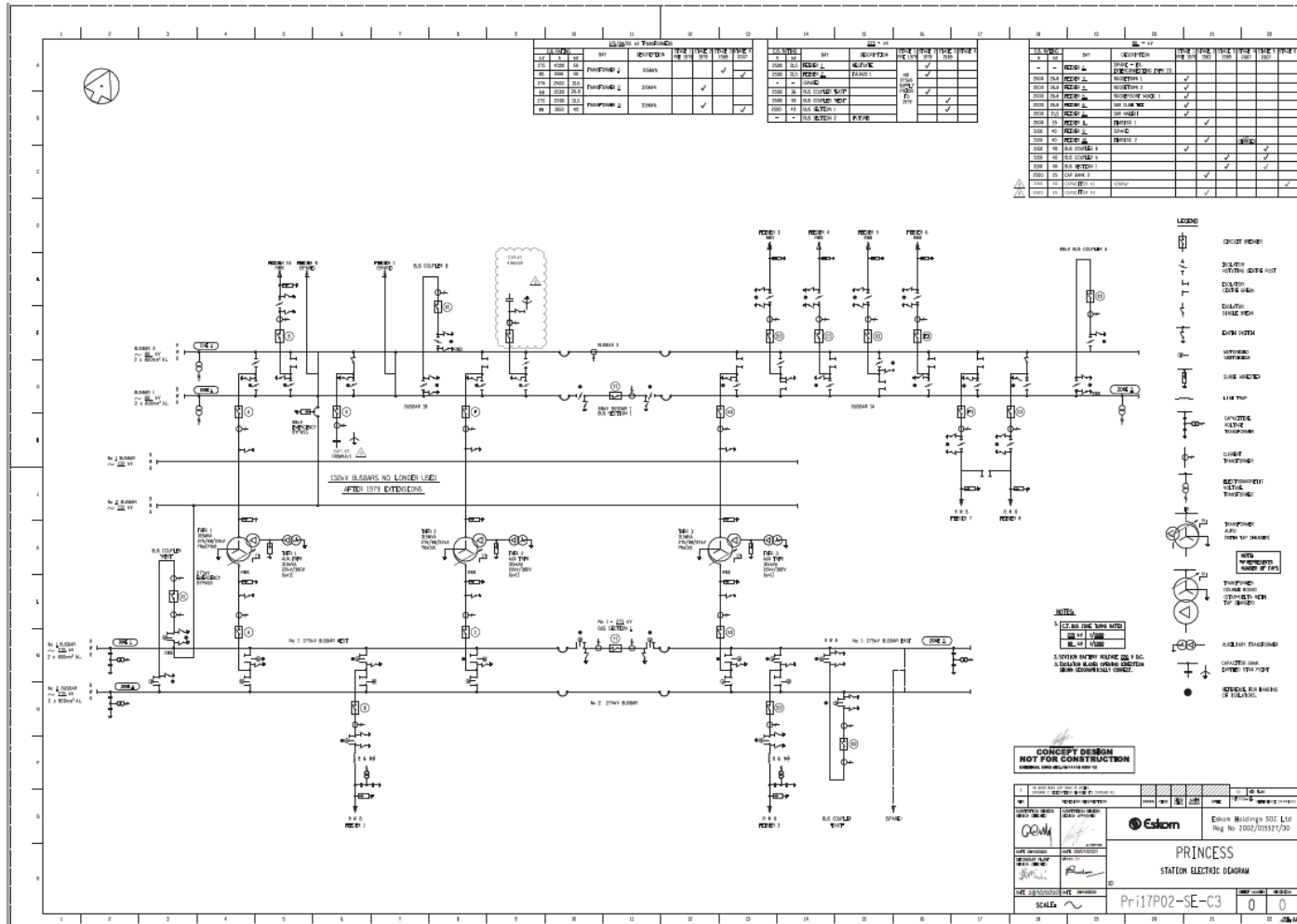


Figure 17: Princess substation electric diagram

5.3.2 Lines

- 400kV powerlines within selected corridor

A conductor optimization study, undertaken by ESKOM, the 4 X IEC 315 conductor, has proven to be most favourable. The towers to be used are the (Refer to Figure 19, Figure 20, Figure 21, Figure 22, Figure 23 and Figure 24 for schematic illustrations of the towers listed below):

- 523 A, 523B, 523C – Double circuit
- 517E, 517F, 515H – Single circuit

5.3.3 Associated Infrastructure

The following associated infrastructure were identified:

- Access roads (during construction and operation); and
- Construction camp(s).

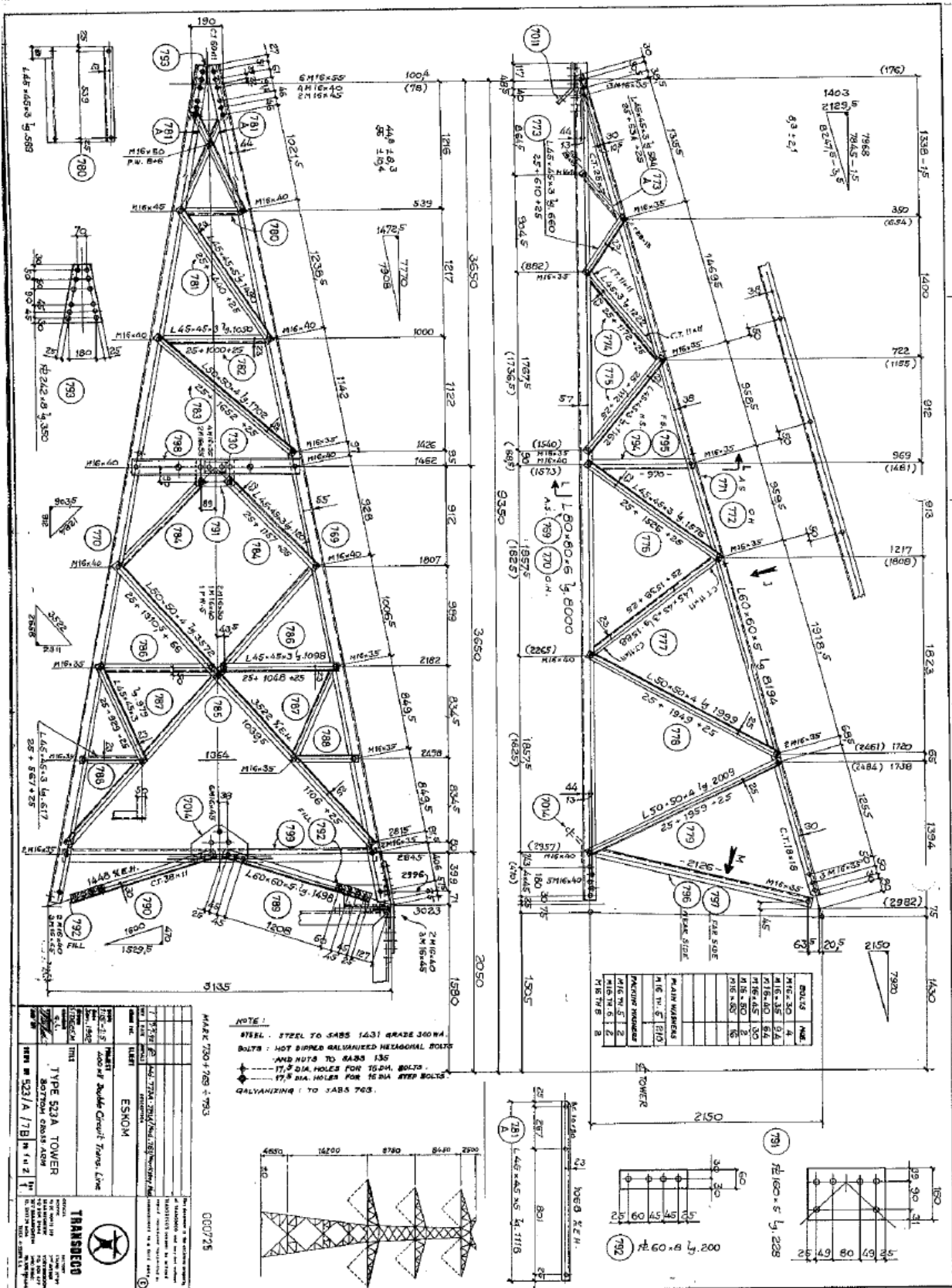


Figure 19: Tower 523A – Double circuit

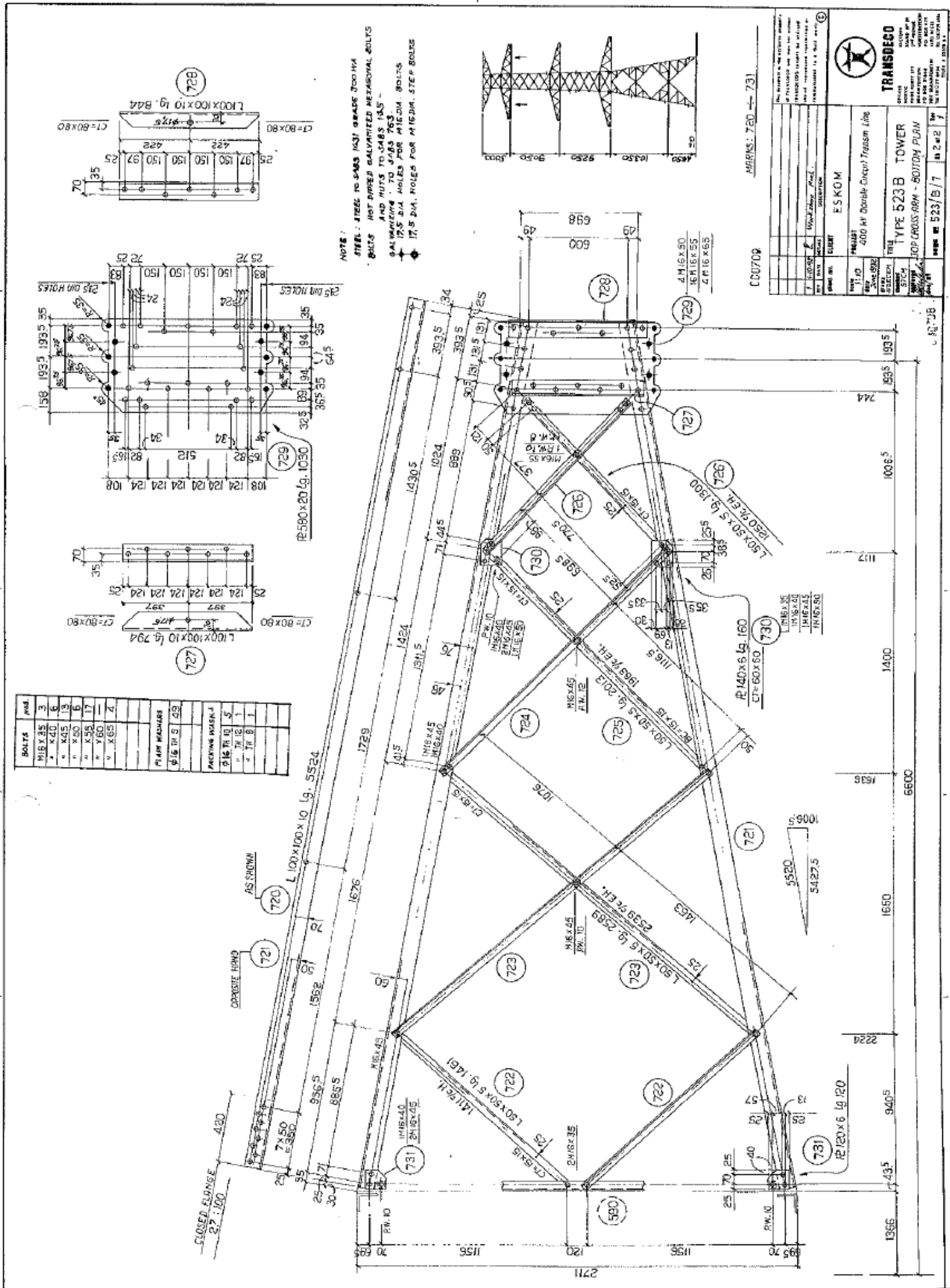


Figure 20: Tower 523B – Double circuit

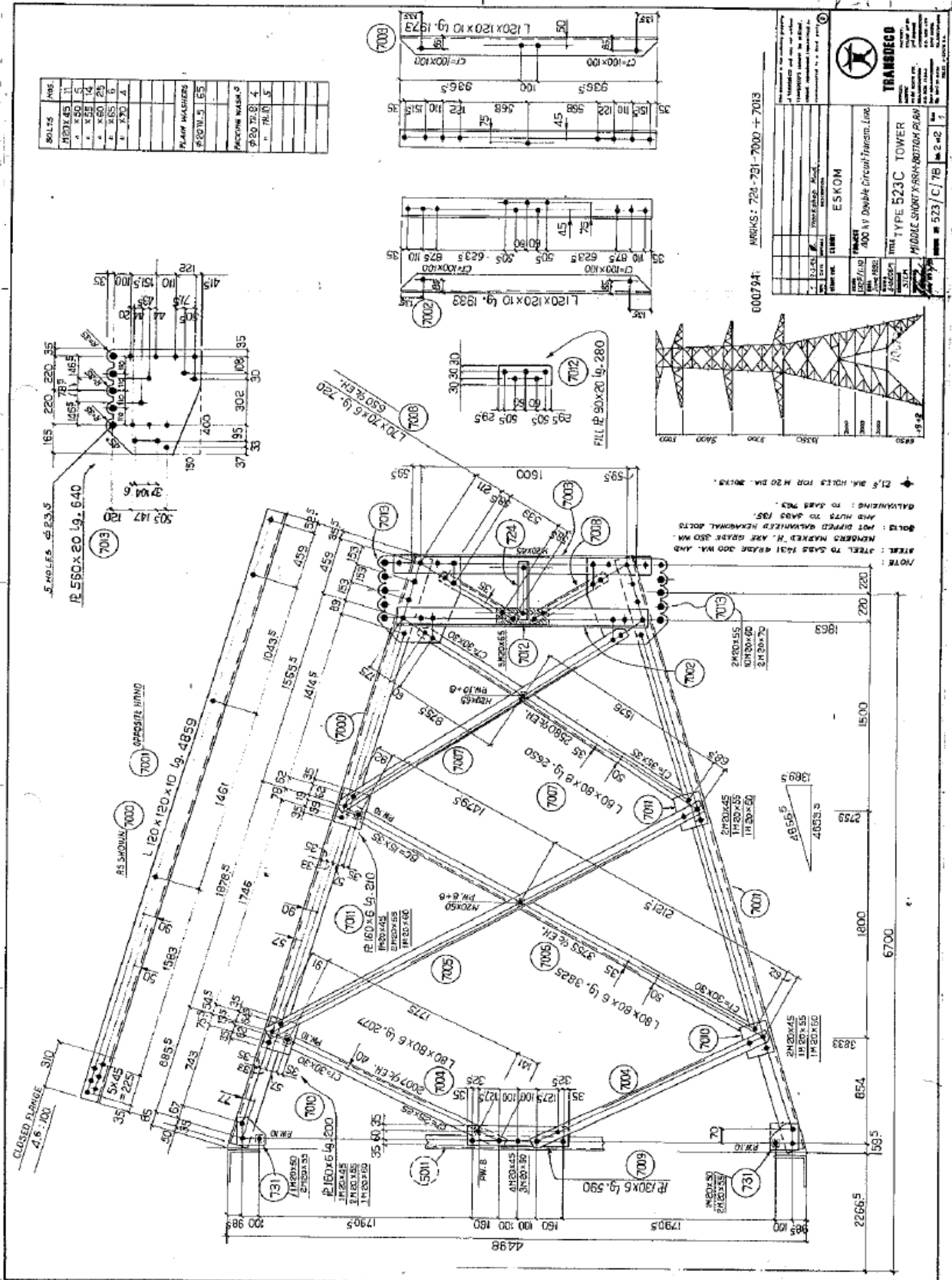


Figure 21: Tower 523C – Double circuit

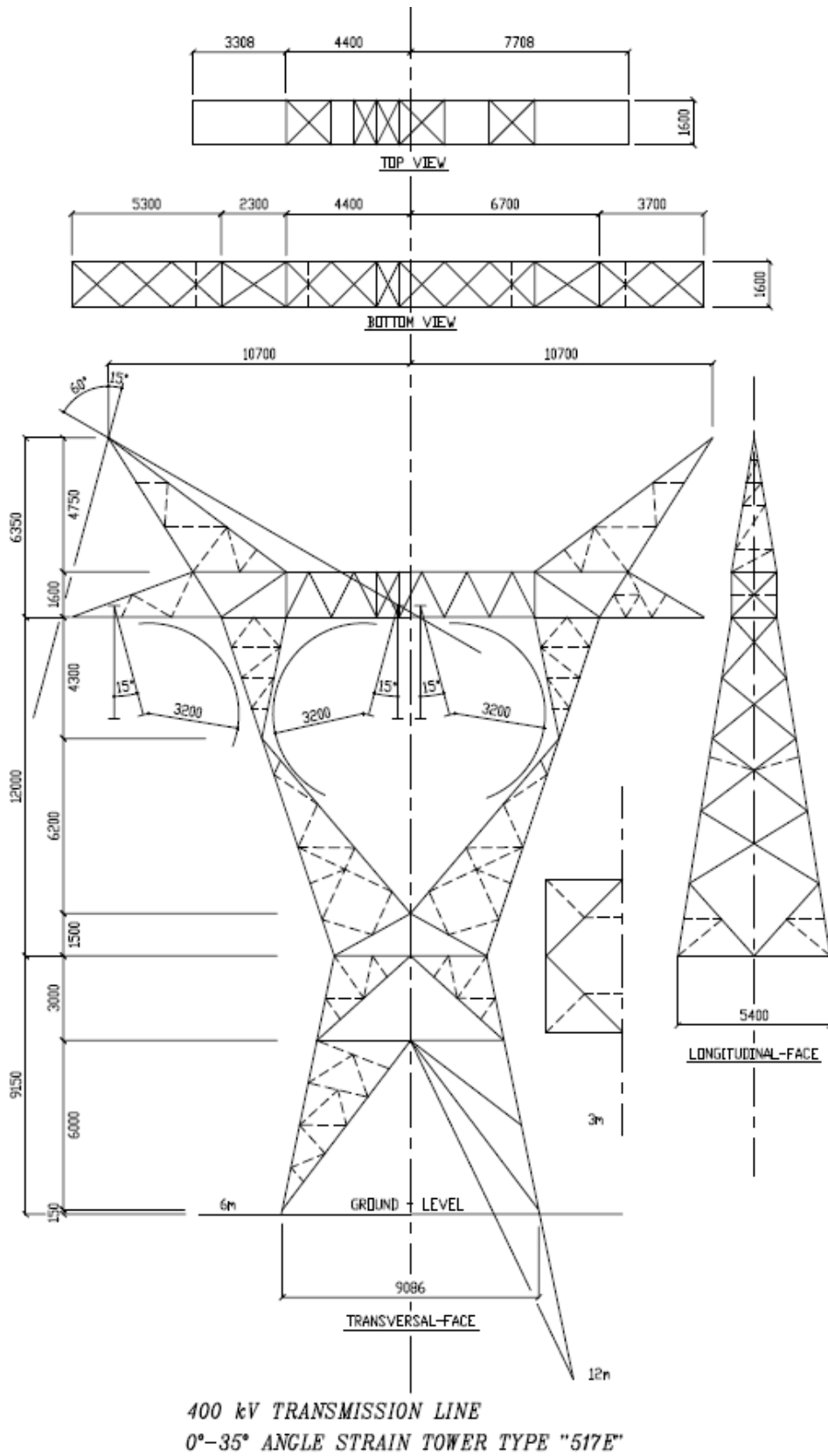


Figure 22: Tower 517E – Single circuit

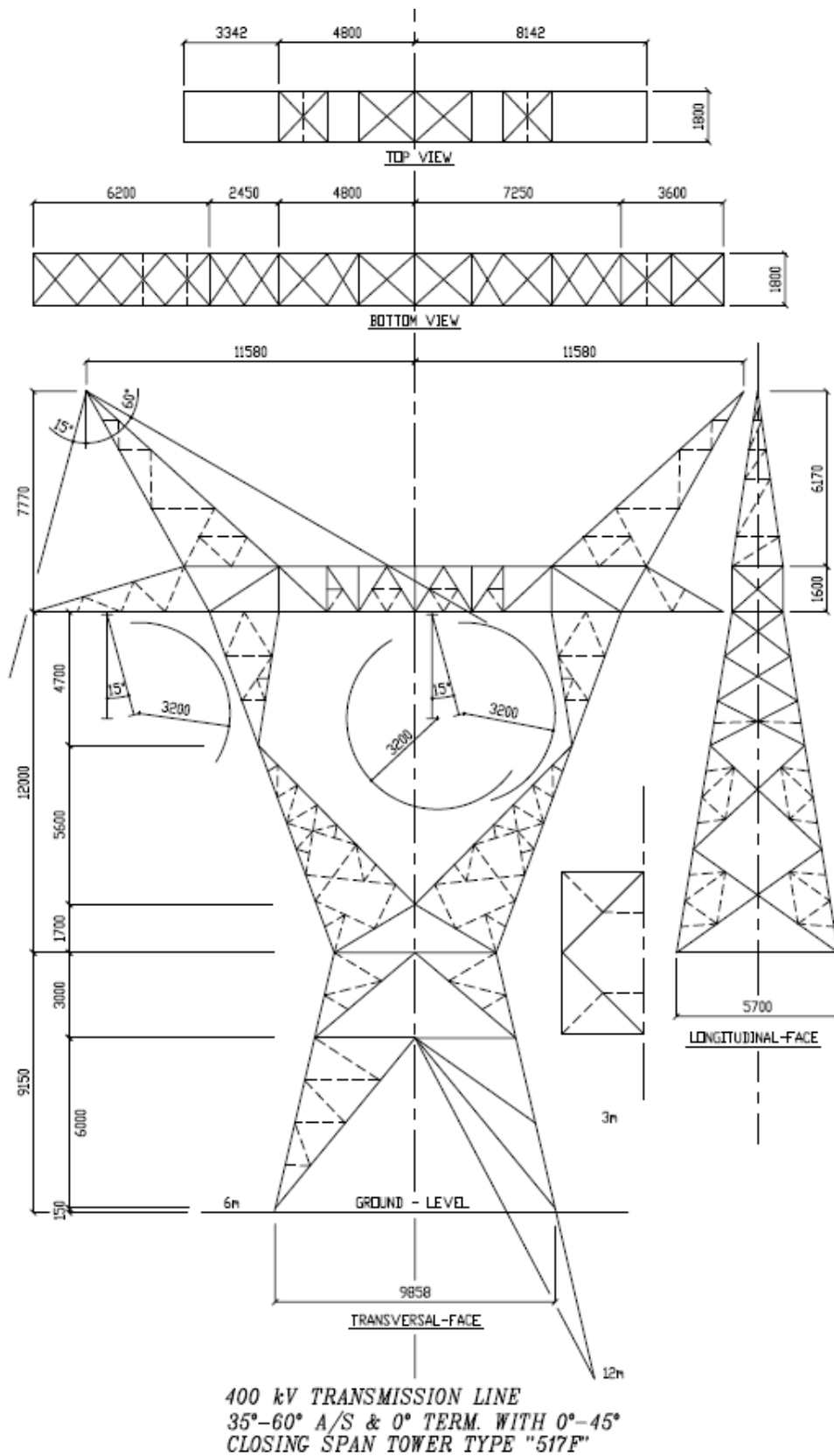


Figure 23: Tower 517F – Single circuit

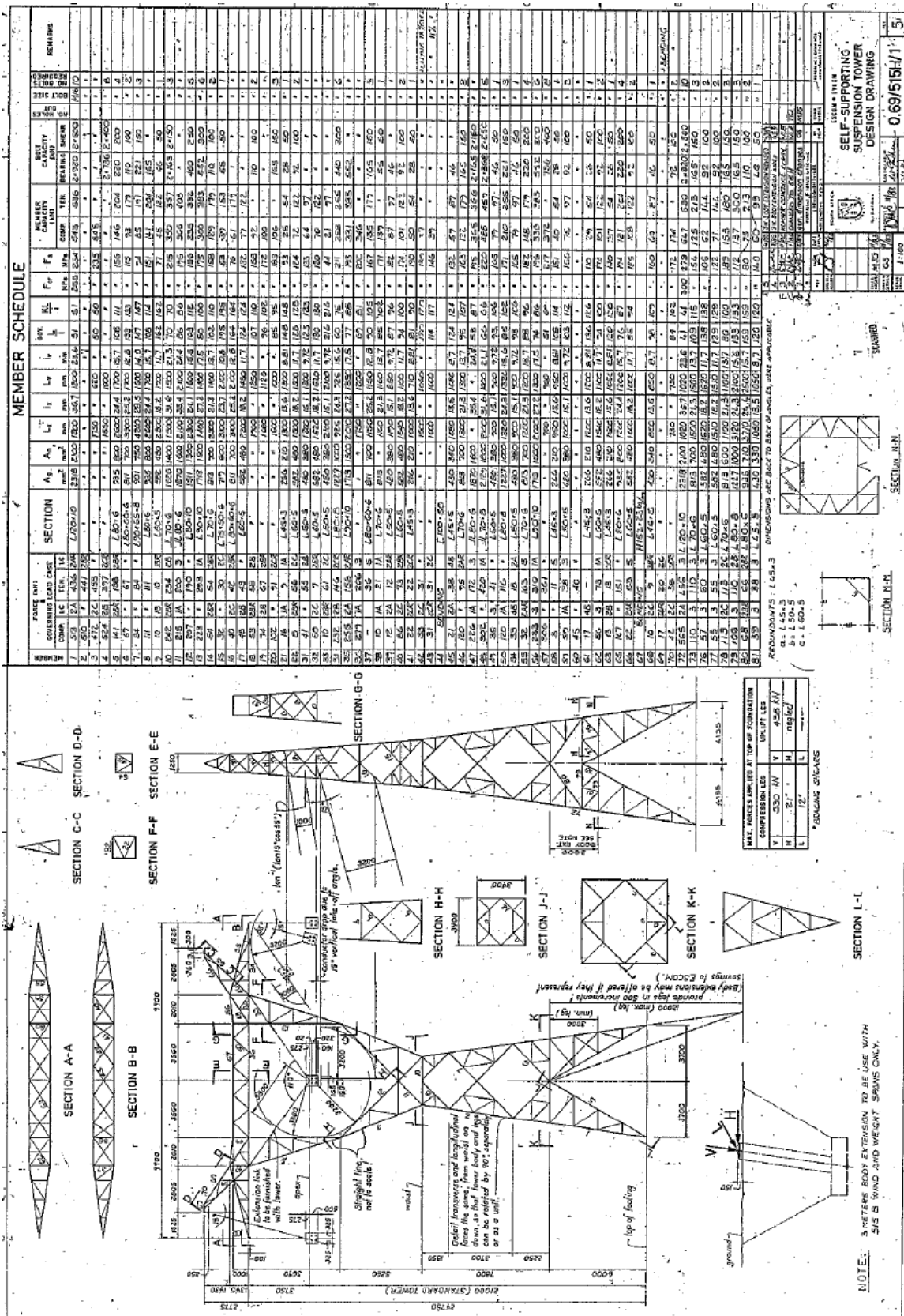
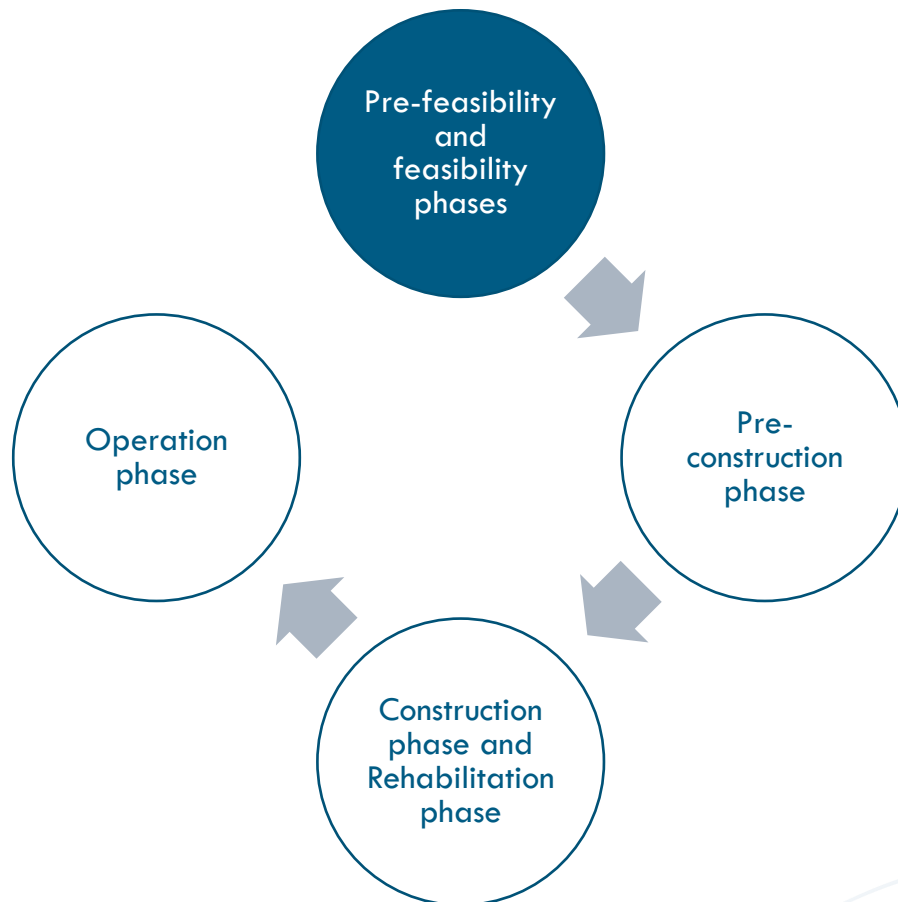


Figure 24: Tower 517H – Single circuit

5.4 PROJECT LIFECYCLE

The lifecycle of the proposed project is divided into five distinct phases, namely:

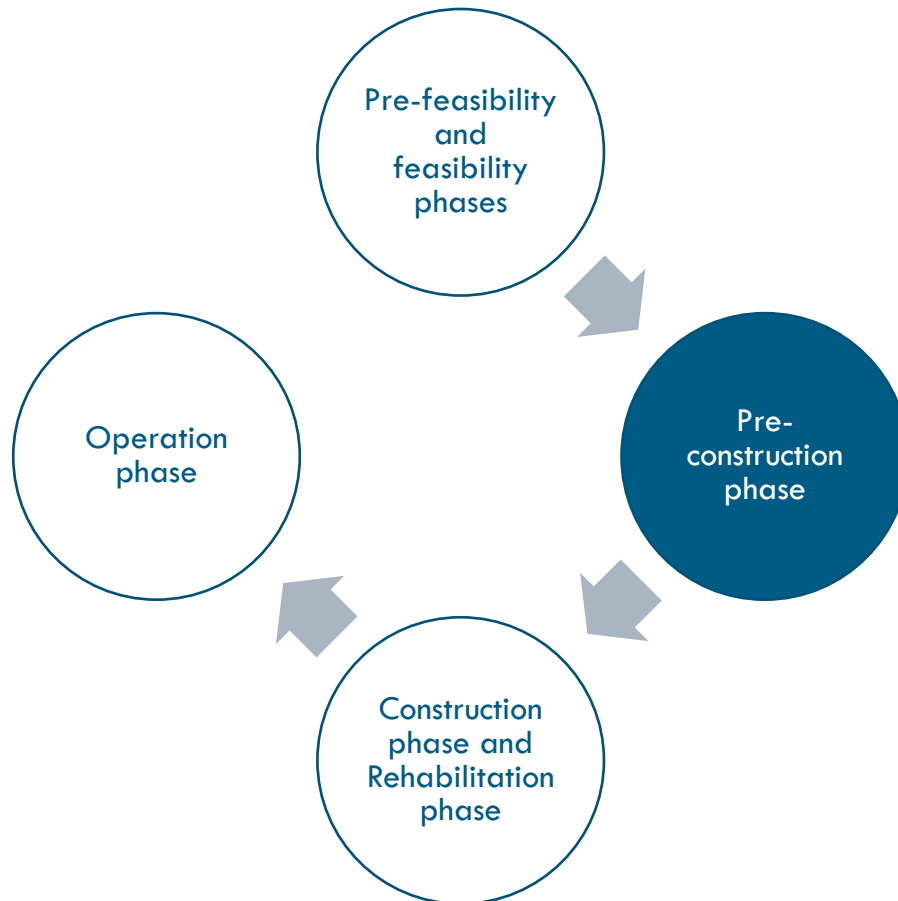
5.4.1 Pre-feasibility and Feasibility Phases



The following activities form part of pre-feasibility:

- High level identification of environmental and social constraints
- Screening of the project and different alternatives
- Selection of a preferred transmission route corridor
- Preliminary designs

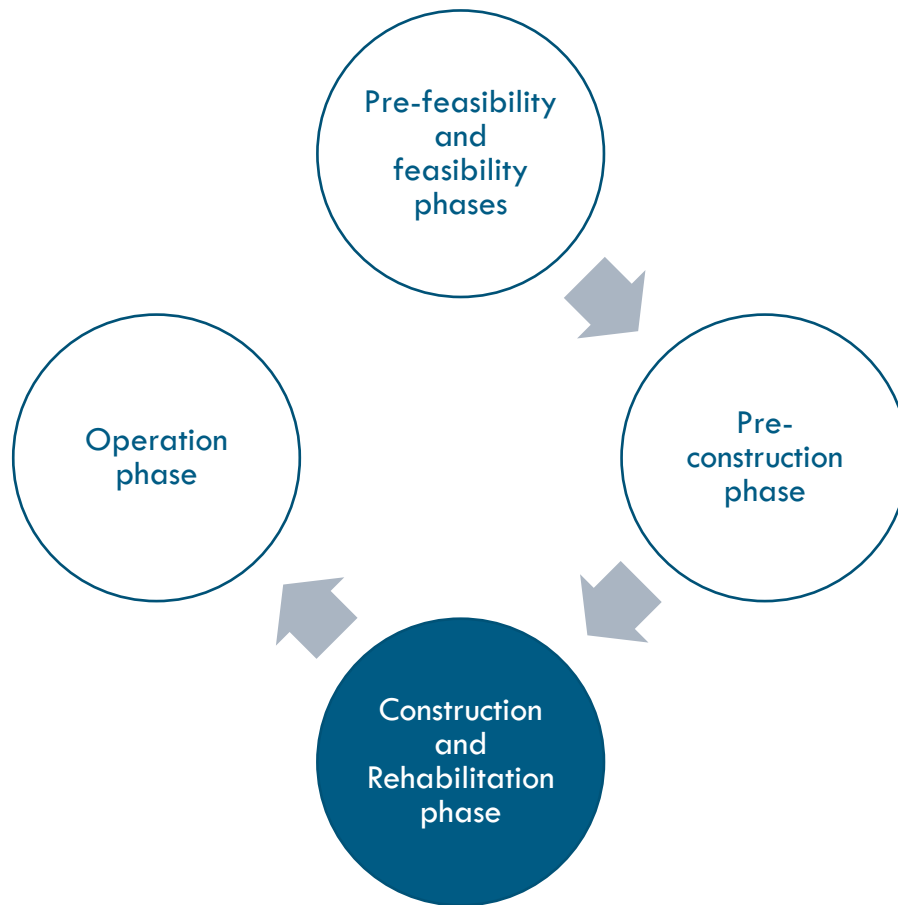
5.4.2 Pre-construction Phase



The following activities forms part of the pre-construction phase:

- Obtaining environmental authorisations, permits and/or licenses from the various competent authorities.
- Wayleave application where required.
- Land acquisition process.

5.4.3 Construction Phase



The construction will be done as per the Eskom construction methodologies and / or specifications. In summary this phase will entail the following in no particular order:

- Site clearance and gate installation to facilitate access and construction (as per Eskom internal guidelines and standards in South Africa)
- Establishment of the contractor's site camps
- Construction of access roads and installation of stormwater infrastructure where required
- Pegging out of tower locations by surveyor
- Bush clearing centre line and tower footprint areas where required
- Soil Nominations (to establish foundation and tower design requirements)
- Tower foundation excavations (separation of topsoil from sub-soil)
- Transportation of construction equipment on site
- Assembly and erection of towers
- Cable stringing and installation of earth conductors
- Handling and disposal of construction waste

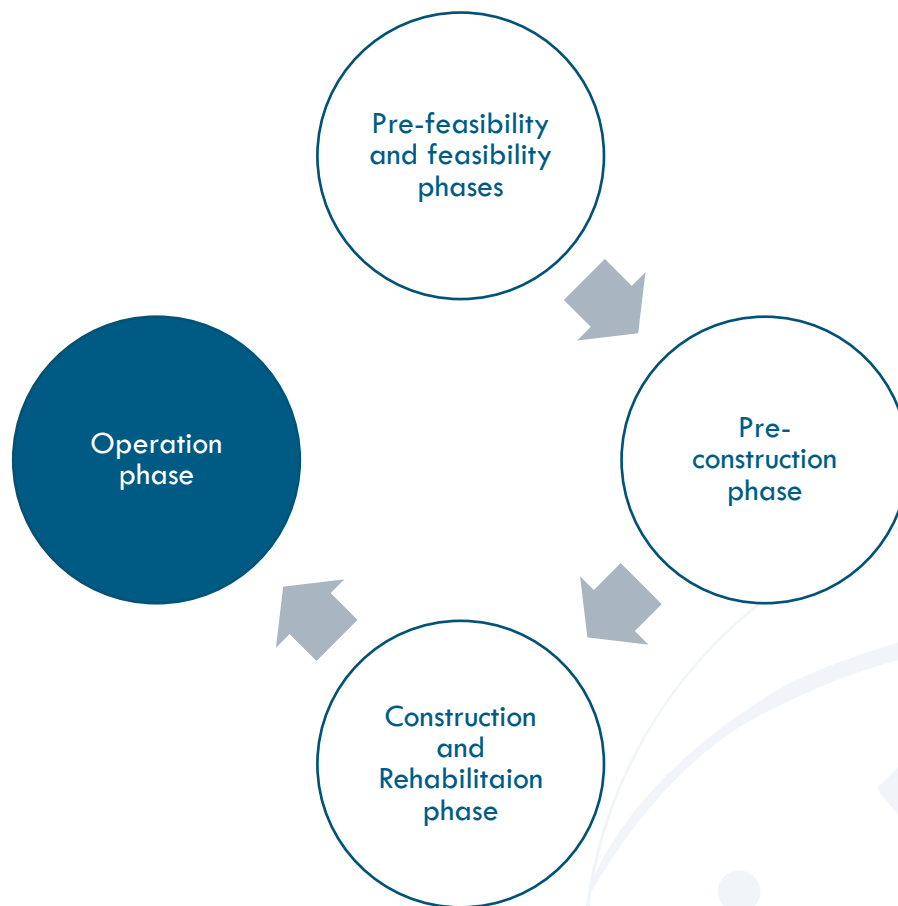
The rehabilitation of disturbed areas will be done as an ongoing process and as a minimum immediately after construction activities have been completed. This will include:

- Removal / decommissioning of Contractor's camp.
- Removal and disposal of all construction equipment and rubble
- Rehabilitation of the disturbed areas as a result of construction works

Rehabilitation will be done as per the specifications of the EMPr.

Final inspection of the line, commissioning and hand over to the Grid Line and Servitude Manager for operation

5.4.4 Operation Phase



The operational phase refers to the actual operation of the proposed powerline and associated infrastructures (i.e., substation). This phase will reflect the outcome and implementation of the EIA process. The infrastructure would not require service provision except for maintenance. Maintenance will be done as per the specifications and / or requirements of Eskom.

5.5 PROJECT NEED AND DESIRABILITY

The Department of Environment Affairs (DEFF) have a guideline for assessing for the need and desirability of a project. The Guideline on Need and Desirability (DEFF, 2010) highlights the obligation for all proposed activities to consider two key questions namely i) *is it the right time for the project?* and ii) *is it the right location for the project?* This information allows the authorities to contemplate the strategic context of the project. The following subsections seek to address the two key questions. These questions also speak directly and explicitly to the potential cumulative impacts associated with the proposed development through space and time crowding. Figure 25 shows the strategic location of the proposed development relative to other similar future developments in the area. It is evident that the proposed development has been considered within a broader strategic and potential cumulative impact context – which are also assessed as part of this EIA.

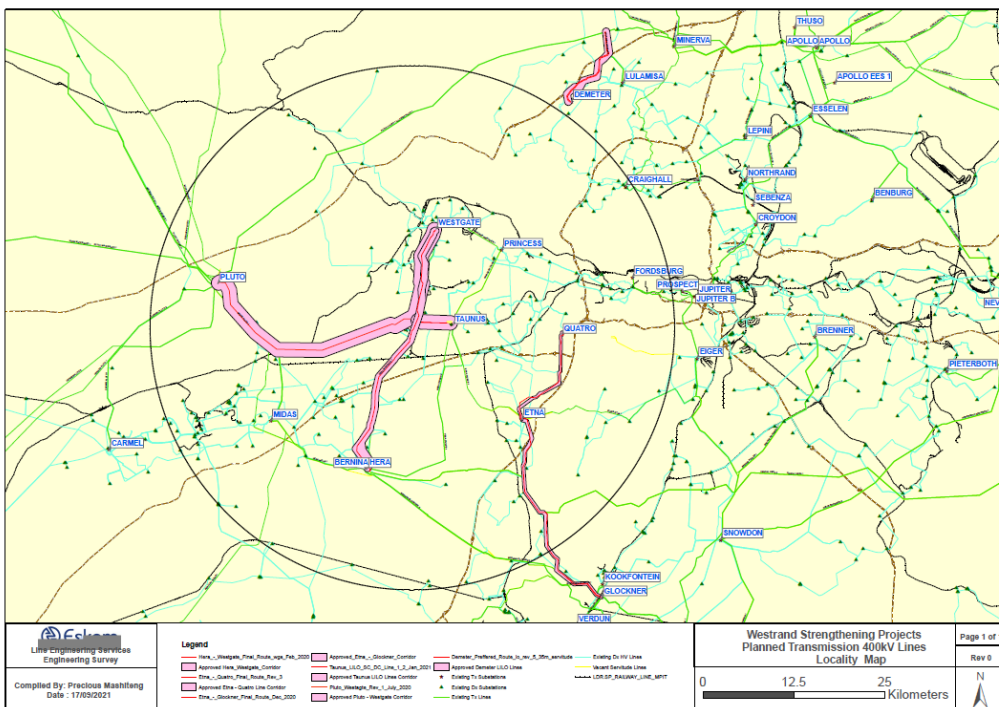


Figure 25: Cumulative impacts of similar projects in the area

5.5.1 Timing of the Project

The phases of the project are explained above in sections 2.1 and section 5. It is evident that this project is a direct outcome of the medium to longer term strategic planning by Eskom to ensure sufficient transmission infrastructure for the region. Eskom does continual projections for electricity supply and demand nationally through so-called grid planning. This application relates to the grid planning done by Eskom for the West Rand region contained in a Grid Plan Report. According to the Grid Plan Report, there is a significant load growth forecast to the west of Johannesburg in areas around Lenasia and Soweto. The load growth is expected to introduce high growth of power demand in the West Rand Customer Load network in the next 5 to 20 years. The timely planning and construction of additional transmission capacity is critical to sustain the electricity provision to one of South Africa’s most important urban regions.

5.5.2 Location of the Project

Eskom provided the initial technical inputs to the identification of possible transmission corridors locations as described in section 5. The evaluation of the different corridor options for the transmission infrastructure was also done through a MCA method discussed in more detail in section 6.2.1. However, the possible location of the corridors was strongly influenced by the location of existing substations as well as the location of future electricity demand as highlighted by the grid planning done by Eskom. Therefore, the desirability of the particular location is, at a high level, determined by the location of future electricity demand and the location of existing electricity infrastructure.

In this regard City Power is proposing to shift a substantial amount of load from Fordsburg substation to the proposed Quattro substation which is located outside Soweto. For these reasons, it is anticipated that West Rand network will be under pressure to supply the new loads. Grid Planning has undertaken a study to address the system constraints and the overall reliability of the substations in the West rand area emerging from the year 2026 onwards. It is evident that the scope of this application is the proposed solution for the future electricity load growth and load shift in the West Rand. There are also various strategic spatial plans in the form of SDFs and EMFs that were considered in this assessment during the scoping phase and beyond. For these reasons the MCA included in section 5 includes evaluation criteria that incorporate the information from these documents. For example, the consideration of CBA are extracted from the most recent version of the Gauteng C-Plan.

6 CONSIDERATION OF ALTERNATIVES

The section outlines the project alternatives considered during the scoping phase of the EIA and the identification of the preferred alternative assessment in more detail during the EIA phase. Both the scoping and EIA phases relied on inputs from various specialists.

6.1 BACKGROUND

According to the 2014 EIA Regulations as amended (GN No. R326) the following definition of alternatives is provided “...in relation to a proposed activity, alternatives means different means of meeting the general purpose and requirements of the activity, which may include alternatives to the—

- (a) *property on which or location where the activity is proposed to be undertaken;*
- (b) *type of activity to be undertaken;*
- (c) *design or layout of the activity;*
- (d) *technology to be used in the activity; or*
- (e) *operational aspects of the activity;*
- (f) *and includes the option of not implementing the activity”.*

Furthermore, the following alternatives are considered in the DEFF&DP Guidelines on Alternatives (DEFF&DP, 2013):

- (a) **Demand alternatives:** Arises when a demand for a certain product or service can be met by some alternative means (e.g. the demand for electricity could be met by supplying more energy or using energy more efficiently by managing demand).
- (b) **Input alternatives:** Input alternatives are applicable to applications that may use different raw materials or energy sources in their process (e.g. industry may consider using either high sulphur coal or natural gas as a fuel source).
- (c) **Routing alternatives:** Consideration of alternative routes generally applies to linear developments such as power line servitudes, transportation and pipeline routes.
- (d) **Scheduling and timing alternatives:** Where a number of measures might play a part in an overall programme, but the order in which they are scheduled will contribute to the overall effectiveness of the end result.
- (e) **Scale and magnitude alternatives:** Activities that can be broken down into smaller units and can be undertaken on different scales (e.g. for a housing development there could be options of 10, 15 or 20 housing units. Each of these alternatives may have different impacts.

One of the main functions of the Scoping Phase was to screen alternatives to provide reasonable and feasible alternatives to be assessed in the EIA Phase. Alternatives screened for this project are described in the following sections, and the preferred alternative assessed during the EIA phase is identified and justified.

6.2 ALTERNATIVES CONSIDERED

Best practice EIA suggests that there are three particularly important types of alternatives to consider as part of scoping for electricity transmission infrastructure namely, routing, design and technology

alternatives. The next sections describe the outcome of the alternatives assessment for these types of alternatives in more detail.

6.2.1 Routing Alternatives

The optimum routing for an overhead electricity transmission line or a transmission loop is ideally a straight line from one point to another, over a flat terrain with no obstacles, sensitive areas, or other constraints. As this is hardly ever possible, selection of the best route is an optimisation exercise, which aims to minimise the impacts on the environment and people, while accommodating technical challenges in the most cost-effective way.

To guide the EIA process, a high-level systematic transmission line corridor selection process was undertaken using a GIS based assessment of alternative routings to screen the most feasible route for the transmission line and transmission loop. A multi-criteria analysis (MCA) method was used to determine the preferred alternative from a technical, environmental and social impact perspective, allowing for an integrated assessment of the route alternatives. The process included not only the relevant environmental and social specialist inputs, but also the technical inputs from Eskom, in order to ensure that all relevant information, local knowledge and transmission expertise was duly taken into consideration in the final decision.

The MCA is summarised in Table 11 for the 400kV lines as well as the two loop-in/out corridors from the Substation, which shows the outcome of the evaluation against certain criteria for the three corridor options and the two loop options respectively. The criteria are measured against a subjective preference scale ranging between:

- low preferability, (orange)
- moderate preferability (yellow) and
- high preferability (green)

The results of the MCA suggest that Corridor 3 and loop 1 is the preferred option with the highest preferability in terms of the assessment criteria. Therefore, the terms of reference (ToR) for the specialists also requires a more in-depth assessment of Corridor 3 and loop 1 (for a detailed description of the ToR see section 7). The spatial information that underpins the outcome of the MCA is included as Appendix J.

Table 11: Summary of MCA results

Key to preferred options: Low Moderate High

Criteria	Corridor 1	Corridor 2	Corridor 3
Engineering considerations			
Length	40 km	38 km	45 km
Number of bends	20 bends	17 bends	18 bends
Access	Good access – through the N14 and other farm roads	Fair access – through the R41 and other farm roads	Fair access – through the servitude roads and other farm roads
Vacant servitude	No servitude registered	No servitude registered	Servitude registered
Parallel to existing lines	± 10% of proposed route parallel to existing lines	± 15% of proposed route parallel to existing lines	± 35% of proposed route parallel to existing lines
Tx line crossings	2 crossings	2 crossings	2 crossings
Dx HV line crossings	5 crossings	5 crossings	6 crossings
Rail crossings	3 crossings	1 crossing	1 crossing
National road crossings	No crossings	No crossings	No crossings
Regional road crossings	One crossing (R28)	5 crossings (R41, R559 & R28)	4 crossings (R41, R559 & R28)
Topography	Flat to moderate	Flat to moderate	Flat to moderate
Outcome: Engineering considerations	Low	Moderate	High
Biophysical considerations			

Criteria	Corridor 1	Corridor 2	Corridor 3
National significance: Important bird areas (IBA's)	No IBAs present within proposed corridor – But of the three corridors, corridor 1 is nearest to the Magaliesberg IBA which lies to the North Wetlands and water bodies is a general concern	No IBAs present within proposed corridor Wetlands and water bodies is a general concern	No IBAs present within proposed corridor Wetlands and water bodies is a concern and regarded as valuable habitat for birds
National significance: Listed threatened terrestrial ecosystems	Approximately 75% of the proposed corridor is covered by ecosystems classified as 'vulnerable' while one small patch is classified as 'critically endangered'	More than 95% of the proposed corridor is covered by 'vulnerable' terrestrial ecosystems (largely unavoidable)	Only small patches of 'vulnerable' terrestrial ecosystems (approximately 35%)
Provincial significance: Critical biodiversity areas	Patches of 'irreplaceable' CBAs of which one transects the corridor and is unavoidable. Patches of 'important areas' (CBAs) and support areas (ESAs)	Large unavoidable patch of 'irreplaceable' CBA transecting the corridor. Small patches of 'important area' (CBA) and support areas (ESA)	Very small patch of irreplaceable CBA which is avoidable. Some patches of 'important areas' (CBAs) and support areas (ESAs)
Provincial significance: Ridges	Some small ridges scattered across the corridor with one partially transecting the corridor, creating a barrier	Some small ridges scattered across the corridor with two partially transecting the corridor – might be avoidable	Some small ridges scattered across the corridor with one partially transecting the corridor – might be avoidable
Provincial significance: Wetlands	47 Known wetlands scattered across the study area	52 Known wetlands scattered across the area with one large wetland transecting the corridor	50 Known wetlands scattered across the study area
Outcome: Biophysical considerations	Moderate	Low	High
Socio-economic considerations			

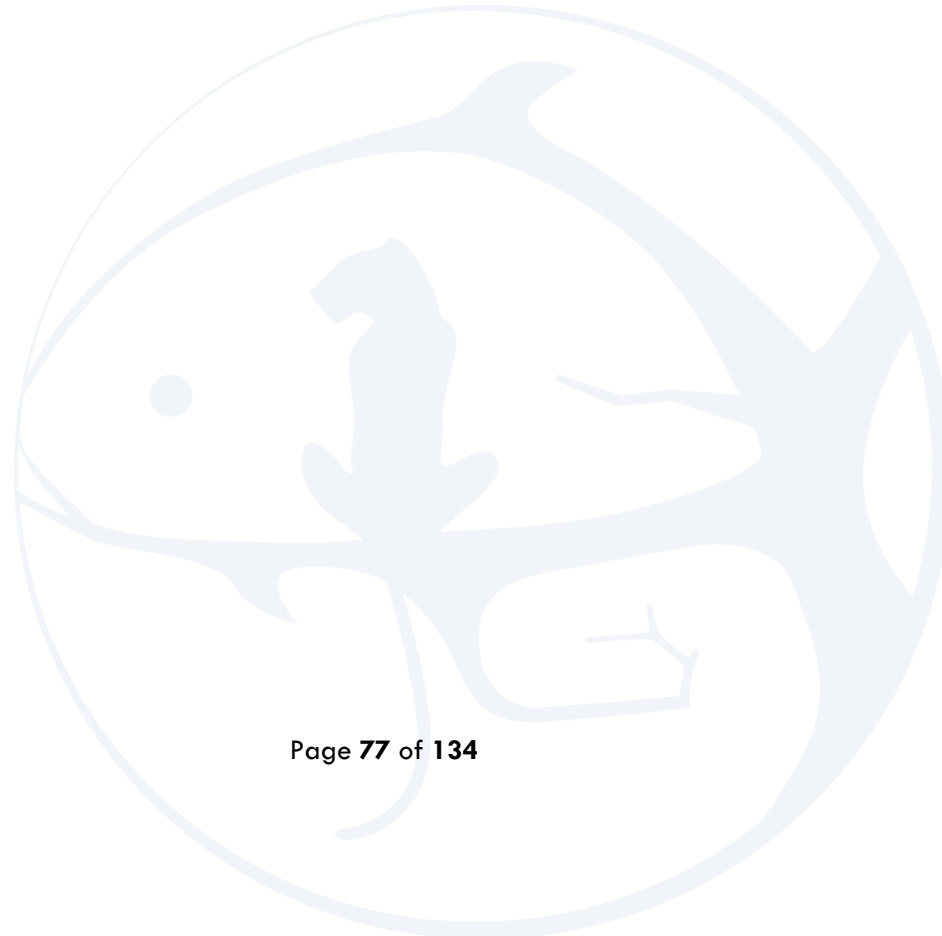
Criteria	Corridor 1	Corridor 2	Corridor 3
Agricultural activity	The corridor is characterised by high agricultural activity	Some agricultural activity	Some agricultural activity
Residential development	Some areas prioritised for residential development might be affected	Some areas prioritised for residential development might be affected	Some areas prioritised for residential development might be affected
Industrial development	The eastern section of the corridor has been earmarked for industrial development and might be affected	Small patches of areas prioritised for industrial development that might be affected	No industrial development priority areas present
Heritage features	Three known heritage features located within the corridor	One known heritage feature located within the corridor	Four known heritage features located within the corridor
Visual receptors	Some smallholdings and residential areas might be affected	Some smallholdings might be affected while one large township (residential) might be significantly affected	Some smallholding and residential areas might be affected
Number of land parcels affected	1250	5307	1692
Outcome: Socio-economic considerations	Moderate	Low	High
Overall Outcome			
	Moderate	Low	High (preferred)

Key to preferred options: Low Moderate High

Criteria	Loop 1	Loop 2
Engineering considerations		
Length	6 km	9 km
Number of bends	4 bends	7 bends
Access	Good access – through R559	Fair access – through the servitude roads
Vacant servitude	No servitudes registered	No servitudes registered
Parallel to existing lines	No existing lines present	± 45% of proposed route parallel to existing lines
Tx line crossings	No crossings	No crossings
Dx HV line crossings	4 crossings	4 crossings
Rail crossings	1 crossing	No crossings
National road crossings	No crossings	No crossings
Regional road crossings	No crossings	No crossings
Topography	Flat	Flat
Desirability: Engineering considerations	High	Low
Biophysical considerations		
National significance: Important bird areas (IBA's)	No IBAs present within proposed loop	No IBAs present within proposed loop

National significance: Listed threatened terrestrial ecosystems	Some patches of 'threatened' terrestrial ecosystems present within loop	Patches of 'threatened' terrestrial ecosystems present within loop (32% of area)
Provincial significance: Critical biodiversity areas	Some patches of 'important' CBAs and ESAs present within loop	Many patches of 'important' CBAs (37% of area) and some patches of support areas (ESAs) present within loop
Provincial significance: Ridges	Only a few small ridges present within the proposed loop	Only a few small ridges present within the proposed loop
Provincial significance: Wetlands	Seven known wetlands present with one wetland system transecting the proposed corridor	15 Known wetlands present with one wetland transecting the proposed corridor
Desirability: Biophysical considerations	High	Low
Socioeconomic considerations		
Agricultural activity	Some agricultural activity that might be affected	Some agricultural activity that might be affected
Residential development	Some areas to the east of the proposed loop prioritised for residential development might be affected	Some areas to the east of the proposed loop prioritised for residential development might be affected
Industrial development	No significant issues	No significant issues
Heritage features	No known features	No known features
Visual receptors	A township (residential areas) to the east of the proposed loop might be affected	A township (residential areas) to the east of the proposed loop might be affected
Number of parcels affected	3661	1964
Desirability: Socio-economic considerations	High	Low

Overall desirability		
	High (preferred)	Low



6.2.2 Design Alternatives

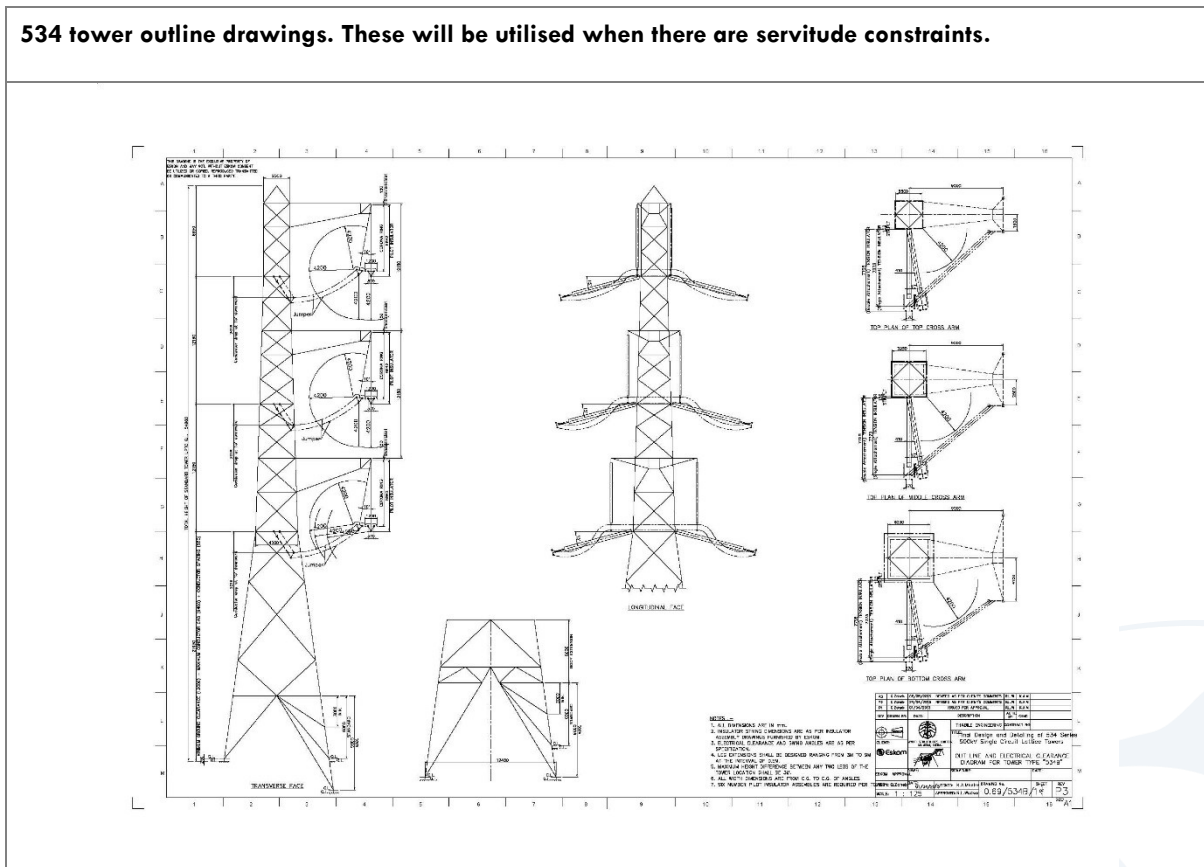
Having identified the preferred transmission line corridor, the alternative design solutions were also considered for supporting the overhead line:

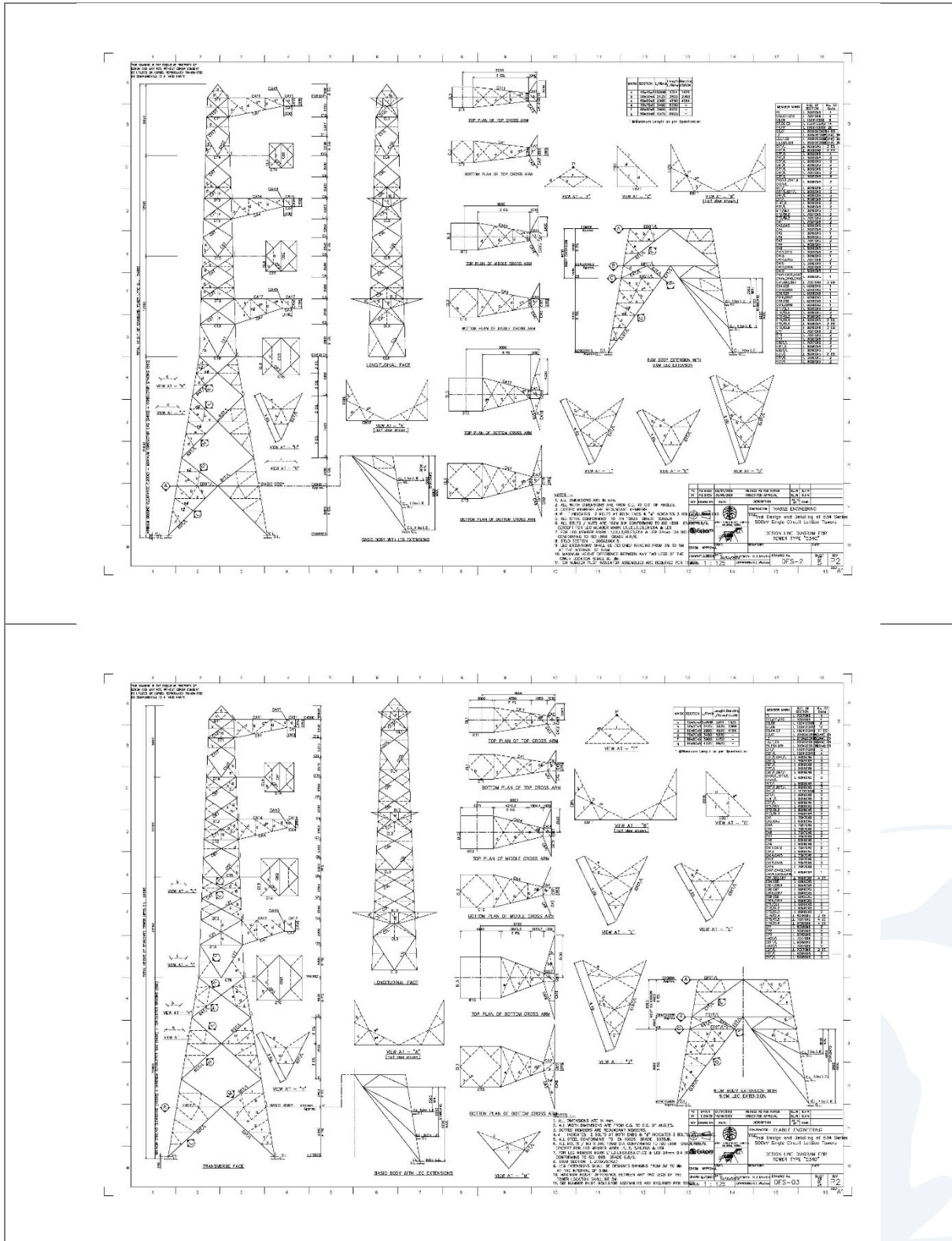
Tower Structures

Various tower structures on which powerlines will be suspended were considered for use during the construction in different sections of the line, subject to landscape, engineering and the biophysical nature of the receiving environment. Including the towers listed in Section 5.2 of this report, the tower designs illustrated in Table 12 could be used as alternatives if deemed necessary.

Table 12: Tower structure alternatives

534 tower outline drawings. These will be utilised when there are servitude constraints.





The final tower selection will be based on Eskom requirements, as well as the conductor selection and terrain, etc. While these have been indicated as the “main” preferred structures there can also be other designs utilised should the terrain and site conditions require this. The footprint of each tower type will

however never exceed the width of the servitude, at 55m and therefore remain within the constraints of this EIA.

Servitude Details

Once Eskom have an approved corridor there is a servitude which is negotiated within the approved corridor with each affected landowner. The width of the servitude for a 400kV line is 55m. The servitude is important as it ensures the safe construction, maintenance and operation of the Overhead Lines. It is also important as Eskom has the required permission for access and maintenance and ensures the safety and integrity of the infrastructure contractually.

Substation Expansions

- Install additional shunt capacity banks as follows:
 - 1x 72 MVar 132-kV capacity bank at Westgate MTS
 - 1x 48 MVar 88-kV capacity bank at Princess MTS
 - 1x 72 MVar 132-kV capacity bank at Taunus MTS
 - 1x 72 MVar 132-kV capacity bank at Quattro MTS
- Install 2x 400-kV/132-kV 500-MVA transformers at Westgate MTS and run the 2x275-kV transformers to end of life

The scope of work associated with the Substation expansions will be undertaken within existing Eskom property, with no significant further footprint expansion. Subsequently, the new impacts associated with the substation upgrades will be contained within the existing Eskom footprint designated for such expansion. Subsequently it would be reasonable to consider, even at this early stage, the impacts associated with the upgrading of the substations as being of low significance.

The expansions will require the installation of new equipment (transformers, busbars etc) for the safe operation of up to 400kV capacity. The equipment will be designed according to the applicable Eskom and SABS specifications and the maximum height will not exceed 45m.

6.2.3 Technology Alternatives

Tower type, equipment and conductor selection and optimisation normally involve the consideration of a number of factors and criteria in order to determine the optimised selection of the appropriate technology. As an example, the criteria for conductor selection include the Corona inception gradient, Radio interference limits, Audible noise and surface gradient. The selection of tower types will also be dependent on the servitude constraints, such as landowner conditions, slopes and soil conditions. All of which can only be established once the servitude area has been secured.

Should there be any servitude constraints within the approved corridor then the 534 series tower types will be used (see Table 12 above for diagrams) as alternatives.

Once all the variables, slope, servitude constraints (to name a few) are known the best technology alternatives will be considered.

6.3 SUMMARY OF ALTERNATIVES

The following alternatives have been identified (Table 13). Only those alternatives that are in bold will be assessed further since they are considered to be the feasible alternatives.

Table 13: Summary of the alternatives considered

Alternative type	Description	Alternatives considered	Preferred alternative
Location	Powerline route	Corridor 1	
		Corridor 2	
		Corridor 3	√
	Loop route	Loop 1	√
		Loop 2	
Design	Tower structures	518 (B,C,D & H) lattice tower series	All the alternatives considered will be used where appropriate
		529 Cross-ropo lattice towers	
		534 lattice towers	
		Triple Tern ACSR conductor	
Technology	Conductor	No development of the transmission line	√
No-Go alternative	No development		

6.4 “NO-GO” ALTERNATIVE

The “No-Go” alternative serves as a basis for comparison and can serve to validate the need and desirability for the project. Therefore, as standard practice and to satisfy regulatory requirements, the option of not proceeding with the project is included in the evaluation of the alternatives. The “No-Go” alternative is defined in this EIA as the option of no transmission line linking the Pluto and Westgate substations. This implies that the objective of transmitting electricity to assist in addressing the future electricity demand will not be achieved. Corridor 3 will be assessed comparatively against the ‘No-Go’ alternative, as required legislatively and in terms of best practice.

7 IMPACT ASSESSMENT METHODOLOGY

The impact assessment described in the EIA report is based on the approved Plan of Study for EIA and related Terms of References (TORs) for the different specialists. This section briefly described both the TORs and methodology followed to determine impact significance.

7.1 SPECIALIST STUDIES: TERMS OF REFERENCE

The terms of reference for the project's specialist studies are summarised in Table 14. The following specialist studies are required:

- Avifaunal Assessment;
- Flora;
- Fauna;
- Wetlands and rivers;
- Heritage Impact Assessment;
- Visual Impact Assessment; and
- Social Impact Assessment
- Palaeontology Impact Assessment

Table 14: Specialist Terms of Reference

Study	Aim	Terms of Reference
Avifaunal Assessment	Assess the potential impacts of the project on the existing avifaunal habitat and Important Bird Areas	<p>Baseline Description:</p> <ul style="list-style-type: none"> ○ Consider the potential impact of the three corridors on the avifauna across the project area. Emphasis should be placed on Corridor 3, which is the preferred route based on the outcome of the multi-criteria analysis; ○ Desktop review of all relevant available information; ○ Undertake additional field work if required to verify desktop assessment or address gaps in available data; ○ Liaise and consult with the relevant authorities and communities, as required, to access additional information applicable to the investigation; ○ Identify relevant legislation and policies to be complied with; and ○ Identify sensitive elements (including ecosystem services) that may potentially be impacted on by the proposed development. <hr/> <p>Assessment:</p> <ul style="list-style-type: none"> ○ Assess the preferred alternative Corridor 3 and any technology alternatives provided by the project team; ○ Assess various avifaunal datasets, including but not limited to IBAs and describe the avifaunal communities (particularly with reference to Red List species) most likely to be impacted on by the proposed development; ○ Assess suitable bird habitats and potential sensitive areas within the proposed corridor(s). these areas will be represented in a sensitivity map for ease of reference. ○ A full assessment of potential impacts and proposed mitigation measures. Allow for assessment of impacts during the construction, operation and decommissioning phases, as well as direct and indirect impacts. <ul style="list-style-type: none"> ▪ Identify and evaluate predicted impacts of proposed development on the affected avifauna; ▪ Propose measures to mitigate the negative impacts and optimise the positive ones;

Study	Aim	Terms of Reference
		<ul style="list-style-type: none"> ▪ Assess significance of each impact before and after mitigation; ▪ Determine the cumulative impact in terms of the current and proposed activities in the area; ▪ Identify additional measures to ensure that the project contributes towards sustainability goals; ○ Provide recommendations for any ongoing monitoring that may be necessary; and ○ Identify any assumptions and limitations that have informed the study or gaps in knowledge that have become apparent.
<p>Aquatic and Terrestrial Biodiversity Assessment:</p> <ul style="list-style-type: none"> • Flora; • Fauna; and • Wetlands and rivers 	<p>Determine the impacts of the proposed project on aquatic and terrestrial ecology.</p>	<p>Baseline Description:</p> <ul style="list-style-type: none"> ○ Consider the potential impact of the three corridors on the aquatic and terrestrial biodiversity across the project area. Emphasis should be placed on Corridor 3, which is the preferred route based on the outcome of the multi-criteria analysis; ○ Desktop review of all relevant available information; ○ Collate all secondary data available; ○ Undertake additional field work required to verify desktop assessment or address gaps in available data; ○ Provide a focused and relevant description of all baseline characteristics and conditions of the sites being considered. ○ Liaise and consult with the relevant authorities, as required, to access additional information applicable to the investigation; ○ Identify relevant legislation and policies to be complied with; ○ Determine thresholds of acceptable change and relevant standards to be complied with; and ○ Identify sensitive elements (including ecosystem services) that may potentially be impacted on by the proposed development.
<p>Flora</p>		<p>Assessment:</p>

Study	Aim	Terms of Reference
		<ul style="list-style-type: none"> ○ Provide a description of the general floristic species diversity and community composition; ○ The assessment of flora will include identification/description of the rare, endemic and endangered species; natural habitats; and conservation status of species and habitats; ○ Evaluating the occurrence of potential Red Data species; ○ Evaluating the habitat availability for red data species; ○ Demarcate physiognomic units; and ○ Provide an indication on the ecological condition of the predetermined physiognomic units, which will also be related to any ecosystem services / habitat function. ○ A full assessment of potential impacts and proposed mitigation measures. Allow for assessment of impacts during the construction, operation and decommissioning phases, as well as direct and indirect impacts. <ul style="list-style-type: none"> ▪ Identify and evaluate predicted impacts of proposed development on the affected flora; ▪ Propose measures to mitigate the negative impacts and optimise the positive ones; ▪ Assess significance of each impact before and after mitigation; ▪ Determine the cumulative impact in terms of the current and proposed activities in the area; ▪ Identify additional measures to ensure that the project contributes towards sustainability goals; ○ Provide recommendations for any ongoing monitoring that may be necessary; and ○ Identify any assumptions and limitations that have informed the study or gaps in knowledge that have become apparent.
<p>Fauna</p>		<p>Assessment:</p> <ul style="list-style-type: none"> ○ Conduct a faunal assessment including:

Study	Aim	Terms of Reference
		<ul style="list-style-type: none"> • The faunal assessment will include amphibians, reptiles, birds and mammals (including bats), and will include species distribution based on literature according the habitat / Species Gap distribution, identification of the most sensitive areas or ecosystems and characterization of rare, endemic and endangered fauna species. • Diurnal and arboreal surveys as applicable, justified against the significance rating and location of high priority areas (nocturnal surveys to be undertaken with caution, and only if deemed necessary, due to safety risks); • Incidental records on survey sites; • Incidental fauna sightings; • Scat and sign searches (in high priority areas); • Vehicle and foot transects; • Habitat availability assessment; • Distribution map of fauna survey / findings; <ul style="list-style-type: none"> ○ A full assessment of potential impacts and proposed mitigation measures. Allow for assessment of impacts during the construction, operation and decommissioning phases, as well as direct and indirect impacts. ○ Provide recommendations for any ongoing monitoring that may be necessary; and ○ Identify any assumptions and limitations that have informed the study or gaps in knowledge that have become apparent.
<p>Wetlands and rivers</p>		<p>Assessment:</p> <ul style="list-style-type: none"> ○ Delineation / Confirmation of significant wetland and river boundaries using the requisite techniques based upon the latest Wetland Classification systems; ○ Identification of relevant ecosystem services associated with the identified rivers and wetlands;

Study	Aim	Terms of Reference
		<ul style="list-style-type: none"> ○ Indicate suitable buffer zones as prescribed by the relevant provincial policies / conservation plans; ○ A full assessment of potential impacts and proposed mitigation measures. Allow for assessment of impacts during the construction, operation and decommissioning phases, as well as direct and indirect impacts. <ul style="list-style-type: none"> ▪ Identify and evaluate predicted impacts of proposed development on the affected wetlands and rivers; ▪ Propose measures to mitigate the negative impacts and optimise the positive ones; ▪ Assess significance of each impact before and after mitigation; ▪ Determine the cumulative impact in terms of the current and proposed activities in the area; ▪ Identify additional measures to ensure that the project contributes towards sustainability goals; ○ Provide recommendations for any ongoing monitoring that may be necessary; and ○ Identify any assumptions and limitations that have informed the study or gaps in knowledge that have become apparent.
Heritage Impact Assessment	Looks at the potential impacts on the existing cultural landscape within which the Project will be undertaken	<p>Baseline:</p> <ul style="list-style-type: none"> ○ Consider the potential impact of the three corridors on the heritage resources across the project area. Emphasis should be placed on Corridor 3, which is the preferred route based on the outcome of the multi-criteria analysis; ○ Collate all secondary data available; ○ Undertake additional field work required to verify desktop assessment or address gaps in available data; ○ Provide a focussed and relevant description of all baseline characteristics and conditions of the sites being considered.

Study	Aim	Terms of Reference
		<ul style="list-style-type: none"> ○ Liaise and consult with the relevant authorities, as required, to access additional information applicable to the investigation; ○ Identify relevant legislation and policies to be complied with; and ○ Determine thresholds of acceptable change and relevant standards to be complied with; ○ Identify sensitive elements that may potentially be impacted on by the proposed development; <p>Assessment:</p> <ul style="list-style-type: none"> ○ Assess the preferred alternative Corridor 3 and any technology alternatives provided by the project team; ○ Identify and evaluate predicted impacts of proposed development on the heritage resources ○ Assess significance of each impact before and after mitigation. ○ Determine the cumulative impact in terms of the current and proposed activities in the area; ○ Identify additional measures to ensure that the project contributes towards sustainability goals; ○ Detail the processes to be followed to obtain required permits and to relocate graves, if applicable; ○ Provide recommendations for any ongoing monitoring that may be necessary; and ○ Identify any assumptions and limitations that have informed the study or gaps in knowledge that have become apparent.
Visual impact assessment	Assess the visual impact associated with the proposed development	<p>Baseline</p> <ul style="list-style-type: none"> ● Consider the potential visual impact of the three corridors. Emphases should be placed on Corridor 3, which is the preferred route based on the outcome of the multi-criteria analysis; ● Collate all secondary data available;

Study	Aim	Terms of Reference
		<ul style="list-style-type: none"> • Undertake additional field work required to verify desktop assessment or address gaps in available data; • Provide a focused and relevant description of all baseline characteristics and conditions of the sites being considered. • Liaise and consult with the relevant authorities, as required, to access additional information applicable to the investigation; • Identify relevant legislation and policies to be complied with; • Determine thresholds of acceptable change and relevant standards to be complied with; and • Identify sensitive elements that may potentially be impacted on by the proposed development. <p>Assessment:</p> <ul style="list-style-type: none"> • Assess the preferred alternative route and any technology alternatives provided by the project team; ○ Identify and evaluate predicted impacts of proposed development on the visual environment and/or natural landscapes; ○ Assess significance of each impact before and after mitigation; ○ Determine the cumulative impact in terms of the current and proposed activities in the area; ○ Identify additional measures to ensure that the project contributes towards sustainability goals; and • Identify any assumptions and limitations that have informed the study or gaps in knowledge that have become apparent.
Social Impact Assessment		<p>Baseline:</p> <ul style="list-style-type: none"> • Collate all secondary data available;

Study	Aim	Terms of Reference
	<p>Assess the socio-economic impacts associated with the proposed development</p>	<ul style="list-style-type: none"> • Undertake additional field work required to verify desktop assessment or address gaps in available data; • Provide a focused and relevant description of the social baseline characteristics and conditions. • Liaise and consult with the relevant authorities, as required, to access additional information applicable to the investigation; • Identify relevant legislation and policies to be complied with; • Determine thresholds of acceptable change and relevant standards to be complied with; and • Identify vulnerable communities that may potentially be impacted on by the proposed development. <p>Assessment:</p> <ul style="list-style-type: none"> • Assess the social impacts associated with the preferred alternative route and any technology alternatives provided by the project team; • Identify and evaluate predicted impacts of proposed development on the social environment, including but not limited to the following: <ol style="list-style-type: none"> (1) Develop a detailed overview and understanding of the demographic profile of the community; (2) Assess regional and local economies, with an emphasis on the way in which households in the project area sustain themselves; (3) Identify and assess the needs of vulnerable groups (i.e. women), indigenous people and ethnic minorities; (4) Identify and assess the factors that contribute to the overall quality of life; (5) Employment opportunities for affected communities; (6) How gender issues will be addressed or monitored;

Study	Aim	Terms of Reference
		<p>(7) Impacts on agricultural activities</p> <ul style="list-style-type: none"> • Assess significance of each impact before and after mitigation; • Determine the cumulative impact in terms of the current and proposed activities in the area; • Identify additional measures to ensure that the project contributes towards sustainability goals; • Provide recommendations for any ongoing social monitoring that may be necessary; and • Identify any assumptions and limitations that have informed the study or gaps in knowledge that have become apparent.
Climate Change Screening Study	Estimate the potential impact of climate change on the project and how the project may contribute to climate change	<ul style="list-style-type: none"> • Identify the potential impacts of climate change on the line infrastructure; • Identify the impacts of line infrastructure on climate; • Provide context for climate change implications in terms of the energy sector at a high level; • Provide high level indicators at industry level to assess impacts and dependencies in terms of climate change adaptation and mitigation targets.
Palaeontology Specialist Study	Looks at the potential impacts on the existing palaeontology landscape within which the Project will be undertaken	<p>Baseline:</p> <ul style="list-style-type: none"> ○ Consider the potential impact of the three corridors on the palaeontology resources across the project area. Emphasis should be placed on Corridor 3, which is the preferred route based on the outcome of the multi-criteria analysis; ○ Collate all secondary data available; ○ Undertake additional field work required to verify desktop assessment or address gaps in available data; ○ Provide a focussed and relevant description of all baseline characteristics and conditions of the sites being considered.

Study	Aim	Terms of Reference
		<ul style="list-style-type: none"> ○ Liaise and consult with the relevant authorities, as required, to access additional information applicable to the investigation; ○ Identify relevant legislation and policies to be complied with; and ○ Determine thresholds of acceptable change and relevant standards to be complied with; ● Identify sensitive elements that may potentially be impacted on by the proposed development;
		<p>Assessment:</p> <ul style="list-style-type: none"> ○ Assess the preferred alternative Corridor 3 and any technology alternatives provided by the project team; ○ Identify and evaluate predicted impacts of proposed development on the palaeontology resources ○ Assess significance of each impact before and after mitigation. ○ Determine the cumulative impact in terms of the current and proposed activities in the area; ○ Identify additional measures to ensure that the project contributes towards sustainability goals; ○ Provide recommendations for any ongoing monitoring that may be necessary; and ● Identify any assumptions and limitations that have informed the study or gaps in knowledge that have become apparent.

In addition to the above-mentioned tasks, the specialists will also have inputs in the public participation, namely:

- Provide input into the public presentation at the Scoping and ESIA phases based on the issues raised; and
- Assist EAP with appropriate responses to issues raised by stakeholders in the Public Participation Process, as required.

7.2 METHODOLOGY FOR IMPACT ASSESSMENT

The assessment of the significance of impacts for a proposed development is by its nature, a matter of judgement. To DEFF with the uncertainty associated with judgement and ensure repeatable results, impacts are rated using a standardised recognised methodology adhering to NEMA and generally accepted best practice.

7.2.1 Consequence Criteria

For each predicted impact, criteria are applied to establish the significance of the impact based on likelihood and consequence, both without mitigation being applied and with the most effective mitigation measure(s) in place.

The criteria that contribute to the consequence of the impact are intensity (the degree to which pre- development conditions are changed), which also includes the type of impact (being either a positive or negative impact); the duration (length of time that the impact will continue); and the extent (spatial scale) of the impact. The sensitivity of the receiving environment and/or sensitive receptors is incorporated into the consideration of consequence by appropriately adjusting the thresholds or scales of the intensity, duration and extent criteria, based on expert knowledge. For each impact, the specialist applies professional judgement to ascribe a numerical rating for each criterion according to the examples provided in Table 15, Table 16 and Table 17 below.

Table 15: Definition of Intensity ratings

Criteria	Negative impacts (-)	Positive impacts (+)
Very high (-/+ 4)	Very high degree of damage to natural or social systems or resources. These processes or resources may restore to their pre-project condition over very long periods of time (more than a typical human lifetime).	Great improvement to ecosystem or social processes and services or resources.
High (-/+ 3)	High degree damage to natural or social system components, species or resources.	Intense positive benefits for natural or social systems or resources.
Moderate (-/+ 2)	Moderate damage to natural or social system components, species or resources	Average, on-going positive benefits for natural or social systems or resources.
Low (-/+ 1)	Minor damage to natural or social system	Low positive impacts on natural or social systems or resources

Criteria	Negative impacts (-)	Positive impacts (+)
	components, species or resources. Likely to recover over time. Ecosystems and valuable social processes not affected.	
Negligible (0)	Negligible damage to individual components of natural or social systems or resources, such that it is hardly noticeable.	Limited low-level benefits to natural or social systems or resources.

Table 16: Definition of Duration ratings

Rating	Criteria
2	Long-term: The impact will continue for 6-15 years.
1	Medium-term: The impact will continue for 2-5 years.
0	Short-term: The impact will continue for between 1 month and 2 years.

Table 17: Definition of Extent ratings

Rating	Criteria
2	Regional: The impact will affect the entire region
1	Local: The impact will extend across the site and to nearby properties.
0	Site specific: The impact will be limited to the site or immediate area.

The consequence is then established using the formula:

$$\text{Consequence} = \text{type} \times (\text{intensity} + \text{duration} + \text{extent})$$

Depending on the numerical result, the impact's consequence would be defined as either extremely, highly, moderately or slightly detrimental; or neutral; or slightly, moderately, highly or extremely beneficial. These categories are provided in Table 18 below:

Table 18: Application of Consequence ratings

Rating	Significance rating
-8	Extremely detrimental
-7 to -6	Highly detrimental
-5 to -4	Moderately detrimental
-3 to -2	Slightly detrimental
-1 to 1	Negligible

Rating	Significance rating
2 to 3	Slightly beneficial
4 to 5	Moderately beneficial
6 to 7	Highly beneficial
8	Extremely beneficial

7.2.2 Significance Criteria

To determine the significance of an impact, the probability (or likelihood) of that impact occurring is also taken into account. In assigning probability, the specialist takes into account the likelihood of occurrence but also takes cognisance of uncertainty and detectability of the impact. The most suitable numerical rating for probability is selected from Table 19 below:

Table 19: Definition of Probability ratings

Rating	Criteria
4	Certain/ Definite: There are sound scientific reasons to expect that the impact will definitely occur.
3	Very likely: It is most likely that the impact will occur.
2	Fairly likely: This impact has occurred numerous times here or elsewhere in a similar environment and with a similar type of development and could very conceivably occur.
1	Unlikely: This impact has not happened yet but could happen.
0	Very unlikely: The impact is expected never to happen or has a very low chance of occurring.

The significance is then established using the following equation:

$$\text{Significance} = \text{consequence}^1 \times \text{probability}$$

Depending on the numerical result of this calculation, the impact would fall into a significance category of negligible, minor, moderate or major, and the type would be either positive or negative. Examples of these categories are provided in Table 20:

Table 20: Application of significance ratings

Rating	Significance rating
--------	---------------------

¹ The term consequence is used in this methodology instead of magnitude (as included in the definition of “significant impact” in GNR 326. Furthermore, the specialists themselves translate their subjective judgements into numerical ratings to determine the significance score. As this “translation” is undertaken by the specialists themselves, it is asserted that outcomes will be accurately interpreted.

-4	Very high - negative
-3	High - negative
-2	Moderate - negative
-1	Low - negative
0	Very low
1	Low - positive
2	Moderate - positive
3	High - positive
4	Very high - positive

7.2.3 Confidence Rating

Once the significance of an impact occurring without mitigation has been established, the same impacts will be assigned ratings after the proposed mitigation has been implemented.

Although these measures may not totally eliminate subjectivity, they provide an explicit context within which to review the assessment of impacts. The specialists appointed to contribute to this impact assessment have empirical knowledge of their respective fields and are thus able to comment on the confidence they have in their findings based on the availability of data and the certainty of their findings. As with all studies it is not possible to be 100% certain of all facts, and for this reason a standard “degree of certainty” scale (Table 21). The level of detail for specialist studies is determined according to the degree of certainty required for decision-making. The impacts are discussed in terms of affected parties or environmental components.

Table 21: Definition of Confidence ratings

Rating	Criteria
Low	Judgement is based on intuition and there some major assumptions used in assessing the impact may prove to be untrue.
Medium	Determination is based on common sense and general knowledge. The assumptions made, whilst having a degree of uncertainty, are fairly robust.
High	Substantive supportive data or evidence exists to verify the assessment.

7.2.4 Cumulative Impact Assessment

The assessment also set out to determine the cumulative impact associated with the development with cumulative impact being defined as “Relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities”. The ToR for the different specialist studies also explicitly required the identification of cumulative impacts.

For the purpose of this assessment the findings of the specialist studies as well as the overall assessment determined a cumulative impact significance score as described in Table 22 below. The method relies on

combining the individual impact significance score with considerations of time and space crowding to determine if the individual impacts can be absorbed within time and space to a reasonable level.

Table 22: Definition of cumulative impact ratings

Rating	Criteria
Low	The cumulative impacts are considered low based on the individual impact significance score and their potential to be absorbed through time and space.
Medium	The cumulative impacts are considered medium based on the individual impact significance score and their potential to be absorbed through time and space.
High	The cumulative impacts are considered high based on the individual impact significance score and their potential to be absorbed through time and space.

7.2.5 Mitigation of Potential and Residual Impacts

The significance of the impacts identified during the scoping phase will be assessed during the impact assessment phase. The specialists will recommend measures to mitigate the impacts.

The implementation of the mitigation measures is ensured through the EMP. The EMP will be used to enforce the mitigation measures and ensure that the impacts of all phases of the proposed project are properly managed and addressed. The EMP will meet all the requirements of NEMA.

7.3 PUBLIC PARTICIPATION ACTIVITIES

I&APs was provided with ongoing opportunities to participate during the EIA process, which include the following:

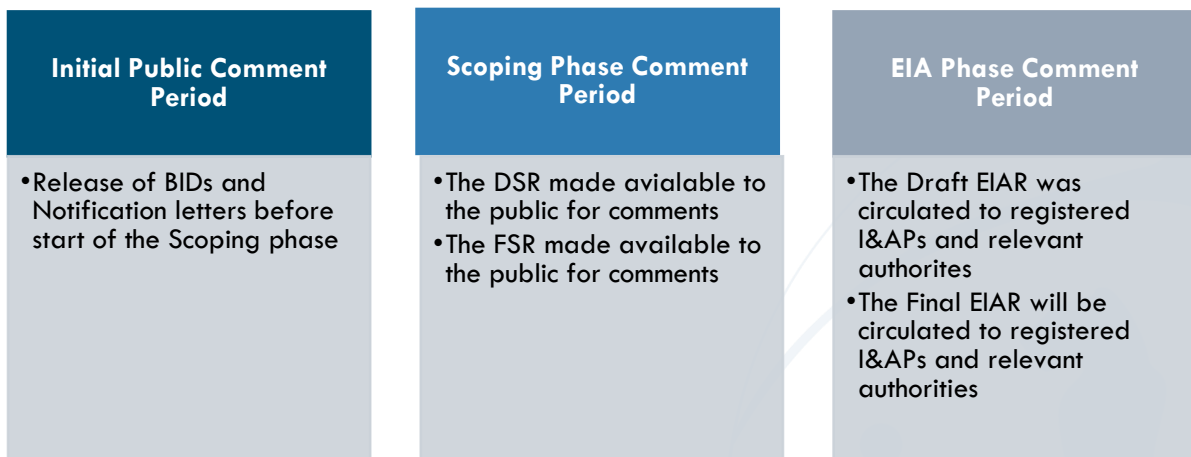


Figure 26: Engagement opportunities during the EIA process

Throughout the EIA process, I&APs was provided with the opportunity to contact the EAP to discuss the project and raise any issues or concerns they might have.

7.4 TASKS TO BE UNDERTAKEN DURING THE EIA PROCESS

The activities that took place during the EIA phase included but were not limited to the following:

Specialist Studies

- Specialists undertook their assessment of significance of impacts and made recommendations for mitigation measures to manage impacts.
- No additional specialist studies were required apart from those identified during the scoping phase.

Draft EIAR

- The Draft EIAR was compiled, together with the EMPr after acceptance of the final Scoping Report by the DEFF. The draft EIAR incorporates the comments and/or necessary changes recommended by the DEFF.

Revised EIAR

- The revised EIAR was compiled, together with the EMPr after the comments on the draft EIAR by DEFF. The revised EIAR incorporate the comments and / or necessary changes recommended by the DEFF.

Public Participation

- The draft and revised EIAR is subjected to a 30-day comment period. Notifications will be sent out to inform the public of the availability of the report for comments.
- All comments received during public comment period on the draft and revised EIAR will be compiled into a final EIAR before submission to DEFF.

Final EIAR

- Compilation of a Final EIAR and EMPr for submission, taking into account all the comments received during the review and public participation of the EIA process.

8 IMPACT ASSESSMENT RESULTS – SUMMARY FROM SPECIALIST STUDIES

This section describes the outcome of the impact assessment per specialist area. Each specialist study was conducted according to strict ToR and significance rating methodology as described in section 7 above. The impact assessment statement which combines all of the assessment outcomes from the specialist studies is described in section 10. The DEFF Screening tool was consulted for the identification of specialist studies, please refer to table 23 for a summary of the findings and site sensitivity verification.

Further to the above it should be noted that all specialist studies (please refer to the dates on specialist reports) were conducted prior to the Procedures for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, which were promulgated in Government Notice No. 320 of 20 March 2020 (i.e. “the Protocols”), and in Government Notice No. 1150 of 30 October 2020 (i.e. protocols for terrestrial plant and animal species). Subsequently, the specialist studies were conducted in accordance with Appendix 6 of the Environmental impact Assessment Regulations, 2014, as amended. In terms of the Palaeontology Specialist Study conducted in September 2021, the study adheres to the general protocols and Appendix 6 of the EIA Regulations, 2014, as amended.

Table 23: Specialist studies required by the DEFF screening tool

Specialist Studies required by the DEFF Screening Tool	Were the specialist studies undertaken and included in this EIAR	Motivation for not including the required specialist study / Site sensitivity verification	Were the protocols applicable.
Agricultural Impact Assessment	No	Refer to the site sensitivity verification report attached as Appendix R.	Not applicable.
Landscape/Visual Impact Assessment	Yes	NA	No, since the specialist study was finalised in February 2019, prior to protocol regulations.
Archaeological and Cultural Heritage Impact Assessment	Yes	NA	No, since the specialist study was finalised in January 2019, prior to protocol regulations.
Palaeontology Impact Assessment	Yes	NA	Although the study was finalised in September 2021, no specific protocols exist for PIAs.
Terrestrial Biodiversity Impact Assessment	Yes	NA	No, since the specialist studies were finalised in January 2019, prior to protocol regulations. The specialists are however SACNASP registered.

Aquatic Biodiversity Impact Assessment	Yes	NA	No, since the specialist studies were finalised in January 2019, prior to protocol regulations. The specialists are however SACNASP registered.
Avian Impact Assessment	Yes	NA	No, since the specialist studies were finalised in January 2019, prior to protocol regulations. The specialists are however SACNASP registered.
Civil Aviation Assessment	No	Refer to the site sensitivity verification report attached as Appendix R.	Not applicable.
RFI Assessment	No	Refer to the site sensitivity verification report attached as Appendix R.	Not applicable.
Geotechnical Assessment	No	Refer to the site sensitivity verification report attached as Appendix R.	Not applicable.

8.1 AVIFAUNA

The Avifauna Assessment was conducted by Meagan Diamond from Feathers Environmental Services and the full report is included in Appendix F7. The results from the Avifauna study can be summarised as follows:

Table 24: Avifauna Assessment Results

Westrand Strengthening Project Avifaunal Impact Assessment						Consequence			Consequence	Probability	Significance Pre Mitigation	Significance Post Mitigation	Impact Rating Pre Mitigation	Impact Rating Post Mitigation	Confidence level	Mitigation measure
No.	Phases	Activity	Aspect	Impact	Type	Intensity	Duration	Extent								
1	Construction	Site clearing activities	Displacement of Red List and non-Red List priority avifaunal species as a result of habitat loss or transformation .	Avifaunal habitat is cleared to accommodate the Pluto-Westgate 400kV, Hera-Westgate 400kV power line towers, the servitude for the stringing of the conductors and access roads reducing the amount of habitat available to birds for foraging, roosting and breeding.	Negative	2	0	2	4	3	12	6	M - Moderate	L - Low		Construction activity should be restricted to the immediate footprint of the infrastructure. Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of Red List species. Maximum use should be made of existing access roads & the construction of new roads should be kept to a minimum. Recommendations of the ecological & botanical specialist studies must be strictly implemented, i.e. limitation of the construction footprint, particularly in key areas (i.e. wetlands, ridges) and rehabilitation of disturbed areas is concerned.
2		Site clearing activities	Displacement of Red List and non-Red List priority avifaunal species as a result of disturbance associated with the construction activities	Displacement as a result of disturbance (i.e. noise and movement of construction equipment and personnel) associated with the construction of the Pluto-Westgate 400kV, Hera-Westgate 400kV power lines and access roads resulting in a negative direct impact on the resident avifauna.	Negative	2	2	2	6	3	18	12	M - Moderate	M - Moderate		An avifaunal walk-through to be conducted prior to construction to identify Red List species (if any) that may be breeding within the authorised route alignment to ensure that the impacts are adequately managed. Construction activity should be restricted to the immediate footprint of the infrastructure. Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of Red List species. Measures to control noise should be applied according to current best practice in the industry.
1	Operation	Maintaining power line infrastructure, servitudes and access roads	Displacement of Red List and non-Red List priority avifaunal species as a result of habitat transformation and disturbance	Displacement as a result of disturbance associated with the operation of the Pluto-Westgate 400kV, Hera-Westgate 400kV power line infrastructure and access roads resulting in a negative direct impact on the resident avifauna.	Negative	1	0	0	1	2	2	0	L - Low	L - Low		All maintenance activities should ensure that little transformation and destruction of the natural habitat occurs and minimise unnecessary disturbance on site.
2		Avifaunal mortality	Collisions with the power line cabling	Mortality of Red List and non-Red List priority avifauna with the earthwire of the Pluto-Westgate 400kV, Hera-Westgate 400kV power lines resulting in a negative direct mortality impact, particularly large terrestrial birds, waterbirds and raptors.	Negative	3	4	2	9	2	18	7	M - Moderate	L - Low		Power line marking with bird flight diverters will be required in those areas that contain wetlands, waterbodies, grassland and irrigated agricultural lands (spans to be identified during the walk-through of the authorised alignment, prior to the commencement of construction activities). Eskom line and servitude managers are requested to report all bird collisions encountered during routine line patrols of the power lines to the Eskom-Endangered Wildlife Trust Strategic Partnership.
3		Avifaunal establishment	Avifauna habitat increase	Avifauna habitat increase	Power line towers provide a suitable substrate for perching, roosting and nesting	Positive	2	4	2	8	2	16	16	M - Moderate	M - Moderate	
1	Decommissioning	Decommissioning activities	Decommissioning of towers and associated infrastructure	Displacement as a result of disturbance (i.e. noise and movement of equipment and personnel) associated with the decommissioning of the Pluto-Westgate 400kV, Hera-Westgate 400kV power line infrastructure resulting in a negative direct impact on the resident avifauna.	Negative	2	0	2	4	3	12	6	M - Moderate	L - Low		All decommissioning activities should ensure that little transformation and destruction of the natural habitat occurs and minimise unnecessary disturbance on site.
2		Rehabilitation activities	Rehabilitation of tower footprints, power line servitudes and access road .	Tower footprints, power line servitudes and access roads are rehabilitated to its natural state, resulting in additional breeding and foraging habitat for avifauna.	Positive	2	4	2	8	2	16	16	M - Moderate	M - Moderate		As this is a positive impact on the avifaunal species in the area, no mitigation is recommended.

A total of 298 bird species have been recorded within the relevant pentads during the SABAP2 atlassing period to date. Of these species, 12 are considered to be of regional conservation concern i.e. Red List species of which seven are GDARD priority species. In addition, nine species are near endemic to South Africa (species whose range extends only marginally outside South Africa) and a further 19 species are endemic to southern Africa. White Stork, which is not listed, but is protected internationally under the *Bonn Convention on Migratory Species* and Lesser Kestrel, a GDARD priority species, were also recorded. Each of these species have been recorded in low abundances over the twelve-year survey period, a likely result of the high levels of disturbance caused by the surrounding land use practices. A single summer survey was conducted on 28 December 2018 and was comprised of a single vehicle transect, totalling approximately 108 kilometres, encompassing 27 survey points covering both the proposed Pluto-Westgate 400kV power line Corridor 3 and Hera-Westgate 400kV Loop-In and Loop-Out Corridor 1 and to some extent, the surrounding project area. The site visit produced a combined list of 40 species. Species that featured regularly and in relative high densities included: Southern Red Bishop *Euplectes orix*, Laughing Dove *Streptopelia senegalensis*, Rock Dove *Columba livia*, Cape Turtle-Dove *Streptopelia capicola*, Red-eyed Dove *Streptopelia semitorquata*, Southern Masked-Weaver *Ploceus velatus*, Cape Sparrow *Passer melanurus*, Cattle Egret, Common Myna *Acridotheres tristis*, Dark-capped Bulbul *Pycnonotus tricolor*, Helmeted Guineafowl, Pied Crow and Speckled Pigeon *Columba guinea*. No Red List species were observed during the site visit. Although this assessment focuses on the impacts on regional Red List species, as these are the species of highest conservation concern, the impact on endemics, near endemics, waterbirds and raptors has also been considered.

The study area is located within the Grassland Biome and is comprised of the Carletonville Dolomite Grassland and Soweto Highveld Grassland vegetation types. The proposed Pluto-Westgate and Hera-Westgate 400kV power line corridors and the broader study area has experienced a fairly substantial degree of transformation as a result of agricultural practices and urbanisation. While pockets of natural habitat persist within the proposed corridors, the fragmented nature of this habitat and the levels of existing disturbance within the corridors, may preclude the diversity and abundance of Red List species within the study area. The site visit to the study area revealed the presence of nine microhabitat types: rivers, grassland, wetlands, waterbodies, thicket, cultivated lands, exotic tree plantations, urban infrastructure and industry. The habitat within which the proposed project area is located is low to moderately sensitive from a potential avifaunal impact perspective. In recent years, anthropogenic impacts, mostly in the form of agriculture, mining and urbanisation have largely transformed the landscape resulting in a negative impact on avifaunal diversity and abundance with the study area. This is reflected in the low reporting rates for priority species, which may also indicate that levels of disturbance are high.

The construction and operation of the proposed Pluto-Westgate 400kV and Hera-Westgate 400kV Loop-In and Loop-Out power lines will result in various impacts of low to medium significance to birds occurring in the vicinity of the new infrastructure, which can be reduced through optimal routing alongside existing power lines or road infrastructure, avoiding construction in wetland habitats and the application of mitigation measures (i.e. bird flight diverters) on spans of conductors/earthwires that traverse grassland habitat. Given the presence of existing habitat degradation and disturbance, it is anticipated that the proposed Pluto-Westgate 400kV and Hera-Westgate 400kV Loop-In and Loop-Out powerlines **can be constructed** within the project area with acceptable levels of impact on the resident avifauna, **subject to the following recommendations:**

- An avifaunal walk-through must be conducted prior to construction, to identify any species that may be breeding within the vicinity of the authorised alignment to ensure that any impacts likely to affect breeding species (if any) are adequately managed. In addition, high risk sections of towers and power line cabling, requiring the installation of bird guards and bird flight diverters respectively must be identified.
- The recommendations of the ecological and botanical specialist studies must be strictly implemented, especially as far as limitation of the construction footprint (especially the removal of natural vegetation) and rehabilitation of disturbed areas is concerned.
- Construction activities should be restricted to the immediate footprint of the infrastructure.
- Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of avifaunal species.
- Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum.
- In addition to this, the normal suite of environmental good practices should be applied, such as ensuring strict control of staff, vehicles and machinery on site and limiting the creation of new roads as far as possible.

8.2 FAUNA

The Faunal Assessment was conducted by Resolute Environmental Solutions and the full report is included in Appendix F3. The results from the Faunal study can be summarised as follows:

Table 25: Faunal Assessment Results

Westrand Strengthening Project - Faunal Impact Assessment							Consequence			Consequence	Probability	Significance	Impact Rating	Confidence level	Mitigation measure
No.	Phases	ID	Activity	Aspect	Impact	Type	Intensity	Duration	Extent						
1	Construction		Site clearing activities.	Removal / Clearing of established vegetation (site clearing).	Loss of faunal habitat through the clearing of vegetation. In addition, this may lead to severe erosion and general degradation of the environment.	Negative	0	0	2	2	4	8	L - Low		<ul style="list-style-type: none"> All construction activities should be undertaken according to the EMP, care must be taken to not destroy / degrade natural habitat as far as possible, and to minimise unnecessary disturbances on site.
2			Excavations and associated activities.	Excavation for tower foundations.	The construction footprint will lead to the loss alteration of natural vegetation, leading to exposed/compacted soils, in turn leading to increased runoff and erosion. In addition, excavations in wetlands will lead to habitat degradation, decreased ecoservice provision and further decrease the ability to support biodiversity.	Negative	1	0	0	1	4	4	L - Low		<ul style="list-style-type: none"> All construction activities should be undertaken according to the EMP, care must be taken to not destroy / degrade natural habitat as far as possible, and to minimise unnecessary disturbances on site. Avoid crossing wetlands and ridges – when wetlands such as rivers need to be crossed (which is inevitable), make use of pylons with the smallest ecological footprint and construct it perpendicular to the watercourse, to reduce the impacted distance as far as possible.
3			Temporary storage of hazardous substances.	Storage and handling of hazardous substances.	Contamination of the natural environment due to incorrect / poor handling and storage procedures.	Negative	0	0	0	0	0	0	L - Low		<ul style="list-style-type: none"> Do not store or handle hazardous substances within sensitive habitats. Fence off and secure storage areas and ensure all contractors and staff understand the correct handling and storage procedures, and subsequent emergency procedures if a spill does occur. Ensure spill kits and procedures are available at all times and maintained.
4			Establishment of access roads.	Construction of access road for the project.	Transformation / loss of faunal habitats as a result of road establishment and the associated activities, e.g. vegetation clearing, nuisance dust, creating favourable habitat for alien and invasive plant species.	Negative	1	0	2	3	2	6	L - Low		<ul style="list-style-type: none"> Make use of current established roads. Ensure the proposed road's path is walked by a fauna specialist to assist in relocating / identifying fauna which may be impacted by the road construction process. Minimise areas to be cleared. Follow the prescribed EMP rehabilitation measures for roads not be used after the construction phase.
1	Operational		Site clearing activities.	Denuded areas not rehabilitated / revegetated.	Denuded areas not rehabilitated will lead to increased stormwater runoff and erosion. Subsequently, an increase in erosion will cause siltation of important fauna habitat, and furthermore, the ecosystem services provision of the area will be compromised.	Negative	0	0	2	2	3	6	L - Low		<ul style="list-style-type: none"> All monitoring and maintenance activities should be undertaken according to the EMP, with care taken to destroy as little as possible of the natural habitat, and to minimise unnecessary disturbance on site. All disturbed areas should be rehabilitated.
2			Maintenance related to powerlines.	Cable maintenance and/or replacement.	The powerline maintenance will lead to damage and transformed vegetation, leading to exposed / compacted soils, in turn leading to increased runoff and erosion. Construction in wetlands will lead to habitat degradation. Decreased ecoservice provision. Further decreased ability to support biodiversity.	Negative	0	0	2	2	2	4	L - Low		<ul style="list-style-type: none"> All activities should be undertaken according to the EMP, with care taken to destroy as little as possible of the natural habitat, and to minimise unnecessary disturbance on site. All disturbed areas should be rehabilitated.
3			Maintaining of access roads.	Maintaining of access road for the project area.	Transformation of faunal habitats through road establishment. Due to vegetation clearing, possible invasive plant species to establish.	Negative	0	0	2	2	2	4	L - Low		<ul style="list-style-type: none"> Make use of current established roads. Minimise areas cleared for roads. Rehabilitate habitat where indicated. Invasive eradication methods should take place.

Westrand Strengthening Project - Faunal Impact Assessment							Consequence			Consequence	Probability	Significance	Impact Rating	Confidence level	Mitigation measure
No.	Phases	ID	Activity	Aspect	Impact	Type	Intensity	Duration	Extent						
1	Decommission		Site clearing activities.	Removal / Clearing of established vegetation (site clearing).	Loss of faunal habitats through the clearing of vegetation. Subsequently, this may lead to severe erosion and general degradation of the environment. Decreased ecoservice provision. Further decreased ability to support biodiversity.	Negative	0	0	2	2	4	8	L - Low		<ul style="list-style-type: none"> All decommission activities should be undertaken according to the EMP, with care taken to destroy as little as possible of the natural habitat, and to minimise unnecessary disturbance on site. All disturbed areas should be rehabilitated.
2			Activities associated with decommissioning.	Decommissioning of tower and demolishing of foundations.	Activities associated with decommissioning will lead to damage and transformed vegetation, leading to exposed / compacted soils, in turn leading to increased runoff and erosion. Construction in wetlands will lead to habitat degradation. Decreased ecoservice provision. Further decreased ability to support biodiversity.	Negative	0	0	0	0	3	0	L - Low		<ul style="list-style-type: none"> All decommission activities should be undertaken according to the EMP, with care taken to destroy as little as possible of the natural habitat, and to minimise unnecessary disturbance on site. All disturbed areas should be rehabilitated.
3			Temporary storage of hazardous substances.	Delivering material to contractors camp. Storage of hazardous substances.	Transformation of fauna habitats. Due to vegetation clearing, possible invasive plant species may establish. Possible risk for fauna to get trapped or drown.	Negative	0	0	0	0	2	0	L - Low		<ul style="list-style-type: none"> All cleared areas should be rehabilitated. Use a system that is in-line with the EPM. Fill in and rehabilitate storage areas in the decommissioning phase.



The expected initial impacts on fauna caused by the project will be minimal, because most fauna species are relatively mobile or adaptive. Impacts to connectivity and ecological services will be insignificant, especially since most fauna can adapt fast to low-key and consistent disturbances such as noise.

In addition, the Westrand Corridor leans towards an urban and residential land-use; that translates into disturbed and even transformed environments and concomitant depauperate species richness. Wherever fields have been established species richness has been reduced to zero as result of a total habitat transformation into a barren setting. Towards the centre and Western sector of the Westrand Corridor the emphasis is on cattle grazing and agriculture and environmental disturbance of grasslands varies from high to minimal and the extensive Highveld grassy plains support a higher number of terrestrial vertebrate residents.

The proposed corridor for powerlines will not result in a further loss of ecological sensitive and important habitat units, ecosystem function (e.g. reduction in water quality, soil pollution), loss of mammal habitat, nor of loss/displacement of threatened or protected species. No sensitive ecological system or function is present.

All streams and wetlands are red flagged as sensitive, as per statutory prerequisites.

- Species richness: The status quo will not be altered during the construction or especially the operational phases.
- Endangered species: The status quo will not be altered during the construction or especially the operational phases.

In conclusion, if sound ecological principles are adopted and the EMP successfully implemented, and based on the current available information, the project can be approved.

8.3 FLORA

The Floral Assessment was conducted by Resolute Environmental Solutions and the full report is included in Appendix F4. The results from the Floral study can be summarised as follows:

Table 26: Floral Assessment Results

Westrand Strengthening Project - Floral Impact Assessment						Consequence				Consequence	Probability	Significance	Impact Rating	Confidence level	Mitigation measure
No.	Phases	Activity	Aspect	Impact	Type	Intensity	Duration	Extent	Consequence						
1	Construction	Site clearing and establishment.	Removal / Clearing of established vegetation (site clearing).	Damage to vegetation, leading to exposed / compacted soils, in turn leading to increased runoff and erosion. Decreased ecoservice provision. Further decreased ability to support biodiversity.	Negative	0	0	2	2	2	4	L - Low	70%	<ul style="list-style-type: none"> • Areas with natural veld must be demarcated on all plans as "no-go" areas (as far as practically possible); • A temporary fence or demarcation must be erected around construction areas to prevent access to sensitive environments or vegetation not assessed during this assessment; • Prohibit construction vehicles access into natural areas beyond the demarcated boundary of the construction area; • After construction, the land must be cleared of rubbish, surplus materials, and equipment, and all parts of the land must be left in a condition as close as possible to that prior to construction; • After construction, the land should be rehabilitated by sowing an indigenous grass mix, containing species that naturally occur within the area; • The eradication and control of alien and invasive vegetation should be undertaken and maintained; • The necessary erosion control structures be put in place to avoid further habitat loss; • No uncontrolled open fires should be allowed (i.e. uncontrolled veld fires pose a serious risk to the natural environment); and • Employees must be made aware of the value of the natural environment. 	
2				Infestations of invasive alien plant species as a result of habitat disturbance. Alien and invasive plant species will disrupt ecosystem services within the area.	Negative	0	0	2	2	2	4	L - Low	70%		
3		Excavation and associated activities.	Excavation for tower foundations.	Potential erosion of rich top soil of affected areas will be deposited in other areas. The topography of the study area will be transformed due to disturbance of natural resources such as vegetation.	Negative	0	0	0	0	2	0	L - Low	70%		
4		Transport of material, equipment and staff / labour.	Vehicle movement to deliver materials.	Seed dispersal of problem plants to other areas of the project area. Trampling of vegetation in the affected areas.	Negative	1	0	2	3	2	6	L - Low	70%		

Westrand Strengthening Project - Floral Impact Assessment						Consequence			Consequence	Probability	Significance	Impact Rating	Confidence level	Mitigation measure
No.	Phases	Activity	Aspect	Impact	Type	Intensity	Duration	Extent						
5		The development of access roads to powerline construction.	Removing vegetation for the construction of roads.	Transformation / loss of natural habitats as a result of road establishment and the associated activities, e.g. vegetation clearing, nuisance dust, creating favourable habitat for alien and invasive plant species, etc.	Negative	1	0	2	3	2	6	L - Low	70%	<ul style="list-style-type: none"> • Areas with natural veld must be demarcated on all plans as "no-go" areas (as far as practically possible); • The transformed, secondary and disturbed vegetation within the project area should be utilised for all construction related activities (e.g. construction camps) and the impact area on remnant grasslands should be minimised where possible; • Bulbous species unearthed by construction, should be replanted as part of rehabilitation of the disturbed soils. An ecologist should be consulted as to the species identification; and • The removal or disturbance of vegetation should be minimized.
1	Operational	Maintenance related to powerlines.	Cable maintenance and / or replacement.	The powerline maintenance will lead to damage and transformed vegetation, leading to exposed / compacted soils, in turn leading to increased runoff and erosion. Construction in wetlands will lead to habitat degradation. Decreased ecoservice provision. Further decreased ability to support biodiversity.	Negative	0	0	2	2	2	4	L - Low	70%	<ul style="list-style-type: none"> • Make use of established roads; • Minimise areas cleared for roads; • Rehabilitate habitat where indicated; and • Invasive eradication methods should take place.
1	Decommission	Site clearing activities.	Removal / Clearing of established vegetation (site clearing).	Loss of natural habitats through the clearing of vegetation. Subsequently, this may lead to sever erosion and general degradation of the environment. Decreased ecoservice provision. Further decreased ability to support biodiversity.	Negative	1	0	0	1	2	2	L - Low	70%	<ul style="list-style-type: none"> • All decommission activities should be undertaken according to the EMP, with care taken to destroy as little as possible of the natural habitat, and to minimise unnecessary disturbance on site. • All disturbed areas should be rehabilitated.
2		Activities associated with decommissioning.	Decommissioning of tower and demolishing of foundations.	Activities associated with decommissioning will lead to damage and transformed vegetation, leading to exposed / compacted soils, in turn leading to increased runoff and erosion. Construction in wetlands will lead to habitat degradation. Decreased ecoservice provision. Further decreased ability to support biodiversity.	Negative	0	0	0	0	2	0	L - Low	70%	<ul style="list-style-type: none"> • All decommission activities should be undertaken according to the EMP, with care taken to destroy as little as possible of the natural habitat, and to minimise unnecessary disturbance on site. • All disturbed areas should be rehabilitated.

It was found that within the project area there are habitats which are closely associated with sensitive plant species. Historic data indicate that Carletonville Dolomite Grassland was the vegetation type of the study area with highest numbers of red list plant species. In addition, CBAs and ESAs which occur within the project area, should be conserved as these are vital for the preservation of ecological goods and services.

Alien invasive plants, mining and agricultural activities and urban and industrial developments pose the biggest threat to vegetation within the project area. As a result of the rapid environmental degradation and habitat loss, certain plant species which occur in the project may be listed as threatened in the near future. Subsequently, the management and protection of the remaining natural habitats in the project area should be priorities and included in all project phases.

It is recommended that a botanist forms part of the EMP walkdown to assist in identifying sensitive / natural habitats and guiding the project team to minimise impact on the natural environment.

In conclusion, based on the assessment undertaken and information gathered, the proposed development will have very little impact on the vegetation within the project area. However, this is with the assumption that the EMP is successfully implemented and all parties understand the significance of protecting the natural environment.

8.4 HERITAGE IMPACT ASSESSMENT

The Heritage Impact Assessment was conducted by PGS Heritage and the full report is included in Appendix F1. The results from the Heritage Study can be summarised as follows:

The data analysis has enabled the identification of possible heritage sensitive areas that included:

Dwellings;

Clusters of dwellings (homesteads and farmsteads);

Historical structures; and

Graves and burial grounds.

Previous studies conducted in the greater area have shown that the archaeological includes Stone Age and Iron Age sites, as well as historical structures and graves or burial grounds.

During this study, 23 heritage sites were identified. These include 12 burial grounds, (of which four are municipal cemeteries (WTR002, WTR003, WTR004, WTR008, WTR009, WTR013, WTR014, WTR016, WTR020, WTR021, WTR022, WTR023) and 11 historical structures or dwellings (WTR001, WTR005, WTR006, WTR007, WTR010, WTR011, WTR012, WTR015, WTR017, WTR018, WTR019). Refer to Section 8.4 for the locality of heritage resources in relation to the proposed development area. It should be noted that Heritage resources were identified previously within the study area during legacy fieldwork conducted by PGS in 2016 (17 sites). These sites are described in the full report.

It must be considered that the heritage significance of the identified sites plays a role in the evaluation of the impact and must influence the magnitude rating of the impact tables. Thus, a heritage resource with a high heritage significance rating will have a higher impact magnitude rating than a resource with

a low or no heritage significance rating. Consequently, mitigation measures will be more extensive for a heritage resource with a high heritage significance than for those with a low heritage significance.

The impact of the proposed project on the burial grounds is rated as having a HIGH negative significance before mitigation and with the implementation of mitigation measures as having a LOW negative significance

Impacts on Historical sites are rated as being as MODERATE negative significance before mitigation and with the implementation of the mitigation measures the impact significance is reduced to LOW negative.

In the event that heritage resources are discovered during site clearance, construction activities must stop and a qualified archaeologist must be appointed to evaluate and make recommendations on mitigation measures.

The overall impact of the development, on the heritage resources identified during this report, is seen as acceptably low after the recommendations have been implemented and therefore, impacts can be mitigated to acceptable levels allowing for the development to be authorised.

The interim and final comments received from SAHRA are attached in Appendix F1.3 and F1.4.

8.5 SOCIAL IMPACT ASSESSMENT

The Social Impact Assessment was conducted by Global Green Environmental Consultants and the full report is included in Appendix F6. The results from the SIA study can be summarised as follows:

Table 27: SIA Assessment Results

Phases	Impact	Positive or Negative	Consequence			Consequence	Probability	Significance (Impact rating)	Impact level before mitigation	Possible mitigation measures	Impact level after mitigation	Confidence
			Intensity	Duration	Extent							
Pre-construction & construction	Employment creation	+	3	0	2	5	4	20	High +	<ul style="list-style-type: none"> Implementation of a local employment policy where local job seekers will enjoy appointment above other job seekers. Since this is a positive impact, no additional mitigation measures are required. 	High +	High
	Influx of construction workers and job seekers	-	-3	0	-2	-5	-2	-10	Moderate -	<ul style="list-style-type: none"> Implementation of a local employment policy where local job seekers will enjoy appointment above regional job seekers. The movement of construction workers on and off the site should be closely managed and monitored. 	Low -	High
	Risk of theft and damage to infrastructure	-	-3	-0	-1	-4	-2	-8	Low -	<ul style="list-style-type: none"> The site should be fenced in order to prevent free access to and from the site. Access of all vehicles and peoples (including construction workers) to and from the construction site should be monitored by security. No construction workers, except for security personnel, should be permitted to stay overnight on any construction site. Appointment of local job seekers might minimize the risk of theft and damage to infrastructure. 	Low -	High

Phases	Impact	Positive or Negative	Consequence			Consequence	Probability	Significance (Impact rating)	Impact level before mitigation	Possible mitigation measures	Impact level after mitigation	Confidence
			Intensity	Duration	Extent							
	Nuisance related to construction activities	-	-2	0	-1	-3	-2	-6	Low	<ul style="list-style-type: none"> Construction activities should be limited to normal working hours on weekdays only. Dust suppression measures must be implemented. Construction vehicles should only drive on demarcated areas. 	Low	High
	Disturbance of agricultural activities	-	-1	-1	-5	-2	-10	Moderate	<ul style="list-style-type: none"> Masts should be located in such a manner as to avoid agricultural activities as far as possible, especially cultivated lands. The footprint associated with the construction related activities should be minimized and clearly demarcated during construction. Construction areas should be clearly demarcated to ensure the minimum disturbance of agricultural land and / or infrastructure. All areas disturbed by construction related activities, should be rehabilitated at the end of the construction phase should they not be required for further use. An Environmental Control Officer (ECO) should be appointed to monitor the construction phase. 	Low	High	

Phases	Impact	Positive or Negative	Consequence			Consequence	Probability	Significance (Impact rating)	Impact level before mitigation	Possible mitigation measures	Impact level after mitigation	Confidence
			Intensity	Duration	Extent							
	Mining activities	-		0	-1	-3	-2	-6	Low -	<ul style="list-style-type: none"> The construction activities should avoid mining areas as far as possible. In the events where mining activities are present in close vicinity to mining activities, arrangement should be made with the mining company to ensure the safety of construction workers and construction activities. Construction of towers on possible mining areas should be approved by the mineral rights holder since the transmission line might sterilize future mining areas. 	Low -	High
	Safety and security	-		0	-1	-4	-2	-8	Low -	<ul style="list-style-type: none"> The construction areas, eclectically close to residential areas should be clearly demarcated and fenced off were possible. The required health and safety measured should be implemented according to relevant law. 	Low +	High
	Health	-		0	-1	-3	-2	-6	Low	<ul style="list-style-type: none"> The impact of the transmission line on human health should be communicated to the residence in the nearby settlements. 	Low -	High
	Reliable supply of electricity	+		2	2	7	4	28	Very high +	<ul style="list-style-type: none"> Since this is a positive impact, no mitigation measures are required. 	Very high +	High

Phases	Impact	Positive or Negative	Consequence			Consequence	Probability	Significance (Impact rating)	Impact level before mitigation	Possible mitigation measures	Impact level after mitigation	Confidence
			Intensity	Duration	Extent							
Operation	Employment creation	+		2	1	5	2	10	Moderate +	<ul style="list-style-type: none"> Implementation of a local employment policy where local job seekers will enjoy appointment above regional job seekers. Since this is a positive impact, no additional mitigation measures are required. 	Moderate +	High
	Economic Impact	+		2	2	7	3	21	High +	<ul style="list-style-type: none"> Since this is a positive impact, no mitigation measures are required. 	High +	High
	Visual Impact	.		-2	-1	-5	-2	-10	Moderate .	<ul style="list-style-type: none"> The recommendations in the VIA specialist study should be implemented. 	Low .	High
	Disturbance of agricultural activities	.		-2	-0	-4	-2	-8	Low .	<ul style="list-style-type: none"> Masts should be located in such a manner as to avoid agricultural activities as far as possible, especially cultivated lands. Compensation should be provided for loss of agricultural land. Maintenance of servitudes and transmission lines should be 	Low .	High

Phases	Impact	Positive or Negative	Consequence			Consequence	Probability	Significance (Impact rating)	Impact level before mitigation	Possible mitigation measures	Impact level after mitigation	Confidence
			Intensity	Duration	Extent							
	Influence on spatial development			-2	-1	-6	-2	-12	Moderate	<ul style="list-style-type: none"> Spatial Development Frameworks should be considered to determine and avoid areas earmarked for future development. The transmission lines should be located as far as possible from urban build-up areas. Existing servitudes should be utilized as far as possible to accommodate the new transmission line. 	Low	High

The above Table provides a summary of the socio-economic impacts associated with the proposed transmission line and associated activities across the different phases. It shows that after mitigation 10 (of 14) impacts received a low negative impact rating whereas the remaining 4 impacts are positive impacts of very high (1), high (2) and moderate significance (1).

Overall the proposed project does not hold any overriding negative socio-economic impacts to suggest a 'no go' option. Finally, employment, reliable supply of electricity and economic impacts potential linked to the project, will significantly contribute towards the realization of the vision and objectives described in the National Development Plan and associated regional and local development plans.

8.6 VISUAL IMPACT ASSESSMENT

The Visual Impact Assessment (VIA) was conducted by Global Green Environmental Consultants and the full report is included in Appendix F2. The results from the VIA study can be summarised as follows:

Table 28: VIA Assessment Results

Viewpoint (see Fig 3)	Viewpoint Analysis Criteria				* Significance Criteria					Significance Rating / Score Con x Prob
	Visual Intrusion	Visual Absorption	Landscape Integrity	Visibility	Consequence Type x (Intensity + Duration + Extent)				Probability	
					Type	Intensity	Duration	Extent		
1	Moderately intrusive	High	High compatibility	Moderately visible	-1 Negative	0 Negligible	0 Short term	0 Site	0 Very unlikely	0 Very Low
2	Marginally intrusive	High	High compatibility	Marginally visible	-1 Negative	0 Negligible	0 Short term	0 Site	0 Very unlikely	0 Very Low
3	Moderately intrusive	High	High compatibility	Moderately visible	-1 Negative	1 Low	0 Short term	0 Site	-1 Unlikely	-1 Low
4	Marginally intrusive	High	High compatibility	Marginally visible	-1 Negative	0 Negligible	0 Short term	0 Site	0 Very unlikely	0 Very Low
5	Marginally intrusive	High	High compatibility	Marginally visible	-1 Negative	0 Negligible	0 Short term	0 Site	0 Very unlikely	0 Very Low
6	Marginally intrusive	High	High compatibility	Marginally visible	-1 Negative	0 Negligible	0 Short term	0 Site	0 Very unlikely	0 Very Low
7	Moderately intrusive	High	High compatibility	Moderately visible	-1 Negative	1 Low	0 Short term	0 Site	-1 Unlikely	-1 Low
8	Moderately intrusive	High	High compatibility	Moderately visible	-1 Negative	1 Low	0 Short term	0 Site	-1 Unlikely	-1 Low
9	Moderately intrusive	High	High compatibility	Moderately visible	-1 Negative	1 Low	0 Short term	0 Site	-1 Unlikely	-1 Low
10	Marginally intrusive	High	High compatibility	Moderately visible	-1 Negative	0 Negligible	0 Short term	0 Site	0 Very unlikely	0 Very Low
11	Marginally intrusive	High	High compatibility	Marginally visible	-1 Negative	0 Negligible	0 Short term	0 Site	0 Very unlikely	0 Very Low

*These criteria are not typically used in VIA but were provided in the terms of reference to ensure consistency in significance methodology between different specialists. Therefore, we combined the significance criteria with the viewpoint analysis criteria for this VIA

The ToR clearly specifies that the VIA should focus on Corridor 3 as the preferred corridor alternative. This corridor alternative was selected based on a detailed multi-criteria analysis described in the final Scoping Report. The multi-criteria analysis already included a high-level consideration of potential visual impacts, which showed that, from a visual impact significance perspective, there was not a clearly preferred alternative corridor. Moreover, the high-level visual impact significance for the upgrading of the substations as well as connector loops were also considered, and scoped out of this assessment because of their low potential visual impact significance. Having identified the preferred transmission line corridor, the design specifications for the tower structures were considered. As part of the Scoping Phase various tower structures on which powerlines will be suspended were considered for use during the construction in different sections of the line, subject to landscape, engineering and the biophysical nature of the receiving environment. The towers will be up to 42m (depending on the extensions used) in height and the distance between each tower will be from 250 m with a maximum distance or span of 450 m between towers.

Based on the outcome of the visual impact assessment we conclude that the proposed development will have a 'low' to 'very low' significant negative visual impact on the surrounding receptors and landscape. We base our conclusion on the following:

- *Landscape scale assessment* which confirms that the landscape has a distinctly mixed land use, industrial and mining character which increase the visual absorption capacity and lower the landscape quality.
- *Viewpoint assessment* of 11 purposefully selected viewpoints, which confirmed the visual character of the landscape. Due to the occurrence of existing bulk infrastructure and especially electricity transmission and distribution infrastructure none of the viewpoints were highly impacted.

We therefore recommend that the proposed development be approved from a visual impact perspective.

8.7 WETLAND ASSESSMENT

The Wetland and Riparian Habitat Assessment was conducted by Resolute Environmental Solutions and the full report is included in Appendix F5. The results from the Wetland Assessment study can be summarised as follows:

Table 29: Wetland Assessment Results

Westrand Strengthening Project - Wetland & River stream Impact Assessment							Consequence			Consequence	Probability	Significance	Impact Rating	Confidence level	Mitigation measure	
No.	Phases	ID	Activity	Aspect	Impact	Type	Intensity	Duration	Extent							
1	Construction		Site clearing activities.	Removal / Clearing of established vegetation (site clearing).	Site clearing and removal of vegetation may lead to severe erosion and general degradation of the environment.	Negative	1	0	2	3	4	12	L - Low		<ul style="list-style-type: none"> All construction activities should be undertaken according to the EMP, care must be taken to not destroy / degrade natural habitat as far as possible, and to minimise unnecessary disturbances on site. 	
2			Earthworks within the wetlands.	Earthworks within the wetlands to construct powerlines.	Earthworks within the wetlands leading to increased runoff and erosion and altered runoff patterns as well as loss in natural vegetation, leading to exposed / compacted soils, in turn leading to increased runoff and erosion. In addition, excavations in wetlands will lead to habitat degradation, decreased ecoservice provision and further decrease the ability to support biodiversity.	Negative	1	0	0	1	4	4	L - Low		<ul style="list-style-type: none"> All construction activities should be undertaken according to the EMP, care must be taken to not destroy / degrade natural habitat as far as possible, and to minimise unnecessary disturbances on site. To comply to the calculated watercourse buffer zones. Avoid crossing wetlands and ridges – when wetlands such as rivers need to be crossed (which is inevitable), make use of pylons with the smallest ecological footprint and construct it perpendicular to the watercourse, to reduce the impacted distance as far as possible. 	
3			Temporary storage of hazardous substances.	Storage and handling of hazardous substances.	Contamination of the natural environment due to incorrect / poor handling and storage procedures.	Negative	0	0	0	0	0	0	0	L - Low		<ul style="list-style-type: none"> Do not store or handle hazardous substances within sensitive habitats. Fence off and secure storage areas and ensure all contractors and staff understand the correct handling and storage procedures, and subsequent emergency procedures if a spill does occur. Ensure spill kits and procedures are available at all times and maintained.
				Topsoil stockpiling.	Topsoil stockpiling adjacent to wetlands.	Topsoil stockpiling adjacent to wetlands lead sediment runoff, into the watercourses and may lead to severe erosion and general degradation of the environment.	Negative	0	0	0	0	1	0	L - Low		<ul style="list-style-type: none"> All construction activities should be undertaken according to the EMP, care must be taken to not destroy / degrade natural habitat as far as possible, and to minimise unnecessary disturbances on site. To comply to the calculated watercourse buffer zones. Avoid crossing wetlands and ridges – when wetlands such as rivers need to be crossed (which is inevitable), make use of pylons with the smallest ecological footprint and construct it perpendicular to the watercourse, to reduce the impacted distance as far as possible.

Westrand Strengthening Project - Wetland & River stream Impact Assessment							Consequence			Consequence	Probability	Significance	Impact Rating	Confidence level	Mitigation measure
No.	Phases	ID	Activity	Aspect	Impact	Type	Intensity	Duration	Extent						
4			Establishment of access roads.	Construction of access road for the project.	Transformation / loss of natural habitats as a result of road establishment and the associated activities, e.g. vegetation clearing, nuisance dust, creating favourable habitat for alien and invasive plant species.	Negative	1	0	2	3	2	6	L - Low		<ul style="list-style-type: none"> • Make use of current established roads. • Ensure the proposed road's path is walked by a fauna specialist to assist in relocating / identifying fauna which may be impacted by the road construction process. • Minimise areas to be cleared. • Follow the prescribed EMP rehabilitation measures for roads not be used after the construction phase.
1	Operational		Site clearing activities.	Denuded areas not rehabilitated / revegetated.	Site clearing and removal of vegetation may lead to severe erosion and general degradation of the environment.	Negative	0	0	2	2	2	4	L - Low		<ul style="list-style-type: none"> • All monitoring and maintenance activities should be undertaken according to the EMP, with care taken to destroy as little as possible of the natural habitat, and to minimise unnecessary disturbance on site. • All disturbed areas should be rehabilitated.
2			Maintenance related to powerlines.	Cable maintenance and / or replacement.	The powerline maintenance will lead to damage and transformed natural habitat, leading to exposed / compacted soils, in turn leading to increased runoff and erosion. Construction in wetlands will lead to habitat degradation. Decreased ecoservice provision. Further decreased ability to support biodiversity.	Negative	0	0	2	2	2	4	L - Low		<ul style="list-style-type: none"> • All decommission activities should be undertaken according to the EMP, with care taken to destroy as little as possible of the natural habitat, and to minimise unnecessary disturbance on site. • All disturbed areas should be rehabilitated.
3			Maintaining of access roads.	Maintaining of access road for the project area.	Transformation of natural habitats through road establishment. Due to vegetation clearing, possible invasive plant species may establish.	Negative	0	0	2	2	2	4	L - Low		<ul style="list-style-type: none"> • Make use of current established roads. • Minimise areas cleared for roads. • Rehabilitate habitat where indicated. • Invasive eradication methods should take place.
1	Decommission		Site clearing activities.	Removal / Clearing of established vegetation (site clearing).	Site clearing and removal of vegetation may lead to severe erosion and general degradation of the environment.	Negative	0	0	2	2	4	8	L - Low		<ul style="list-style-type: none"> • All decommission activities should be undertaken according to the EMP, with care taken to destroy as little as possible of the natural habitat, and to minimise unnecessary disturbance on site. • All disturbed areas should be rehabilitated.

Westrand Strengthening Project - Wetland & River stream Impact Assessment							Consequence			Consequence	Probability	Significance	Impact Rating	Confidence level	Mitigation measure
No.	Phases	ID	Activity	Aspect	Impact	Type	Intensity	Duration	Extent						
2			Activities associated with decommissioning.	Decommissioning of tower and demolishing of foundations.	Decommissioning within the wetlands leading to increased runoff and erosion and altered runoff patterns as well as loss in natural vegetation, leading to exposed / compacted soils, in turn leading to increased runoff and erosion. In addition, excavations in wetlands will lead to habitat degradation, decreased ecosystem service provision and further decrease the ability to support biodiversity.	Negative	0	0	0	0	3	0	L - Low		<ul style="list-style-type: none"> All decommission activities should be undertaken according to the EMP, with care taken to destroy as little as possible of the natural habitat, and to minimise unnecessary disturbance on site. All disturbed areas should be rehabilitated.
3			Temporary storage of hazardous substances.	Delivering material to contractors camp. Storage of hazardous substances.	Transformation of fauna habitats. Due to vegetation clearing, possible invasive plant species may establish. Possible risk for fauna to get trapped or drown.	Negative	0	0	0	0	2	0	L - Low		<ul style="list-style-type: none"> All cleared areas should be rehabilitated. Use a system that is in-line with the EPM. Fill in and rehabilitate storage areas in the decommissioning phase
4			Rehabilitation.	Rehabilitation of access road for the project area.	On-going erosion and sedimentation of wetlands due to incorrect rehabilitation.	Negative	1	0	2	3	2	6	L - Low		<ul style="list-style-type: none"> Make use of current established roads. Minimise areas cleared for roads. Rehabilitate habitat where indicated.



The expected initial impacts on riparian watercourses caused by the project can be severe if the recommended water course buffer zones and mitigation measures are not implemented. All watercourses are regarded as sensitive and should be protected, as per South African statutory requirements. Although all watercourses within the project have some degree of disturbance / modification, the proposed project should aim to, at a minimum, not further degrade the natural environment and supporting ecological systems.

In conclusion, if sound ecological principles are followed and the EMP successfully implemented, the project can be approved.

8.8 PALAEOLOGY IMPACT ASSESSMENT

The Palaeontology Impact Assessment was conducted by (AHSA) Archaeological and Heritage Services Africa (Pty) Ltd and the full report is included in Appendix F8. The impact assessment of the Palaeontology study is included in table 30.

Table 30: Palaeontology Impact Assessment

PART B: Assessment		
SEVERITY/NATURE	H	-
	M	-
	L	Soils do not preserve any fossils; so far there are no records from the Malmani Subgroup of stromatolites in this region so it is very unlikely that fossils occur on the site. The impact would be very unlikely.
	L+	-
	M+	-
	H+	-
DURATION	L	-
	M	-
	H	Where manifest, the impact will be permanent.
SPATIAL SCALE	L	Since the only possible fossils within the area would be trace fossils, stromatolites, in the Malmani Subgroup in dolomites, the spatial scale will be localised within the site boundary.
	M	-
	H	-
PROBABILITY	H	-
	M	-

PART B: Assessment		
	L	The site visit showed that there are no fossils in characteristic areas of the route. It is extremely unlikely that any fossils would be found in the loose sand and soils that will be excavated for pole foundations. Nonetheless, a Fossil Chance Find Protocol should be added to the eventual EMPr.

Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are the correct age and type to contain fossils, namely the dolomites of the Malmani Subgroup could have stromatolites. The site visit however, showed that there are no surficial dolomites or stromatolites. The results from the Palaeontology Study can be summarised as follows:

Based on experience and the lack of any fossils seen during the site visit, it is extremely unlikely that any fossils would be disturbed by the proposed project. No fossils would be found in the soils that will be excavated for poles or access roads. There is a very small chance that fossils (stromatolites of the Malmani Subgroup, Transvaal Supergroup) may occur in the rocks below the surface, so a Fossil Chance Find Protocol should be added to the EMPr. If fossils are found by the environmental officer, or other designated responsible person, once excavations have commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample. **As far as the palaeontology is concerned, the project should be authorised** based on the following:

- The substations are existing and are in built-up areas that are already disturbed.
- LILO-1 and LILO-2 are in very disturbed areas and on non-fossiliferous rocks
- Corridor 1 (northern) has only a short section on potentially fossiliferous rocks but the land is already ploughed or built-upon so there are no surface stromatolites.
- Corridor 2 (central) is on non-fossiliferous rocks and the route is already very disturbed. This is the preferred route from the palaeontological aspect.
- Corridor 3 (southern) is mostly on fossiliferous rocks but many parts are disturbed. The site visit showed that there are no fossils along this route.

As far as the palaeontology is concerned, there are no stromatolites along the southern route (Corridor 3), therefore the project should be authorised.

The interim and final comments received from SAHRA are attached in Appendix F1.3 and F1.4.

9 PUBLIC PARTICIPATION PROCESS (PPP)

This section details the approach to the PPP according to the legislative requirements and public participation measures conducted to date. As mentioned previously, this report forms part of a resubmission. Subsequently, I&APs from the previous conducted public participation process were included and informed. Furthermore, DEFF indicated that the preliminary public participation process (site notices, newspaper notices, etc.) should be repeated due to a two-year period that passed since the beginning of the first public participation actions. Therefore, this section provides a description of the public participation process conducted as part of this resubmitted application. Public Participation measures conducted as part

of the previous application are included in the accepted Scoping Report attached as Appendix P, documentation related to any public participation measures from any other phase related to this application can be provided on request.

The public participation related to this application will ensure that the protection of personal information of all I&APs in accordance with the POPI ACT.

9.1 APPROVED COVID 19 PUBLIC PARTICIPATION PLAN

A Public Participation Plan, in accordance with Regulations GN.R. 650 (Directions Regarding Measures to Address, Prevent and Combat the Spread of COVID-19 Relating to National Environmental Management Permits and Licenses, as published on 05 June 2020) was submitted to DEFF and approved on 03 March 2021 (refer to Appendix E1).

9.2 NOTICES TO I&APS THAT REGISTERED AS PART OF THE PREVIOUS APPLICATION

Registered I&APs, that formed part of the previously submitted application, received a notice via email and WhatsApp for resubmission of the application and circulation of the draft EIAR on 24 March 2021. The notice was sent to previously registered I&APs to notify them of the intent to resubmit the application in accordance with Regulation 21(2) of GNR 326 (refer to Appendix E4).

After submission of the draft EIAR, it was again circulated to I&APs on 09 July 2021 for their further comments and or inputs (refer to Appendix E5).

The revised EIAR was circulated to I&APs on 18 October 2021 for their further comments and or input (refer to Appendix E6).

9.3 NOTICE TO STAKEHOLDERS

Identified stakeholders, that formed part of the previously submitted application, received a notice via email for resubmission of the application on 24 March 2021. The notice was sent to inform them of the intent to resubmit the application in accordance with Regulation 21(2) of GNR 326 (refer to Appendix E5.1). The draft EIAR was circulated to stakeholders on 28 July 2021 for their further comments and or inputs (refer to Appendix E5.2). Stakeholders consist of identified stakeholders, relevant authorities, ward councillors, organ of state, etc. that might have jurisdiction over the application site.

After submission of the draft EIAR, it was again circulated to stakeholders on 09 July 2021 for their further comments and or inputs (refer to Appendix E5).

The revised EIAR was circulated to stakeholders on 18 October 2021 for their further comments and or input (refer to Appendix E6).

9.4 OTHER POSSIBLE AFFECTED PARTIES (STAKEHOLDERS)

Possible affected parties were identified according to a desktop study of the proposed route alternatives provided by Eskom; however, some limitations, such as unavailability of contact details or people simply

not taking calls, were experienced in obtaining contact details and information of some stakeholders. Nevertheless, the following stakeholders were notified:

- Agri-Gauteng;
- Carletonville Independent Ratepayers Association;
- Rugani Carrot farm; and
- Westoniria Residents Concern Association.

Stakeholders were provided with a 30-day commenting period (refer to Appendix E4 & E5).

9.5 NOTICE TO STATE DEPARTMENTS

State Departments included in the public participation process who received notices and to whom all reports were circulated include:

- DEA Biodiversity section
- Department of Agriculture, Forestry & Fisheries
- Department of Mineral Resources
- Department of Water and Sanitation
- Department of Agriculture and Rural Development
- Department of Rural Development and Land Reform
- City of Johannesburg Metropolitan Municipality
- Merafong City Local Municipality
- Mogale City Local Municipality
- West Rand District Municipality
- Rand West City Local Municipality
- Minerals Council South Africa
- National Energy Regulator of South Africa
- South African Civil Aviation Authority
- South African Heritage Resources Agency
- South African National Road Agency SOC Limited
- Transnet
- BirdLife South Africa Headquarters
- Cradle of Humankind.

9.6 NOTICE TO WARD COUNCILLORS

Relevant wards were selected based on information sourced from the demarcation board and municipal websites. Ward councillors included in the public participation process who received notices and to whom all reports were circulated include:

- Ward Councillor: Wards 13, 20 and 53 City of Johannesburg Metropolitan Municipality
- Ward Councillor: Wards 1 and 2 Merafong City Local Municipality
- Ward Councillor: Wards 2, 26, 30 and 34 Mogale City Local Municipality
- Ward Councillor David Molebatsi, MMC Integrated Environmental Management, Rand West City Local Municipality.

9.7 NOTICE BOARDS / SITE NOTICES

Notice boards were fixed on 23 March 2021 on existing substations and on the proposed corridors or close to an area easily accessible to the public that could potentially be affected at the following locations:

- Pluto Substation (Location coordinates: 26°13'12.36"S; 27°27'24.95"E);
- Westgate Substation (Location coordinates: 26° 8'50.29"S; 27°45'15.67"E);
- Taunus Substation (Location coordinates: 26°16'6.22"S; 27°46'49.08"E);
- Along N14 road (Location coordinates: 26° 9'17.81"S; 27°33'11.63"E);
- Along R41 road (Location coordinates: 26°13'7.28"S; 27°30'14.31"E); and
- Along R 28 road (Location coordinates: 26°12'28.30"S; 27°41'40.37"E)

Potential I&APs were provided with a 30-day commenting period (refer to Appendix E2 of the draft EIA).

9.8 NEWSPAPER NOTICES

A notice was placed in English in two local newspapers (refer to Appendix E3) on the following dates:

- Krugersdorp news on 02 April 2021 and 21 May 2021.
- Randfontein herald on 02 April 2021 and 21 May 2021.

IAPs were given the opportunity to raise comments within 30 days of the advertisements. See Appendix E for proof of all the public participation process documentation.

9.9 I&AP REGISTER

After notification of all the above relevant, possible and previous I&APs, a register for I&APs was created to ensure circulation of all relevant information and reports to all registered I&APs. The I&AP register is attached as Appendix E7.

9.10 COMMENTS AND RESPONSES

The updated comments and responses received from I&APs throughout the EIA process up to date are included in Appendix E8.

9.11 FUTURE PUBLIC PARTICIPATION MEASURES

Further and future public participation measures will be conducted in accordance with the NEMA EIA Regulations and approved Covid 19 Public Participation Plan.

10 ENVIRONMENTAL IMPACT STATEMENT

This section aims to provide a summary of the key positive and negative impacts related to the project in order to allow for the environmental authority to make an informed decision. The results are based on the specialist reports – so for more detailed discussion on the specific impact and their mitigation measures refer to page 99 above and/or the specific specialist study in section 0.

10.1 SUMMARY OF POSITIVE IMPACTS AFTER MITIGATION INCLUDING CUMULATIVE IMPACTS

The project will have significant positive impacts which are summarised in Table 31. With implementation of the recommended mitigation measures, these impacts can be enhanced to moderate/high impacts.

Table 31: Summary of the positive impacts

	Pre- constructi on	Construct ion	Operatio n	Decommis- sioning	Before Mitigation	After Mitigation	Cumulative impact
Job creation		X			Low (+ve)	Moderate (+ve)	Moderate (+ve)
Opportunity for local sourcing of goods and services		X			Low (+ve)	Moderate (+ve)	Moderate (+ve)
Local and regional economic benefits and multiplier effects		X	X		Low (+ve)	Moderate (+ve)	Moderate (+ve)
Increased availability of stable electricity		X	X		Moderate (+ve)	High (+ve)	High (+ve)

10.2 SUMMARY OF NEGATIVE IMPACTS AFTER MITIGATION INCLUDING CUMULATIVE IMPACTS

A summary of the negative impacts in the order of their significance after implementing the proposed mitigation measures is provided in Table 32. Most of the impacts have a very low significance after mitigation. These impacts are easily manageable if the environmental management programme is implemented (find attached as Appendix N the EMPr). Although some of the impacts are expected have a high/ very high significance before mitigation, none of the impacts are expected to have high / very high significance after mitigation and none is expected to produce high negative cumulative impacts within time and space.

The fewest impacts fall under the moderate category, after mitigation and in this project, these are the impacts requiring the most attention and/or consideration.

Table 32: Summary of the negative impacts

Impact	Pre-construction	Construction	Operation	Decommissioning	Before Mitigation	After Mitigation	Cumulative impacts
VERY LOW IMPACTS AFTER MITIGATION							
Electrocution of birds			X		Very low (-ve)	Very low (-ve)	Very low (-ve)
Flooding from high rainfall intensity events			X		Very low (-ve)	Very low (-ve)	Very low (-ve)
Soil erosion	X	X		X	Very low (-ve)	Very low (-ve)	Very low (-ve)
Soil contamination (dangerous goods)	X	X		X	Low (-ve)	Very low (-ve)	Very low (-ve)
Loss of arable land	X	X			Low (-ve)	Very low (-ve)	Very low (-ve)
Damage to infrastructure due to potential veld fires			X		Low (-ve)	Very low (-ve)	Very low (-ve)
Displacement due to habitat transformation		X			Low (-ve)	Very low (-ve)	Very low (-ve)
Visual impacts of construction camps and laydown areas	X	X			Low (-ve)	Very low (-ve)	Very low (-ve)
Increased level of noise generation (and potential vibrations)	X	X		X	Low (-ve)	Very low (-ve)	Very low (-ve)
Dust emission	X	X		X	Low (-ve)	Very low (-ve)	Very low (-ve)
Engine exhaust hazardous emissions	X	X		X	Low (-ve)	Very low (-ve)	Very low (-ve)
Increased-traffic congestion		X			Low (-ve)	Very low (-ve)	Very low (-ve)
Road safety		X			Low (-ve)	Very low (-ve)	Very low (-ve)
Loss of riparian systems and disturbance of water courses		X	X	X	Low (-ve)	Very low (-ve)	Very low (-ve)
Increase in sedimentation and erosion		X	X	X	Low (-ve)	Very low (-ve)	Very low (-ve)

Impact	Pre-construction	Construction	Operation	Decommissioning	Before Mitigation	After Mitigation	Cumulative impacts
Potential impact on localised surface water quality		X		X	Low (-ve)	Very low (-ve)	Very low (-ve)
LOW IMPACTS AFTER MITIGATION							
The visual impact of transmission lines in natural areas			X		Moderate (-ve)	Low (-ve)	Low (-ve)
Loss of intact vegetation units / terrestrial habitats		X		X	Moderate (-ve)	Low (-ve)	Low (-ve)
Loss of Critical Biodiversity Areas and habitat fragmentation		X		X	Moderate (-ve)	Low (-ve)	Low (-ve)
Loss of species of special concern	X	X	X	X	Moderate (-ve)	Low (-ve)	Low (-ve)
Birds collision			X		Moderate (-ve)	Low (-ve)	Low (-ve)
Paleontological sites within the high-risk areas	X	X		X	Moderate (-ve)	Low (-ve)	Low (-ve)
Stone Age sites	X	X		X	Moderate (-ve)	Low (-ve)	Low (-ve)
Iron Age site	X	X		X	Moderate (-ve)	Low (-ve)	Low (-ve)
Built Environment	X	X		X	Moderate (-ve)	Low (-ve)	Low (-ve)
MODERATE IMPACTS AFTER MITIGATION							
The visual impact of cleared servitudes in natural areas		X	X		Moderate (-ve)	Moderate (-ve)	Moderate (-ve)
Physical and economic displacement		X			High (-ve)	Moderate (-ve)	Moderate (-ve)

The project is considered to have negative impacts that are within acceptable limits and which can be managed down to tolerable levels. No fatal flaws have been identified. The most significant impacts have been flagged above. These impacts require mitigation and careful monitoring, which is outlined in detail in the EMPr. It is the responsibility of the applicant and appointed contractor to then ensure that management of these impacts are given priority. There is no highly significant cumulative impact foreseen.

11 CONCLUSION

As per the EIA requirements, this study has reviewed and assessed a range of contemplated biophysical and social impacts associated with the proposed project. The main findings and recommendations of the EIA process have been documented in this report. No fatal flaws have been identified; however, the most significant impacts have been flagged. These impacts require careful mitigation and monitoring. It is the responsibility of the applicant and appointed Contractor to then ensure these impacts are given priority.

It is the opinion of the EAP that all major impacts have been identified and have been assigned appropriate management measures. Impacts after mitigation, will be reduced to a MEDIUM or LOW significance, and can be managed accordingly including cumulative impacts.

11.1 LEVEL OF CONFIDENCE IN THE ASSESSMENT

The EAP believes that the information contained within this EIA Report is adequate to inform the DEFF in their decision-making regarding the authorisation of the project in terms of the NEMA. It is also the opinion of the EAP that all major impacts have been identified and appropriate management measures have been assigned to manage these impacts. Although the study area is large and specialists were not able to assess the entire area in detail, the experience of the specialists and their knowledge of the area from other studies previously conducted in the area, the availability of high-quality aerial imagery to inform areas that needed to be ground-truthed and the relative homogeneity of the area provided a high degree of confidence in the specialist assessments.

11.2 WAY FORWARD

This report (including the EMPr) has been advertised and made available to I&APs. All the issues and comments received from the public were documented and responded accordingly. This report was also updated and amended where necessary. Based on the information presented in this final EIAR, the DEFF will be able to make a decision on the project in terms of the NEMA.

11.3 RECOMMENDED CONDITIONS FOR ENVIRONMENTAL ASSESSMENT

The following are the recommended conditions to be included in the environmental authorisation of the proposed project:

- A detailed walk-down must be conducted with avifaunal, ecological, heritage and palaeontology specialists after the specific location of the towers (and servitude) is identified to allow for the micro-siting of the towers to further reduce the significance of the impacts. The walk down will also allow for identification of natural features and species of concerns that were not identified during the site assessment.
- To ensure compliance with, and implementation of the EMPr by:
 - (i) Ensuring the Contractor has a permanent Environmental Officer based on site, to monitor adherence to the EMPr; and

- (ii) Appointing a suitably qualified Environmental Control Officer to undertake audits on a regular basis throughout the construction phase.
- To ensure that all staff, Contractors and associated sub-contractors are aware of and understand the requirements of the EMPr and environmental issues in relation to their individual areas of work.
 - The EMPr should be included in the contractual obligations of the appointed EPC contractor.
 - A Water Use Licence must be obtained from the relevant authority for any activities that are likely to impact on water resources in accordance with the National Water Act (Act No. 36 of 1998).
 - Necessary permits shall be obtained from the Department of Forestry and Fisheries for any removal of trees protected under the National Forest Act of 1998.

12 EAP DECLARATION UNDERTAKING OF OATH

I, Charlotte Cilliers of **RESOLUTE ENVIRONMENTAL SOLUTIONS**, swear under oath / affirm, in line with Appendix 3 of the NEMA EIA Regulations, 2014, as amended, that:

- (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 are true and correct.



Signature of the Environmental Assessment Practitioner

RESOLUTE ENVIRONMENTAL SOLUTIONS

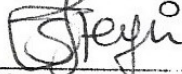
Name of Company

10 December 2021

Date

Signature of the Commissioner of Oaths:

CERTIFIED A TRUE COPY OF THE
ORIGINAL



COMMISSIONER OF OATHS (RSA)
SUSANNA ELIZABETH STEYN, 31429
Professional number 35491 (SA)
Carpe Diem Nr. 15,
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Tel: 079 526 7946

13 REFERENCE LIST

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