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BOSA

TRANSMISSION PROJECT

BOSA TRANSACTION ADVISORY SERVICES

FINAL ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT

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Aurecon South Africa (Pty)

Reg No 1977/003711/07

Aurecon Centre
Lynnwood Bridge Office Park
4 Daventry Street
Lynnwood Manor 0081Aurecon Centre
Lynnwood Bridge Office Park
4 Daventry Street
Lynnwood Manor 0081

T +27 44 805 5428
F +27 44 805 5454
E diane.erasmus@aurecongroup.com
W aurecongroup.com

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APPROVALS

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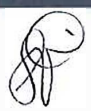
Transaction Advisor Approval			
Author signature		Approver signature	
Name	**Diane Erasmus**	Name	**Andries van der Merwe**
Title	**Stream Lead**	Title	**Technical Director**
Date	12 March 2018	Date	12 March 2018

Sponsor Approval	
Eskom Approver Signature	
Name	**Sebenzile Vilakazi**
Title	**Senior Environmental Advisor**
Date	9 March 2018

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NEMA Legislative requirement with reference to the relevant section of this report:

NEMA Appendix 3	Content	Reference in report
1(1)	The environmental impact assessment process must be undertaken in line with the approved plan of study for environmental impact assessment.	Section 5 and Annexure F
1(2)	The environmental impacts, mitigation and closure outcomes as well as the residual risks of the proposed activity must be set out in the environmental impact assessment report.	Section 5
2	**The objective of the environmental impact assessment process is to, through a consultative process**	
2(a)	determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;	Section 2
2(b)	describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location development footprint on the approved site as contemplated in the accepted scoping report;	Section 4.5
2(c)	identify the location of the development footprint within the preferred approved site as contemplated in the accepted scoping report based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;	Section 4.4.1 and Annexure I.2 and I.3
2(d)	determine the- (i) nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and (ii) degree to which these impacts- (aa) can be reversed; (bb) may cause irreplaceable loss of resources, and (cc) can be avoided, manged or mitigated.	Section 5
2(e)	identify the most ideal location for the activity within the preferred development footprint of the approved site as contemplated in the accepted scoping report based on the lowest level of environmental sensitivity identified during the assessment; -	Section 4.4.1 and Annexure I.2 and I.3
2(f)	identify, assess, and rank the impacts the activity will impose on the preferred location development footprint on the approved site as contemplated in the accepted scoping report through the life of the activity;	Section 5
2(g)	identify suitable measures to avoid, manage or mitigate identified impacts; and	Section 5
2(h)	identify residual risks that need to be managed and monitored.	Section 5

NEMA Appendix 3	Content	Reference in 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 -**	
3 (1) (a)	details of- (i) the EAP who prepared the report; and (ii) the expertise of the EAP, including a curriculum vitae;	Section 1.2 and Annexure A
3 (1) (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; and (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	Section 4.1 Annexure D
3 (1) (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; (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	Section 4.1 Annexure D
3 (1) (d)	a description of the scope of the proposed activity, including- (i) all listed and specified activities triggered and being applied for; and (ii) a description of the associated structures and infrastructure related to the development;	Section 2.6.2
3 (1) (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;	Section 2
3 (1) (f)	a motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred location development footprint within the approved site as contemplated in the accepted scoping report	Section 4.5
3 (1) (g)	a motivation for the preferred development footprint within the approved site as contemplated in the accepted scoping report;	Section 4.5
3 (1) (h)	a full description of the process followed to reach the proposed development footprint within the approved site, including: (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;	Section 4 Section 2 Annexure I.2 & I.3

NEMA Appendix 3	Content	Reference in report
	(iv) the environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; (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; (vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks; (vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community, that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; (viii) the possible mitigation measures that could be applied and level of residual risk; (ix) if no alternative development locations footprints for the activity were investigated, the motivation for not considering such; and (x) a concluding statement indicating the location of the preferred alternative development location footprint within the approved site as contemplated in the accepted scoping report.	
3 (1) (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 location development footprint on the approved site as contemplated in the accepted scoping report through the life of the activity, including- (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;	Section 5 and Annexure F
3 (1) (j)	an assessment of each identified potentially significant impact and risk, including- (i) cumulative impacts; (ii) the nature, significance and consequences of the impact and risk; (iii) the extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring; (v) the degree to which the impact and risk can be reversed; (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) the degree to which the impact and risk can be mitigated;	Section 5

NEMA Appendix 3	Content	Reference in report
3 (1) (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;	Section 5 and 6
3 (1) (l)	an environmental impact statement which contains- (i) a summary of the key findings of the environmental impact assessment: (ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site 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 alternatives;	Section 6
3 (1) (m)	based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation;	Annexure H
3 (1) (n)	the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment;	Section 4.4
3 (1) (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	Section 6
3 (1) (p)	a description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Section 5
3 (1) (q)	a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;	Section 6
3 (1) (r)	where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised;	N/A
3 (1) (s)	an undertaking under oath or affirmation by the EAP in relation to: (i) the correctness of the information provided in the reports; (ii) the inclusion of comments and inputs from stakeholders and I&APs; (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;	Annexure B
3 (1) (t)	where applicable, details of any financial provisions for the rehabilitation, closure, and	N/A

NEMA Appendix 3	Content	Reference in report
	ongoing post decommissioning management of negative environmental impacts;	
3 (1) (u)	an indication of any deviation from the approved scoping report, including the plan of study, including- (i) any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and (ii) a motivation for the deviation;	N/A
3 (1) (v)	any specific information that may be required by the competent authority; and	Please refer to the table below
3 (1) (w)	any other matters required in terms of section 24(4)(a) and (b) of the Act.	N/A
3 (2)	Where a government notice gazetted by the Minister provides for any protocol or minimum information requirements to be applied to an environmental impact assessment report the requirements as indicated in such notice will apply	N/A

Information requested by the DEA South Africa in the approval of the Plan of Study to be included in the ESIA report

No.	Content	Reference in report
Comments of Final Scoping Report		
(i)	It must be made clear within the project description section of the EIAr[1], whether the Mahikeng substation is included in this application or within a separate application. If the substation has been applied for separately, please provide the details and status of the that application (how far that process is) and also indicate whether the end point of the preferred alternative routes align with the exact location of the proposed Mahikeng substation and the extent to which that connection point has been assessed within the current application	Section 4.3
(ii)	Proof of placement of site notices must be included in the EIAr	Annexure E.3.2
(iii)	The date of the EIAr must be written on the cover of the EIAr	Date has been included in the cover page
(iv)	Please ensure that all the relevant Listing Notice activities are applied for, that the Listing Notice activities applied for are specific and that they can be linked to the development activity or infrastructure in the project description. The listed activities table must be included in the EIAr and must provide a description of the project activity that triggers the applicable listed activities	Table 11
(v)	The listed activities included in the EIAr and the application form must be the same and correct. Please note that Listed Activity 11 of GN R 983 is not applicable, and must be removed from the listed activity table, since the capacity of the power line exceeds the threshold of 275 kV. Activity 4 of GN R 985 must also be corrected to Activity 10 of GN R 985	Table 11
(vi)	Further, please note that on 7 April 2017, the Minister of Environmental Affairs made amendments to the EIA Regulations, 2014, published under Government Notice ("GN") No. R. 982 of 4 December 2014, in terms of section 24(5) and 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) ("NEMA"). The amendments to the EIA Regulations, 2014 and its listing notices came into effected on 7 April 2017. Please be advised that only the applicable similarly listed activities in terms of the EIA Regulations, 2014 (as amended) must be included in the EIR and applicable form	Table 11
(vii)	The EIAr must provide an assessment of the impacts and mitigation measures for each the listed activities	Section 5.15
(viii)	The EIAr must provide co-ordinates from the start, middle and end point of the proposed transmission line	Section 4.1

[1] The DEA has used the terminology EIAr for the report documenting the assessment phase of the ESIA. This study has used terminology ESIA Report or EIR for the EIAr.

No.	Content	Reference in report
(ix)	The EIAr must also include a comments and response report in accordance with Appendix 2 (1) (h) (iii) of the EIA Regulations, 2014.	Annexure E.4
(x)	The EIAr must include the details of the PPP that was undertaken in accordance with Regulation 41 of the EIA Regulations.	Section 7.3 - 7.5
(xi)	The Terms of Reference for the following specialist studies are accepted to be assessed in the assessment phase: • Avifaunal Assessment; • Aquatic and Terrestrial Biodiversity Assessment; • Heritage Impact Assessment; • Visual Impact Assessment; • Social Impacts Assessment and Livelihood Restoration Plan (LRP); and • Climate Change Assessment.	Section 5
(xii)	The EIAr must adhere to all the comments issued by this Department in the Draft SR dated August 2017	All the comments have been addressed
(xiii)	The EIAr must include an undertaking under oath or affirmation by the EAP in relation to (i) the correctness of the information provided in the reports; (ii) the inclusion of comments and inputs from the stakeholders and I&APs; (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) and information provided by the EAP to interested and affected parties and any responses by the ERAP to comments or inputs made by interested or affected parties, as per 3(1)(s) of Appendix 3.	Annexure B
	Comments on Draft Environmental and Social Impact Assessment Report	
(a)	It is noted that the Mahikeng substation will be applied for as part of a separate application and that the end of the powerline corridor does not end at a fixed point, but within an area including all three alternatives which form part of the power line application. However, the implications of this and what is being recommended for approval (i.e. the expectations of the Department when drafting the decision} have not been made clear, in particular:	An amendment will be applied for to link the BOSA line to the approved substation site.
	(i) It is the EAP's expectation that the whole area surrounding and including the endpoint of the corridor as depicted in the EIR (yellow circle in Figure 1 on page 4}, must be approved for construction of the last section of the powerline required to connect to the Mafikeng Substation once approved? In other words, must the decision also include for the construction of the section of the power line from the endpoint coordinate within the yellow circle in Figure 1 to the actual Mahikeng substation location once approved? If so, and the Department is expected to approve the entire Mafikeng substation area indicated in yellow, is it the EAPs assertion that the entire area within the yellow circle has been assessed for the construction of that last section of the power line? Note that the Department authorises linear activities up to the	

No.	Content	Reference in report
	endpoint coordinate that is provided by the EAP, so this aspect needs to be clarified in the EIR and in the decision; or	
	(ii) Will the construction of the last section of the powerline required to connect to the Mahikeng Substation also be applied for and assessed separately, within the Mahikeng Substation application that has been submitted to the Department (reference number 14/12/16/3/3/2/1051)?	As above
	(iii) Is it the EAP's recommendation that the decision should include for the construction of the powerline up to the end point coordinate provided (as is usually done), with the understanding that the applicant will apply for that remaining section of the power line to connect to the Mafikeng Substation, either through a normal application for environmental authorisation (EA), or an EA amendment process (whichever is applicable), once the location of the Mahikeng Substation has been determined and approved?.	As above
(b)	Please ensure that all issues raised and comments received during the circulation of the draft EIAr from registered interested and affected parties (I&APs) and organs of state which have jurisdiction (including this Department's Biodiversity & Conservation Branch) in respect of the proposed activity are adequately addressed and included in the final EIAr. Proof of correspondence with the various stakeholders must be included in the final EIAr. Should you be unable to obtain comments, proof must be submitted to the Department of the attempts that were made to obtain comments. The Public Participation Process must be conducted in terms of Regulation 39, 40, 41, 42, 43 and 44 of the EIA Regulations, 2014.	Annexure E4 and E5
(c)	Proof of the placement of site notices must be included in the EIAr (i.e. photographic evidence that the notice boards were placed at the affected site).	Annexure E.3.2
(d)	Please ensure that all hardcopy and softcopy maps are clear and legible. Hardcopy maps must be at least A3 size.	Annexure D
(e)	You are further reminded that the final EIAr to be submitted to this Department must comply with all the requirements in terms of the scope of assessment and content of the EIAr in accordance with Appendix 3 of the EIA Regulations, 2014. Further note that in terms of Regulation 45 of the EIA Regulations 2014, this application will lapse if the applicant fails to meet any of the timeframes prescribed in terms of these Regulations, unless an extension has been granted in terms of Regulation 3(7).	Final EIAr will be submitted as per project schedule (Annexure F)

LIST OF ACRONYMS

AfDB	African Development Bank
BA	Basic Assessment
BID	Background Information Document
BOSA	Botswana-South Africa
CA	Competent Authority
CBD	Convention on Biological Diversity
CLO	Community Liaison Officer
CWAC	Coordinated Waterbird Count
DBSA	Development Bank of Southern Africa
DoE	Department of Energy
DEA	Department of Environmental Affairs
DSR	Draft Scoping Report
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EHS	Environmental, Health, and Safety
EIA	Environmental Impact Assessment
EIAA	Environmental Impact Assessment Act
EIA*	Early Iron Age
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EPFI	Equator Principles Financial Institutions
ESA	Early Stone Age
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
EU	European Union
GEF	Global Environmental Fund
GN	Government Notice
IBA	Important Bird Areas
IDP	Integrated Development Plan
IFC	International Finance Corporation
IIPSA	Infrastructure Investment Programme for South Africa
IRP	Integrated Resource Plan

ITCZ	Inter-Tropical Convergence Zone
I&APs	Interested and Affected Parties
LCA	Life Cycle Analysis
LIA	Late Iron Age
LRP	Livelihoods Restoration Plan
MIA	Middle Iron Age
MSA	Middle Stone Age
NDP	National Development Plan
NEES	National Energy Efficiency Strategy
NEMA	National Environmental Management Act (No. 107 Of 1998)
NWA	National Water Act (Act No. 36 of 1998)
POPs	Persistent Organic Pollutants
PoS	Plan of Study
PPDF	Project Preparation and Development Facility
READ	Rural, Environment and Agricultural Development
SABAP 2	South African Bird Atlas 2
SADC	Southern African Development Community
SAPP	Southern African Power Pool
SDF	Strategic Development Framework
SIPs	Strategic Integrated Projects
SMMEs	Small-Medium and Micro Sized Enterprises
ToR	Terms of Reference
UNCCD	UN Convention to Combat Desertification
UNFCCC	United Nations Framework Convention on Climate Change
VAC	Visual Absorption Capacity
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 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.
Specialist	means a person that is generally recognised within the scientific community as having the capacity of undertaking, in conformance with generally recognised scientific principles, specialist studies or preparing specialist reports, including due diligence studies and socio-economic studies.

INTRODUCTORY NOTE

This report serves a Final Environmental and Social Impact Assessment (ESIA) Report as required by the National Environmental Management Act (Act No. 107 of 1998) [NEMA] in South Africa and in terms of the International Finance Corporation (IFC) Performance Standards and DBSA Environmental and Social Safeguard Standards. This Report also refers to the Environmental Assessment Act (Act No. 10 of 2011) [EIAA] in Botswana, as compliance with this legislation is required for the section of line from the Border of South Africa and Botswana to the Isang Substation.

This document has been compiled in accordance with the approved Plan of Study and Scoping Report issued by the Department of Environmental Affairs (DEA) in South Africa in October 2017. This report also addressed and incorporated the comments received on the Draft EISA Report that was made available to the public for comments between 26 January and 26 February 2018.

The aim of this document is to provide the competent authorities with sufficient information and independent environmental and social assessment of the proposed project to make informed decision regarding the authorisation of the project in terms of the NEMA.

NB: Substantive changes to the Draft ESIA Report (unless corrections to grammar and spelling) have been underlined for ease of comparison between the draft and final versions).

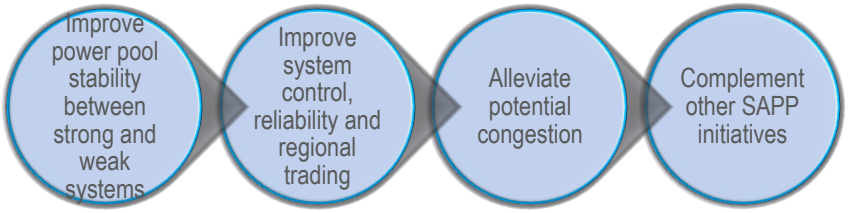
NON-TECHNICAL SUMMARY

What is proposed?

The Southern African Power Pool (SAPP) coordinates planning, generation and transmission of electricity for national electricity suppliers in the Southern African Development Community (SADC) region. SAPP identified the Botswana-South Africa (BOSA) Transmission Interconnection Project as one of the initiatives to reduce electricity supply constraints and assist in improving distribution of electricity in the region. Eskom of South Africa (Eskom) and the Botswana Power Corporation (BPC) will be the beneficiaries of the project.

The SAPP appointed Aurecon South Africa (Pty) Ltd to undertake the Preliminary Design and the Environmental and Social Impacts Assessment (ESIA) on the transmission corridor. The project is for a 400 kV transmission power line. The proposed 210 km transmission line stretches between the Mahikeng area in South Africa and Gaborone in Botswana, with the longest section (approximately 149 km) of the line within South Africa[2]. The line will connect the existing Isang substation in Botswana to the proposed Watershed B substation in South Africa**.**

The objectives of the BOSA interconnector are primarily as follows:



Given the challenging economic climate; the construction of the 400 kV transmission line between Botswana and South Africa is important for supporting economic development in the Region.

What are the legal requirements?

The project is funded by the European Union (EU) and the funds are administered by the Development Bank of Southern Africa (DBSA). An environmental assessment process is required to meet the international funder standards for environmentally and socially sustainable development and will be termed an Environmental and Social Impact Assessment (ESIA). The DBSA Environmental and Social Safeguards Standards, closely linked to the Performance Standards of the International Finance Corporation (IFC) will guide the overall ESIA. Two "sub-Environmental Impact Assessments (EIAs)" have run in parallel, to ensure that the specific South African and Botswana requirements are met.

The ESIA authorisation process is required in terms of the National Environmental Management Act (No.107 of 1998) (NEMA), as amended in South African and the Environmental Impact Assessment Act (No. 10 of 2011) (EIAA) in Botswana. The details of the entire line have been included in the application which will go to the Department of Environment Affairs (DEA) in South Africa to allow for an overview of the entire project, although decision-making will only apply to the section of line between the proposed Watershed B substation and the border between South Africa and Botswana. A separate application is being made for the Botswana section of the line, managed by Digby Wells Botswana (trading as RPM).

The application for environmental authorisation is for a 1 km wide corridor within which the transmission lines will be located (i.e. 500 m on either side of the centreline of the route) to allow area for design changes and allow some flexibility for later stages of the project.

[2] The original concepts for the BOSA Transmission Line development considered two adjacent, single circuit, 400 kV transmission lines. From a technical and financial feasibility perspective only one single circuit 400 kV transmission line is planned for construction. One line is thus the subject of this assessment in the ESIA Report.

What is the ESIA Process and Approach?

The ESIA is an interdisciplinary process that typically follows distinct phases. Each includes some form of public engagement and/or consultation. While this process is not uniform from country to country it generally consists of similar procedural steps as described below. The process in the centre represents best international practice for ESIA, as informed by the IFC Performance Standards

SOUTH AFRICA

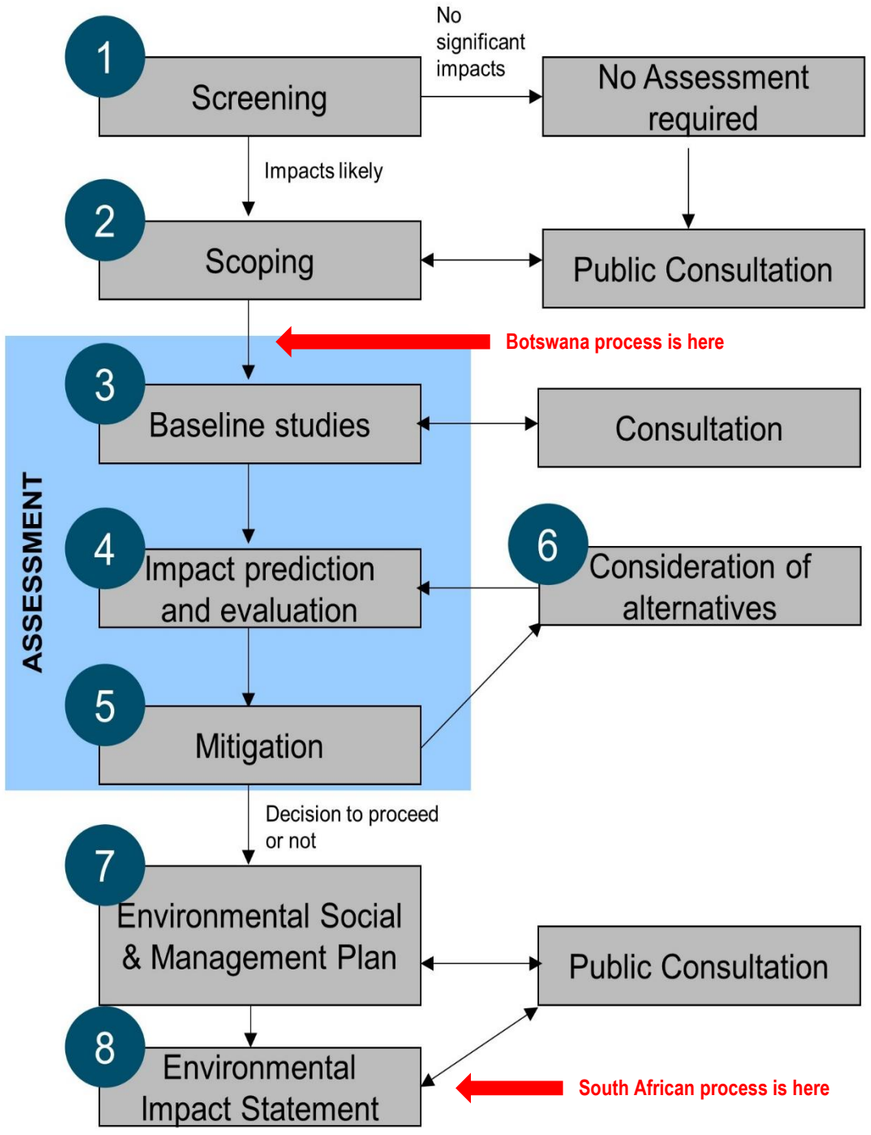
- Pre-application consultation with Competent Authority (CA)
- Initial Public Engagement (Issuing of notifications and BIDs)
- Submission of Environmental Authorisation (EA) application

NOTE: *Screening is not stipulated as part of the regulatory process therefore has no specified timeframes. It is the responsibility of the applicant to do the screening exercise.*

- Preparation and submission of a Draft Scoping Report (DSR) and Plan of Study (PoS) for ESIA (**44 days** from acceptance of application including the commenting period of **30 days.**
- DSR is finalised by addressing the comments received. Final Scoping Report and PoS for ESIA are submitted for authority review. The CA has **43 days** to make a positive or negative decision.

- Draft Environmental Impact Report (EIR) and ESMP Phase: **106 days** including the commenting period of **30 days.**
- Final EIR and ESMP – the CA has **107days** to review – grant or refuse Authorisation.

- Applicant is notified of the decision within **5 days.**
- All registered I&APs are to be notified, in writing within **14 days** of the date of the Department's decision.
- EA appeal process is finalised in **90 days.**



BOTSWANA

- Submission of a Project Brief to DEA Botswana
- Review by DEA Botswana should take a week

- Terms of Reference and Scoping Report
- Advertising of intended activity once for a period not less than 21 days using official languages.
- After **21 days** hold public meetings
- Consultations with government departments, NGOs and businesses.
- Submission of ToR and Scoping report to DEA
- The Act provides **30 days** for review.

- Draft Environmental Impact Assessment Report
- Develop an Environmental Management Plan
- Develop a Monitoring Plan
- Further consultations if necessary
- Submit Environmental Impact Assessment Statement (EIS) to DEA
- The Act provides **60 days** for review.

- Public Review Period
- Draft adverts stating impacts and mitigation measures as contained in the EIS for DEA approval
- Publish adverts in a nationally circulating paper and Government Gazette for **4 weeks**
- Obtain approval from DEA if no further comments are raised
- The Act provides **60 days** for review.

Project Lifecycle

Prefasibility and feasibility Phases: These phases included building a busness case for the project, high level identification of social and environmnetal constraints, screening of alternativ, site selection and preliminary designs.

Planning or Pre-construction Phase: includes obtaining of all the relevent environmnetal authorisations and permits, land acquisition process and wayleave appliications where necessary (CURRENT PHASE).

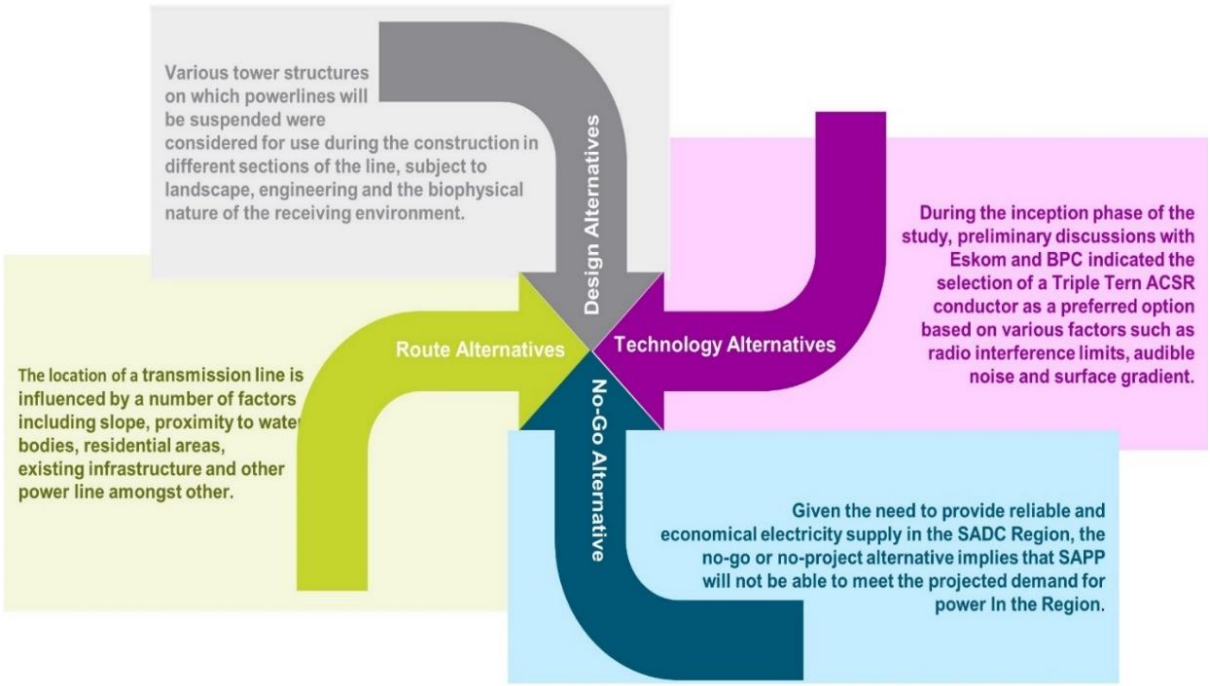
Construction Phase: includes construction activities related to the installation of the powerline and associated.

Rehabilitation Phase: The design life of the powerline is permanent withno intention to it. However, sound rehabilitation procedures must be followed to re-instate affected project areas not needed for project infrastructure to a similar or better condition to the current environment.

Operational Phase:Operational activities associated with the maintenance and control of the power line.

What are the alternatives considered?

Route alternatives have been assessed at a high-level early in the process so that the line has been designed around the constraints and opportunities. Good planning ensures a more sustainable project and ensures a smoother transition through the project phases, preventing delays.



What is the biophysical and social environment?

The baseline environment and the sensitive aspects in each country are summarised below:

SOUTH AFRICA	BOTSWANA
Climate change	
Climatic conditions in the North-West Province vary from arid conditions in the west, semi-arid in the central regions to temperate in the east. The site is in the western parts of the Province. The average rainfall is between 300 mm to 700 mm per annum, of which the most rainfall occurs during the summer months. Summers are typically hot whilst winters are mild to cold. The daily average high temperatures during summer seasons are 32ºC and the average daily minimum temperatures in winter are 0.9ºC	Climatic condition in the Kgatleng District and South-East District is semi-arid, like most of the country. The average rainfall is between 400mm to 500mm and the rainfall is mostly occurring during summer. Summers are hot and winters have cold mornings and evenings whilst the days are usually mild. The daily average temperature during summer seasons is 19.6ºC and 40ºC and the average daily minimum temperatures for winter seasons go below zero degrees in the extreme cold winter nights.
Flora	
The proposed transmission line alignment with buffer areas would have spanned 11 vegetation units will be affected. Three of the units, namely; Dwarsberg-Swartruggens Mountain Bushveld, Klerksdorp Thornveld and Zeerust Thornveld are endemic to the Province with >80% of the national extent occurs within the Province. Current land use has influenced the vegetation types, either transformation through agriculture (30% of the Province) or being poorly represent within the various protected areas within the Province. The only vegetation units that were found close to natural were those associated with steep valleys (kloofs), ridges / mountain ranges, koppies / inselbergs. These higher lying vegetation types or habitats supported a larger variety of plant and animal species than the lower lying areas.	Limited spatial information is available on the extent and types of vegetation found within the study area located within Botswana. Two Savanna / Woodland vegetation units occur within the study area and these include the following: • B6b Hardveld, composed of dominant tree species *Peltophorum africanum, Vachellia tortilis, V. karroo* and Ziziphus mucronata • G16a Transition Sandveld / Hardveld dominated by *Terminalia sercicea, Vachellia tortilis*, and *Ziziphus mucronata* The vegetation within the study area, except for some water bodies, has undergone some form of transformation, mostly due to intensive agriculture and grazing.

SOUTH AFRICA	BOTSWANA
Fauna	
Mammals: Within the study area, and common or ubiquitous species such as Vervet monkeys (*Chlorocebus pygerythrus*), Baboons (*Papio ursinis*) and Black-backed jackal (*Canis mesomelas*) were observed. **Amphibian:** Currently, none of the identified frog species under consideration are Red listed, however the Giant Bullfrog (*Pyxicephalus adspersus*) is regionally listed as Near Threatened within South Africa. This species is expected in both sections of the study area, but due to the dry conditions none were observed. **Reptiles:** Based on the information obtained from the South African Reptile Conservation Assessment (SARCA), a total of 52 taxa (comprising of 23 snakes and 29 tortoise and lizard species) have been recorded within the study area. It is assumed that similar species will occur within the Botswana portion of the study area. It is however possible that more species could exist in the study sites other than those listed in the current distributional data.	
Aquatic Ecosystems	
Due to the spatial scale of the project, several different types of aquatic environments were conferment within the study area. These include the following: [Rivers and streams] [Open water bodies / lakes] [Wetlands] [Endorheic pans / depressions] [Springs/eyes] [Artificial waterbodies] According to the spatial databases the systems within the study area are ranked between Moderately to Large Modified due to land use patterns. However due to the sensitivity of these systems and the potential for important fish habitat, the Ecological Importance and Sensitivity was rated as Moderate to High for the study area.	
Avifauna	
The project does not traverse an IBA. However, one IBA does occur within the broader area. The closest IBA (Botsalano Nature Reserve) is located approximately 40 km north of central Mahikeng near the border with Botswana. This nature reserve supports both grassland and woodland dependent bird species and is of interest from an ornithological point of view.	The project does not traverse an IBA in Botswana as well. However, two IBAs do occur within the broader area. These are: • **Mannyelanong Hill (BW007)** - This IBA is located between 15km west of the proposed BOSA 400 kV power line • **The South-east Botswana IBA (BW011)** – This IBA is located 50km west of the proposed BOSA 400 kV power line.

SOUTH AFRICA	BOTSWANA
Land use	
The study area is characterised by different land use types, which include: • Several game and cattle farms. • Cultivated farming activities (i.e. croplands) lying west of the proposed alignment. Most of these farming activities are mostly concentrated close to larger towns. • Mining and its related activities (waste dumps, settling ponds) are concentrated around formalised towns or cities. The closest mine is located 7km away from the proposed alignment. • Settlements consists of both rural and urban settings. • The largest part of the study area consists out of natural areas with wilderness characteristics.	The study area's land cover consists of the small-scale farming activities, it is expected that these are associated with small rural settlements. The only formalised town identified is Mochudi, which lies west of the proposed alignment. The natural landscape is also the largest part of the study area in Botswana. These types of landscapes have important well - being value contributing to the sense of place and aesthetic appeal.
Social Environment	
The study area falls within the Ngaka Modiri Molema District Municipality (NMMDM). Ramotshere Moiloa and Mahikeng Local Municipalities are the two Local Municipalities that is affected by the proposed project. The main towns and settlements within 10 km of the study area are Ikopeleng, Khunotswana, Lehurutshe, Mantsie, Motswedi, Driefontein, Miga and Supingstad.	The proposed development falls within the Kgatleng and South-East Regions in Botswana. South-East District has two sub-districts namely; Ramotswa sub-district and Tlokweng sub-district. The major settlements close to the proposed development are: Monametsana, Malotwana, Mochudi, Dikwididing, Mokatse and Modipane.
Heritage and Archaeological Resources	
The archaeological sites recorded in the area and its surroundings include: • Stone Age: Several occurrences of Late-and Middle Stone Age artefacts were identified on the proposed route. • Iron Age: Iron Age is well represented in this area. Loose scatters of potsherds were noticed throughout the study area. Built environment: The study area runs through numerous villages and built up areas. Several farm homesteads also fall within the study area. The only other aspect that is of heritage significance are the community cemeteries.	The Botswana section of the powerline consists of the following heritage or archaeological sites: • National Monument – Modipe Hill Iron Age sites • Middle Stone Age sites (3 sites) • Iron Age and historical sites (2 sites) Abandoned homesteads

SOUTH AFRICA	BOTSWANA
Visual Resources	
The topography between in the South African section of the line border is predominantly uniform with the dominant topographical feature being flat plains. A series of consecutive ridges and isolated higher lying topographical areas are located north of the N4 and south of the South Africa - Botswana border. The Mean elevation ranges from 779 meters above mean sea level (mamsl) in the lowest point to 2328 mamsl at the highest point. The proposed overall study area has a rural feel with an even outstretched natural landscape, intercepted by dispersed rural settlements, homesteads and infrastructure associated with commercial agricultural activities. The overall landscape quality is considered moderate - high because of the dominant horizontal scale of the study area, minimal man-made structures, little visual discontinuity and interruption of the natural environment.	The uninterrupted flat terrain defines the dominant horizontal scale of the landscape north of the South Africa Botswana border towards Mochudi. The proposed corridor crosses two river valleys, north of Mochudi, offering some variation on the largely even topography. The landscape character is characterised by open and expansive semi-arid landscape is separated by patchworks of subsistence farming and is further defined by a flat to slightly undulating terrain. Vast tracks of open dirt roads connect various smaller settlements and towns. The overall landscape quality is considered moderate to high because of the dominant horizontal scale of the study area, minimal man-made structures, and little visual discontinuity and interruption of the natural environment.

What are the potential environmental and social impacts?

Various potential impacts on the biophysical and socio-economic environment were identified and assessed. The table below is a summation of the identified impacts, according to their significance after implementing mitigation measures.

VERY LOW NEGATIVE IMPACTS	LOW NEGATIVE IMPACTS	MEDIUM NEGATIVE IMPACTS
Electrocution of birds	The visual impact of transmission lines in protected and natural areas	Increased social pathologies from influx of job seekers and construction workers during construction
Increased flooding from high rainfall intensity events may impact on infrastructure (climate change)	Loss of intact vegetation units / terrestrial habitats	Physical and economic displacement
Soil erosion where construction has occurred	Loss of Critical Biodiversity Areas and habitat fragmentation	Reduced energy transmission from higher temperatures
Soil contamination during construction activities	Loss of species of special concern	The visual impact of cleared servitudes in natural areas

Loss of arable land because of infrastructure	Birds collision with the line	
Damage to infrastructure from veld fires	Disturbance of Paleontological (iron and Stone Age) sites within identified high-risk areas during construction	
Displacement of animals due to habitat transformation	Built Environment (abandoned homestead)	
Visual impacts of construction camps and laydown areas	Burial sites (community cemeteries)	
Increased level of noise generation (and potential vibrations) during construction		
Dust emission during construction		
Engine exhaust hazardous emissions during construction		
Increased-traffic congestion during construction		
Road safety during construction		
Loss of riparian systems and disturbance of water courses during construction		
Increase in sedimentation and erosion during construction		
Potential impact on localised surface water quality during construction		

Moderate Positive	High Positive
Job creation	Increased availability of stable electricity
Opportunity for local sourcing of goods and services	
Local and regional economic benefits and multiplier effects	

What are the mitigation measures proposed to manage impacts?

The measures listed below should be implemented in various phases of the project. These have been included in the Environmental and Social Management Plan for the project, as appropriate for implementation.

CLIMATE CHANGE

- **CONSTRUCTION AND OPERATIONAL PHASES:**
- Decrease heat stress on the people working on the project
- Clear vegetation cover below the lines to reduce fire risk
- Monitor potential wildfires or ignition to implement fire supression early
- Forecast the rainfall events to prepare for the potential flooding impacts
- Implement measures to evacuate excess water away from installations

VISUAL

- **PRE-CONSTRUCTION AND CONSTRUCTION PHASES:**
- Avoid visually sensitive areas
- Limit the contrast between the vertical scale of the receiving environment
- Make use of sites which have been previously disturbed
- Use existing vertical features as a backdrop or screen for the transmission line
- Avoid areas with large concentrations of potential viewers
- Make use of existing access roads where feasible
- Minimise modification of the existing topography and the removal of large trees
- Match the alignment and access roads to the topography and to the surrounding farm roads or tracks

NOISE

- **PRE-CONSTRUCTION AND CONSTRUCTION PHASES:**
- Construction may only occur during the day
- Should construction have to continue after hours, all residents affected must be notified
- All machinery and equipment must be maintained in good working order
- Take preventative measures where practical to reduce opportunity for complaints regarding noise
- Turn off all equipment when not in use
- Assess and manage all noise complaints

FAUNA & FLORA

- **PRE-CONSTRUCTION AND CONSTRUCTION PHASES:**
- A walk-down must be conducted to finalise the tower positions in most suitable locations
- Vegetation clearing should occur in in a phased manner
- ECO with a good understanding of the local flora be appointed during the construction phase
- All alien plant re-growth must be monitored
- Where necessary, requisite permits for plant removal authorities must be obtained

AVIFAUNA

- **PRE-CONSTRUCTION AND CONSTRUCTION PHASES:**
- Avoid sensitive habitats as far as possible
- On-going monitoring of electrocution events must occuronce operational and site specific mitigation be applied reactively.
- The final powerline alignment must be inspected on foot by the avifaunal specialist
- If power line marking is required, bird flight diverters must be installed
- Light and dark colour devices must be installed as soon as the conductors are strung
- Construction activity should be restricted to the immediate footprint of the infrastructure
- Control access to the remainder of the site
- Implement measures to control noise
- Make use of existing access roads

AQUATIC

- **PRE-CONSTRUCTION AND CONSTRUCTION PHASES:**
- No construction disturbance on or with 32 m buffer of water courses
- Vegetation clearing should occur in a phased manner
- No waste water discharge into water courses or natural drainage
- Emergency plans must be in place in case of spillages onto road surfaces and water courses
- No stockpiling should take place within a water course
- Erosion and sedimentation into channels must be minimised

SOIL AND LAND CAPABILITY

- **PRE-CONSTRUCTION AND CONSTRUCTION PHASES:**
- Construction activities must be phased to minimise soil exposure
- Vegetation clearing must be kept to a minimum
- Devise a soil conservation and stockpiling plan.
- Keep trenches open for the shortest duration possible
- Stabilise disturbed areas and re-vegetated immediately
- Avoid soil contamination and clean up spillages immediately
- Dispose of contaminated soil as hazardous waste
- Restrict all intrusive surface disturbance to powerline footprint
- Notify those people using the land needed for construction a minimum of six months prior to commencement of construction

AIR QUALITY

- **PRE-CONSTRUCTION AND CONSTRUCTION PHASES:**
- Plan topsoil stripping and keep to a minimum
- Implement dust suppression measures
- Locate construction activities as far away from sensitive receptors as far as possible
- Limit the height and slope of material stockpiles to reduce wind entrainment
- Use dust suppression measures on exposed stockpiles
- Establish and enforce vehicle speed limits on site
- compact all access roads adequately
- Rehabilitate disturbed areas immediately
- No overloading of fine material
- Service and maintain plant and equipment to function at an optimal
- Where possible use low sulphur containing diesel
- Avoid unnecessary idling of vehicle engines while parked

TRAFFIC & ROAD CONDITIONS

- **PRE-CONSTRUCTION AND CONSTRUCTION PHASES:**
- Plan the most appropriate route for large vehicles (such as trucks) transporting equipment, materials and employees
- Implement traffic calming measures
- Source materials and labour locally, as far as possible
- Schedule deliveries for off-peak hour traffic times
- Provide alternative temporary access routes if needed
- Allow for safe pedestrian crossings where necessary
- Use existing roads where possible and maintain to baseline levels
- Implement storm water control mechanisms
- Ensure all vehicles used during the project have the appropriate load-bearing capacity for the materials
- Repair any damages to public or private roads caused during construction

HERITAGE

- **PRE-CONSTRUCTION AND CONSTRUCTION PHASES:**
- Implement a watching brief and monitoring program during construction
- Do not disturb heritage resources or sites without authorisation
- Subject the final tower placements to a walk-down survey to verify that no heritage sites will be affected

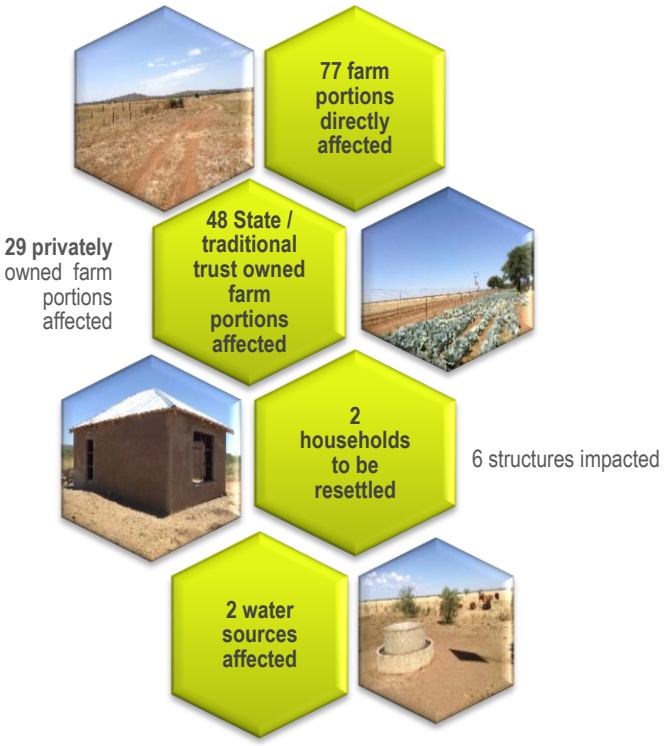
SOCIO-ECONOMIC

- **PRE-CONSTRUCTION AND CONSTRUCTION PHASES:**
- Maximise and monitor local recruitment, create local procurement opportunities
- Promote employment and training (incl. women and youth) and encourage indirect employment creation
- Where possible, use labour-intensive methods of construction
- Create a platform where development of micro, small and medium enterprises is developed
- Develop register of local SMMEs
- Establish a Stakeholder Liaison Committee, use community structures to identify local labour pool, implemnet fair and transparent recruitment policy
- Plan the project minimise social costs and maximise the benefits discussed in the ESIA
- Align awareness campaigns with those of other organisations in the area
- House construction workers in a construction village site as needed and control of access to construction camp
- Cease construction activities before nightfall
- Maximise the proportion of job opportunities allocated to locals
- Demolish construction camps and village after construction activities have finished, or donaate to the local municipality

How will resettlement and loss of land be managed?

The project will involve establishing a permanent servitude along the transmission line, as well as for ancillary infrastructure like access roads. Certain land use restrictions will be permanently in force within this servitude. Households and communities residing or owning assets in either of these reserves (or in the areas earmarked for surface infrastructure) will therefore experience physical and/or economic displacement because of the project. In addition, construction activities may cause a temporary disruption in access and communities' daily movement patterns from one side of the transmission route to the other. To address such impacts, it was necessary to compile a EIA Process Framework (RPF)[1].

As part of the RPF an asset and infrastructure survey was conducted in October and November 2017, to attain what assets and infrastructures are impacted by the proposed project. The RPF identifies the process to be followed for compensation. A summary of the findings is alongside.



Stakeholder engagements

Throughout the ESIA process, I&APs had the opportunity to contact the EAP to discuss the project and raise any issues or concerns they had about the project. Various engagement activities were undertaken during the Scoping and Assessment Phase.

Community group and public meetings were held with specific stakeholders to discuss issues related to the proposed development. All comments received during public comment period on the Draft ESIA have been compiled into an updated Comments and Response Report (CRR).

In total, the project had **three opportunities** (*initial Notification and Scoping and Assessment Phase*) to participate in the ESIA process, and all three have been concluded.

1This was called a Resettlement Action Plan (RAP) in the Draft ESIA Report but because the project will commence in late 2020 (at the earliest), the details at this stage are not specific enough for a RAP. The document provided is thus a Resettlement Policy Framework (RPF) that sets the policy for a detailed RAP that must be undertaken prior to commencement of the project to ensure that compensation is commensurate to the economic conditions at the time. According to the approved Plan of Study for ESIA, it was originally anticipated that there would be no resettlement and a Livelihoods Restoration Plan would be required. However, due to the need to resettle 2 households, this was changed to a RPF.

Going forward

The draft ESIA Report (along with the ESMP) has been advertised and made available for public and commenting authority review. Various public meetings will be held to discuss the project with the affected communities and stakeholders. All the issues and comments received during the comment period will be documented and responded to in the Comments and Response Report. The report will be finalised to incorporate these comments and responses, and amended where necessary. The ESIA will be finalised and submitted to the DEA SA for decision-making on the application to and DEA Botswana for comment. Registered I&APs will be notified of the decision.

SECTION 1

1 Introduction

This section introduces the purpose of this Environmental Social Impact Assessment Report, provides a brief overview of the project background, the project team and lists the assumptions and limitations that pertain to the study and the compilation of this report.

1.1 Project Background

The Southern African Power Pool (SAPP) is a prominent power pool initiative tasked with coordinating the planning, generation and transmission of electricity on behalf of member state utilities in the Southern African Development Community (SADC) region. As, such SAPP has identified Botswana-South Africa (BOSA) Transmission Interconnection Project as one of the energy pool initiatives. The aim of the project is to alleviate the current electricity supply constraints and contribute towards energy security of supply in the long run by enhancing the distribution of electricity in the region. Given the transborder nature of the project, both Eskom of South Africa (Eskom) and the Botswana Power Corporation (BPC) will subsequently be the beneficiaries of the project.

The project is funded by the European Union (EU) and the funds are administered by the Development Bank of Southern Africa (DBSA). An environmental assessment process is required to meet the international funder standards for environmentally and socially sustainable development and will be termed an Environmental and Social Impact Assessment (ESIA). The DBSA Environmental and Social Safeguards Standards, closely linked to the Performance Standards of the International Finance Corporation (IFC) will guide the overall ESIA, which will be conducted as two Environmental Impact Assessments (EIAs), run in parallel, to ensure that the specific South African and Botswana requirements are met.

The SAPP appointed Aurecon South Africa (Pty) Ltd (hereafter referred to as Aurecon) as an independent consulting firm to provide transaction advisory services and project scoping for the proposed transmission interconnector project between the two countries. Aurecon was commissioned to undertake the Preliminary Design and the ESIA on the referred transmission corridor. The design and environmental authorisation processes to be undertaken are for the construction of a 400 kV transmission power line, 210 km in length[4]. The application for environmental authorisation is for a 1 km wide corridor within which the transmission lines will be located. The line will connect the existing Isang substation in Botswana to the proposed Watershed B substation (hereinafter referred to as Mahikeng substation) near Mahikeng in South Africa **(Figure 1).**

The ESIA authorisation process is required in terms of the National Environmental Management Act (No.107 of 1998) (NEMA), as amended in South African and the Environmental Impact Assessment Act (No. 10 of 2011) (EIAA) in Botswana. The details of the entire line have been included in the application which will go to the Department of Environment Affairs (DEA) in South Africa to allow for an overview of the entire project, although decision-making will only apply to the section of line between the proposed Mahikeng substation and the border between South Africa and Botswana.

The DEA in Botswana require that an environmental practitioner registered with Botswana Environmental Assessment Practitioners Association (BEAPA) undertake the EIA process in Botswana and Aurecon have thus partnered with a local firm Digby Wells, trading as RPM, who have managed the process in Botswana

[4] The original concepts for the BOSA Transmission Line development considered two adjacent, single circuit, 400 kV transmission lines. From a technical and financial feasibility perspective only one single circuit 400 kV transmission line is planned for construction. One line is thus the subject of this assessment in the ESIA Report.

in terms of the EIAA. A separate report will be submitted to the DEA in Botswana for review and approval of the relevant section in Botswana.

The detailed project description is provided in **Section 4.**

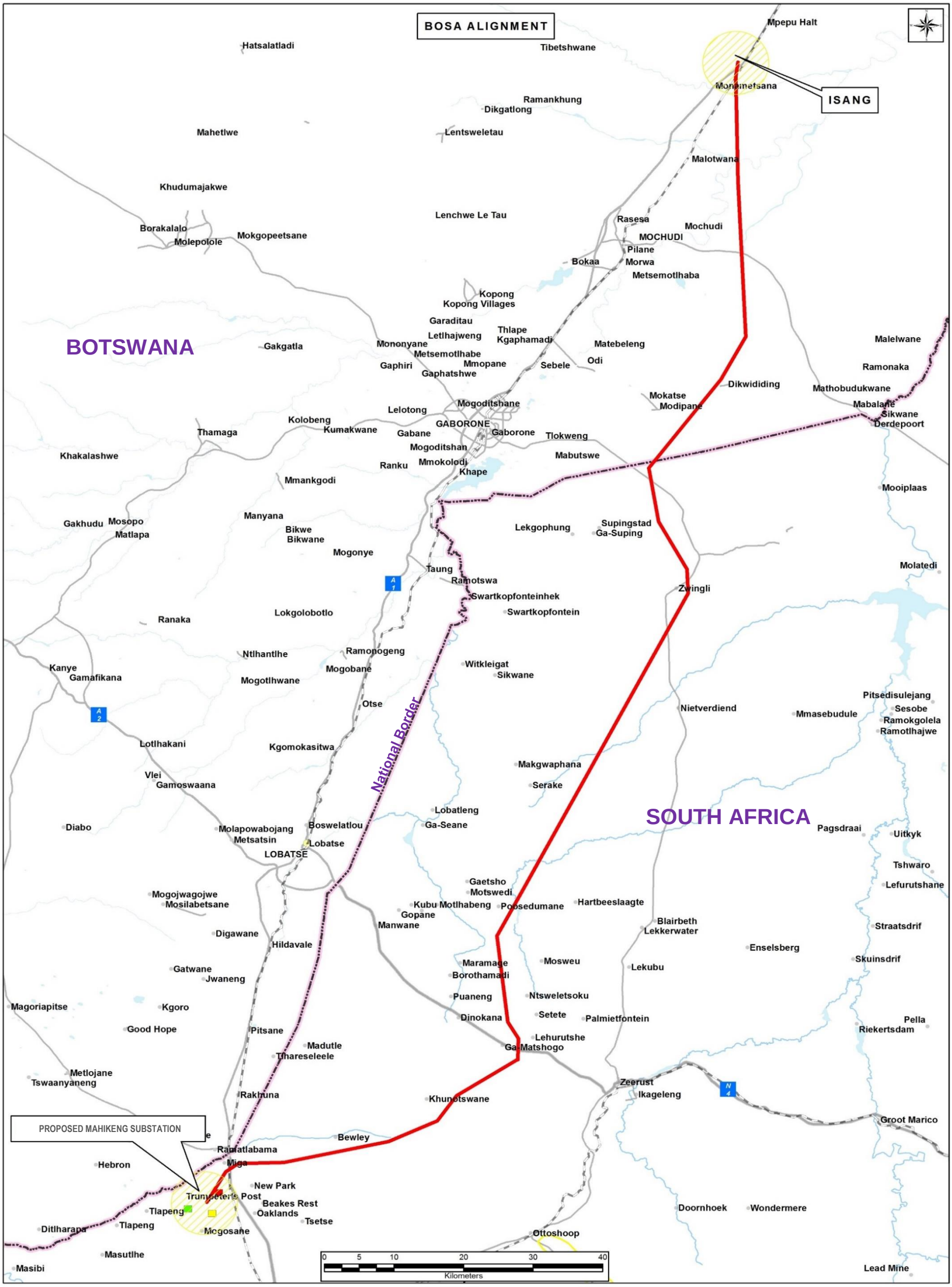


Figure 1: Proposed transmission line locality map (Mahikeng substation will be at one of three sites in the yellow circle, depending on the outcomes of the environmental process underway for the substation)[5]

[5] The transmission line has been rerouted by a maximum of 4.2 km to accommodate the concerns of one of the landowners (detailed in Section 4.3). No new landowners are affected as the route remains on the same properties.

1.2 Project Team

1.2.1 Key project stakeholders

Figure 2 is a summarisation of the project structure, stakeholders and their roles in the project**.**

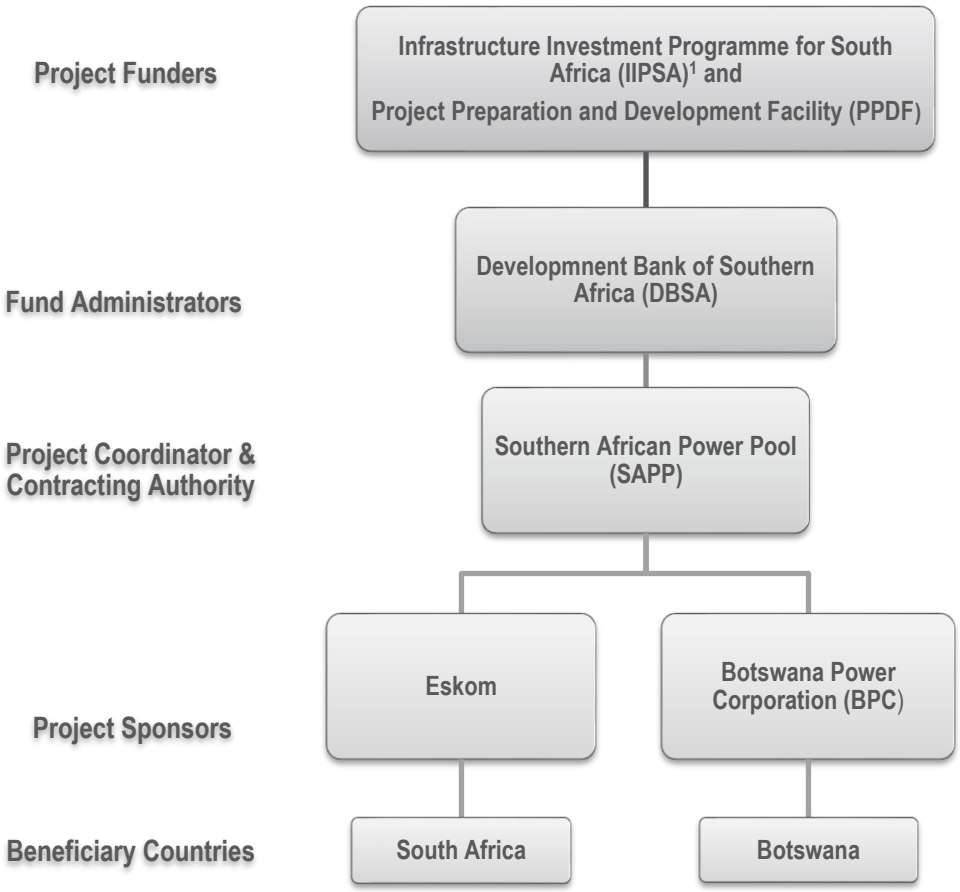


Figure 2: Project structure[6]

1.2.2 Project proponents

The SAPP has commissioned the BOSA Transmission Interconnection Project on behalf of the national electricity suppliers in Botswana and South Africa, namely BPC and Eskom respectively. The details of these state utilities are listed below **(Table 1):**

Table 1: Details of the project proponents

Details	South Africa	Botswana
Company	Eskom SOC Ltd	Botswana Power Corporation (BPC)
Contact Person	Sebenzile Vilakazi	Jenamiso Moalosi
Telephone	+27 11 800 4902	+267 71375643
Fax	+27 86 550 6158	+267 395 9404
Email Address	Vilakazs@eskom.co.za	moalosij@bpc.bw

[6] IIPSA is jointly developed by the Government of South Africa (GoSA) and the European Union (EU) to assist in addressing the country's triple challenges of high unemployment, poverty and inequality and a national infrastructure programme was introduced in 2012 for the development of both national and regional infrastructure over the long term.

Details	South Africa	Botswana
Postal Address	PO Box 1091 Johannesburg 2000	-
Physical address	Megawatt Park, Maxwell Drive, Sunninghill, Sandton Johannesburg	BPC Head Office (Motlakase House) Macheng Way Industrial site, Gaborone

1.2.3 Environmental assessment practitioners

In line with the South African Regulation 13 of the EIA Regulations (GN R982 of 2014) as amended the proponent is required to appoint an Environmental Assessment Practitioner (EAP) to undertake the EIA process respectively for any activities regulated in terms of the NEMA in South Africa. In terms of the EIAA in Botswana, a BEAPA registered consultant must manage the EIA process. The practitioners worked together to consider the line as one project, while managing the applications in each country respectively. The details of the project EAPs are listed below **(Table 2):**

Table 2: Details of the project EAPs

Details	South Africa	Botswana
Company	Aurecon South Africa (Pty) Ltd	Digby Wells Environmental, trading as RMP
Contact Person	Diane Erasmus	Elmar Schuran[7]
Telephone	+27 44 805 5428	+267 390 5414
Fax	+27 44 805 5454	+267 397 5993
Email Address	Diane.Erasmus@aurecongroup.com	Elmar.Schuran@digbywells.com
Postal Address	PO Box 509 George 6530, South Africa	P O Box 3026 Gaborone
Physical address	Suite 201, 2nd Floor, Bloemhof Building, 65 York Street, George South Africa 6529	Unit 12, Kgale Court Plot 127, GIFP, Gaborone, Botswana

Aurecon has selected a team of experienced specialists and multi-disciplinary practitioners to execute this project in a professional and objective manner. A synopsis of the qualifications and experience of the Environmental Assessment team this project is provided hereunder **(Table 3).** Full CVs are available in **ANNEXURE A.**

Table 3: Details of the environmental assessment team

Name	Position	Firm	Qualification(s)	Years of Experience	Professional Affiliations
Diane Erasmus	Project Leader	Aurecon South Africa (Pty) Ltd	MSc Nature Conservation	28 years	Environmental Assessment Practitioners Association of South Africa
Wendy Mlotshwa	Environmental Scientist	Aurecon South Africa (Pty) Ltd	BSc (Hons) Environmental Science	4 years	Candidate – South African Council of Natural Scientific Professions
Amelia Visagie	Public participation consultant	Aurecon South Africa (Pty) Ltd	BComm Hon Industrial and Organisational Psychology	28 years	South Africa Board for People Practices

[7] The BEAPA registered consultant on the project has changed from Kagiso Sakarea to Elmar Schuran. The change has been formally submitted to DEA Botswana.

Name	Position	Firm	Qualification(s)	Years of Experience	Professional Affiliations
Elmar Schuran	Environmental Scientist	Digby Wells Environmental	Dipl. Ing. Of Nature Conservation and Land Use Planning (MSc)	10 years	Botswana Environmental Assessment Practitioners Association
Francois Retief	*Independent peer reviewer	North West University and Global Green Consultants	PhD Environmental Impact Assessment	20 years	International association for Impact Assessment

In terms of the requirements stipulated in the Regulation 13 (1) of NEMA, the EAP must be independent. The requirement for independence of the environmental consultant is aimed at reducing the potential for bias in the environmental process.

Neither Aurecon nor any of its sub-consultants are subsidiaries of SAPP, Eskom or BPC, nor is SAPP, Eskom or BPC a subsidiary to Aurecon. Furthermore, none of these parties have any interests in secondary or downstream developments that may arise out of the authorisation of the proposed project.

The ESIA process; the Scoping and ESIA reports were peer reviewed by *Prof. Francois Retief of Global Green Consultants, as required in South Africa because the design engineers and the environmental practitioners are both from Aurecon. The Peer Review reports on the Scoping and ESIA reports are included in **ANNEXURE J**.

1.2.4 Competent authorities

The details of the Botswana and South African Competent Authorities (CAs) that will handle or process the EIA applications for the BOSA project are listed in **Table 4** below:

Table 4: Details of the Competent Authorities

Name	South Africa	Botswana
Department	Department of Environmental Affairs (DEA) *(Director: Integrated Environmental Authorisations)*	Department of Environmental Affairs (DEA)
Contact Person	Thulisile Nyalunga	Faith Tsile
Telephone	(012) 399 9372	(267) 716 83905
Email Address	TNyalunga@environment.gov.za	spaseko@gov.bw
Postal Address	Private Bag X447 Pretoria 0001	Private Bag 0068 Gaborone Botswana
Physical address	Environment House 473 Steve Biko Road Arcadia, Pretoria	Gaborone West Industrial Travaglini House

1.3 Assumptions, Limitations and Knowledge Gaps

The following **assumptions** have been identified for this phase of the ESIA process:

- The information provided by Eskom and BPC is accurate, adequate and unbiased, and that no information that could change the outcome of the ESIA process has been withheld.
- The information obtained from the specialist baseline studies undertaken for this project is accurate and objective.

- The alignment will not deviate from within the preferred corridor that has been assessed by the EAP and the specialists.
- There is no certainty on the outcome of the EIA for the proposed Mahikeng substation, what issues or objections will be raised in this study, or which alternative location will be selected so this alignment does not end at a fixed point but rather within an area including all three alternatives.
- Eskom and BPC will adhere to the conditions of the respective Environmental Authorisation (EA) in each country and any applicable legislation for the duration of the project.

This FEIR is based on the following **limitations:**

- The scope of this investigation is limited to identifying the environmental impacts associated with the preferred alignment or corridor.
- The information, as presented in this document, only has reference to the study area(s) as indicated on the accompanying maps.

Knowledge gap(s) in the study include:

The exact location for the proposed Mahikeng substation is currently not known. An EIA for the Mahikeng substation is being undertaken parallel to the BOSA ESIA process. There are currently three alternative sites, one of which may be approved and/or authorised.

1.4 Purpose of this Report

The main aim of this report is to identify potential environment and social impacts of the project (both negative and positive) and formulate recommendations to ensure that the proposed development takes into consideration appropriate measures to enhance positive impacts and mitigate adverse impacts during its execution. In line with the national and international standards or requirements, this report must include but not be limited to the following aspects:

- ESIA 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 and associated activities;
- 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 the potential impacts (positive and negative);
- Description of the Stakeholder Engagement (SE) or Public Participation Process (PPP)[8] that has been conducted to date; and
- Recommendations and key procedural aspects going forward.

[8] Stakeholder Engagement is the term used in the DBSA Environmental and Social Safeguards Standards and the IFC Performance Standards for engaging with those affected by the proposed activity, while NEMA in South Africa uses the term Public Participation. In the context of this report, the meaning of the terms is taken to be the same and the term used by the DBSA is used in this process, namely Stakeholder Engagement.

1.5 Report Structure

This report serves to document the Assessment Phase of the ESIA process and is structured as follows:

Section One: *Introduction* **-** Provides an overview and/or background to the project and team involved in the ESIA process. It also outlines the purpose of this document, assumptions and limitations of the study.

Section Two: *Legislative and Policy Framework* - Describes the legislation and policy framework for the ESIA process applicable to the project.

Section Three: *ESIA Process and Approach* - Outlines the ESIA approach followed to this stage of the process.

Section Four: *Project Description* - Provides a detailed project description (project location, infrastructure and activities involved), outlines the different project alternatives considered and the process followed to identify the feasible options and motivation of the need for the proposed BOSA project.

Section Five: *Environmental and Social Impacts* - Provides a description and assessment of the project impacts on the biophysical and social aspects of the affected environment.

Section Six: *Environmental and Social Statement* – Summarises and ranks the key findings of the Assessment Phase according to their significance.

Section Seven: *Stakeholder Engagement Process* - Describes the stakeholder engagement activities undertaken to date, and proposed activities to be undertaken during the public review of the draft ESIA Report.

Section Eight: *Conclusion* - Provides conclusions of the study and way forward.

SECTION 2

2 Legislative and Policy Framework

This section provides an overview of the legal and policy framework within which the project takes place. Other relevant guidelines and policies to be considered when undertaking an ESIA process are listed under this section.

2.1 Overarching International Standards and Policies

2.1.1 DBSA Environmental and Social Safeguards Standards

The DBSA is a development finance institution involved in delivering developmental infrastructure in Southern Africa and the Southern African Development Community (SADC). It aims to advance development that improves the quality of life of people and support economic growth and regional integration. The DBSA has developed the Environmental and Social Safeguards Standards as an extension of its Environmental Appraisal Framework and the Social and Institutional Appraisal Guidelines. It has developed these to synchronise with the environmental and social standards of other Development Finance Institutions such as the Global Environmental Fund (GEF) Minimum Environmental and Social Safeguards Standards, the World Bank Group EHS Guidelines, the IFC Performance Standards and the African Development Bank AfDB Safeguards (DBSA, 2015).

2.1.2 Global environmental fund (GEF) minimum standards

The GEF unites 183 countries in partnership with international institutions, civil society organisations and the private sector to address global environmental issues while supporting national sustainable development initiatives (DBSA, 2015). It is the largest public funder of projects providing grants for projects related to biodiversity, climate change, international waters, land degradation, the ozone layer, and persistent organic pollutants.

2.1.3 Equator principles

The Equator Principles are a set of principles for determining, assessing and managing social and environmental risk in project financing. The Equator Principles were developed by private-sector banks and were launched in June 2003. Equator Principles Financial Institutions (EPFI) can voluntarily agree to adhere to Equator Principles, and by doing so, agree to apply them to all new project financings. The aim is that EPFIs only finance projects which are developed in an environmentally and socially sound manner. The Equator Principles incorporate, by reference, the IFC Performance Standards and the World Bank Group EHS Guidelines. The importance of climate change, biodiversity and human rights are recognised in these principles and negative impacts on project-affected ecosystems, communities and the climate should be avoided where possible.

2.1.4 IFC Policy on Environmental and Social Sustainability

The IFC is an international financial institution that offers investment, advisory, and asset management services to encourage private sector development in developing countries. The IFC's Performance Standards offer a framework for understanding and managing environmental and social risks for high profile, complex, international or potentially high impact projects. They define clients' responsibilities for managing their environmental and social risks and are regarded as an international benchmark which have been adopted by many organisations as a key component of their environmental and social risk management (IFC, 2012). The Performance Standards provide guidance on how to identify risks and impacts and are designed to help avoid, mitigate, and manage risks and impacts as a way of doing business

in a sustainable manner, including stakeholder engagement and disclosure obligations of the client in relation to project-level activities.

2.1.5 Environmental, Health, and Safety (EHS) Guidelines

The World Bank Group EHS Guidelines are referred to in Performance Standards 1 as the technical reference documents with general and industry-specific examples of good international industry practice, to be used as a technical source of information during project appraisal. The EHS Guidelines contain the performance levels and measures that are normally acceptable to the World Bank, the IFC and the DBSA, and that are generally considered to be achievable in new facilities at reasonable cost using existing technology. For the above, the EHS Guidelines establish performance indicators that should be achieved as a minimum. The EHS Guidelines provide performance levels and measures to be achieved in new facilities by existing technology at reasonable costs. The EHS Guidelines should be tailored to each project based on the outcomes of an environmental assessment. The requirements of these guidelines must be met during the different implementation phases of the project. If the host country has more stringent performance indicators then these must be guaranteed.

2.2 Regional Policies and Agreements

2.2.1 SAPP framework

The SAPP is a regional body that optimises the use of available energy resources in the region, allowing countries to support each other during emergencies. The Power Pool consists of 12 SADC member countries represented by their respective power utilities **(Figure 3)** (SAPP, 2010).

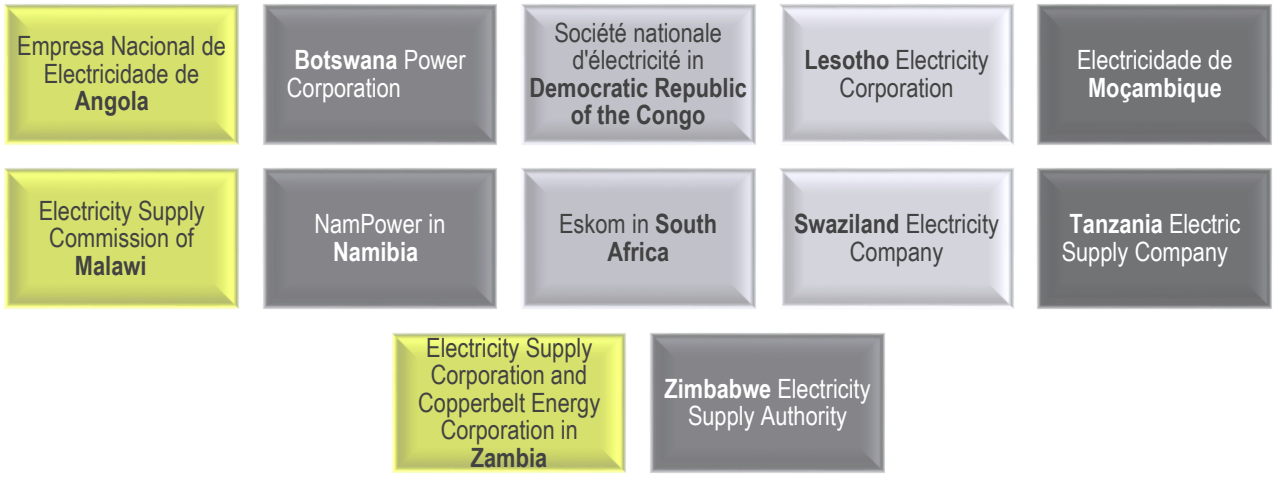


Figure 3: Member countries of the SADC Power Pool

The SAPP is committed to reasonable utilisation of natural resources and limiting the impact on the environment (SRK, 2017) and therefore developed a guide as a tool to assist in completing an ESIA that will meet the environmental and social requirements of the host country and the Finance Institutions such as the World Bank, the DBSA, the African Development Bank (AfDB) and the IFC (SAPP, 2010). An Environmental and Social Management Framework was further developed in 2017 to assist in screening projects at a high level to strengthen the assessment, mitigation and management of environmental and social risks and impacts at a high-level (SRK, 2017) and to cater for different categories of projects based on the extent and significance of likely impacts and risks. The SAPP subscribed to the IFC Performance Standards, which are also considered in this ESIA, together with the DBSA Safeguards Standards.

2.3 National Legal Requirements

2.3.1 Legislation

Given the extent of the project, there are numerous other pieces of legislation which should be considered to assess the potential applicability of these for the proposed activity. The relevant legislation from both countries are listed in **Table 5.**

Table 5: Legislation applicable to the project

South Africa	Botswana
• Constitution of the Republic of South Africa (Act No. 108 of 1996) • National Environmental Management Act (Act 107 of 1998) • Basic Conditions of Employment Act (Act No. 75 of 1997) • National Environmental Management: Waste Act (Act No. 59 of 2008) • National Environmental Management: Air Quality Act, 2008 (Act No. 39 of 2008) • National Water Act (Act No. 36 of 1998) • Electricity Regulation Act (Act No. 4 of 2006) • Minerals and Petroleum Resources Development Act (Act No. 28 of 2002) • National Forest Act (Act No. 84 of 1998) • Occupational Health and Safety Act (Act No. 85 of 1993) • National Road Traffic Act (Act No. 93 of 1996) • Hazardous Substances Act (Act No 15 of 1973) • Expropriation Act (Act No. 63 of 1975) • Promotion of Administrative Justice Act (Act No. 3 of 2000) • Extension of Security of Tenure Act (Act No. 62 of 1997) • National Environmental Management: Biodiversity Act (Act No. 10 of 2004) • North West Biodiversity Management Act (Act No. 4 of 2016) • Conservation of Agricultural Resources Act (Act No. 43 of 1983) • Traditional Leadership and Governance Framework Amendment Act (Act No. 23 of 2009) • National Heritage Resources Act (Act No. 25 of 1999) • Spatial Planning and Land Use Management Act (Act No. 16 of 2013)	• Environmental Assessment Act (Act No. 10 of 2011) • Electrical Supply Act Chapter 73:01 • Atmospheric Pollution (Prevention) Act (Cap. 65:03 of 1971) • Tribal Land Act (Cap 32: 02 of 1990) • Employment Act, 1992 • Public Health Act (Cap. 63:01 of 1981) • Waste Management Act (Cap. 65:06 of 1998) • Water Act (Cap. 34:01 of 1968) • Monuments and Relics Act 12 of 2001 • Water Works Act, Chapter 34:03 (1962) • Town and Country Planning Act Chapter 32:09 (1980) • Road Traffic Act Chapter 69:01 (1975) • Mines, Quarries, Works and Machinery Act Chapter 44:02 (1978) • Mines and Minerals Act Chapter 66:01 (1999) • Herbage Preservation (Prevention of Fires) Act (1st February 1978) • Factories Act (1979) • Plant Protection Act (Cap 35:02 of 2007)

2.3.2 Policies, plans and strategies

The following policies, plans and strategies were considered during the ESIA:

Table 6: Applicable policies, plans and strategies

South Africa	Botswana
• White Paper on the Energy Policy of the Republic of South Africa (1998); • Draft Post-2015 National Energy Efficiency Strategy (NEES) (2016); • Integrated Resource Plan for Electricity (IRP), 2010-2030 (2013); • The National Development Plan (NDP) 2030 (2012); • Strategic Plan 2015-2020 – Department of Energy; • Integrated Energy Plan (IEP) 2016; • Integrated Development Plans (IDP) of Ngaka Modir Molema District Municipality 2012/2016; and • Integrated Development Plans (IDP) of Ramotshere Moiloa Local Municipality 2015/2016.	• National Policy on Natural Resources Conservation Development Government Paper No.1 of 1990 • Development Control Code, 2013 • Waste Management Strategy, 1998 • Botswana Waste Water and Sanitation Policy-1999 • Composition of Municipal Solid Waste in Botswana, Southern Africa, 2012 • National Policy on HIV/AIDS (1998)

2.3.3 Guidelines

This ESIA process is also informed by the series of national and international environmental guidelines **(Table 7):**

Table 7: Applicable environmental guidelines

South Africa
• EIA Guideline for Renewable Energy Projects (DEA, 2015). • Scoping, Integrated Environmental Management Information Series 2 (DEAT, 2002). • Stakeholder Engagement, Integrated Environmental Management, Information Series 3 (DEAT, 2002). • Specialist Studies, Integrated Environmental Management, Information Series 4 (DEAT, 2002). • Criteria for determining Alternatives in EIA, Integrated Environmental Management, Information Series 11 (DEAT, 2004). • Environmental Management Plans, Integrated Environmental Management, Information Series 12 (DEAT, 2004). • Guideline for involving biodiversity specialists in EIA processes. Edition 1 (Brownlie, 2005). • Guideline for the review of specialist input into the EIA processes: Edition 1 (Keatimilwe and Ashton, 2005). • Guideline for Environmental Management Plans (Lochner, 2005). • Guideline for determining the scope of specialist involvement in EIA processes: Edition 1 (Münster, 2005). • Public Participation 2010, Integrated Environmental Management Guideline Series 7 (DEA, 2010). • Guidelines to minimise the impact on birds of Solar Facilities and Associated Infrastructure in South Africa (Smit, 2012). • Guideline on Need and Desirability (Department of Environmental Affairs (DEA, 2013). • Guideline on Alternatives, EIA Guideline and Information Document Series (DEA&DP 2013).

2.4 Provincial and Local Regulations

2.4.1 District Spatial Development

The proposed project need to take into consideration the current and future spatial development of the host region when assessing the potential impacts. Below is a high-level summary of the existing development patterns and strategic integrated projects.

The existing development pattern of Ngaka Modiri Molema District Municipality is characterised by:

- A settlement pattern of urban and rural settlements consisting of urban areas, rural dense and scattered settlements;
- Agricultural land;
- Natural areas and nature reserves;
- Mining and industrial areas; and
- Infrastructure such as dams, airports, roads and railway networks.

The existing development patterns for the Ngaka Modiri Molema District Municipality is indicated in **Figure 4** below.

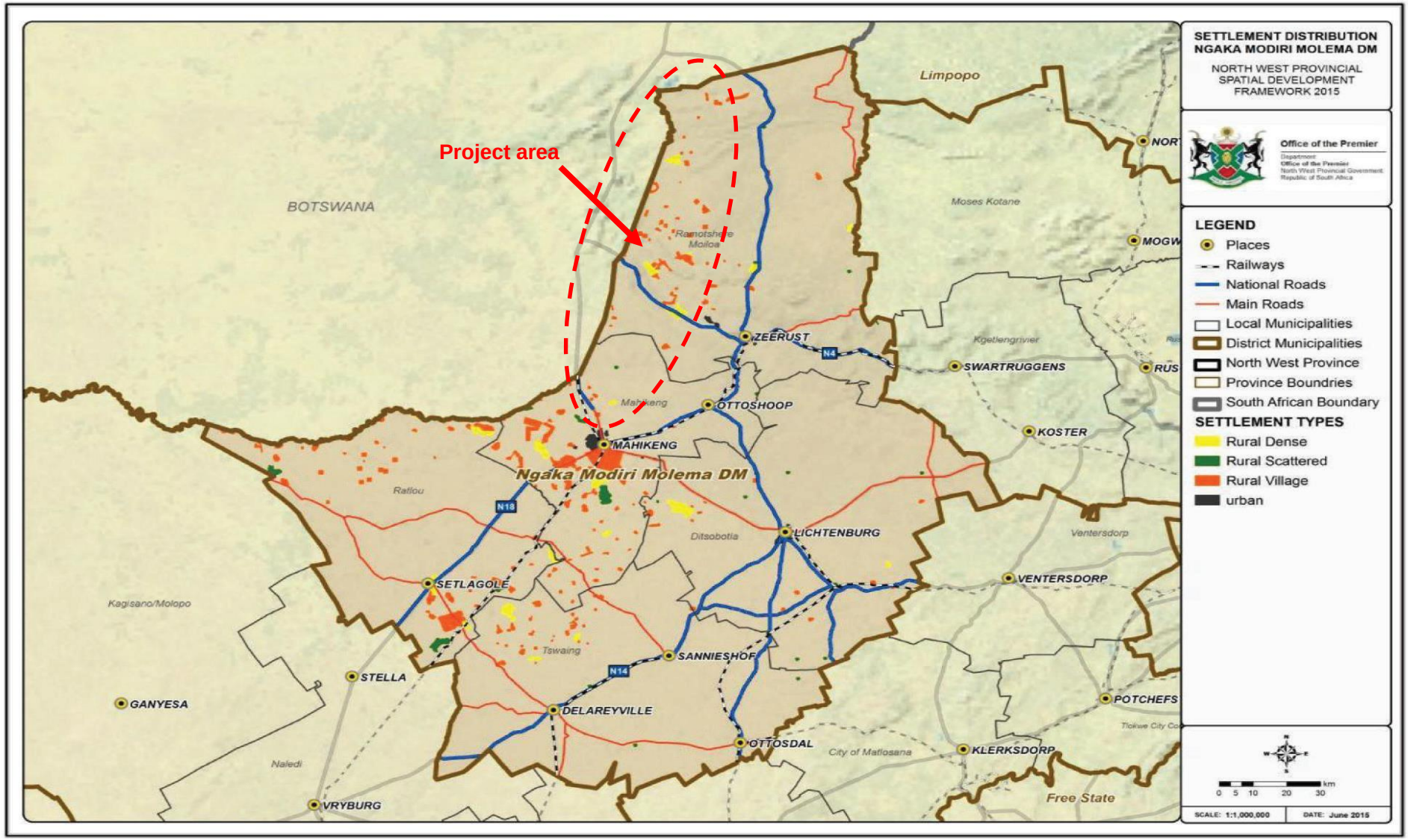


Figure 4: Existing Development Patterns within South Africa

Strategic Integrated Projects developed and approved to support economic development and address service delivery in the district include the following Agricultural Projects:

- Groundnut Processing; and
- Oil Processing Plant.

Table 8 provide a summary of the nodes, corridors, focus areas and competitive edge of the Ngaka Modiri Molema District Municipality.

Table 8: Ngaka Modiri Molema District

Nodes, corridors, focus areas	Description
Number of First Order Nodes	One - Mahikeng
Number of Second Order Nodes	Two – Mmabatho and Lichtenburg
Major Development Corridors	N18
Mining Focus Areas	Largest part of Ditsobotla and Ramotshere Moiloa Local Municipalities
Primary Industrial Cluster	Mining is limited
Agricultural cluster	Lichtenburg and Mahikeng
Key Tourism Nodes / Clusters / Attractions	The area is fairly flat and dry in the west, becoming bushveld towards the east. The Central Region offers game viewing – including the Big 5 – bird watching, hunting, fishing, sport, hospitality, conference facilities, shopping, gaming, Anglo-Boer War sites and a number of high quality guest houses and guest farms. – Madikwe Game Reserve – Anglo Boer War Sites Attractions – Molemane Eye – Barberspan Bird Sanctuary – Botsalano Game Reserve – Disaneng Dam – Henk Joubert Game Reserve – Kortkloof Cultural Village – Leopard Park Golf Course – Mahikeng Game Reserve

Competitive Edge	Land – Availability of resources – Availability of land for spatial expansion – Spatial expansion capacity Labour / demographics – Labour supply & demand – Availability of skills – Labour absorption rate – Downstream demand Capital – Capital formation – Investment leveraging – Attractive risk and return profile – Capital growth, income stream growth – Business formation – Expansion capacity Entrepreneurship – Global competitiveness – Research and Development capacity – Job creation – Human, intellectual and social capital

In addition to the above-motioned, the proposed project forms part of the National Strategic Integrated Projects (SIPs) 10 which pertains to electricity transmission and distribution by:

- Expanding the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development; and
- Aligning the 10-year transmission plan, the services backlog, the national broadband roll-out and the freight rail line development to leverage off regulatory approvals, supply chain and project development capacity.

The District Municipality also has electricity-related priorities, which comprise of the following[9]:

- Electricity connections and high mast lights;
- Upgrading of electricity infrastructure; and
- Conducting a water and electricity meter audit.

Figure 5 illustrates the overall household access to electricity on a municipal level. The proposed project is located in the municipality with the lowest access to electricity.

[9] Ramotshere Moiloa Local Municipality – Spatial Development Framework (SDF) 2014-2015.

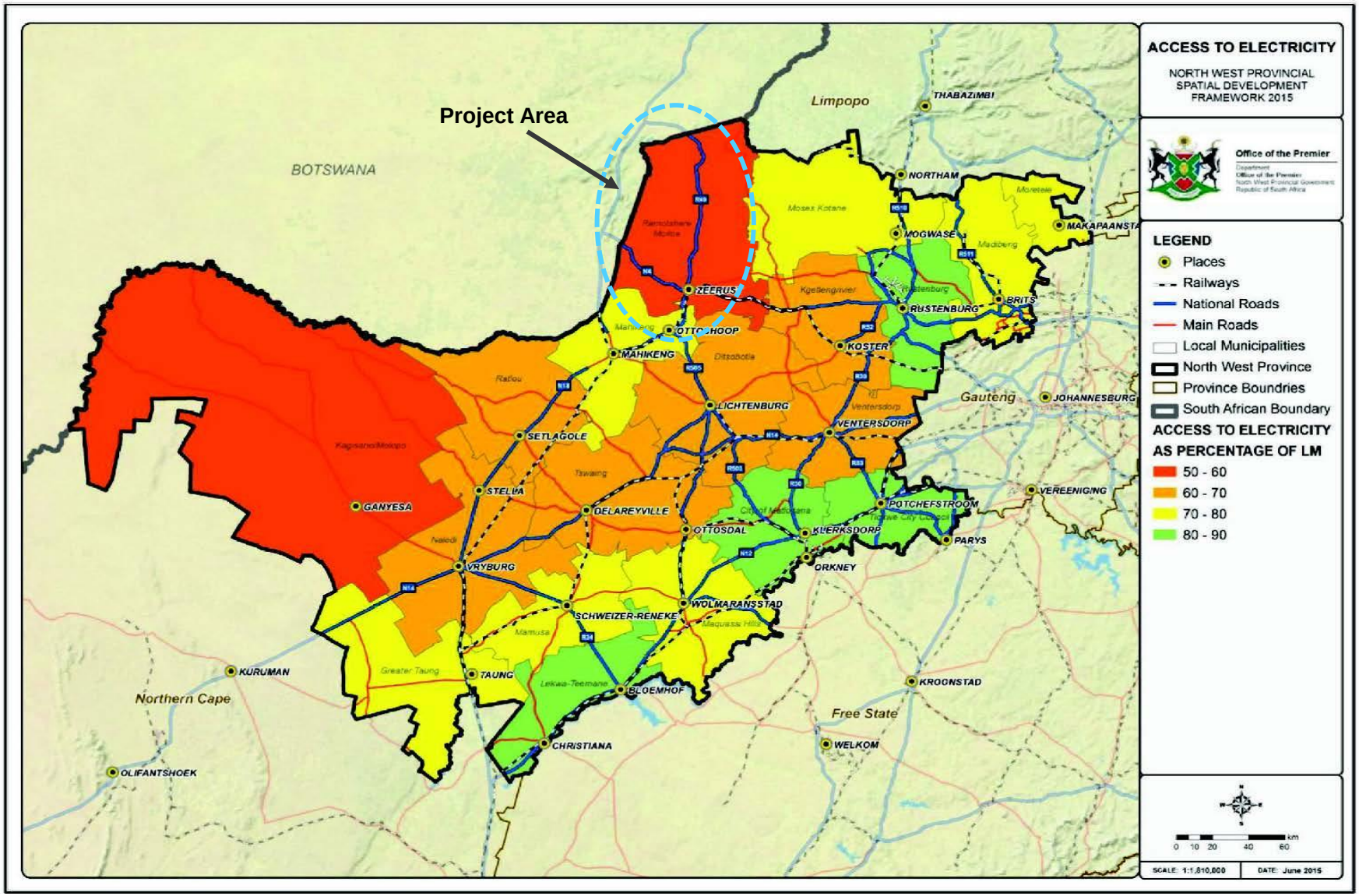


Figure 5: Access to Electricity in the North-West Province

2.4.2 Municipal Development Planning

Mahikeng Local Municipality is the administrative capital of the province with Mahikeng and Mmabatho forming a large urban concentration. Although Mahikeng is the capital of the North-West Province, the remainder of the Municipality still has a largely rural nature with a vast amount of tribal land. Due to the growth trajectory of the Municipality, the Municipality can follow the diversification and management strategy to ensure that the economy does not start to lag behind. A key component of this strategy will be linking Mmabatho and Mahikeng and ensuring integration relating to business, commercial and public services

Ramotsere Moiloa Local Municipality also predominantly consists of rural areas with dispersed population and low densities. The natural environment lends itself to the establishment of nature reserves with Madikwe Nature Reserve situated in the northern part of the municipality. Due to the mostly rural nature of the Municipality, it will be beneficial to concentrate development on established nodes.

Table 9 outlines the development guidelines for the affected local municipalities as per the Provincial Spatial Development Framework[10] (Office of the Premier, 2015; Anon, 2016):

Table 9: Development guidelines for the affected municipalities

Mahikeng Local Municipality	*Ramotshere Moiloa Local Municipality*
• Focus investment in the core urban areas of Mahikeng and Mmabatho to create agglomeration advantages, fastening economic growth. • Mahikeng, although it has capital status, still has large areas with unregulated and informal development, creating an insufficient urban network. • Investing in infrastructure development and maintenance within Mahikeng will help to strengthen the economy's position. • Ensure attractive building stock and physical business environment to attract private sector investment. • A definite urban edge is needed to prohibit urban sprawl. • Create a sustainable urban form through zoning and adequate planning. • Promote the Industrial Development Zone and create a conductive environment for private sector investment. • Provide tax incentives to attract private sector investment. • Focus on skills development in the finance, business, manufacturing and trade sectors to enable the large economically active population to obtain employment. • Diversify the economy by focusing on backward and forward linkages to existing industries. • Provide access to basic services.	• Invest in agriculture to increase crop production in areas with high agricultural potential. • Protect water sources and develop water infrastructure to ensure sustainability. • Develop agro-industries that promote local beneficiation to create employment opportunities, to create a value chain and increase economic development. • Focus invest in infrastructure and services in Zeerust to strengthen the urban core and create a strong economic core that provides employment opportunities and services to the population. • Provide access to basic services. • Promote and enhance the tourism sector – approximately 20% of the municipality is game farms. Although they are relatively scattered and far away from rural settlements, there is potential to develop the tourism sector and create tourism related services that will provide employment opportunities. • Protect the natural environment and prohibit mining in the agriculture and tourism areas. • Formalise the informal economy and incorporate the informal traders in the economy. • Provide affordable housing opportunities in Zeerust and smaller nodes to increase densities.

[10] North West Province Spatial Development Framework (SDF) 2016

• Develop adequate affordable housing opportunities for the growing urban population and to address the housing backlog. • Develop agro-industries. • Formalise the economy. • Protect and develop water infrastructure. • There is opportunity to promote tourism in the Municipality. • Protect critical biodiversity areas. • Protect high value agriculture land.	

In conclusion, the proposed development does not compromise any of the objectives or development plans set within the North West SDF (2016) and Ramotshere Moiloa Local Municipality IDP (2014/2015). Rather, the proposed project is in line with the strategic plans and priorities for the area. The project will not only facilitate the distribution of electricity but also provide temporary job opportunities for the local communities during construction.

2.5 Utilities Environmental and Social Policies

2.5.1 Eskom

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 us to take a long-term view and ensure that the scope of our 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 (Eskom, 2016).

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

- Minimise pollution and environmental degradation and address safety an, occupational health in management systems;
- Comply with legislative and policy requirements;
- Implementation of management systems in accordance with, but not limited to ISO 9001, ISO 140001, 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.

2.5.2 BPC

BPC, as part of its environmental policy, implement an integrated management system for environmental and occupational safety, health and fire protection throughout the Corporation. In terms of this, BPC aims to identify and pro-actively manage all safety, health and environmental risks posed by its operations and major project activities. The systems include provision for:

- Identification of safety, health and environmental risks in BPC operations;
- Assessment and characterisation of the potential consequences of safety, health and environmental related risks to employee, contractors, customers, communities and the environment; and
- Evaluate the effectiveness of BPC SHE controls, including preventative and mitigation measures (BPC, 2017).

2.6 Project Categorisation

2.6.1 International categorisation

By virtue of source of funding, the project is subjected to international requirements. The international funders require that certain identified projects are classified in terms of the activity proposed and the receiving environment as to the level of assessment required in terms of environmental and social aspects**.**

DBSA and World Bank use the same similar classification system categorises projects into four Environmental Assessment categories based on environmental and social factors (DBSA, 2015) as follows:

Figure 6: DBSA project categories

1: May have **significant broad and diverse adverse environmental and/or social impacts** that are irreversible in the absence of adequate mitigation measures

2: Likely to have **less severe adverse environmental and/or social impacts** that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures

3: Likely to have **minimal adverse environmental or social impacts**

4/FI: Business activities involving investments in financial institutions (FIs) or through delivery mechanisms involving financial intermediation

The proposed transmission line is considered a **Category 2 or B project**, as it is not located in a sensitive area, the project will not affect protected areas, there are not significant livelihoods issues and no major social or environmental concerns were raised. Residual impacts can be managed to acceptable levels. Additionally, limited involuntary resettlement is required, as there will be very little physical displacement as

well as economic displacement, which have been considered in the Resettlement Policy Framework (RPF)[11] (**ANNEXURE G7**).

Based on the scope of the proposed development, the following international policies pertaining to environmental and social issues will be triggered **(Table 10).** These are described in detail under **Section 2.6.3**.

Table 10: Summary list of the triggered environmental and social policies

DBSA Environmental and Social Safegaurds (ESS)		World Bank Environmental and Social Standards (ESS)		IFC Perfomance Standards (PS)	
ESS 1: Environmental and social impact assessment	√	**ESS 1:** Assessment and management of environmental and social risks and impacts	√	**PS 1:** Environmental and social impact assessment and management systems	√
ESS 2: Protection of natural habitats	√	**ESS 2:** Labour and working conditions	√	**PS 2:** Labour and working conditions	√
ESS 3: Involuntary resettlement	√	**ESS 3:** Resource efficiency and pollution prevention and management	√	**PS 3:** Pollution prevention and abatement	√
ESS 4: Community stakeholders and vulnerable groups	√	**ESS 4:** Community health and safety	√	**PS 4:** Community health, safety and security	√
ESS 5: Pest Management	√	**ESS 5:** Land acquisition, restrictions on land use and involuntary resettlement	√	**PS 5:** Land acquisition and involuntary resettlement	√
ESS 6: Physical and cultural resources	√	**ESS6:** Biodiversity conservation and sustainable management of natural resource management	√	**PS 6:** Biodiversity conservation and sustainable natural resource management	√
ESS 7: Safety of dams	X	**ESS 7:** Indigenous people/ sub-Saharan African historically undeserved traditional local communities	√	**PS 7:** Indigenous people	√
		ESS 8: Cultural heritage	√	**PS 8:** Cultural heritage	√
		ESS 9: Financial intermediaries	X		
		ESS 10: Stakeholder engagement and information disclosure	√		

The proposed development is therefore required to undergo an ESIA process to address compliance with relevant host country laws, regulations and permits that pertain to environmental and social issues, discussed in subsequent sections.

[11] This was called a Resettlement Action Plan in the Draft ESIA Report but because the project will commence in late 2020 (at the earliest), the details at this stage are not specific enough for a RAP. The document is thus a Resettlement Policy Framework that sets the policy for a detailed RAP that must be undertaken prior to commencement of the project to ensure that compensation is commensurate to the economic conditions at the time.

2.6.2 National categorisation

The DBSA require that the ESIA process should address compliance with relevant host country laws, regulations and permits that pertain to environmental and social issues**.**

During the screening process of deciding whether an ESIA is required in terms of NEMA for the project in South Africa, the listed activities in **Table 11** in terms of NEMA were triggered. Based on the scale and impacts associated with the project, a full EIA process is required, rather than a Basic Assessment (BA) process.

The activities in terms of EIAA in Botswana are indicated in **Table 12.**

Table 11: Applicable listed activities in terms of NEMA Regulations of 2014 (as amended)

Listed Activity	Description of the Activity	Relevance to the development activity	Infrastructure or aspect of the project
GN R983 Activity 11	*The development of facilities or infrastructure for the transmission and distribution of electricity –* *(ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more.*	The proposed transmission line is a 400 kV line and it may traverse urban areas or industrial complexes between Mahikeng (South Africa) and Isang (Botswana)	Transmission line (including tower structures)
GN R983 Activity 12	*The development of-* *(xii) infrastructure or structures with a physical footprint of 100 square metres or more;* *where such development occurs-* *(a) within a watercourse.*	The transmission line will traverse numerous water resources, include but not limited to the following: • Ngotwane, • Sandloot and • Brakfonteinspruit.	Tower positions (in relation to watercourse)
GN R983 Activity 14	*The development of:* *The development of facilities or infrastructure for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres but not exceeding 500 cubic metres.*	The construction phase may include the storage of hydrocarbons in the lay down areas for construction machinery and/or vehicles.	Construction sites/ camps
GN R983 Activity 19	*The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shell grit, pebbles or rock of more than 5 cubic metres from –* *(i) a watercourse.*	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 to erect towers may arise.	Tower positions (in relation to watercourse)
GN R984 Activity 9	*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.*	The project entails the development of a 400 kV transmission line from the Mahikeng substation area close to Mahikeng to the Isang substation in Botswana. Most of the corridor will be outside urban areas or industrial complexes.	Transmission line (including tower structures)

Listed Activity	Description of the Activity	Relevance to the development activity	Infrastructure or aspect of the project
GN R985 Activity 4	*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.* ***North West*** *(vi) Areas within a watercourse or wetland, or within 100 metres from the edge of a watercourse or wetland.*	The construction phase may include the storage of hydrocarbons in the lay down areas for construction machinery and/or vehicles.	Construction sites/ camps
GN R985 Activity 12	*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.* ***North West*** *(vi) Areas within a watercourse or wetland, or within 100 metres from the edge of a watercourse or wetland.*	Clearance of vegetation within watercourse or 100m from the edge of a watercourse might be required.	Servitude for access roads and transmission line
GN R985 Activity 14	*The development of —* *(ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs—* *(a) within a watercourse;* ***North West*** *(iv) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority;* *(vi) Areas within 5 kilometres from protected areas identified in terms of NEMPAA or from the core areas of a Biosphere reserve.*	The proposed transmission line will have a footprint of 210 000m (L) X 1000m (W). The line will traverse numerous water courses. According to the North-West Biodiversity Conservation Assessment Report[12] it all falls within two Critical Biodiversity Areas (CBA), namely CBA T1 and T2. The proposed corridor is also within 5km of the Madikwe Nature Reserve along the South Africa - Botswana border,	Transmission line, access roads and construction camps

Table 12: Botswana: EIAA listed activities

Listed Activity	Description of the Activity	Relevance to the project
The EIA Regulations 2012 **Schedule 1** **Transboundary Projects**	All projects that have transboundary impacts such as fences, bridges, water transfer schemes and power plants and power lines.	The project crosses into South Africa

[12] Department: Agriculture, Conservation, Environment and Rural Development (DACERD) (2009). North West Province Biodiversity Conservation Assessment Technical Report. Version 1.

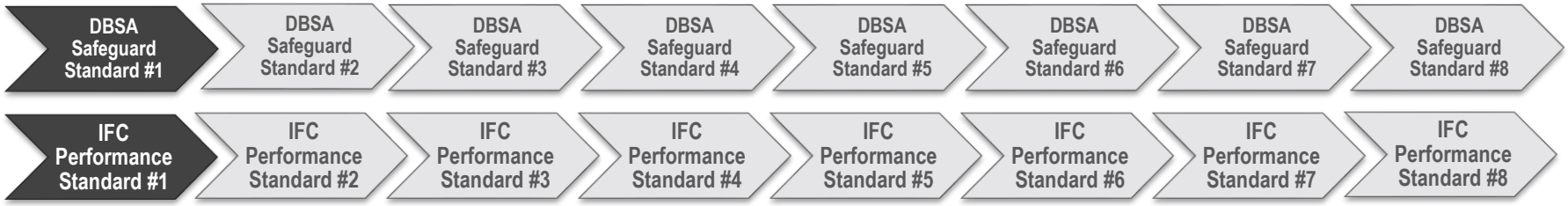
Listed Activity	Description of the Activity	Relevance to the project
The EIA Regulations 2012 Schedule 1 Infrastructure developments	Installations of power lines	The project is a 400 kV powerline between Botswana and South Africa.

The section below describes the above listed legislation for the both countries and how they comply with the DBSA Environmental and Social Safeguards Standards and IFC Performance Standards which are applicable to this project (**Figure 7 to Figure 15** and **Table 13 to Table 21).**

2.6.3 Applicability to the project

2.6.3.1 DBSA Environmental Social Safeguards and IFC Performance Standards

Environmental and Social Impacts:



ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT	RELEVANCE TO THE PROJECT
Highlights the importance of identifying environmental and social risks and impacts, and managing their performance throughout the life of a project. The objectives are • To identify and evaluate environmental and social risks and opportunities of the project. • To adopt mitigation measures to compensate/offset the risks and impacts to workers, communities, and the environment. • To provide means for adequate engagements and consultation with the local communities regarding issues that directly impact them. Ensure the relevant information is disclosed and distributed. • To promote use/implementation of management systems to monitor the environmental and social performance through the lifecycle of the project.	The project ESIA has been undertaken as described below: • Detailed screening and site selection processes **(Section 4.4.1)** were undertaken at the early stages of the project to identify potential risks and opportunities associated with the project and inform the most environmentally and socially responsible alternatives to take into the project. • The specialist studies **(Section 5)** were undertaken to assess the potential impacts posed by the construction and operational activities and the proposed mitigation measures have been incorporated into the ESMP document which will be implemented by the Contractor during construction. • Adequate consultation and engagement of interested and affected stakeholders have been undertaken in the different stages of the ESIA process as per the NEMA requirements **(Section 7).**

Figure 7: Requirements and applicability of the DBSA Safeguard Standard 1 and IFC Performance Standard 1

Table 13: Legislative framework complying with the Safeguard and Performance Standard 1

Legislation(s)	Country	Description	Applicability	Reference in the Report
Constitution of the Republic of South Africa (Act No. 108 of 1996)	**South Africa**	Constitution is the supreme law of the country. Section 24 of the Constitution provides the overarching environmental legislative framework for environmental management and it aims to ensure that everyone has the right to an environment that is not harmful to their health or well-being and the environment is protected for the benefit of present and future generations, through reasonable legislative and other measures. Furthermore, Section 25 of the Constitution guarantees everyone the right of access to information which is essential for them to exercise their Constitutional right including any information pertinent to the environmental assessment (EA) or ESIA process.	Eskom will be required to adhere to the ESMP requirements to ensure that social and environmental management considerations are taken into account and implemented throughout the lifecycle of the project. As per Section 25, adequate consultation and engagement of stakeholder has been done in the different stages of the ESIA process as per the NEMA requirements.	**Annexure H**
National Environmental Management Act (Act No. 107 of 1998)	**South Africa**	The National Environmental Management Act (NEMA) is the principal underlying framework for environmental law and legislation in South Africa. The main purpose of the NEMA is to achieve effective and co-operative environmental governance by means of developing principles that guide the decision-making with matters concerning the environment. Section 28(1) states that "every person who causes or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring". If such pollution or degradation cannot be prevented, then appropriate measures must be taken to minimise or rectify such pollution or degradation.	In terms of the NEMA, the proposed development triggers listed activities which implies that the project may significantly impact on the environment and an Environmental Authorisation (EA) is required prior to commencement. Aurecon was appointed as an independent consulting firm to ensure that the NEMA principles and requirements are followed throughout the ESIA process. The ESMP is the main output of the ESIA process that will be implemented by the Contractor appointed by Eskom to manage and mitigate potential environmental and social risks associated with the project during construction.	**Section 2.6.2** **Section 3**

Legislation(s)	Country	Description	Applicability	Reference in the Report
Environmental Assessment Act (Act No. 10 of 2011)	**Botswana**	This Act provides for environmental impact assessment to be used to assess the potential effects of planned developmental activities. It is used to determine and to provide mitigation measures for effects of such activities.	To comply with EA Act of 2011, the project needs to formally go through the following stages: • The Project Brief Form **(Complete)** • The Terms of Reference/Scoping Report **(In progress)**; and • The Environmental Impact Assessment Document.	**Section 2.6.2** **Annexure F 1.2**

Protection of Natural Habitats

PROTECTION OF NATURAL HABITATS

Promotes the protection of biodiversity and the sustainable management and use of natural resources.

The objectives are

- To protect and conserve biodiversity
- To maintain the benefits from ecosystem services
- To promote sustainable management of practices that integrated conservation needs and development practices.

RELEVANCE TO THE PROJECT

The proposed transmission line will cross numerous streams, agricultural fields and patches of natural environment which could possibly affect various ecosystem functions and/or natural ecological processes.

It is the developer's duty to implement appropriate environmental management tools to ensure that all development within the area are in line with the principles of ecologically sustainable development and the protection of biodiversity.

Figure 8: Requirements and applicability of the DBSA Safeguard Standard 2

Table 14: Legislative framework complying with the Safeguards Standard 2

Legislation(s)	Country	Description	Applicability	Reference in the Report
National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEM:BA) **&** **North-West Biodiversity Management Act (Act No. 4 of 2016)**	**South Africa**	NEM:BA provides for the management and conservation of South Africa's biodiversity within the framework of the NEMA. The Act also provides a list of protected species and identifies restricted activities involving threatened or protected species. Restricted activities include the gathering, collecting, cutting, uprooting, damaging or destroy a listed species.	In accordance with the Act, Eskom has the responsibility to conserve endangered ecosystems and apply appropriate environmental management tools to ensure integrated environmental management thereby ensuring that all development within the area are in line with the principles of ecologically sustainable development and the protection of biodiversity.	**Annexure H**
Conservation of Agricultural Resources Act (Act No. 43 of 1983) (CARA)	**South Africa**	The Act provides for control over the utilisation of natural agricultural resources to promote the conservation of the soil, water sources and the vegetation and the combating of weeds and invader plants; and for matters connected therewith.	Since the proposed route traverses agricultural lands and various water courses, regulatory measures must be adopted to minimise the impacts such as soil erosion, alien encroachment and pollution. The ESMP document will be used by the appointed Contractor during construction to manage and conserve soil and water resources.	**Annexure H**
National Veld and Forest Fire Act No. 101 of 1998	**South Africa**	While much of this Act is aimed at the responsibilities of the landowner, it also states that any person who leaves a fire unattended, lights a fire which spreads, throws out matches or other material subject to spontaneous combustion, or lights a fire on a road verge or smokes in an area where it is prohibited can be charged.	The project is at the high risk of outbreak of fires due to the vegetation throughout the route as such efforts should be made to preserve and guard against such incident, especially through the education of workers on how they should handle flammable products.	**Annexure H**
Herbage Preservation (Prevention of Fires) Act (Cap 38:02 of 1978)	**Botswana**	The Act prevents and controls bush fires and other fires. The general requirements of the Act are that: In section 4 (1) no person shall set any fire to any vegetation on any land which he does not own or in lawful occupation, without permission in writing of an Herbage Preservation Committee. Section 6 (1) provides that every person intending to burn vegetation, shall give a reasonable notice of his intension		

Legislation(s)	Country	Description	Applicability	Reference in the Report
		as soon as possible. The notice shall include the time at which the burning will start and it goes to all owners or occupiers of adjoining land.		

Labour and Working Conditions

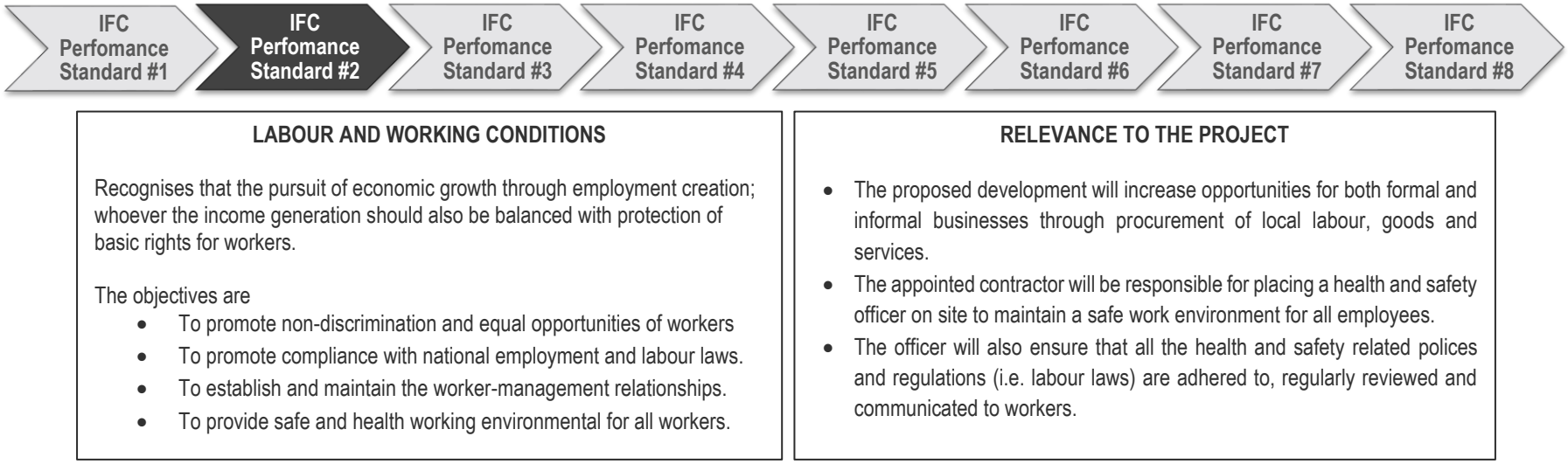


Figure 9: Requirements and applicability of the IFC Performance Standard 2

Table 15: Legislative framework complying with the Performance Standard 2

Legislation(s)	Country	Description	Applicability	Reference in the Report
Basic Conditions of Employment Act (Act No. 75 of 1997)	**South Africa**	The objective of this is Act is to give effect and regulate the right to fair labour practices conferred by section 23(1) of the Constitution by enforcing basic conditions of employment and regulating the variation of basic conditions of employment.	Eskom and/or contractor will be responsible for ensuring there is a committee in place to enforce employment policies, practices and/or specifications relating to remuneration, training, leave, working hours and termination of employment. The age restriction (15 years) for employment will need to be considered as the Act makes it a criminal offence to employ a child under age.	**Annexure G.4**
Occupational Health and Safety Act (Act No. 85 of 1993)	**South Africa**	Section 8 states that every employer shall provide and maintain, as far as is reasonably practicable, a working environment that is safe and without risk to the health of the employees.	Eskom and/or contractor will be responsible for ensuring that the work environment is safe for workers and that applicable safety gear is provided during the construction, operational and decommissioning phases.	**Annexure G.4**
Employment Act, 1992 (Cap 47:01 of 1992)	**Botswana**	This Act provides for the legal rights of the employer and employee's relations. Every employer shall, unless the employee has broken his contract of employment or the contract of employment becomes, without default on the part of the employer impossible of performance, provide his employee with work in accordance with the contract of employment during the period for which the contract is binding on a number of days equal to the number of working days provided for, either expressly or by implication in the contract of employment.	The contractor is bound by this Act to fairly treat his employees and the employees are also bound by the Act to abide by their contracts. The contractor is advised to give priorities of unskilled labour to the people to those villagers along the power line.	**Annexure G.4**

Land Acquisition & Involuntary Resettlement

INVOLUNTARY RESETTLEMENT	RELEVANCE TO THE PROJECT
This is applicable to physical or economic displacement resulting from land transactions such as expropriation or negotiated settlements. The objectives are • To avoid, and when avoidance is not possible, minimise displacement by exploring alternative project designs. • To avoid forced eviction. • To anticipate and avoid, or where avoidance is not possible, minimise adverse social and economic impacts from land acquisition or restrictions on land use by (i) providing compensation for loss of assets at replacement costs and (ii) ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected. • To improve, or restore, the livelihoods and standards of living of displaced persons.	While every effort has been made to avoid having to move people, a few structures will be directly affected by the transmission line and will be relocated as per the measures and actions set out in the Resettlement Policy Framework (RPF). There will also be economic displacements because of the Project which have been addressed in the RPF.

Figure 10: Requirements and applicability of the DBSA Safeguard Standard 3 and IFC Performance Standard 5

Table 16: Legislative framework complying with the Safeguards Standard 3 and Performance Standard 5

Legislation(s)	Country	Description	Applicability	Reference in the Report
Expropriation Act (Act No. 63 of 1975)	**South Africa**	The Expropriation Act ensures that all the relevant expropriation negotiations are undertaken and all the affected parties are compensated accordingly.	Eskom would have to negotiate with the landowners to obtain requisite rights to construct the proposed line over private land. The expropriation process should be undertaken as per the provisions of the Act.	**Annexure D.4** **Annexure E.2** **Annexure G7**
Promotion of Administrative Justice Act (Act No. 3 of 2000)	**South Africa**	This Act regulates the administrative action which materially and adversely affects the rights of any person. Section 3 of the Act stipulates the fair and mandatory procedures that one must follow when making decisions affecting the rights of a particular individual. *"…(i) adequate notice of the nature and purpose of the proposed administrative action, (ii) a reasonable opportunity to make representations. (iii) a clear statement of administrative action; (iv) adequate notice of nay right of review or internal appeal, where applicable; and (v) adequate notice of the right to request reasons."*	In terms of this Act, Eskom will give notice to all landowners from whom land is to be expropriated for the project. Eskom's Expropriation or Relocation Plan is also subjected to the procedures that must be followed when making decisions affecting the rights of the local residents.	**Section 7** **Annexure D.4** **Annexure E.2** **Annexure G7**
Extension of Security of Tenure Act (Act No. 62 of 1997)	**South Africa**	This Act aims to facilitate long-term security of land tenure and regulate the conditions of residence on certain land.	The provisions of the Act will apply in the case of any non-landowning residents on land (e.g. farm workers) if such land is to be acquired for the project.	**Section 7** **Annexure D.4** **Annexure E.2** **Annexure G7**
Spatial Planning and Land Use Management Act (Act No. 16 of 2013)	**South Africa**	The Act facilitates land development and land use management within municipal jurisdictions. It also gives the traditional council the power to perform land use management and duties on behalf of the municipality in the traditional area concerned.	As per of the ESIA process the affected local municipalities and traditional authorities have been consulted regarding the proposed development in their area. Further negotiations for land or land use applications will be undertaken by Eskom prior to construction with the relevant land owners or custodians.	**Annexure D.4**

Town and Country Planning Act Chapter 32:09 (1980)	**Botswana**	This Act makes provision for the orderly and progressive development of land in both urban and rural areas and aims to preserve and improve the amenities thereof; for the grant of permission to develop land and for other powers of control over the use of land; and for purposes ancillary to or connected with the matters aforesaid.	The development will have to be granted a planning permission before commencement of construction.	**Annexure D.4**

Pollution Prevention and Abatement

IFC Performance Standard #1 | IFC Performance Standard #2 | **IFC Performance Standard #3** | IFC Performance Standard #4 | IFC Performance Standard #5 | IFC Performance Standard #6 | IFC Performance Standard #7

POLLUTION PREVENTION AND ABATEMENT

Recognises that increased industrial activity and urbanisation often generate higher levels of air, water and land pollution, and that there are efficiency opportunities.

The objectives are

- To avoid or minimise adverse impacts on human health and the environment by avoiding or minimising pollution from project activities.
- To promote more sustainable use of resources, including energy and water.
- To reduce project-related greenhouse gases emissions.

RELEVANCE TO THE PROJECT

- Pollution prevention impact mitigation measures have been addressed in the ESMP; prior to construction an additional site specific EMPr will be also developed as an additional tool to assist the Contractor in this regard.
- It is the responsibility of the appointed contractors to apply technically and financially feasible resource efficiency and techniques to minimise the impacts on the natural and social environmental.
- As part of the construction phase, an environmental control offer (ECO) will be appointed to audit the compliance of the appointed contractors with the ESMP requirements.

Figure 11: Requirements and applicability of the IFC Performance Standard 3

Table 17: Legislative framework complying with the Performance Standard 3[13]

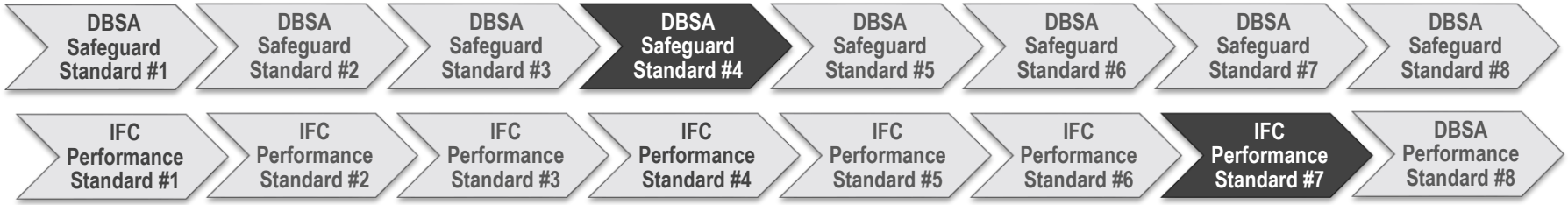
Legislation(s)	Country	Description	Applicability	Reference in the Report
National Environmental Management: Waste Act (Act No. 59 of 2008)	**South Africa**	This Act aims to regulate waste management to protect human health and the environment by putting measures in place to prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources.	As required by the Act, Eskom and associated Contractor(s) must avoid the generation of waste, reduce, re-use, recycle or recover where feasible. These general principles of responsible waste management have been incorporated into the project Waste Management Plan (WMP) (which forms part of the ESMP).	**Annexure H**
National Environmental Management: Air Quality Act, 2008 (Act No. 39 of 2008)	**South Africa**	The National Environmental Management: Air Quality Act (NEM:AQA) provides for setting of standards for regulating and monitoring air quality and/or dust to protect the environment and human health.	It is anticipated that dust will be generated during the construction phase of the project with large earth moving equipment and the transport of construction material to and from the site on unpaved roads. Therefore, ambient dust must be monitored to ensure the environment that is not harmful to the health and well-being of people.	**Section 5.14** **Annexure H**
National Water Act (Act No. 36 of 1998)	**South Africa**	The National Water Act (NWA) governs the management of water as one of the nation's common resources. It aims to ensure the sustainable use of water through the protection of the quality and quantity of water resources for the benefit of all water users. According to the Act, a person can only be entitled to use water if the use is permissible under the NWA. Section 21 of the NWA specifies the water uses which require authorisation from the DWS prior to the commencement of the activity.	The proposed development requires a Water Use Licence Application (WULA) for working within the watercourse areas prior to construction. The water use and prevention of pollution of water resources during construction will be managed according to the ESMP and conditions of the WULA.	**Section 5.5** **Annexure H**

[13] Resource efficiency and pollution prevention are cross cutting issues and as such, have been dealt with indirectly in the ESIA and directly in the ESMP.

Legislation(s)	Country	Description	Applicability	Reference in the Report
Electricity Regulation Act (Act No. 4 of 2006)	**South Africa**	This is the national regulatory framework that governs the generation, transmission, distribution and trading of electricity in South Africa. It also regulates the applications for the licences required and issued under the Act.	This is an electricity project and Eskom is one of the key stakeholders to be consulted during the licensing. Eskom is therefore responsible to ensure that the project follows the correct channels and the provisions of this Act are adhered to.	**Section 4.2.2**
Atmospheric Pollution (Prevention) Act (Cap. 65:03 of 1971)	**Botswana**	This Act provides for the prevention of pollution of the atmosphere by the carrying on with industrial processes and any other processes that may pollute the atmosphere.	During the construction, operation and decommissioning phase, dust will be generated from the movement of vehicles and construction activities. In addition, fumes from vehicles and machinery will temporarily add to atmospheric pollution. Dust suppression using water bowsers should be conducted on each site as well as on all access roads.	**Section 5.14** **Annexure H**
Waste Management Act (Cap. 65:06 of 1998)	**Botswana**	This Act relates to management of controlled and hazardous waste. This includes the provision of waste management plans.	The proposed development will generate waste in the form of builder's rubble during construction, oil spills and general waste (paper, glass and liquid waste) during operation. There should be a waste management strategy for the development which should focus on Recycling, Reduction and Re-use of waste materials. There will be waste generated from construction camps in the form of solid and liquid waste as such measures should be put in place to prevent pollution, which is included in the ESMP.	**Section 4.2.3** **Annexure H**
Water Act (Cap. 34:01 of 1968)	**Botswana**	This Act defines ownership, rights and use of public water. It also prohibits the pollution, fouling or poisoning of, interference with, or flow alteration of public water.	With regards to the proposed development, ground and surface water are susceptible to contamination from inappropriate storage of fuels and lubricants at construction camps, and measures should be put in	**Section 5.5** **Annexure H**

Legislation(s)	Country	Description	Applicability	Reference in the Report
			place to prevent pollution, which is included in the ESMP.	
Electrical Supply Act Chapter 73:01	**Botswana**	The Electricity Supply Act makes provision for the licensing and control of undertakings for the generation and supply of electricity. A licence is required to use, work or operate any plant, apparatus or works designed for the supply or use of electricity. This Act is applicable to the development.	This is an electricity project and BPC is one of the key stakeholders to be consulted during the licensing. BPC is responsible to ensure that the project follows the correct channels and the provisions of this Act are adhered to.	**Section 4.2.2**

Indigenous People



INDIGENOUS PEOPLE OR COMMUNITY STAKEHOLDERS AND VULNERABLE GROUPS	RELEVANCE TO THE PROJECT
Aims to ensure that the development process shows respect for all affected stakeholders by ensuring the following: • The development process fosters full respect for the human rights, dignity, aspirations, culture, and natural resource-based livelihoods of all communities and especially Indigenous people. • To anticipate and avoid adverse impacts of projects on communities of vulnerable and / or indigenous peoples, or when avoidance is not possible, to minimise and/or compensate for such impacts. • To promote sustainable development benefits and opportunities for communities/ indigenous peoples in a culturally appropriate manner. • To establish and maintain an ongoing relationship based on Informed Consultation and Participation (ICP) with the all stakeholders affected by a project throughout the project's life-cycle.	There are no formally identified Indigenous People in the project area that will be affected, but there are poor communities and areas of subsistence farming that will be affected. • All the affected communities have been informed about the project by distributing notification letters and Background Information Documents (BIDs) through public institutions such as local libraries, clinics etc. • Later in the ESIA process the communities will be consulted formally through public meetings. • Stakeholder material must be circulated with due cognisance of the language and literacy level s of the range of stakeholders and efforts are made to tailor consultation methods appropriately to the various groups.

Figure 12: Requirements and applicability of the DBSA Safeguard Standard 4 and IFC Performance Standard 7

Table 18: Legislative framework complying with the Safeguards Standard 4 and Performance Standard 7

Legislation(s)	Country	Description	Applicability	Reference in the Report
Traditional Leadership and Governance Framework Amendment Act (Act No. 23 of 2009)	**South Africa**	It makes provision for communities to decide for themselves if they want to be regarded as a traditional community in terms of their customs and observe a system of customary law by applying in writing to the Premier. The Act also provides for the establishment and recognition of Traditional Councils, defines the roles and powers of traditional leaders, and provides for dispute resolution and the establishment of a Commission on Traditional Leadership disputes and claims. The authority of the Tribal Authorities in the project area, in terms of acting on behalf of communities in their area of jurisdiction during land acquisition negotiations and granting access for construction work, therefore derives from the provisions of this Act.	The stakeholder engagement process undertaken to date has considered the traditional leadership structures in the various communities consulted and appropriate protocols during consultation were followed.	**Section 7** **Annexure E.2**
Tribal Land Act (Cap 32: 02 of 1990)	**Botswana**	This Act controls land use rights and makes provision for the imposition of restrictions on its use. It also regulates the use of tribal land and it is administered by the land board.	It is important that the project proponent fully understand the rights and obligations in the administration of property affairs in order not to contravene this Act. The project will affect Kgatleng tribal land which is under the administration of the Kgatleng Landboard. An Infrastructure and Asset Survey has been undertaken and the data for all those affected has been included in the RPF report (**Annexure G7**).	**Section 7** **Annexure E.2**

Community Health, Safety and Security

COMMUNITY HEALTH, SAFETY AND SECURITY

Recognises that projects can bring benefits to communities, but can also increases potential exposure to risks and impacts from incidents, structural failures, and hazardous materials.

The objectives are

- To anticipate and avoid adverse impacts on the health and safety of the affected community during the project life from both routine and non-routine circumstances.
- To ensure that the safeguarding of personnel and property is carried out in accordance with relevant human rights principles and in a manner, that avoids or minimises risks to the affected communities.

RELEVANCE TO THE PROJECT

- Relevant provisions of the Safety Act must be complied with pertaining to the safety of the workers and surrounding communities.
- Detailed mitigation or prevention measures and practices are provided in the ESMP. These should be used in conjunction with Eskom / BPC's safety practices.

Figure 13: Requirements and applicability of the IFC Performance Standard 4

Table 19: Legislative framework complying with the Performance Standard 4

Legislation(s)	Country	Description	Applicability	Reference in the Report
Occupational Health and Safety Act (Act No. 85 of 1993)	**South Africa**	Section 8 states that every employer shall provide and maintain, as far as is reasonably practicable, a working environment that is safe and without risk to the health of the employees. Section 17 obliges every employer who has more than 20 employees in the workplace to appoint a health and safety representative for such workplace.	The health and safety representative appointed will be responsible for ensuring that the health and safety measures are adhered to through all phases of the project.	**Annexure H**

Legislation(s)	Country	Description	Applicability	Reference in the Report
National Road Traffic Act (Act No. 93 of 1996)	**South Africa**	This legislation regulates all the national roads and issues pertaining to road safety in South Africa. According to this Act, the roads authorities are obliged to ensure compliance with provisions of this Act: • No person shall display any road traffic sign on a public road unless having been authorised • No person shall drive a vehicle on a public road recklessly or negligently • No person shall operate a motor vehicle which is not in a roadworthy condition on a public road • No person shall, unless otherwise directed by a traffic officer, fail to comply with any direction conveyed by a road traffic sign displayed in the prescribed manner.	Construction vehicles are likely to make use of the existing roads to transport equipment and material to and from the construction site. Construction related traffic could impact negatively on the traffic flow and on conditions of the affected roads. Relevant provisions of the Road Traffic Act must be complied with pertaining to the diversion of the traffic for the road crossings, the correct licensing for all drivers on site as well as the ensuring that all vehicle and plant is road worthy. During construction, the contractor will need to provide high standard warnings and traffic calming measures where construction activities interfere with traffic.	**Annexure H**
Hazardous Substances Act (Act No 15 of 1973)	**South Africa**	This Act regulates the substance which may cause injury or ill-health to or death of human beings due to any toxic substances or products	As at any construction site, various hazardous substances are likely to be used and/or stored on site. Hazardous substances must be stored and handled in accordance with the appropriate legislation and standards, and the contractor must ensure that all relevant Material Safety Data Sheets are kept on site at all times for safety and auditing purposes. Further to the provisions of this Act, the management of these substances should be managed through the implementation of the ESMP.	**Annexure H**

Legislation(s)	Country	Description	Applicability	Reference in the Report
Public Health Act (Cap. 63:01 of 1981)	**Botswana**	This Act protects the purity of any supply of water which the public has a right to use and does use for drinking or domestic purposes, and to take all necessary measures against any person so polluting any such supply or polluting any streams so as to be a nuisance or danger to health. Some general requirements of this Act are; • The developer will make sure that clean and hygienic environment is created at the work site and workers will be educated on clean behaviour to avoid or minimise the opportunities of falling sick and spread communicable diseases.	The Contractor should ensure that clean water is provided to workers and that toilets are cleaned daily.	**Annexure H**
Road Traffic Act (Cap 69:01 of 1975)	**Botswana**	The Act provides for the registration and licensing of motor vehicles; for the issue of driving licences; for the creation of offences relating to the use of vehicles and for the regulation of traffic; and for matters incidental thereto. Section 78 Traffic signs • Subject to and in conformity with such general or other directions as may be given by the Minister, a road authority may cause or permit traffic signs to be placed on or near a road. • Traffic signs shall be of the prescribed size, colour and type except where the Minister authorises the erection or retention of a sign of another character. • After the commencement of this Act, no traffic signs shall be placed on or near any road except	The Contractor should ensure that road signs are put in the right places to warn other road users of the presence of construction machinery. Flag men should be engaged to manage traffic at busy intersections.	**Annexure H**

Legislation(s)	Country	Description	Applicability	Reference in the Report
		under and in accordance with subsections (1) and (2).		

Pest Management

DBSA Safeguard Standard #1 | DBSA Safeguard Standard #2 | DBSA Safeguard Standard #3 | DBSA Safeguard Standard #4 | **DBSA Safeguard Standard #5** | DBSA Safeguard Standard #6 | DBSA Safeguard Standard #7 | DBSA Safeguard Standard #8

PEST MANAGEMENT

Aims to promote the use of biological or environmental control methods and to reduce the reliance on synthetic chemical pesticides to protect natural systems and people from the harmful effects of such pesticides.

An Integrated Pest Management and / or Vector Management Plan that promotes methods to control pests needs to ensure the following:

- Have a negligible adverse effect on human health.
- Be effective against the target species.
- Have minimal impact on non-target species and the natural environment.
- Ensure the method, timing and frequency of pesticide application minimise damage to natural systems.

RELEVANCE TO THE PROJECT

The utilities need to clear the areas below and close to the transmission line of vegetation to reduce fire risk and any other type of interference.

- This Safeguard covers the potential use of pesticides / herbicides during the implementation of the project, which is addressed in the ESMP.
- The Contractor will only be expected to used pesticides or herbicide only when it is necessary and they must be used according to the manufacturer's specifications.

Figure 14: Requirements and applicability of the Safeguards Standard 5

Table 20: Legislative framework complying with the Safeguard Standard 5

Legislation(s)	Country	Description	Applicability	Reference in the Report
National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEM:BA) & North-West Biodiversity Management Act (Act No. 4 of 2016)	**South Africa**	NEM:BA provides for the management and conservation of South Africa's biodiversity within the framework of the NEMA.	In accordance with the Act, the Contractor has the responsibility to use pesticides / herbicides responsibly to ensure the protection of biodiversity.	**Annexure H (Appendix 5 of ESMP Ecological/Biodiversity Plan)**
Occupational Health and Safety Act (Act No. 85 of 1993)	**South Africa**	Section 8 states that every employer shall provide and maintain, as far as is reasonably practicable, a working environment that is safe and without risk to the health of the employees.	Herbicides / pesticides must be applied in a way that will not affect the health of the person applying it.	**Annexure H**
National Water Act (Act No. 36 of 1998)	**South Africa**	The National Water Act (NWA) governs the management of water as one of the nation's common resources. It aims to ensure the sustainable use of water through the protection of the quality and quantity of water resources for the benefit of all water users.	Application of herbicides / pesticides must be done in such a manner that there is no pollution of water resources (above or below ground).	**Annexure H**
Pesticide Management Policy of South Africa	**South Africa**	Provides guidance on how pesticides should be managed.	Application of herbicides / pesticides must be undertaken in accord with this Policy.	**Annexure H**
National Forest Act (Act No. 84 of 1998)	**South Africa**	According to the Act, no person is permitted to cut, disturb, damage or destroy any indigenous tree in a natural forest; or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any tree, or any forest product derived from an indigenous tree without a licence. A licence must be issued for a period equal to the period for which the activity.	The application in terms of Section 15 of the NFA will be made if protected tree species will be destroyed or removed during construction.	**Annexure H**

Legislation(s)	Country	Description	Applicability	Reference in the Report
Water Act (Cap. 34:01 of 1968)	**Botswana**	This Act defines ownership, rights and use of public water. It also prohibits the pollution, fouling or poisoning of, interference with, or flow alteration of public water.	Application of herbicides / pesticides must be undertaken in such a manner that there is no pollution of water resources (above or below ground).	**Annexure H**
Plant Protection Act (Cap 35:02 of 2007)	**Botswana**	Provides guidance on action to prevent the introduction or spread of pests.	Ensure that proposed activity does not pose any threats to plant resources in Botswana and necessary measures are taken to prevent the introduction or spread of pests.	**Annexure H**

Physical and Cultural Resources

PHYSICAL AND CULTURAL RESOURCES

Aims to protect cultural heritage from adverse impacts of project activities and support its preservation

The objectives are

- To protect cultural heritage from the adverse impacts of project activities and support its preservation.
- To promote the equitable sharing of benefits from the use of cultural heritage.

RELEVANCE TO THE PROJECT

The physical construction for tower structures could potentially disturb physical cultural resources.

- During the MCDM process, the known heritage sites were included in the process of identifying the most feasible corridor with the least impacts. Furthermore, a heritage assessment study was undertaken as part of the ESIA and prior to construction a site walk down will also be done to further assess the impacts of tower positions.

Figure 15: Requirements and applicability of the DBSA Safeguards Standard 6 and IFC Performance Standard 8

Table 21: Legislative framework complying with the Safeguard Standard 6 and IFC Performance Standard 8

Legislation(s)	Country	Description	Applicability	Reference in the Report
National Heritage Resources Act (Act No. 25 of 1999) (NHRA)	**South Africa**	The NHRA stipulates that cultural heritage resources may not be disturbed without authorization from the relevant heritage authority. Section 34 (1) of the NHRA states that *"no person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority…".* Section 38 of the NHRA also states that any person who intends to undertake a linear development exceeding 300m in length must at the earliest stages of the development, notify the responsible Heritage Resources Authority and furnish them with details regarding the location, nature, and extent of the proposed development.	The South African Heritage Resources Authority (SAHRA) and North West Provincial Heritage Resources Authority were notified of the proposed project. Construction activities associated with the proposed development could disturb or destroy features of cultural heritage value in the area. These potential impacts have been assessed through a heritage specialist study in the assessment phase. Should a permit be required for the damaging or removal of specific heritage resources, an application would have to be submitted to SAHRA or the relevant provincial heritage agency for the approval of such an activity.	**Annexure H**
Monuments and Relics Act (Cap 59:03 of 2001)	**Botswana**	In terms of the Monuments and Relics Act 12 of 2001 section 19(2) both an archaeological predevelopment impact assessment and an environmental assessment study must be undertaken by any person wishing to undertake a major development such as construction or excavation, for the purposes of mineral exploration and prospecting, mining, laying of pipelines, construction of roads and dams, or erection of any other structure, which will physically disturb the earth's surface.	The project has engaged a Department of National Museums and Monuments approved archaeologist. A detailed assessment of the route was undertaken by a professional archaeologist based in Botswana during the assessment phase.	**Annexure H**

Biodiversity Conservation and Sustainable Management of Resources

BIODIVERSITY CONSERVATION AND SUSTAINABLE MANAGEMENT OF LIVING NATURAL RESOURCES

Promotes the protection of biodiversity and the sustainable management and use of natural resources.

The objectives are

- To protect and conserve biodiversity
- To maintain the benefits from ecosystem services
- To promote sustainable management of practices that integrated conservation needs and development practices.

RELEVANCE TO THE PROJECT

- The proposed transmission line will cross numerous streams, agricultural fields and natural environment which could possibly affect various ecosystem functions and/or natural ecological processes.
- It is therefore the developer's duty to implement appropriate environmental management tools to ensure that all development within the area are in line with ecological sustainable development and protection of biodiversity.

Figure 16: Requirements and applicability of the IFC Performance Standard 6

Table 22: Legislative framework complying with the Performance Standard 6

Legislation(s)	Country	Description	Applicability	Reference in the Report
National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEM:BA) & North-West Biodiversity Management Act (Act No. 4 of 2016)	**South Africa**	NEM:BA provides for the management and conservation of South Africa's biodiversity within the framework of the NEMA. The Act also provides a list of protected species and identifies restricted activities involving threatened or protected species. Restricted activities include the gathering, collecting, cutting, uprooting, damaging or destroy a listed species.	In accordance with the Act, the Contractor has the responsibility to conserve endangered ecosystems and apply appropriate environmental management tools to ensure integrated environmental management thereby ensuring that all development within the area are in line with the principles of ecologically sustainable development and the protection of biodiversity.	**Annexure H**

Legislation(s)	Country	Description	Applicability	Reference in the Report
National Water Act (Act No. 36 of 1998)	**South Africa**	The National Water Act (NWA) governs the management of water as one of the nation's common resources. It aims to ensure the sustainable use of water through the protection of the quality and quantity of water resources for the benefit of all water users.	The Contractor has the responsibility to apply appropriate environmental management tools to ensure integrated environmental management thereby ensuring that all development within the area are in line with the principles of ecologically sustainable development and the protection of biodiversity.	**Annexure H**
Pesticide Management Policy of South Africa	**South Africa**	Provides guidance on how pesticides should be managed.	The Contractor has the responsibility to apply appropriate environmental management tools to ensure integrated environmental management thereby ensuring that all development within the area are in line with the principles of ecologically sustainable development and the protection of water resources.	**Annexure H**
National Forest Act (Act No. 84 of 1998)	**South Africa**	According to the Act, no person is permitted to cut, disturb, damage or destroy any indigenous tree in a natural forest; or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any tree, or any forest product derived from an indigenous tree without a licence. A licence must be issued for a period equal to the period for which the activity.	The application in terms of Section 15 of the NFA will be made if protected tree species will be destroyed or removed during construction.	**Annexure H**
Water Act (Cap. 34:01 of 1968)	**Botswana**	This Act defines ownership, rights and use of public water. It also prohibits the pollution, fouling or poisoning of, interference with, or flow alteration of public water.	The Contractor has the responsibility to apply appropriate environmental management tools to ensure integrated environmental management thereby ensuring that all development within the area are in line with the principles of ecologically sustainable development and the protection of water resources.	**Annexure H**

Legislation(s)	Country	Description	Applicability	Reference in the Report
Plant Protection Act (Cap 35:02 of 2007)	**Botswana**	Provides guidance on action to prevent the introduction or spread of pests.	Ensure that proposed activity does not pose any threats to plant resources in Botswana apply appropriate environmental management tools to ensure that all development within the area are in line with the principles of ecologically sustainable development and the protection of biodiversity.	**Annexure H**

Safety of Dams

DBSA Environmental and Social Safeguard Standard 7 is not applicable to this project.

Accountability and Grievance Systems

ACCOUNTABILITY AND GRIEVANCE SYSTEMS

This safeguard standard aims to promote transparent and efficient lines of communication between the project team and the public (specially the affected communities)

The objectives are

- To ensure effective and empowered local grievance and redress mechanism to receive, facilitate and follow up on the resolution of affected people's grievances and concerns about the environmental and social performance of the project.
- To develop mechanism functions for the receipt and timely response to complaints from parties affected by the implementation of the project.
- To ensure the mechanism should not impede access to judicial or administrative remedies.

RELEVANCE TO THE PROJECT

- The Contractor will be responsible for maintaining good relations with relevant affected and have a liaison officer for the entire contract. This person shall be available to investigate all problems arising on the work. This person will also ensure open channels of communication and prompt response to queries and claims.
- All the complaints from the public must be documented and filed on site, as a record of all the issues raised and how they were addressed by the contractor.

Figure 17: Requirements and applicability of the Safeguards Standard 8

Table 23: Legislative framework complying with the IFC Performance Standard 8

Legislation(s)	Country	Description	Applicability	Reference in the Report
Traditional Leadership and Governance Framework Amendment Act (Act No. 23 of 2009)	**South Africa**	It makes provision for communities to decide for themselves if they want to be regarded as a traditional community in terms of their customs and observe a system of customary law by applying in writing to the Premier.	The stakeholder engagement process undertaken to date has been done in such a manner respect the traditional leadership structures in the various areas and follow the appropriate protocols when consulting with communities.	**Section 5.8** **Annexure D.4** **Annexure E.2** **Annexure G.6**

Legislation(s)	Country	Description	Applicability	Reference in the Report
		The Act also provides for the establishment and recognition of Traditional Councils, defines the roles and powers of traditional leaders, and provides for dispute resolution and the establishment of a Commission on Traditional Leadership disputes and claims. The authority of the Tribal Authorities in the project area, in terms of acting on behalf of communities in their area of jurisdiction during land acquisition negotiations and granting access for construction work, therefore derives from the provisions of this Act.		**Annexure G.7**
Tribal Land Act (Cap 32: 02 of 1990)	**Botswana**	This Act controls land use rights and makes provision for the imposition of restrictions on its use. It also regulates the use of tribal land and it is administered by the land board.	Applications for wayleaves must be undertaken with respective land boards.	**Section 5.8** **Annexure D.4** **Annexure E.2** **Annexure G.6** **Annexure G.7**

SECTION 3

3 ESIA Process and Approach

The ESIA is an interdisciplinary process that typically follows distinct phases (**Figure 18**). Each includes some form of public engagement and/or consultation. While this process is not uniform from country to country it generally consists of similar procedural steps as described below. The process in the centre represents best international practice for ESIA, as informed by the IFC Performance Standards

SOUTH AFRICA

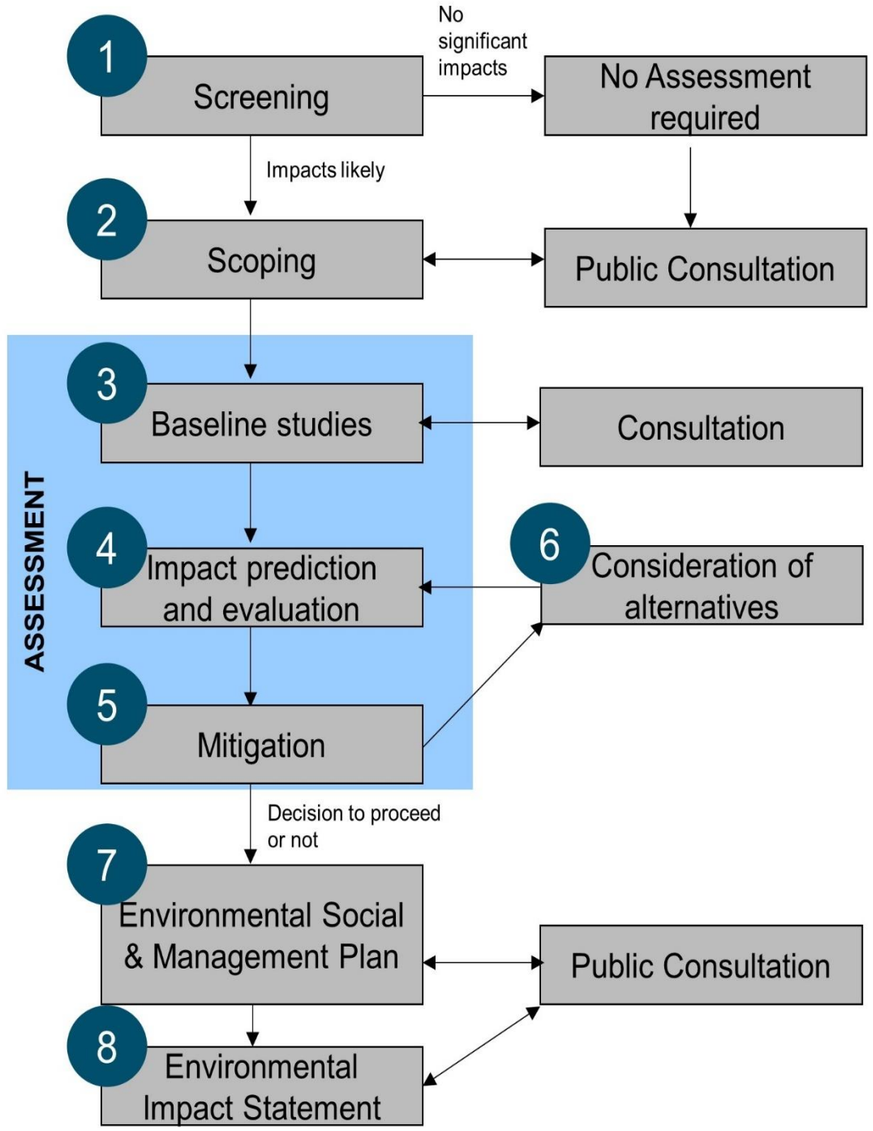
- Pre-application consultation with Competent Authority (CA)
- Initial Public Engagement (Issuing of notifications and BIDs)
- Submission of Environmental Authorisation (EA) application

NOTE: *Screening is not stipulated as part of the regulatory process therefore has no specified timeframes. It is the responsibility of the applicant to do the screening exercise.*

- Preparation and submission of a Draft Scoping Report (DSR) and Plan of Study (PoS) for ESIA (**44 days** from acceptance of application including the commenting period of **30 days.**
- DSR is finalised by addressing the comments received. Final Scoping Report and PoS for ESIA are submitted for authority review. The CA has **43 days** to make a positive or negative decision.

- Draft Environmental Impact Report (EIR) and ESMP Phase: **106 days** including the commenting period of **30 days.**
- Final EIR and ESMP – the CA has **107days** to review – grant or refuse Authorisation.

- Applicant is notified of the decision within **5 days.**
- All registered I&APs are to be notified, in writing within **14 days** of the date of the Department's decision.
- EA appeal process is finalised in **90 days.**



BOTSWANA

- Submission of a Project Brief to DEA Botswana
- Review by DEA Botswana should take a week

- Terms of Reference and Scoping Report
- Advertising of intended activity once for a period not less than 21 days using official languages.
- After **21 days** hold public meetings
- Consultations with government departments, NGOs and businesses.
- Submission of ToR and Scoping report to DEA
- The Act provides **30 days** for review.

- Draft Environmental Impact Assessment Report
- Develop an Environmental Management Plan
- Develop a Monitoring Plan
- Further consultations if necessary
- Submit Environmental Impact Assessment Statement (EIS) to DEA
- The Act provides **60 days** for review.

- Public Review Period
- Draft adverts stating impacts and mitigation measures as contained in the EIS for DEA approval
- Publish adverts in a nationally circulating paper and Government Gazette for **4 weeks**
- Obtain approval from DEA if no further comments are raised
- The Act provides **60 days** for review.

Figure 18: ESIA Process

3.1 Screening Phase

The 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. In terms of NEMA, a full ESIA is required and as the global standards require adherence to host country standards as a minimum. While the categorisation is a Category B or 2 project, the need for a full ESIA in South Africa and Botswana mean that this is a Category A project in terms of the IFC Performance Standards and a Category 1 project in terms of the DBSA Safeguards Standards.

Pre-application meetings were held with both the DEAs in South Africa and Botswana to introduce the project to the authorities and to ensure that the ESIA process is in line with South African and Botswana requirements and/or expectations. Notes from the meetings with DEA in both countries are included in **ANNEXURE C1** and **C.2**. A Project Brief with a brief overview of the Project was submitted to DEA in Botswana in line with their process requirements **(ANNEXURE C.1).**

3.2 Pre-feasibility Phase

A high-level assessment of the general study area was undertaken as part of the Transaction Advisor Process to determine constraints and opportunities and to develop potential line route corridors between Mahikeng and Isang substations. 19 routes were originally identified and screened down to the 5 most suitable alternatives to be examined in more detail. Assessment of 5 alternative routes for the transmission line was undertaken using a Multi-Criteria Decision Making (MCDM) model. This allowed for the preferred alternative to be selected in an integrated manner, based on technical, environmental and social criteria. The Mahikeng substation site was originally located to the south east of Mahikeng but due to altered growth loads and updated objectives for Eskom, the site was moved to the north west of Mahikeng. This required an additional process in the pre-feasibility stage to assess constraints and opportunities associated with linking the proposed Mahikeng substation to the existing Isang substation. A new route was thus found to link to the existing preferred route to Isang, following the same process that was used to determine the original preferred route. This is the route which has been taken forward into the Scoping and ESIA phases. The Route Selection Report is included in **ANNEXURE F** and is detailed in **Section 4.**

3.3 Scoping Phase

The activities outlined below were undertaken as part of the Scoping Process. Details of the stakeholder engagement are provided in **Section 8** and **ANNEXURE E.**

- **Identification and engagement** of the relevant authorities and Interested and Affected Parties (I&APs) with the release of a Background Information Document (BID) for a period of 30-days to elicit their interest in the project.
- Selection of the full range of **feasible alternatives** to be taken through to the ESIA 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 ESIA and Scoping Report from information gathered the Pre-feasibility and Screening process.

- A second **public consultation**, involving the release of the Scoping Report for public review, together with public meetings, allowing for I&APs and / or relevant authorities to learn about a proposed project and comment.
- **Submission of the Final Scoping Report and PoS** to the DEA for approval. In South Africa, the letter of acceptance was issued in October 2017.

3.4 Assessment Phase

The assessment stage involved the evaluation of the impacts identified in the scoping phase 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 also involved:

- Selective **walk through or site visit** of the proposed route by all the technical specialists.
- **Compilation of the ESIA Report** incorporating the specialists' findings, the assessment of significance of impacts and recommendations to avoid, reduce or manage impacts.
- Advertisement of the release of the reports for **public comments** and holding of appropriate public or focus groups meetings.

3.5 Environmental and Social Management Plan

The purpose of the Environmental and Social Management Plan (ESMP) is to provide a framework within which the environmental and social risks and liabilities identified during the ESIA process are managed for the lifecycle of the Project. The ESMP also aims to address occupational health and safety issues that may be associated with the day-to-day activities of the project. The plan also outlines a detailed implementation and monitoring costs associated with the activities planned and audit plan to measure compliance.

The ESMP 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 ESMP should be considered as a "live" document, applicable to the specific project. The ESMP 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.

It is acknowledged that because the scale and extent of the project and the fact that detailed design must still be completed, the ESMP is still generic in aspects such monitoring arrangements, specific functions of individuals and timeframes. A walk-down is required by the heritage and ecological specialists to micro-site the tower positions and such aspects that are lacking detail at this stage must be refined as the project plans for implementation progress. A site specific EMP would also be recommended, to capture tower specific issues. This will be a responsibility for Eskom and BPC to ensure that such requirements are written into the specifications for contractors.

The ESMP and associated management plans are appended as **ANNEXURE H.**

3.6 Environmental Impact Statement

The Environmental Impact Statement (EIS) (also known as Environmental Impact Report (EIR) in South Africa) is one of the **last steps** of the process. Both the EIS and ESMP have been made available to **the I&APs and public for comments**. Considering all the comments received, the report has been **finalised for the DEA South Africa to make a decision** regarding the environmental authorisation of the project in terms of NEMA.

SECTION 4

4 Project Description

The purpose of this chapter is to provide an overview of the proposed project and associated activities to be undertaken during different phases of the project

The transmission line route described in this chapter is the preferred alternative, determined after a detailed process to determine the most environmentally, socially and technically suitable option to avoid areas of environmental and social concern. A detailed description of process followed to select route alternatives is provided in **Section 44.4**.

4.1 Site Location and Extent

The proposed 210 km transmission line stretches between the Mahikeng area in South Africa and the area immediately north of Gaborone in Botswana, with the longest section (approximately 149 km) of the line within South Africa **(Figure 1).** The South African section of the powerline traverses the Mahikeng and Ramotshere Moiloa Local Municipalities, under the jurisdiction of the Ngaka Modiri Molema District Municipality, in the North-West Province. The Botswana section traverses the Kgatleng District, whose administration capital is in Mochudi.

The study area servitude for the ESIA is a 1 km wide strip (i.e. 500 m on either side of the centreline of the route) to ensure sufficient coverage for anticipated design changes and allow some flexibility for later stages of the project. The geographical co-ordinates of the transmission line are tabulated below **(Table 24):**

Table 24: Site co-ordinates

Country	Location	Latitude (S)	Longitude (E):
South Africa	**Starting point** *Approximately 16 km north-west of Mmabatho*	25°42'11.15"	25°32'13.48"
	Middle point *Approximately 10 km north-east of Borakalalo Village*	25°13'40.64"	25°59'7.17"
	End point *Near the border post between Botswana and South Africa*	24°42'2.67"	26° 7'20.87"
Botswana	**Starting point** *Near the border post between Botswana and South Africa*	24°42'2.67"	26° 7'20.87"
	Middle point *Approximately 8 km east of Mochudi Village*	24°26'2.19"	26°14'22.17"
	End point *Approximately 38 km north-east of Lentsweletau Village*	24° 9'33.76"	26°13'57.19"

The list of farms properties and their 21-digit Surveyor-General codes that will be directly affected by the project are included in **ANNEXURE D.4.**

The landowner (Farmer: Putfontein 2 Portion 4) indicated that accreditation for his game farm could be affected by the visual impact of the power line. He suggested an alternative, which was acceptable from a technical perspective. All the specialists have confirmed that the new route did not affect their assessment. The social specialist stated that the deviation would have a slightly more positive impact, as the landowner had an input into the alignment; the new alignment has less of an impact on a tourism attraction and the line running next to the road on the remainder of Sandbult preferred. The deviation takes the route a maximum of 4.2 km from the existing route and remains on the originally affected properties, namely Putfontein Portions 3 and 4, Draailaagte Portion 1 and Sandbult remainder (**Figure 19**).

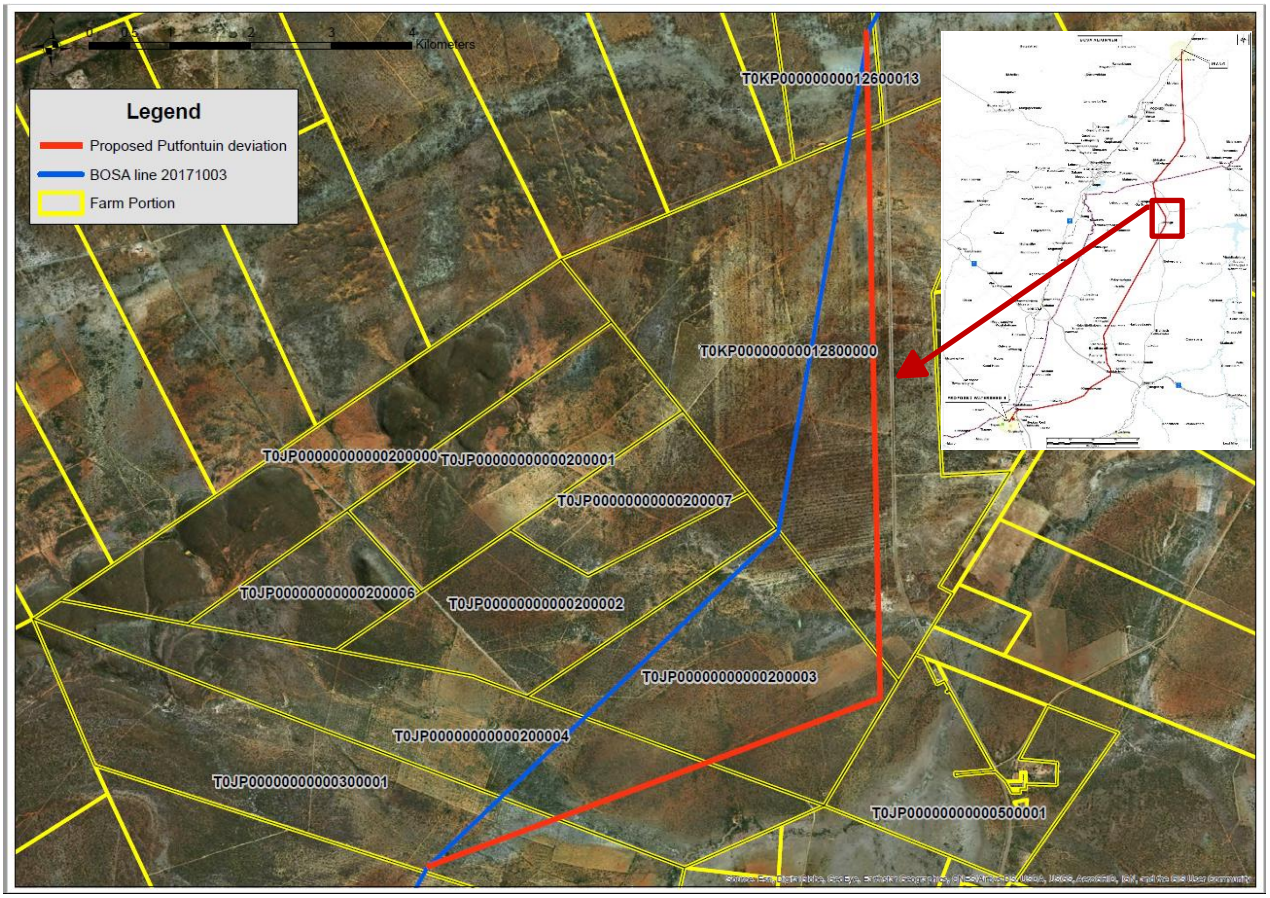


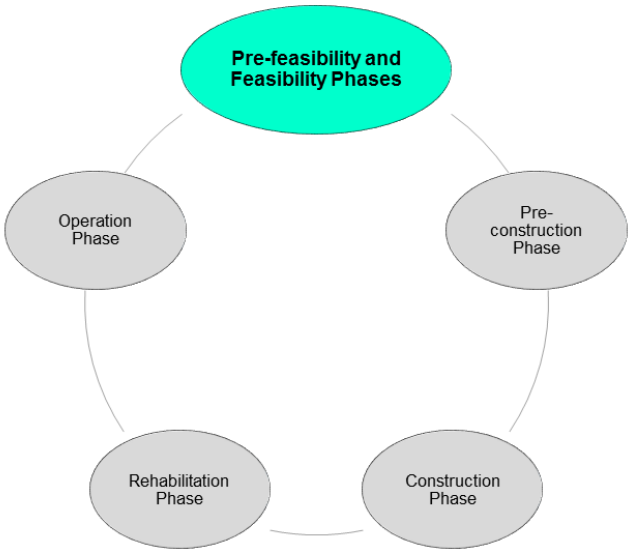
Figure 19. Details of the deviation in the Putfontein area

The Mahikeng substation site was originally located to the south east of Mahikeng but due to altered growth loads and updated objectives for Eskom, the site was moved to the north west of Mahikeng. This required an additional process in the pre-feasibility stage to assess constraints and opportunities associated with linking the proposed Mahikeng substation to the existing Isang substation **(ANNEXURE I.3).**

4.2 Project Activities

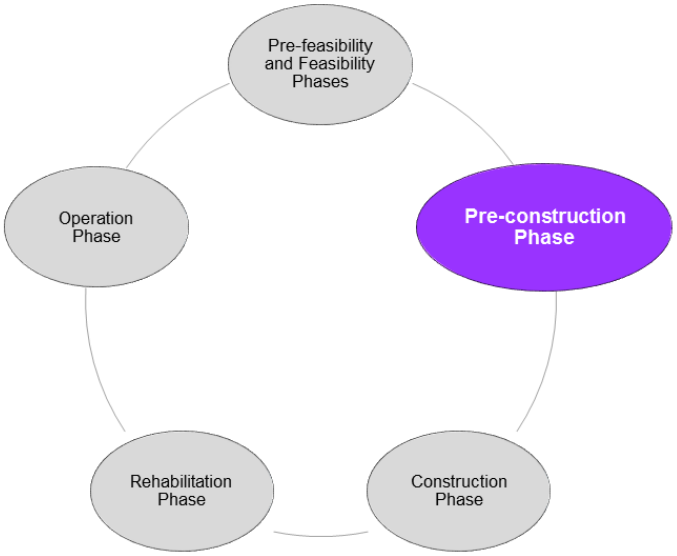
The lifecycle of the proposed BOSA interconnection project is divided into five distinct phases, namely:

4.2.1 Pre-feasibility and feasibility Phases



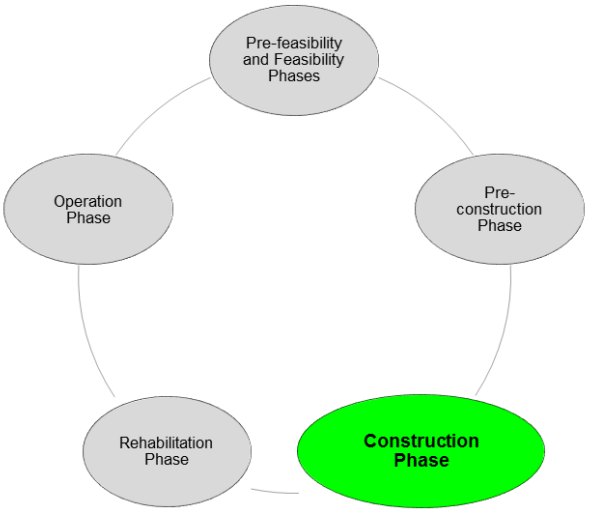
- Building of business case to demonstrate the need for the BOSA
- High level identification of environmental and social constraints
- Screening of the project and different alternatives
- Selection of a preferred transmission route corridor
- Preliminary designs

4.2.2 Pre-construction phase



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

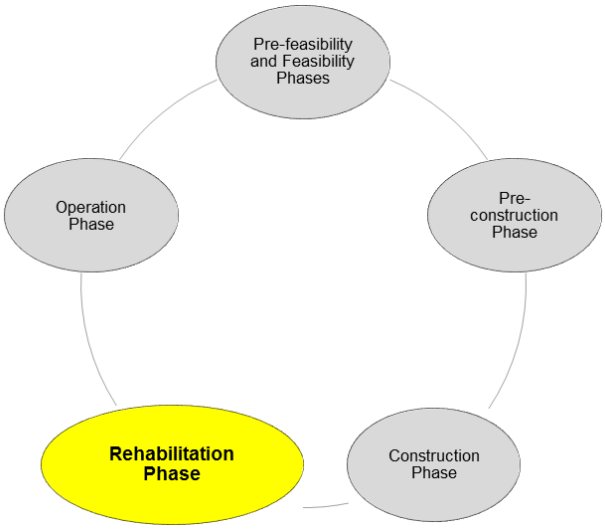
4.2.3 Construction phase



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

- Site clearance to facilitate access and construction *(as per Eskom internal guidelines and standards in South Africa)*
- Construction of access roads and installation of stormwater infrastructure where required
- Pegging out of tower locations
- Establishment of the contractor's site camps
- Removal and stockpiling of topsoil
- Transportation and storage of construction equipment on site
- Installation of foundation for the towers
- Assembly and erection of towers
- Cable stringing and installation of earth conductors
- Handling and disposal of construction waste

4.2.4 Rehabilitation phase



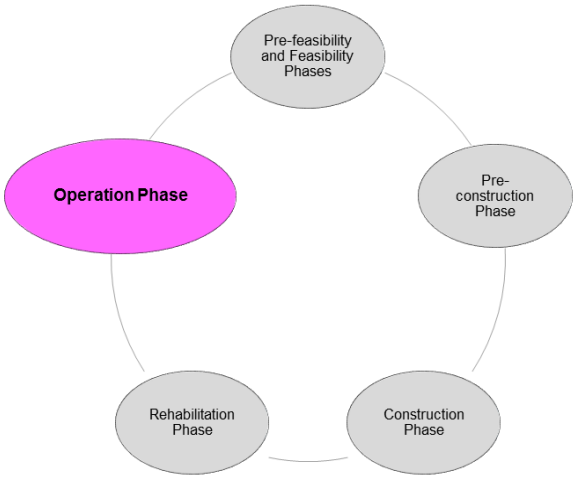
Although the design life of the powerline is permanent and there is no intention to decommission the infrastructure, a proper rehabilitation procedure must be followed. The objective of rehabilitating the site would be to re-instate the affected project areas not needed for project infrastructure to a similar or better condition to the current environment.

The rehabilitation of disturbed areas will be done immediately after construction activities have been completed at each tower site. This will include:

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

Rehabilitation will be done as per the specifications of ESMP.

4.2.5 Operation phase



- The operational phase refers to the actual operation of the proposed powerline and associated infrastructures (i.e. substation).
- This phase is not likely to have a significant impact on the natural environment or put a burden on local services. The infrastructure would not require service provision except for maintenance.
- Maintenance will be done as per the specifications and / or requirements of Eskom and BPC.

4.2.6 Decommissioning phase

The proposed powerline is permanent infrastructure and there is no intention to decommission. However, should the power line need to be decommissioned at some stage, it will consist of the following activities *inter alia*:

- Decommissioning of the power line and associated infrastructure;
- Dismantling and removal of transmission cables and towers;
- Rehabilitation of tower foundations and other disturbed areas;
- Transport and disposal the material off-site; and
- Necessary monitoring (site surveys) must be done, for at least 6 months after rehabilitation has been completed. The aim of monitoring and maintenance is to ensure that the rehabilitation objectives were met and that the rehabilitation process was successful.

As there is no intention to decommission the line, especially in the near future, there has not been a focus on decommissioning actions and impacts. Should the line be decommissioned for any reason in the future, a decommissioning plan must be compiled at the time for implementation during that stage, based on conditions at the time.

4.3 Project Infrastructure and Specifications

The design and EA processes to be undertaken are for the construction of a 400 kV transmission power line 210 km in length. The line will connect the existing Isang substation in Botswana to the **proposed Mahikeng substation** in South Africa**.**

PROPOSED MAHIKENG SUBSTATION

The proposed Mahikeng substation is not part of this application, as it will be applied for separately. The substation application together with the DSR were submitted on 5 December 2017 and acknowledged by the DEA on the 8 December 2017, with the reference number 14/12/16/3/3/2/1051. The substation alternative sites will be fully assessed during the EIA phase after the acceptance of the Scoping Report by DEA.

The detailed design has been informed by the outcomes of the environmental and social study. The intention, as approved by DEA, was to apply for corridor area of 1 km, which was assessed by specialists. Within this corridor, a development footprint of 55 m will be required for the line, with areas of 75 m by 47 m for the tower structure (**Figure 20**).

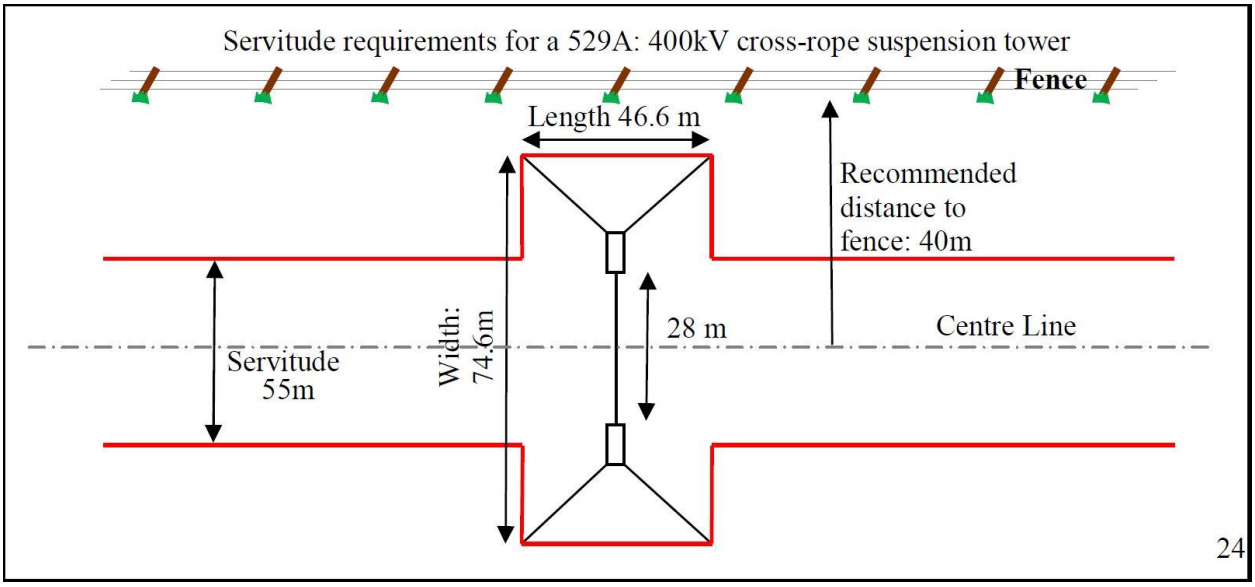


Figure 20. Development footprint area for the length of the transmission line

The detailed design will determine how many tower structures will be required and exactly where, within the corridor these should be placed. Because of the uncertainty at this stage, and to ensure that no aquatic resources, protected species or heritage resources are compromised, a walk-down of the route, with detailed investigations at each of the proposed tower locations to allow for micro-siting at the time, is required. As all sensitivities have been avoided at a larger scale, there is confidence that checks for micro-siting will address sensitivities on the finer scale.

Two types of tower structures will be used for the line, namely; 529a Cross-Rope Suspension and 515b - Guyed-V Suspension towers in South Africa and Botswana respectively[14]. Detailed technical specifications of these towers and other structures that were considered in the prefeasibility design stage are specified in **Section 4.4.2.**

The towers will vary between 21.75 m and 30.75 m in height and the average span between two towers will be between 250 m and 500 m depending on the above-mentioned environmental factors. The conductor type to be used is the Triple Tern ACSR conductor. The attachment height will vary between 18 m and 33 m, depending on the length of spans and required clearance.

During the construction phase, the access roads and construction camps will be established. Where possible all access roads and construction camps will be located in areas with the least environmental impacts. They will also be rehabilitated after construction except for the access roads that will be used to access the transmission line during operation.

[14] The proposed structures were finalised by the design team after the Draft ESIA Report was circulated for public comment – the information is thus updated in this report, with the only material difference being a different look to the tower (less visually intrusive).

4.4 Project Alternatives

The IFC Performance Standards, the DBSA Environmental and Social Safeguard Standards, the NEMA and the EIAA all require that alternatives be considered during the ESIA process. According to DEAT (2004) *"an alternative can be defined as a possible course of action, in place of another, that would meet the same purpose and need".*

The DEA&DP Guideline on Alternatives (DEA&DP, 2013)[15] states that *"every EIA process must identify and investigate alternatives, with feasible and reasonable alternatives to be comparatively assessed. If, however, after having identified and investigated alternatives, no feasible and reasonable alternatives were found, no comparative assessment of alternatives, beyond the comparative assessment of the preferred alternative and the option of not proceeding, is required during the assessment phase. What would, however, have to be provided to the Department in this instance is proof that an investigation was undertaken and motivation indicating that no reasonable or feasible alternatives other than the preferred option and the no-go option exist."*

The 2014 EIA Regulations (GN No. R982) provide the following definition: ***"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 undertake;*

*(b) type of **activity** to be undertaken;*

*(c) **design or layout** of the activity;*

*(d) **technology** to be used in the activity;*

*(e) **operational** aspects of the activity; and*

*(f) includes the option of not implementing the activity ("**No-Go**" alternative).*

In addition to the list above, the DEA&DP Guidelines on Alternatives (DEA&DP, 2013) also consider the following as alternatives:

(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 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.*

The different alternatives applicable to this project are described in the following sections.

[15] This guideline has been used as a best practice tool since it is the most recent guideline in South Africa on alternatives.

4.4.1 Routing alternatives

The optimum routing for an overhead electricity transmission line 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 never 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.

A systematic and comprehensive transmission line corridor selection process was undertaken using a GIS based assessment of alternative routings to screen the most feasible routes, as described in detail in **ANNEXURE I.2 and I.3**. A Multi-Criteria Decision Making (MCDM) process was then undertaken to determine the preferred alternative from a technical, environmental and social perspective, allowing for an integrated assessment of the route alternatives. The process included not only the relevant environmental and social specialist team, but also Aurecon technical team and representatives of Eskom and BPC, to ensure that all relevant information, local knowledge and transmission expertise was duly taken into consideration in the final decision; and that all interested parties agreed on the way forward.

Several factors were taken into consideration in informing route selection, including the following**:**

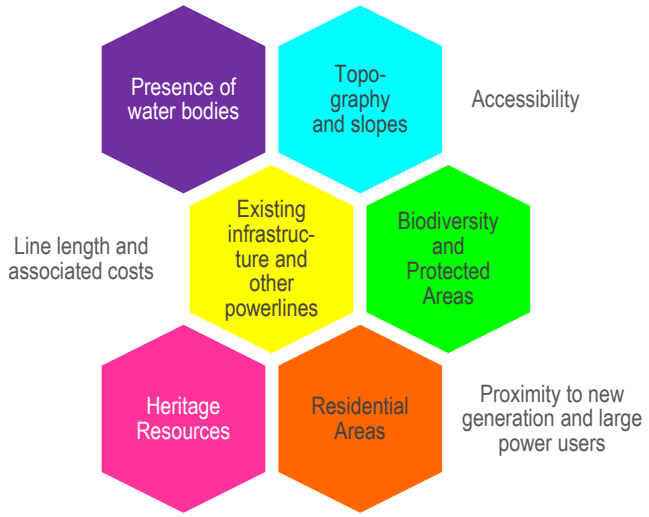


Figure 21: Factors considered in route selection process

A total of 19 potential corridors were identified to link the proposed Mahikeng and existing Isang substation based on the abovementioned considerations. A screening process was undertaken to identify constraints and fatal flaws associated with each corridor. Of these 19 routes, 12 were considered significantly constrained and a total of five corridors were identified as potential routes for more detailed assessment **(Table 25).** The five potential corridors **(Figure 27)** were identified for assessment during the MCDM workshop to allow for the choice of the best three alternatives to take forward to the feasibility study for more detailed assessment in Phase 2.

Table 25: Details of the 19 route alignments identified

Route Name	Length (km)	Suitability	Comment
A	226	Potential	Assessed further

B	284	Constrained	• Line length – costly to construct • Crossed path of 220 kV transmission lines to the west of Isang substation • Crossed formally protected area in South Africa • Crossed area identified as a bird sensitive area in Botswana (high vulture activity) • Crossed large areas of subsistence and formal agriculture – high levels of compensation and possible resettlement required
C	**210**	**Potential**	**Assessed further**
D	216	Constrained	• Line route too close to Gaborone – potential to constrain future development
E	**212**	**Potential**	**Assessed further** *(Variation on C)*
F	**214**	**Potential**	**Assessed further**
G	**215**	**Constrained**	• Variation of C; too similar to be considered an alternative • Crossed railway corridor leaving Isang
H	**264**	**Constrained**	• Line length – costly to construct • Crossed path of 220 kV transmission lines to the west of Isang substation
I	**250**	**Constrained**	• Line length – costly to construct • Crossed path of 220 kV transmission lines to the west of Isang substation • Crossed formally protected area in South Africa • Crossed area identified as a bird sensitive area in Botswana (high vulture activity)
J	**284**	**Constrained**	• Line length – costly to construct • Crossed path of 220 kV transmission lines to the west of Isang substation • Crossed area identified as a bird sensitive area in Botswana (high vulture activity) • Crossed large areas of subsistence and formal agriculture – high levels of compensation and possible resettlement required
K	**222**	**Constrained**	• Variation on A - too close to be considered an alternative
L	**265**	**Constrained**	• Line length – costly to construct • Crossed path of 220 kV transmission lines to the west of Isang substation
M	**318**	**Constrained**	• Line length – costly to construct • Crossed path of 220 kV transmission lines to the west of Isang substation • Crossed area identified as a bird sensitive area in Botswana (high vulture activity) • Crossed large areas of subsistence and formal agriculture – high levels of compensation and possible resettlement required
N	**250**	**Constrained**	• Line length – costly to construct • Crossed path of 220 kV transmission lines to the west of Isang substation • Crossed formally protected area in South Africa • Crossed area identified as a bird sensitive area in Botswana (high vulture activity) • Crossed large areas of subsistence and formal agriculture – high levels of compensation and possible resettlement required
O	257	Constrained	• Line length – costly to construct • Crossed path of 220 kV transmission lines to the west of Isang substation • Crossed large areas of subsistence and formal agriculture – high levels of compensation and possible resettlement required

P	222	Constrained	• Line route too close to Gaborone – potential to constrain future development
Q	237	Constrained	• Line length – costly to construct • Crossed formally protected area in South Africa • Crossed area identified as a bird sensitive area in Botswana (high vulture activity) • Crossed large areas of subsistence and formal agriculture – high levels of compensation and possible resettlement required
R	223	Constrained	• Line route too close to Gaborone – potential to constrain future development • Variation on P
S	**215**	**Potential**	**Assessed further** *(Variation on A)*

The five most feasible options were further assessed in a MCDM model against the following criteria to determine the preferred option:

Table 26: MCDM Criteria

Category	Weight	Criteria	Description
Technical (Inc. financial)	30%	Te1. Slope	Avoid steep slopes more than 1:10
		Te2. Access	Constructability and maintainability in terms of construction and access to site
		Te3. Length	Line length and associated cost
		Te4. Width	Ability to construct 2 single circuit transmission lines spaced between 7 to 10 km apart within the corridor
Environmental	30%	En1. Biodiversity	Aquatic and terrestrial ecology; Ecological services
		En3. Avifauna	Flight paths; Nesting areas, Focal points
Social	35%	So1. Heritage	Archaeological and cultural heritage resources
		So2. Compensation	Homes or other assets that will require resettlement or other compensation
		So3. Social	Proximity to existing large villages or towns that will remain; Distance to communities
		So4. Visual	Visibility on ridges
Strategic	5%	St1. Proximity	Proximity to potential new Generation and Large Power Users

The results of the assessment based on the above-mention criteria are summarised below:

4.4.1.1 Technical

Route C was considered the best route from an overall technical perspective **(Figure 22).** Technical considerations ensure the most cost-effective solution for the lifecycle of the project for the planning stages, through construction and operation to decommissioning.

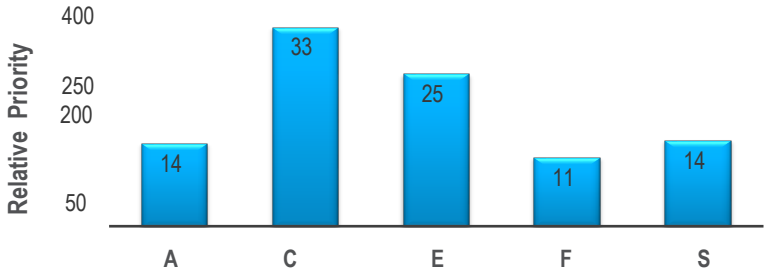


Figure 22: Ranging of routes from a technical perspective

4.4.1.2 Environmental

The ranking for each route and order of preference are indicated in **(Table 27).** The summary result finds an overall preference for Route C, followed very closely by Route E. Route C is preferred for all categories, except from a purely environmental perspective where Route E is marginally preferred to Route C. Route A is showed the lowest preference for all criteria. There was a slight preference for Route S compared to Route F.

Based on the above outcome was recommended that Route C be taken forward as the preferred alternative for more detailed assessment, with Routes E and S also taken forward as potential alternatives. Routes F and A was therefore screened out for further assessment.

Table 27: Description of routes from an environmental perspective (where 1 = preferred & 5 = least preferred)

Route	Ranking	Issues & Sensitivities encountered
E	1	• Traverses 4 ridge complexes[2] which usually contain high number of plants, with high numbers being Species of Special Concern • Crosses 2 broad floodplain areas • Slightly further away from the fence of a protected area (Madikwe) than Route C • Least sensitive from an avifaunal perspective (not as close to avifaunal focal points or IBA or breeding areas
C	2	• Very similar to Route E – while close to the Madikwe boundary the route avoids the broad sections of ridges or passes between ridge complexes • Least sensitive from an avifaunal perspective (not as close to avifaunal focal points or IBA or breeding areas
S	2	• Avoids broad ridges when compared to Route A • Avoids Madikwe protected areas when compared to Routes C and E • Avoids one floodplain when compared to Option A • Intersects with an inselberg and transverses a broad water course in the Kalkpan area • Intersects an inselberg when compared Option E
F	2	• Intersects inselbergs when compared Option E • Crosses a broad water course at Kalkpan • Avoids one floodplain when compared to Option • Avoids broad ridges when compared to Route A • Avoids Madikwe as per Routes C and E
A	5	• Traverses 3 broad ridges and 3 smaller ridges • Traverses inselbergs and several wide floodplain areas • Crosses over sensitive ridges • Several broad floodplains are encountered • Most sensitive from an avifaunal perspective by a significant margin

4.4.1.3 Social

Heritage:

- While Routes C and E have similar alignment, Option E appears to pass through ports or necks in the mountains rather than across them.
- Heritage sites are more likely to be found on the mountains rather than in the passes and Route E is thus favoured slightly more than Route C.
- Most sites of heritage significance in the Botswana section are in and around the Gaborone area. Routes A, F and S are all closer to this node than Routes Options C and E.

- Route C is closer to important heritage sites at Modipane.
- Route E has the least potential impact on sites on the Botswana and South African sections of the route.

Relocation/Compensation:

- Route selection considered the impact on smallest number of properties - attempted to avoid homesteads and commercial properties as far as possible during route selection.
- Relocation is the most severe of social impacts – to be avoided as far as possible.
- The impact during construction will be limited and most agriculture can continue under lines when operational.
- The preferred routes are C, E, S, F and A, in that order.

Proximity to towns/ distance from communities:

- Construction close to communities often result in safety issues and creates expectations around employment and project benefits.
- While there are few community benefits from transmission lines, there are also relatively small impacts on communities after construction.
- The route selection process followed focussed on avoiding communities or aligning the route to skirt the edge of the communities.
- From a social perspective, the preferred routes are C, E, S, F and A, in that order.

Visual considerations:

- Routes were considered in terms of the sensitivity of visual receptors (i.e. are the receptors residing in the area or passing through), the visibility of the project, the length of proposed line and the presence of large game reserves and areas of high tourism value.
- Route C crosses the least number of settlements and towns. It crosses the R49 various times but visual receptors on the road will be less sensitive to an overhead transmission line than individuals residing in the area.
- Routes C and E cross smaller areas of topographical significance (i.e. raised areas), which will make them less visible from a distance than the other three route alternatives.
- Routes C and E have lower visual exposure as they are located further away from most bigger towns and settlements.
- None of the proposed routes cross large game reserves.
- The routes were ranked, from most preferred to least preferred, as follows: C; E; S; F and A.

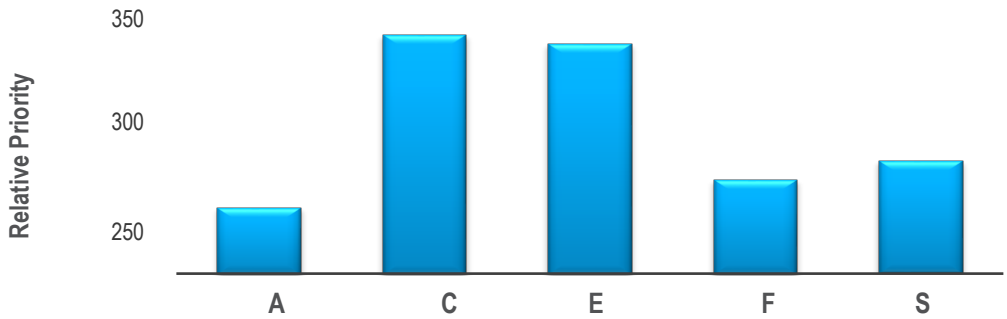


Figure 23: Preference of routes from a social perspective (including heritage, compensation, disruption and visual considerations)

4.4.1.4 Strategic

This category and criterion considered the potential to either provide bulk power to large users in the area in future or allow for ease of connection to large generators of power in the future. Only Routes C and E transverse close to identified bulk consumers towards the east where there are potential chrome and coal deposits. These two route options were thus preferred for this aspect.

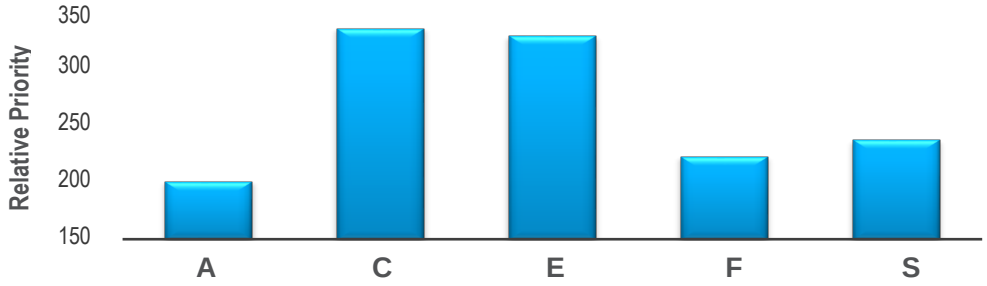


Figure 24: Preference of routes from a strategic perspective

4.4.1.5 Overall preference

Based on the criteria explained above, three best alternatives were Route, C, E and S**;** route C being the most preferred as indicated below:

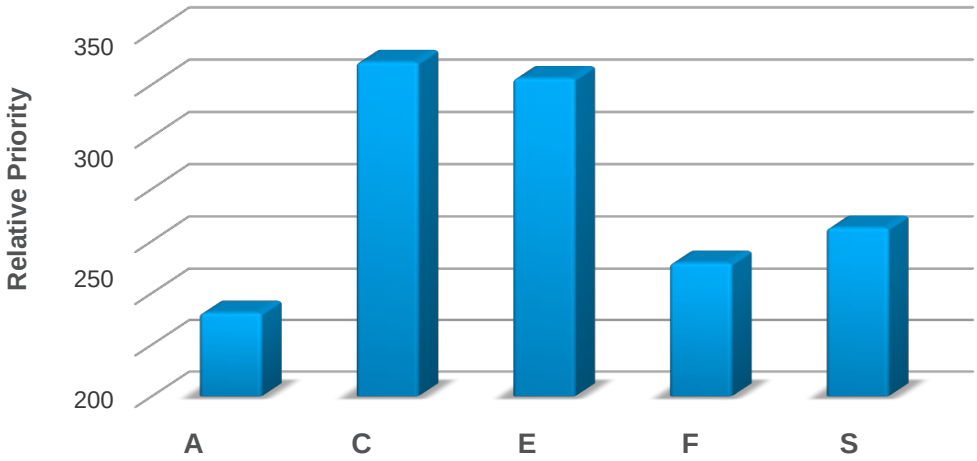


Figure 25: Overall preference for each route based on all criteria

The location of the initially proposed Mahikeng substation was changed, however Route C remained the preferred alternative. Another MCDM process was undertaken with the inputs of the specialists to find ways to link the new Mahikeng substation to Route C. Same environmental, social, and technical aspects were factored in selection of the routes. Three alternatives were considered, and based on the outcome of the MCDM it was recommended that Route T2 be taken forward as the preferred alternative to link Mahikeng substation to Route C leading to Isang substation. The updated preferred route will be assessed in detail in the ESIA which will allow for identification of potential mitigation measures to further reduce predicted impacts from the project.

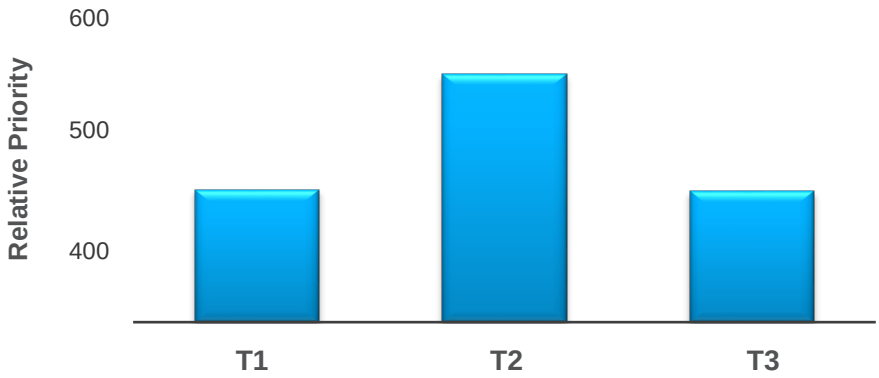


Figure 26: Preferred route from an integrated perspective

Although the MCDM process did not involve the public inputs, the outcome of the MCDM study was presented to the affected communities during the public meetings; and no objections were made towards the preferred corridor. Furthermore, examination of the SDFs do not show constraints related to the location of the route and support the development of electricity infrastructure in general. The details will be examined further in the ESIA phase, where this will be shown spatially. The route selection process is detailed in **ANNEXURE I.2 and I.3**.

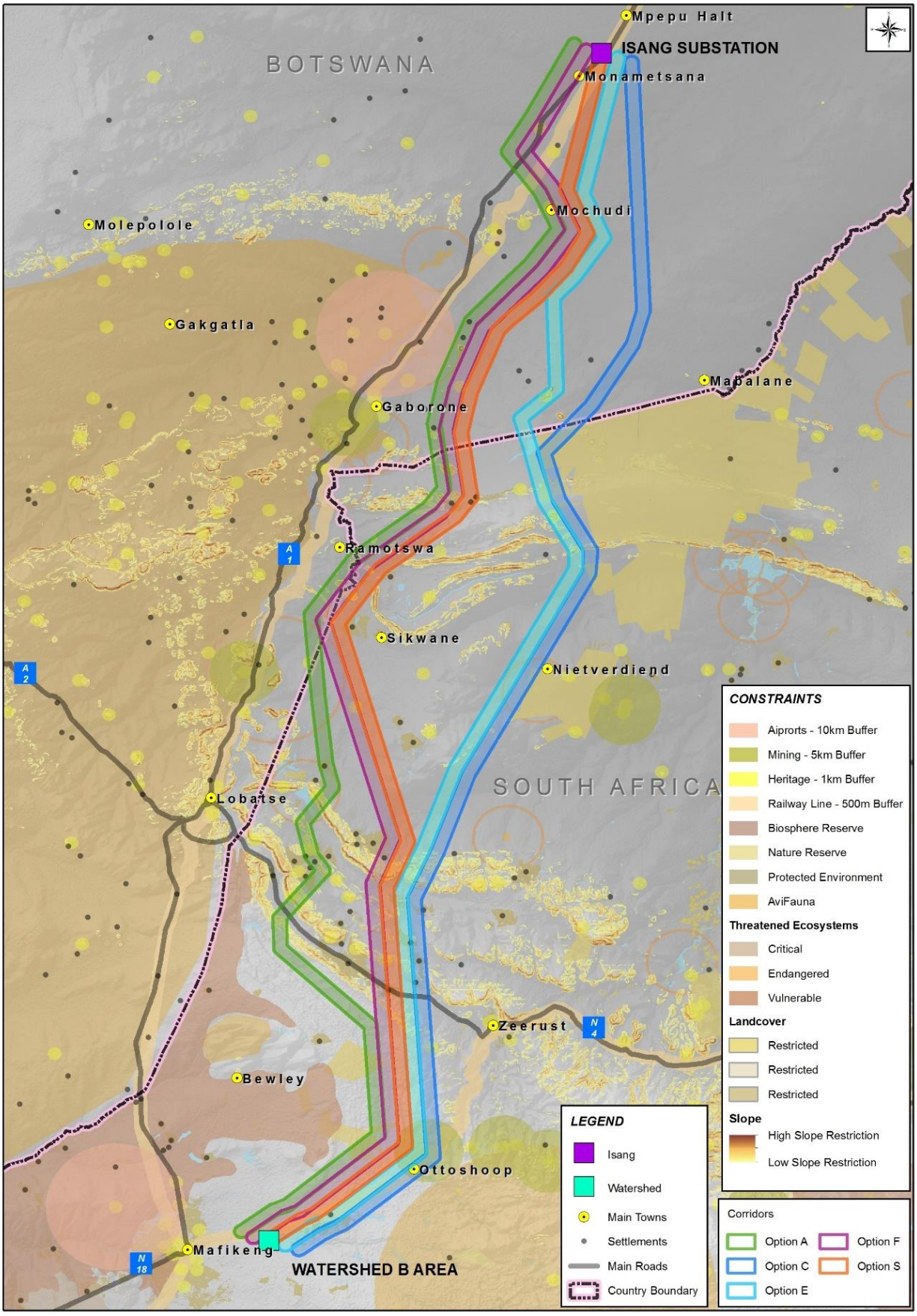


Figure 27: Alignment of 5 potential routes from original Mahikeng substation location

Due to strategic considerations, Eskom changed the location of the proposed Mahikeng substation to the northwest of Mahikeng. The same process outlined above was followed to select the best alignment to link the new substation location to the preferred Route C.

The final sensitive map showing all the sensitive areas that were identified and avoided during the MCDM process is attached **ANNEXURE D.3.**

4.4.2 Design alternatives

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

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 vary between 21.75 m and 30.75 m in height and the distance between each tower towers will be between 250 m and 500 m.

The following tower structures, as shown below in **Figure 28** were proposed as the basis for the preliminary transmission line design:

	**518H** **SELF SUPPORTING SUSPENSION TOWER** These are self-supporting lattice structures that were commonly used before the cheaper guyed and cross rope structures were designed. *(These tower structures will be used in South African locations where the 529 series is not suitable due to space or slope constraints)*
	**520B** **GUYED-V SUSPENSION TOWERS** Costs less than 518H. Good for where space is limited. Designed for heavier conductors, optimal is Quad Zebra. *(These structures will be used in South Africa locations where the 529 series is not suitable due to space constraints)*

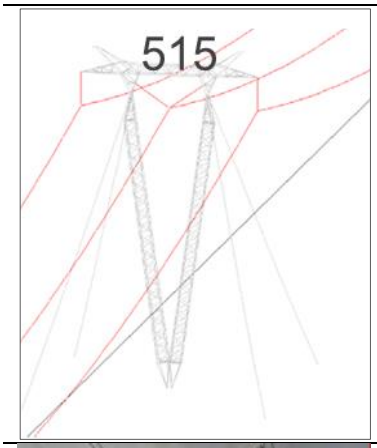
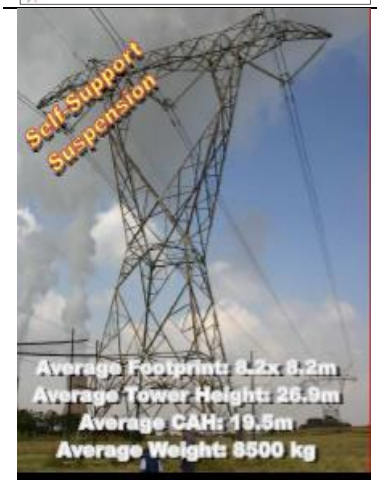
	**529A** **CROSS-ROPE SUSPENSION TOWERS** Optimal guyed mast design, making it lighter, more efficient and cost effective. Designed for Triple Tern conductor. *(These structures are the preferred choice for use on the South Africa section of the line)*
	**515B** **GUYED-V SUSPENSION TOWERS** **(preferred by BPC)** Good for use where space is limited. Tower beam helps with live line maintenance. No longer used in SA (replaced by 520B) Designed for lighter Quad Wolf conductor configuration. *(These structures are the preferred choice for use on the Botswana section of the line)*
	**517A** **SELF-SUPPORTING SUSPEBSION TOWERS** This tower is designed for Twin Dino conductor, but can be used for triple tern. It is generally costlier than the V-type or cross-rope types. *(These structures will be used in South Africa locations where the 529 series is not suitable due to space constraints)*

Figure 28: Tower structure alternatives

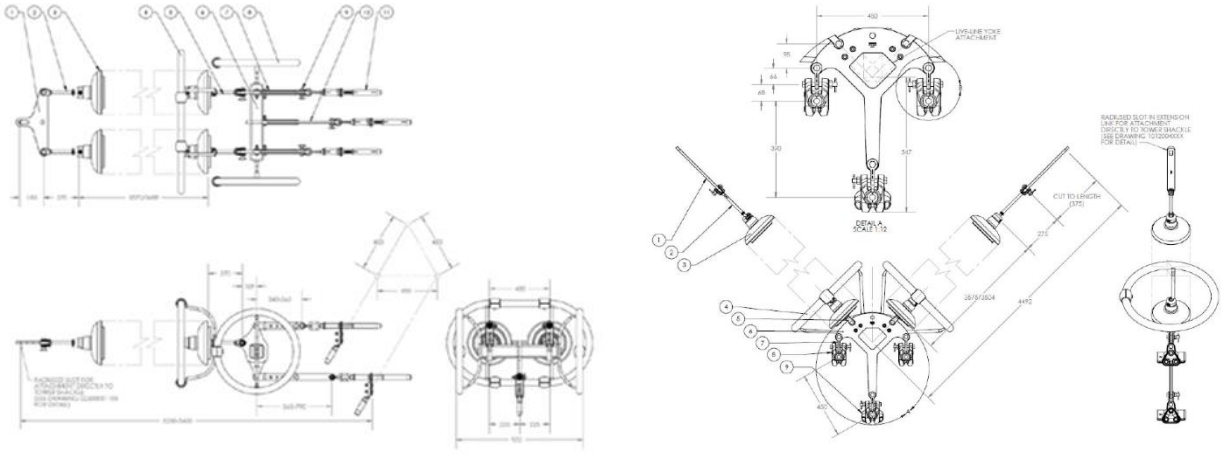
After further engineering assessments, it was concluded that 529A structure would be more suitable for the BOSA transmission line. This tower structure will be used along 90% of the South African portion of the route. Due to the extent of the project and varying terrain Intermediate structures will be required. Intermediate structures will also be required for the bend points. These will be the **517E** and **517F** structures. Also, where it is not possible to use the 529 as an intermediate tower (due to space constraints or the slope) **518J** towers will be used.

The Botswana section of the line will be using different structures altogether. These structures are still being developed, but are based on the 515 structures described in **Figure 28**.

4.4.3 Technology alternatives

Conductor selection and optimisation normally involve the consideration of many factors and criteria to determine the optimised selection of the phase conductor, to minimise losses and corona. The criteria include the Corona inception gradient, Radio interference limits, Audible noise and surface gradient. Viable option is then submitted into a financial analysis process to determine the capital cost and associated losses per annum. The results are then ranked to determine the optimised conductor size for the required transfer capacity.

For this inception phase of the study, preliminary discussions with Eskom and BPC have indicated the selection of a Triple Tern ACSR conductor as a preferred option. **Figure 29** Illustrates the typical hardware that will be used on a Triple Tern installation.



A B

Figure 29: A - Strain Insulator Assembly (3x Tern); B - Suspension Insulator assembly (3x Tern)

4.4.4 "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 ESIA as the option of no transmission line linking the North-West Province and the southern portion of Botswana. This implies that the objective of transmitting electricity to assist in alleviating the current electricity supply constraints or meeting the electricity demands will not be achieved. Route C will be assessed comparatively against the 'No-Go" alternative, as required legislatively and in terms of best practice.

4.5 Project Need and Desirability

The DEA SA have a guideline for assessing for the need and desirability of a project. The Guideline on Need and Desirability of a project (DEA, 2017b) highlights the obligation for all proposed activities that trigger the EIA regulations to be considered, the spatial planning context, broader societal needs, and financial viability. This information allows the authorities to contemplate the strategic context of a decision on the proposed project. This section seeks to provide the context within which the need and desirability of the proposed activity should be considered.

Southern Africa has experienced a period of unprecedented growth in utilisation of electricity in the period from 1995 to 2005, largely because of the boom in prices of natural resources. The region had enjoyed a long period of excess generation capacity and abundance of transmission facilities to evacuate power from the generation facilities to the customers. Since 2007, the region has run out of excess generation capacity and many regional transmission lines are now congested. This has led to implementation of demand side management programmes such as load shedding to stabilise the electricity supplies. While the load shedding experienced in South Africa has succeeded in restraining the overall electricity demand in the region to some degree, the measure has also affected socio-economic growth, hence the need to boost power generation capacity and transmission of electricity regionally (Aurecon, 2016).

The SAPP has since embarked upon various initiatives to alleviate the current electricity supply constraints and contribute towards energy security of supply in the long run. The Botswana-South Africa (BOSA) Transmission Interconnection Project, is one of the identified and planned initiatives to address the power generation and transmission challenges in the region. The establishment of the BOSA interconnector provides the opportunity for trade in electricity to better balance the supply/demand requirements of the region and thereby stimulate economic activity (Aurecon, 2016).

The objectives of the BOSA interconnector are primarily as follows:

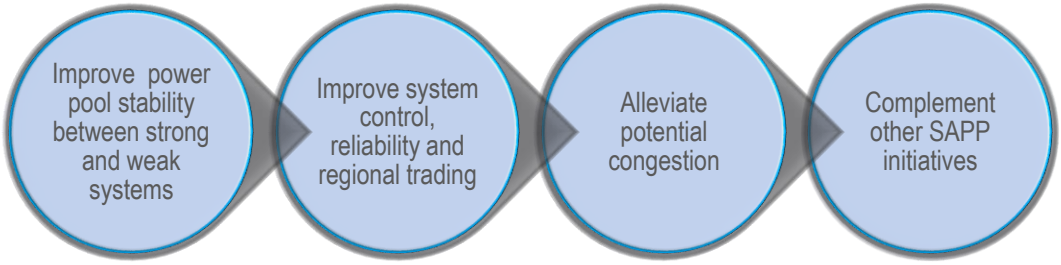


Figure 30: Objectives of the proposed development

Given the challenging economic climate; the construction of the 400 kV transmission line between Botswana and South Africa is important for supporting economic development in the Region.

SECTION 5

5 Environmental and Social Impacts

This section presents the overview of the biophysical and socio-economic baseline of the receiving environment. It also describes the assessment and significance of environmental and social impacts associated with the different activities of the project.

5.1 Approach to Impact Assessment

5.1.1 Aspects assessed

During the screening process, various potential impacts on the biophysical and socio-economic environment were identified. **Table 28** indicates the specialist assessment studies undertaken to form part of the ESIA process.

Table 28: Specialist studies undertaken for the project

Potential Impact	Assessment	Specialist
Impacts on avifauna	Avifaunal Assessment	Chris van Rooyen **Chris van Rooyen Consulting**
Impacts on aquatic and terrestrial biodiversity	Aquatic and Terrestrial Biodiversity Assessment	Brian Colloty **Scherman Colloty and Associates**
Impacts on heritage resources	Heritage Impact Assessment	Stephan Gaigher **GH Heritage Management Consultants**
Visual impacts	Visual Impact Assessment	Elmie Weideman **Aurecon SA (Pty) Ltd**
Socio-economic impacts	Social Impact Assessment (SIA) and Livelihoods Restoration Plan (LRP)	Tebogo Sebogo and Noeleen Greyling **Aurecon SA (Pty) Ltd**
	Stakeholder Engagement	Amelia Visage *(South Africa)* **Aurecon SA (Pty) Ltd** Elmar Schuran *(Botswana)* **Digby Wells Environmental**
Climate Change impacts	Climate Change Assessment	Daniël Brink and Dave Ogier **Aurecon SA (Pty) Ltd**

Additional environmental impacts that were not assessment in form of specialist studies, but were assessed by the project EAP include:

- Air pollution;
- Noise impacts;
- Soil impacts; and
- Traffic impacts.

5.1.2 Impact assessment methodology

The assessment of the potential impacts included direct, indirect as well as cumulative impacts associated with the project. The following assessment methodology was followed to identify and assess these impacts, as per the requirements stipulated in Appendix 3 (1) (j) of the 2014 EIA Regulations:

CONSEQUENCE CRITERIA

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.

SIGNIFICANCE CRITERIA

To determine the significance of an impact, the **PROBABILITY** (or likelihood) of that impact occurring is also considered. In assigning probability the specialist considers the likelihood of occurrence but also takes cognisance of uncertainty and detectability of the impact.

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 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.

MITIGATION OF POTENTIAL & 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 ESMP. The ESMP 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 detailed methodology is described in the Plan of Study for ESIA appended as **ANNEXURE F** and the ESMP to manage impacts for the lifecycle of the project is included in **ANNEXURE H.**

5.2 Climate

The Environmental Consultants from Aurecon South Africa were appointed to conduct a climate analysis and risk screening. The study aimed to provide a greater understanding of the climate change risks faced by the proposed transmission line. The goal of the study was to facilitate the consideration of climate change vulnerability and likely impacts at the project level during the project planning and design. Climate change was not specifically considered during the planning stages of the project and in the selection of alternatives as climate change considerations were similar for the entire study area and did not provide for differentiation of routes against each other.

The limitation of the study is that the scope of the study did not allow for the comprehensive analysis of specific upstream, downstream or operational impacts.

In addition to the limitation of the study, the following information gaps were identified:

- Detailed assessment of reduced carrying capacity efficiency under future climate scenarios;
- Comprehensive fire risk assessment surrounding areas; and
- Life Cycle Analysis (LCA) to determine carbon footprint of the project.

Refer to **ANNEXURE G.1** for the detailed Climate Analysis and Risk Screening Report.

5.2.1 Status quo

The project area is classified generally as an arid desert environment and specifically as a hot semi-arid climate (BSh) according to the generalised Köppen climate classification[16]. This environment is categorised as having low precipitation and long dry spells as well as very high temperatures (Aurecon, 2017a).

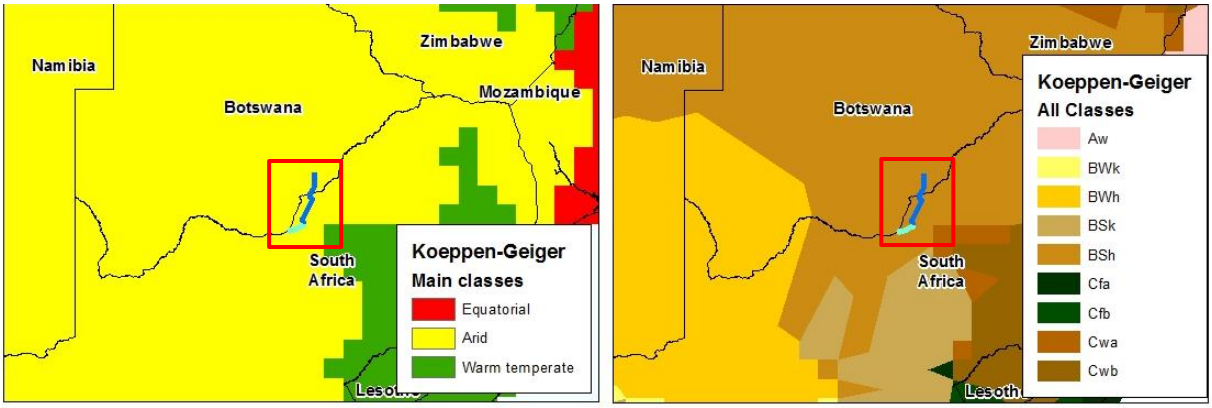


Figure 31: Köppen climate classification of the study site

The climate can also be categorised into two distinct climate zones based on topographical influences present **(Figure 32)**. These are northern and flat, southern and mountainous areas:

- The *northern climatology* is influenced by large homogenous landscape. There is little thermal mitigation and these areas will get very warm during the day but due to the lowered heat retention, should be cooler at night.
- The *southern climate zone* is categorised by the increase in elevation. This will decrease general temperatures and night time temperatures. There is also an increase in precipitation in the more southern areas compared to the northern.

[16] Peel, M.C., Finlayson, B.L., McMahon, T.A., Updated world map of the Koppen-Geiger climate classification, Hydrol. Earth Syst. Sci., 11, 1633–1644, 2007.

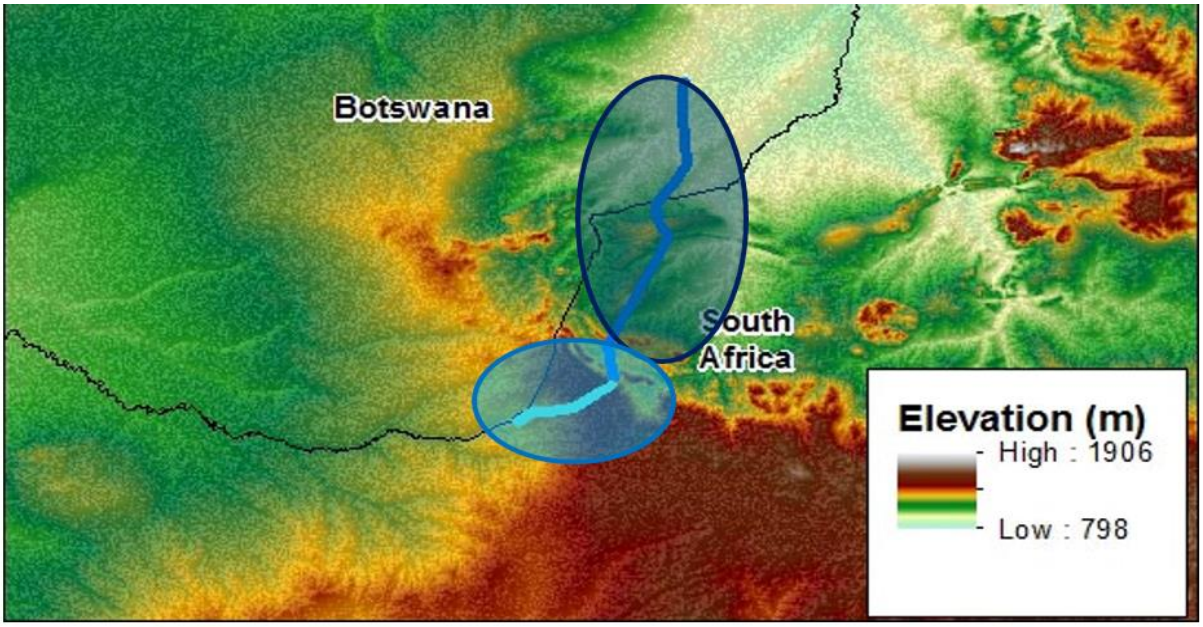


Figure 32: Two distinct climatic zones: northern and flat (dark blue); southern and mountainous (light blue)

5.2.1.1 Observed precipitation

The average annual historical rainfall for the study area is between 460 mm and 500 mm which is focused more to the south east within the late summer months, corresponding to the peak average temperatures (**Figure 33**). At 25.0°S, the area is too close to the equator to be significantly affected by the wintertime mid-latitude cyclones that bring precipitation to the African west coast further to the south. It is also away from the ocean to experience the mitigating effects of the large water mass. The precipitation regime is influenced on a synoptic scale by the movement of the Inter-Tropical Convergence Zone (ITCZ) and localised topographical influences in the south western. The austral (southern hemisphere) summer brings the ITCZ further south and is located just to the north of Namibia/Botswana (Aurecon, 2017a).

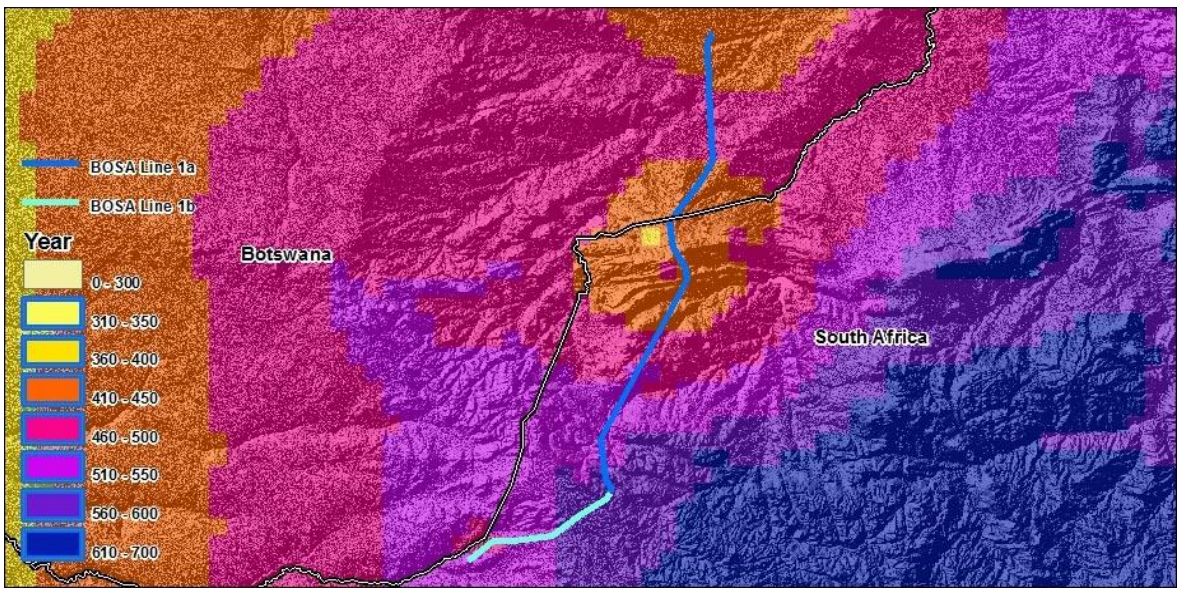


Figure 33: Annual average precipitation patterns

5.2.1.2 Observed temperature

Day time temperatures peak in the northern areas of South Africa and Botswana in summer (**Figure 34**). There is little heat retentive capacity and thus there is a significant diurnal range (day and night cycles). In areas further inland and away from large water bodies, there is little mitigation influence in the temperature. Areas further to the north are subject to a more orthogonal insolation (sunlight at 90 degrees to the earth surface) and therefore experience greater warming than areas further from the equator to the south. The warmest temperatures are noted from October through to March with temperatures in the low 30's (Aurecon, 2017a).

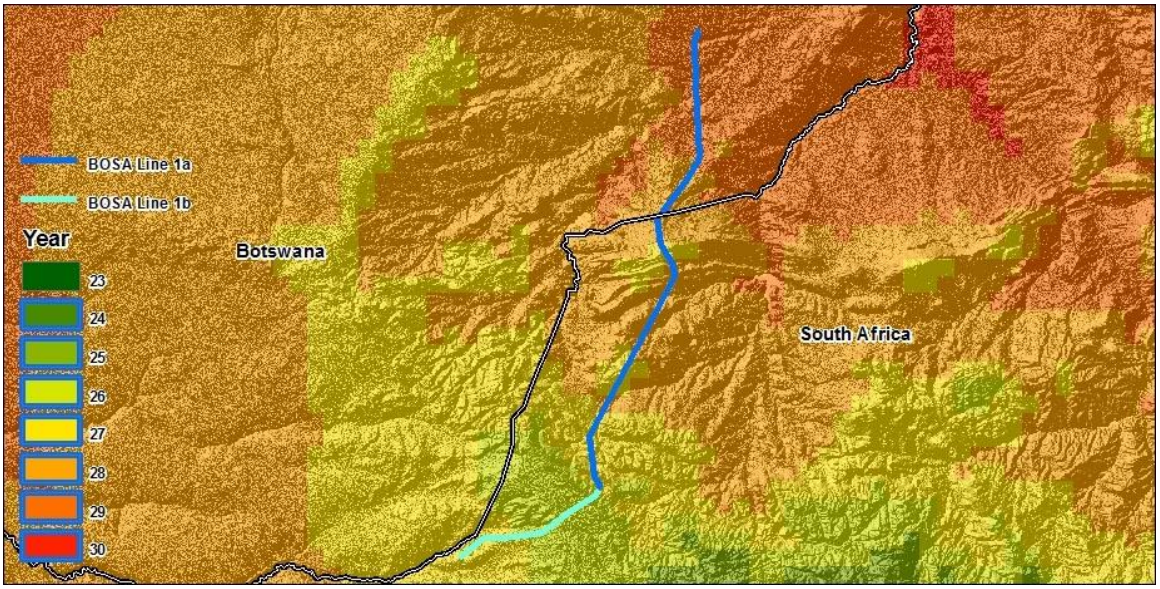


Figure 34: Annual average day time temperature

5.2.1.3 Localised climate conditions

SOUTH AFRICA

Climatic conditions in the North-West Province vary from arid conditions in the west, semi- arid in the central regions to temperate in the east. The site is in the western parts of the Province. The average rainfall is between 300 mm to 700 mm per annum, of which the most rainfall occurs during the summer months[17]. Summers are typically hot whilst winters are mild to cold. The daily average high temperatures during summer seasons are 32ºC and the average daily minimum temperatures in winter are 0.9ºC.[18]

BOTSWANA

Climatic condition in the Kgatleng District and South-East District is semi-arid, similar to most of the country. The average rainfall is between 400 mm to 500 mm and the rainfall occurs mostly during summer.

Summers are hot and winters have cold mornings and evenings whilst the days are usually mild. The daily average temperature during summer seasons is 19.6ºC and 40ºC and the average daily minimum temperatures for winter seasons go below zero degrees in the extreme cold winter nights.

[17] PBAI, 2011. Draft EIA Report: Proposed Ngwedi Substation and Associated Turn-Ins.
[18] North West Province State of the Environment Report

5.2.2 Potential impacts and mitigation measures

Climate change has the potential to have profound impacts of the energy sector. A sufficient and consistent energy supply supports economic activities including commerce, transportation, communications, health, water supply and other critical infrastructure. Thus, climate related disruptions in the energy sector can influence economic drivers and livelihoods. The climate change implications for the study area are mainly related to changes in the precipitation and temperature patterns (**Figure 35**). These potential risks are summarised below:

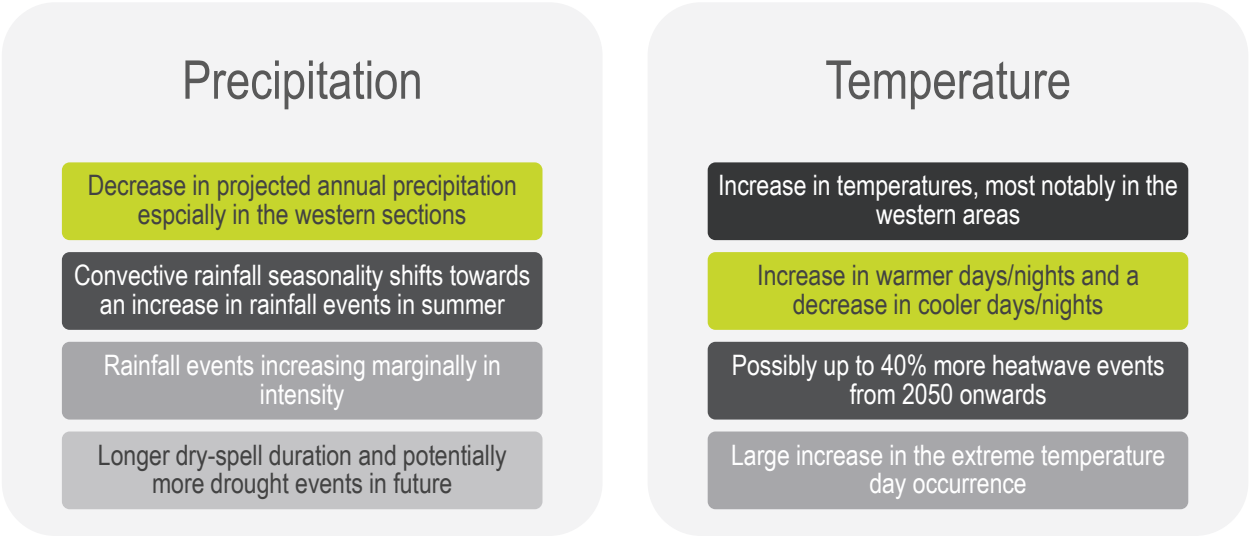


Figure 35: Summarised climate change implications for the study area

All industry and specifically the energy sector will need to develop strategies of adapting and preparing for projected climate change impacts. While the Climate Change report focussed on Climate Change Risk in the context of the proposed transmission line, it can also serve as a precursor to broad-based efforts to improve climate change resilience of transmission infrastructure.

Energy infrastructure has always been vulnerable to natural hazards such as earthquakes, fires, extreme temperatures, floods, etc. Weather related hazards in particular are expected to worsen in light of climate change including, but not limited to, changes in average and extreme temperatures; changes in average, seasonal, and extreme precipitation and hydrology and changes to ecosystems. The primary impacts on the energy sector that may result from climate change are outlined in **Figure 36**.

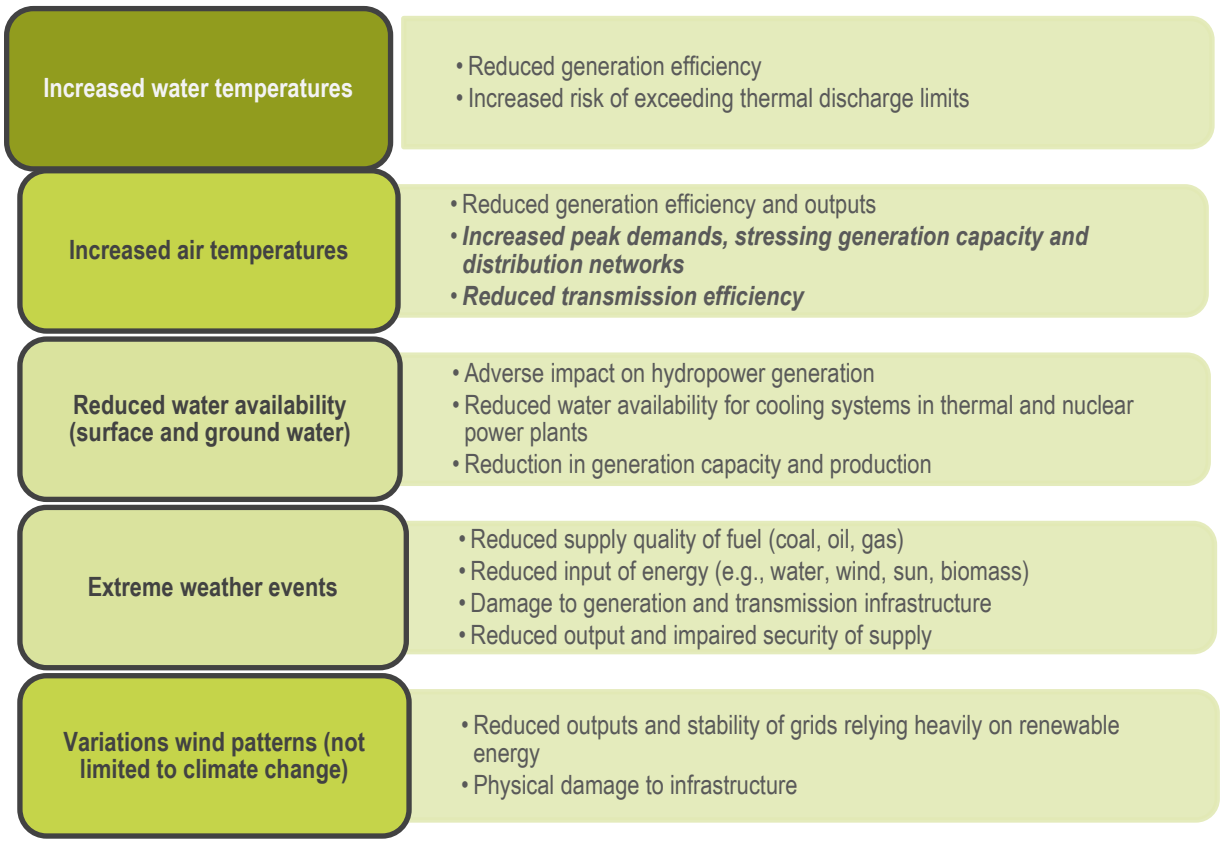


Figure 36: Climate change projections and potential impacts on the energy sector (bold text refers to transmission lines)

Some of the actions identified below can be applied at a project level and these will be carried across into design and operational activities **(Table 29).**

Table 29 Response Options (actions that can be applied to this project are bolded and underlined)

ENGINEERING OPTIONS	
Measure	*Outcome*
• **<u>More robust design specifications</u>**	• **<u>Structures able to withstand more extreme conditions: higher wind or water velocity, higher air and/or water temperatures;</u>** • **<u>Improved resilience and reduced redundancy of transmission and distribution system components; e.g. replacing power conductors with stronger steel-core lines, increased transmission line spacing.</u>**
• Relocate or retrofit existing Infrastructure	• Improving existing infrastructure's ability to withstand more extreme conditions; • Relocation and decentralisation may reduce the presence or need for facilities and infrastructure in high-risk areas; • Improved resilience and reduced redundancy of transmission and distribution system components.

Measure	*Outcome*
• Review and retrofit cooling systems	• Improved resilience of substations and transformers.
• **Consider conductors specifications that maximises the dissipation of heat**	• **Increased heat dissipation and reduced risk of exceeding maximum operating temperatures;** • **Potential reduction in wear and line sag.**
• **Application heat-resistant cells, modules, and components**	• **Reduced physical vulnerability to high temperatures;** • **Reduced loss of output related to increased temperatures.**
NON-ENGINEERING OPTIONS	
• **More robust operational and maintenance procedures**	• **Improved resilience of critical components and reduced operational interruptions.**
• Coordinated land use planning	• Avoid development of future power infrastructure in vulnerable areas.
• Improve forecasting of demand changes and supply and demand	• Balance supply and demand with the impact of climate change on outputs for proactive management of power grid.
• Set up rapid emergency repair teams	• Rapid repair of damaged infrastructure to limit impact on operations and ensure continuity.
• **Identification and implementation of fire risk reduction measures**	• **Reduce fire risk and impacts associated with wildfires (e.g. vegetation management and route selection through low risk areas).**

The specific climate change project risks and/or potential impacts identified below apply to the entire project (South Africa and Botswana) and may be experienced during the construction, operation and decommissioning phases of the proposed project (Aurecon, 2017a).

5.2.2.1 Reduced operational energy transmission

South Africa

Applicable

Botswana

Applicable

Climate change has the potential to negatively impact electricity supply through increased demand (increased need for cooling as temperatures rise) and reduced efficiency of generation and transmission capacity (as temperatures rise, electricity generation and transmission infrastructure become less efficient). The climate analysis indicates that extreme temperatures and dry spells are likely to increase in frequency and intensity in coming decades. As a result, energy infrastructure could face climatic stressors far more regularly, with the potential of compromising design thresholds leading to failure or reduced operational efficiency.

Mitigation Measures:

- While mitigation potential is limited on the infrastructure itself, measures should be taken to decrease heat stress on the people working on the project. Energy propagation will suffer because of increased temperatures and therefore demand management will help to effectively address the efficiency reduction. The latter mitigation measure is outside the scope of the project team to implement.

5.2.2.3 Damage to infrastructure due to potential veld fires

South Africa	Botswana
Applicable	Applicable

The climate analysis indicates that a future increase in conditions conducive to wildfire incidence is likely. Fires has potentially significant impacts for transmission infrastructure. Apart from damaging poles and towers, the greatest risk comes from the smoke and particulate matter associated with wildfires. Smoke and particulate matter can ionize the air, creating electrical pathways away from the transmission line. This can shut down lines causing permanent damage and power outages.

Mitigation Measures:

- Keep areas below the lines cleared of vegetation that could ignite
- Monitor for wildfire on days when there is high ignition potential and deploy firefighting teams immediately in the event of a wildfire.

5.2.2.4 Flooding from high rainfall intensity events

South Africa	Botswana
Applicable	Applicable

The climate models suggest an increase in the precipitation volumes in the late summer months of January, February and March. These increases are in the order of 5 to 10 mm/month with is not largely significant. However due to the likely increased temperatures noted into the future and the fact that precipitation in this region is convectively driven, there is an increased potential for more intense and focused afternoon thunderstorms. While the total monthly volume of rain may be similar to current conditions, the likely intensity increase may reduce the infiltration potential and therefore enhance overland flow leading to flooding and pooling in the lower lying areas, and potential increased erosion risk. These storms are however localised and further enhance analysis would be required to fully assess the flood risk.

Mitigation Measures:

- Forecasting of the rainfall events will help to prepare for the potential impacts.
- Build in measures to evacuate excess water away from installations.

The assessment of the impacts listed above is summarised in **Section 5.2.6**.

5.2.3 Cumulative impacts

South Africa and Botswana's energy sector remain dominated by coal and the main cumulative impact of any development in the energy sector with respect to climate change is the increased carbon footprint (in addition to other anthropogenic activities). In South Africa, coal accounts for an estimated 88% of energy generation with the remainder being nuclear power (5%), hydroelectric (7%), and a small amount from wind and solar. The transmission line itself will not contribute significantly to increased carbon emissions as GHGs will largely result from upstream processes such as manufacturing and power generation and the mitigation potential is thus limited for the transmission infrastructure.

Most of the direct impacts (GHG emissions) will be experienced during the construction phase. Furthermore, due to the rural setting of the area immediately adjacent to the proposed corridor, this

localised and temporary impact is likely to be very low at a site level. The closest industrial activity (Cement factory) is more than 20 km away from the site.

5.2.4 Assessment of no-go alternative

The no-go alternative will have no impacts on the climate change.

5.2.5 Conclusion

While a large body of information exists linking climate change and energy technologies and activities, specific project level experiences are less well documented. For this specific site, the most severe impacts will likely be related to increased temperatures leading to reduced and increased fire risk. Based on the findings, most of the anticipated impacts of climate change on the proposed development can be reduced to **Very Low (-ve)** with mitigation except for the impacts associated with reduced energy transmission from higher temperatures, which will be reduced to **Moderate (-ve)** after implementing mitigation measures.

5.2.6 Summary of the impacts

Table 30: Summary of potential impacts of climate change and proposed mitigation measures

Impact	Pre-mitigation:						Recommended mitigation	Post-mitigation:					
	Duration	Extent	Intensity	Conseq-uence	Proba-bility	Signifi-cance		Duration	Extent	Intensity	Conseq-uence	Proba-bility	Signifi-cance
Reduced energy transmission from higher temperatures	Long-term	Regional	Moderate: - negative	Highly detrimental	Very likely	High - negative	• Mitigation potential is limited on the infrastructure itself, however measures should be taken to decrease heat stress on the people working on the project. • Energy propagation will suffer as a result of increased temperatures and therefore demand management will help to effectively address the efficiency reduction.	Medium-term	Regional	Low - negative	Moderately detrimental	Very likely	Moderate: - negative
Damage to infrastructure due to potential veld fires	Medium-term	Site-specific	Low - negative	Slightly detrimental	Fairly likely	Low - negative	• Clear vegetation below the lines and monitor for wildfires on days when there is high ignition potential to reduce potential for wildfire damage.	Medium-term	Site-specific	Negligible	Negligible	Unlikely	Very low
Flooding from high rainfall intensity events	Short-term	Site-specific	Low - negative	Negligible	Fairly likely	Very low	• Forecasting of the rainfall events to allow for preparation to deal with events. • Build in measures to evacuate excess water away from installations.	Short-term	Site-specific	Negligible	Negligible	Unlikely	Very low

5.3 Flora Biodiversity

Scherman Colloty & Associates were appointed investigate the ecological attributes (terrestrial and aquatic biodiversity) and assess the potential impacts of the project on those attributes. The specialist assessment was based on the results obtained during a literature survey, observations made during previous studies within the study area and site visits conducted for this study.

Due to the scope of the work and time constraints, the study had the following limitations:

- The study was based on instantaneous sampling bouts. A comprehensive understanding of the dynamics of both the floral and faunal of both the terrestrial and aquatic communities require assessments at different time scales (across seasons/years) and through replication. However, due to time constraints such long-term studies are not feasible.
- Detailed investigation of all, or part of, the proposed sites were not possible due to the size and scale of the alignment, and limited access to all areas. However detailed assessment of the available aerial imagery and several drive throughs of the area allowed for increased confidence in this assessment.

Refer to **ANNEXURE G.3** for the detailed Aquatic and Terrestrial Ecological Assessment Report.

5.3.1 Status quo

SOUTH AFRICA

The proposed transmission line alignment with buffer areas affects 11 vegetation units will affect **(Table 31Error! Reference source not found.).** Three of the units, namely; Dwarsberg-Swartruggens Mountain Bushveld, Klerksdorp Thornveld and Zeerust Thornveld are endemic to the Province with >80% of the national extent occurs within the Province.

Table 31: A list of the expected vegetation types within the study area

Vegetation Type	Biome	M&R Conservation Status	Bioregion
Carletonville Dolomite Grassland	Grassland	Vulnerable	Dry Highveld Grassland
Dwaalboom Thornveld	Savanna	Least Threatened	Central Bushveld
Dwarsberg-Swartruggens Mountain Bushveld	Savanna	Least Threatened	Central Bushveld
Eastern Temperate Freshwater Wetlands	Azonal	Least Threatened	Waterbodies
Highveld Salt Pans	Azonal	Least Threatened	Inland Saline Vegetation
Klerksdorp Thornveld	Grassland	Vulnerable	Dry Highveld Grassland
Madikwe Dolomite Bushveld	Savanna	Least Threatened	Central Bushveld
Mafikeng Bushveld	Savanna	Vulnerable	Central Bushveld
Subtropical Freshwater Wetlands			
Subtropical Salt Pans	Savanna	Least Threatened	Central Bushveld
Zeerust Thornveld	Savanna	Least Threatened	Central Bushveld

According to the data contained in the South African Biodiversity Information Facility, and other distributions maps that included Botswana, approximately 2216 flowering plant species are located within the study area. Most of these are direct associated with ridges or rocky outcrops and water courses. This was substantiated by the data collected during the site visits, with the highest number of tree and forb species being found within the ridges and koppies. Therefore, these areas also contained the highest number of protected species (*Boscia spp* and *Vachellia erioloba* – Shepherd's trees and Camel Thorns).

BOTSWANA

Limited spatial information is available on the extent and types of vegetation found within the study area located within Botswana.

Two Savanna / Woodland vegetation units occur within the study area and these include the following:

- **B6b Hardveld**, composed of dominant tree species *Peltophorum africanum, Vachellia tortilis, V. karroo* and *Ziziphus mucronata*
- **G16a Transition Sandveld / Hardveld** dominated by *Terminalia sericea, Vachellia tortilis,* and *Ziziphus mucronata*

Most of these vegetation types and the associated species are common and widespread, with similar habitats extending into both Zimbabwe and South Africa. The vegetation within the study area, except for some water bodies, has undergone some form of transformation, mostly due to intensive agriculture and grazing. The part of the alignment north of Kopfontein, is encroached by *Vachellia fleckii*.

Figure 38: A view of the dry conditions observed in the Gaborone area, associated with the Hardveld vegetation type

Current land use has influenced the vegetation types **(Figure 37),** either because of transformation through agriculture (30% of the Province) or being poorly represent within the various protected areas within the Province. In the assessed areas, the level of transformation of the various habitats was found to be far greater than what was indicated in the bioregional plans, especially for the last 180 km of the alignment (travelling southwards). During the field work, it was also found that the estimation of transformation was accurate within the study area, but the remaining natural vegetation also showed more transformation / change, Intact vegetation was severely encroached by *Vachellia karroo* (southern portion of alignment) and *Dichrostachys cinereal*. The *Dichrostachys cinereal* is often considered an invasive and thicket forming does dominates the northern half of the alignment. The transformation or invasion by this tree species is usually an indicator of over grazing.

Figure 37: A view of the Threatened Ecosystem vegetation type Rand Highveld Grassland with a view of the Pilanesberg in the background

For the most part the only vegetation units that were found close to natural were those associated with steep valleys (kloofs), ridges / mountain ranges, koppies / inselbergs. These higher lying vegetation types or habitats supported a larger variety of plant and animal species than the lower lying areas. The lower lying areas are currently being used for intensive agriculture, grazing or built up areas. Natural

The drought conditions during the site survey prohibited detailed assessment of any forbs or annual plant species. Thus, there is little information on the species of special concern for the study area within Botswana.

The Botswanan Ministry of Wildlife and Tourism has developed two important broad scale spatial management plans which includes the Botswana Conservation Plan (BCP) and the Botswana Biodiversity Strategy and Action Plan (BSAP) (updated 2007). The BCP is a document / project that is largely still being develop and focuses on strategic conservation areas such as the Tuli and Okavango areas at present.

The BSAP has identified several conservation objectives based on environmental status quos and threat levels. Areas, based on bioregions, were then ranked in terms of biodiversity priorities coupled to potential threats. The study area has been ranked as having a Low Biodiversity Priority with regard future conservation needs or objectives.

The overall lack of species complexity and habitat diversity within this portion of the study area was also confirmed during the site visits. Habitat degradation in the form of subsistence farming and other development has greatly impacted on the region.

habitat is also associated with the 20 to 25 km section of the alignment from the Botswana border near Kopfontein southwards. Once the alignment crosses the R49 road (southwards), the general vegetation deteriorates due agricultural practices. Although the tree dominated or bushveld vegetation remains, cultivated areas only occur within the last 34 km of the alignment towards Mahikeng.

Biodiversity Conservation Plans or Biodiversity Sector Plans are spatial tools used to define and manage (Land Use Management Guidelines) important terrestrial and aquatic ecosystems. The North-West Province, has Critical Biodiversity and Ecological Support Area maps for both the terrestrial and aquatic environments. These were used in the alignment selection process, which forms part of the alternatives discussion, i.e. select an alignment that would avoid as many CBAs as possible.

5.3.2 Potential impacts

Due to the nature of a transmission line, the greatest impacts anticipated are associated with the towers, site camp (s) and access roads needed during construction. Thus, the following impacts were assessed:

5.3.2.1 Loss of intact vegetation units / terrestrial habitats

South Africa	Botswana
Applicable	Applicable

Considering new tracks and bush clearing of the servitude area will required, large tracts of intact vegetation will be disturbed.

Mitigation Measures:

- It is recommended that a detailed walk-down be conducted to finalise the tower positions to minimise any impacts, final micro siting of infrastructure to avoid rocky outcrops, intact habitat units and steep inclines. This will also allow for the avoidance of species of special concern.
- Vegetation clearing should occur in in a phased manner in accordance with the construction programme to minimise impacts. This should also be coupled to a rehabilitation and monitoring programme for disturbed areas.
- An Environmental Control Officer (ECO), with a good understanding of the local flora should be appointed during the construction phase. The ECO should be able to make clear recommendations with regards to the management of disturbed areas.
- All alien plant re-growth, which is currently limited within the greater region must be monitored and should it occur these plants should be eradicated.

5.3.2.2 Loss of Critical Biodiversity Areas (CBAs) in South Africa and habitat fragmentation

South Africa	Botswana
Applicable for both in South Africa	Applicable only for habitat fragmentation in Botswana

As the proposed alignment will still intersect with some form of terrestrial CBA in South Africa, the alignment can be micro-sited within the 1km corridor so that that is located within largely transformed sections of the CBAs. Most of the corridor alignment is located within some form of transformed habitat, as confirmed during the site visits. This would minimise both habitat fragmentation in Both South Africa and Botswana and/ or habitat destruction within a CBA in South Africa.

Mitigation Measures:

- It is recommended that a detailed walk-down be conducted to finalise the tower positions to minimise any impacts, avoiding rocky outcrops, intact habitat units and steep inclines. This will also allow for the avoidance of species of special concern.
- Vegetation clearing should occur in in a phased manner in accordance with the construction programme to minimise impacts. This should also be coupled to a rehabilitation and monitoring programme for disturbed areas.

- It is also advised that an ECO with a good understanding of the local flora be appointed during the construction phase. The ECO should be able to make clear recommendations with regards to the management of disturbed areas.
- All alien plant re-growth, which is currently limited within the greater region must be monitored and should it occur these plants should be eradicated.

5.3.2.3 Loss of species of special concern

South Africa

Applicable

Botswana

Applicable

Site clearance may result in the loss of species of conservation concern that are mostly Vulnerable and in decline.

Mitigation Measures:

- It is recommended that a detailed walk-down be conducted to finalise the tower positions to minimise any impacts, avoiding rocky outcrops, intact habitat units and steep inclines. This will also allow for the avoidance of species of special concern.
- Where total avoidance of these species is not possible the requisite permits from the respective authorities must be obtained.

The assessment of the impacts listed above is summarised in **Section 5.3.6.**

5.3.3 Cumulative impacts

No cumulative impacts were considered as this project would result in a new transmission line servitude with no others such lines in close proximity.

5.3.4 Assessment of no-go alternative

The no-go alternative will have a neutral impact on the floral biodiversity in the area as the vegetation will remain intact and undisturbed. The natural vegetation will also continue to provide ecosystem services to the local people, especially in the rural communities where people collect fire woods and plants for traditional medicine.

5.3.5 Conclusion

A diverse range of habitats, which range from important (mostly aquatic) to transformed have been identified in the assessment. However due to the nature of transmission line and its limited physical disturbance, the overall impacts were rated as low with mitigation.

5.3.6 Summary of the impacts

Table 32: Summary of ecological impacts (flora) of the proposed development on the proposed site and proposed mitigation measures

Impact	Pre-mitigation:						Recommended mitigation	Post-mitigation:					
	Duration	Extent	Intensity	Conseq-uence	Proba-bility	Signifi-cance		Duration	Extent	Intensity	Conseq-uence	Proba-bility	Signifi-cance
Loss of intact vegetation units / terrestrial habitats	Long-term	Regional	High negative	Highly detrimental	Fairly likely	Moderate: - negative	• A detailed walk-down be conducted to finalise the tower positions • Vegetation clearing should occur in in a phased manner in accordance with the construction programme • An ECO, with a good understanding of the local flora be appointed during the construction phase. • All alien plant re-growth, must be monitored	Short-term	Site-specific	Moderate: negative	Slightly detrimental	Fairly likely	Low - negative
Loss of Critical Biodiversity Areas and habitat fragmentation	Long-term	Regional	High: negative	Highly detrimental	Fairly likely	Moderate: - negative	• A detailed walk-down be conducted to finalise the tower positions • Vegetation clearing should occur in in a phased manner in accordance with the construction programme • An ECO with a good understanding of the local flora must be appointed during the construction phase. • All alien plant re-growth, must be monitored	Short-term	Regional	Moderate: negative	Moderately detrimental	Unlikely	Low - negative
Loss of species of special concern	Long-term	Regional	High: negative	Highly detrimental	Fairly likely	Moderate - negative	• A detailed walk-down is to be conducted to finalise the tower positions to minimise any impacts • Where total avoidance of species of special concern is not possible the requisite permits from the respective authorities must be obtained.	Short-term	Site-specific	Moderate: negative	Slightly detrimental	Fairly likely	Low - negative

5.4 Faunal Biodiversity

Scherman Colloty & Associates was appointed investigate the ecological attributes (terrestrial and aquatic biodiversity) and assess the potential impacts of the project those attributes. The specialist assessment was based on the results obtained during a literature survey, observations made during previous studies within the study area and site visits conducted for this study.

While the ToR for the ecological assessment included detailed methodological specifications for certain tasks, not all of these were completed. These tasks included:

- Mammal trapping and nocturnal surveys in relation to Aquatic and Terrestrial Biodiversity;
- Assessment of bat impacts as part of the mammal assessment.

These tasks were not undertaken as it was determined that the limited scale of the disturbance did not warrant such intensive investigation.

Refer to **ANNEXURE G.3** for the detailed Aquatic and Terrestrial Ecological Assessment Report.

5.4.1 Status quo

SOUTH AFRICA & BOTSWANA

Mammals:

The mammal species of concern that are likely to be found in the area include the following, which are mostly restricted to protected areas.

Critically Endangered:	**Endangered:**
• Black rhinoceros (*Diceros bicornis* minor) (IUCN Vulnerable), • Short-eared trident bat (*Cloeotis percivali)* (IUCN Least Concern).	• African wild dog (*Lycaon pictus*), • Oribi (*Ourebia ourebi*) (IUCN Least Concern), • Tsessebe (*Damaliscus lunatus*) (IUCN Least concern)
Vulnerable:	**Near Threatened:**
• Cheetah (*Acinonys jubatus*) (IUCN Vulnerable), • Ground pangolin (*Smutsia temminckii*) (IUCN Least Concern), • Roan antelope (*Hippotragus equinus*) (IUCN Least Concern)	• African marsh rat (*Dasymys incomptus*) (IUCN Least Concern), • Brown hyaena (*Hyaena brunnea*) (IUCN Near Threatened), • Darling's horseshoe bat (*Rhinolophus darlingi*) (IUCN Least Concern),

Within the study area, and common or ubiquitous species such as Vervet monkeys (*Chlorocebus pygerythrus*), Baboons (*Papio ursinis*), Black-backed jackal (*Canis mesomelas*), Zebra (*Equus quagga*) and Blesbok (*Damaliscus pygargus*) **(Figure 39**) were observed.

Amphibian:

Little is known or has been documented on the frog distribution within the Botswana section of the study area, but it has been assumed that the approximately 19 amphibian species are likely to occur along the entire alignment. The following were observed within the field surveys (in Botswana and South Africa):

- *Strongylopus fasciatus* (Striped Stream Frog),
- *Bufo garmani* (Eastern Olive Toad)
- *Bufo gutturalis* (Guttural Toad)
- *Amietophrynus rangeri* (Raucous Toad)
- *Schismaderma carens* (Red Toad)
- *Breviceps adspersus* (Bushveld Rain frog)
- *Xenopus laevis* (Common Platanna)
- *Kassina senegalensis* (Bubbling Frog).

Currently, none of these frog species under consideration are Red listed, however the Giant Bullfrog (*Pyxicephalus adspersus*) is regionally listed as Near Threatened within South Africa. This species is expected in both sections of the study area, but due to the dry conditions none were observed.

Reptiles:

Based on the information obtained from the South African Reptile Conservation Assessment (SARCA), a total of 52 taxa (comprising of 23 snakes and 29 tortoise and lizard species) have been recorded within the study area. It is assumed that similar species will occur within the Botswana portion of the study area.

It is however possible that more species could exist in the study sites other than those listed in the current distributional data (Scherman Colloty & Associates, 2017).

Table 33: Inventory of reptile species known to occur within the study area

Scientific Name	Common Name	Conservation Status (IUCN Red List)	Scientific Name	Common Name	Conservation Status (IUCN Red List)
Pelomedusa subrufa	Marsh terrapin	Least Concern	*Varanus niloticus*	Nile monitor	Least Concern
Hemidactylus mabouia	Common tropical house gecko	Least Concern	*Chamaeleo dilepis*	Common flap-necked chameleon	Least Concern
Lygodactylus capensis	Common dwarf gecko	Least Concern	*Bitis arietans*	Puff adder	Least Concern
Lygodactylus nigropunctatus	Black-spotted dwarf gecko	Least Concern	*Pseudaspis cana*	Mole snake	Least Concern
Pachydactylus capensis	Cape gecko	Least Concern	*Hemachatus haemachatus*	Rinkhals	Least Concern (Global)
Trachylepis punctatissima	Montane speckled skink	Least Concern	*Dispholidus typus*	Boomslang	Least Concern
Trachylepis varia	Variable skink	Least Concern	*Philothamnus semivariegatus*	Spotted bush snake	Least Concern
Varanus albigularis	Southern rock monitor	Least Concern			

Figure 39: Several large mammal's species such as Zebra and Blesbok were encountered in farms and game farms within the region

5.4.2 Potential impacts

5.4.2.1 Loss of terrestrial fauna

South Africa

Applicable

Botswana

Applicable

Considering new tracks and bush clearing of the servitude area will required, large tracts of intact habitat supporting terrestrial fauna will be disturbed. However, the area is highly disturbed and most large mammals and terrestrial species of importance are located within protected areas. Faunal diversity is reduced in the transformed areas.

Mitigation Measures:

- It is recommended that a detailed walk-down be conducted to finalise the tower positions to minimise any impacts, final micro siting of infrastructure to avoid rocky outcrops, intact habitat units and steep inclines. This will also allow for the avoidance of species of special concern.
- Vegetation clearing should occur in in a phased manner in accordance with the construction programme to minimise impacts. This should also be coupled to a rehabilitation and monitoring programme for disturbed areas.
- An ECO with a good understanding of the local flora should be appointed during the construction phase. The ECO should be able to make clear recommendations with regards to the management of disturbed areas.

The assessment of the impacts listed above is summarised in **Section 5.4.6.**

5.4.3 Cumulative impacts

Cumulative impacts are not significant for this transmission line as this project would result in a new transmission line servitude with no others such lines in close proximity.

5.4.4 Assessment of no-go alternative

The no-go alternative will have a neutral impact on the faunal biodiversity in the area as the faunal habitats will remain intact and undisturbed.

5.4.5 Conclusions

A diverse range of habitats which support faunal diversity have been transformed, and most species of concern occur in protected areas. Furthermore, due to the nature of transmission line and its limited physical disturbance, the overall impacts were rated as very low with mitigation.

5.4.6 Summary of the impacts

Impact	Pre-mitigation:						Recommended mitigation	Post-mitigation:					
	Duration	Extent	Intensity	Consequence	Probability	Significance		Duration	Extent	Intensity	Consequence	Probability	Significance
Impact 4: Impact on terrestrial fauna (Excluding birds)	Short-term	Local	High - negative	Moderately detrimental	Very likely	Low - negative	All water courses and 32m buffer from be excluded from any construction disturbance, thus no towers or new tracks should occur within these systems, i.e. only the cables must span the aquatic system	Short-term	Local	Low - negative	Slightly detrimental	Fairly likely	Very low

5.5 Aquatic Ecosystems

Scherman Colloty & Associates was appointed investigate the ecological attributes (terrestrial and aquatic biodiversity) and assess the potential impacts of the project those attributes. The specialist assessment was based on the results obtained during a literature survey, observations made during previous studies within the study area and site visits conducted for this study.

Refer to **ANNEXURE G.3** for the detailed Aquatic and Terrestrial Ecological Assessment Report.

5.5.1 Status quo

SOUTH AFRICA & BOTSWANA

Due to the spatial scale of the project, several different types of aquatic environments were confirmed within the study area. These include the following:

- Rivers and streams
- Open water bodies / lakes
- Wetlands
- Endorheic pans / depressions
- Springs/eyes
- Artificial waterbodies

The river systems directly affected by the proposed corridor are listed below.

Figure 40: Identified river systems near the study area

Conservation importance and sensitivity:

Due to the large number of waterbodies, the current state and importance of the affected wetlands was based on national inventories (Aquatic Critical Biodiversity Areas) as well as site specific assessments. It was evident that the main river and wetland systems are under pressure from development and are at times the only natural functioning systems within the cultivated landscapes. As a result, this elevates the importance of these systems in their role as ecological support areas and corridors.

According to the spatial databases, the systems within the study area are ranked between Moderately to Large Modified due to land use patterns. However due to the sensitivity of these systems and the potential for important fish habitat, the Ecological Importance and Sensitivity was rated as Moderate to High for the study area.

The **Preliminary Ecological Importance Assessment** of the aquatic systems within the study area is summarised below:

HIGH SENSITIVITY (strongly avoid these areas)	MODERATE SENSITIVITY	LOW SENSITIVITY
• Wetland clusters, i.e. difficult to span these expansive areas • Alluvial floodplains	• Wetlands and rivers	• All remaining areas that have been transformed or developed in the past

The importance of aquatic systems is also related to ecosystems service and social importance. Ecosystem services include the numerous benefits derived directly or indirectly from the natural environment, from properly-functioning ecosystems. Collectively, these benefits are known as 'ecosystem services', and are often integral to the provisioning of clean drinking water, the decomposition of wastes, and the natural pollination of crops and other plants. Other services include food, freshwater, fibre or aesthetic appreciation of an environment, soil formation, water purification, nutrient cycling or flood regulation (Ginsburg et al. 2010).

Due to the extent of the study area, this could not be rated for individual systems but was rated as follows for the broad aquatic units listed above and are found within the alignment (including buffer) (**Table 34)**:

Table 34. Aquatic systems as ecosystem services

HYDROGEOMORPHIC TYPE	ECOSYSTEM SERVICE	SOCIAL IMPORTANCE	REGIONAL IMPORTANCE OF THIS HGM TYPE
Rivers and streams	Hydrologic function in the maintenance of catchment base flow	Where surface water flows exist, rural communities will use as a water resource, but more important for livestock watering	LOW – limited or mostly ephemeral flows within study area
Open water bodies / lakes	Surface water storage and important for water flow and facultative vegetation	Livestock watering and recreational use	LOW – as most are outside of the study area or very small
Wetlands	Hydrological store within catchments, and passive treatment of water quality, while providing specialised habitat, nutrient cycling and flood regulation	Limited use of wetlands within the region as they are sparse and very small	LOW – sparse and have limited resources
Endorheic pans / depressions	Represent the highest proportion of aquatic habitat within the study area, and are important as ephemeral refugia for birds and unique wetland associated plants	Highly ephemeral and only used for short periods by livestock	High – due to habitat uniqueness and the high numbers of these systems
Springs/eyes	Hydrologic function in the maintenance of catchment base flow	Important water source for rural communities	High, due to baseflow maintenance but these are sparse within study area

HYDROGEOMORPHIC TYPE	ECOSYSTEM SERVICE	SOCIAL IMPORTANCE	REGIONAL IMPORTANCE OF THIS HGM TYPE
Artificial waterbodies	Restrict catchment baseflow and can result in sedimentation erosion	Livestock water and recreational use	LOW – due to impact on natural hydrological regime

5.5.2 Potential impacts

The anticipated impacts associated with aquatic environments are detailed below:

5.5.2.1 Loss of riparian systems and disturbance of water courses

South Africa: Applicable

Botswana: Applicable

Disturbance close to wet areas may result in loss the riparian systems.

Mitigation Measures:

- All water courses and 32 m buffer from the edge to be excluded from any construction disturbance - thus no towers or new tracks should occur within these systems, i.e. only the cables must span the aquatic system.
- Vegetation clearing should occur in a phased manner in accordance with the construction programme to minimise impacts. This should also be coupled with a rehabilitation and monitoring programme for disturbed areas.

5.5.2.2 Increase in sedimentation and erosion

South Africa: Applicable

Botswana: Applicable

Activities occurring within or close to wet area are likely to result in sedimentation subsequently polluting the water quality.

Mitigation Measures:

- All water courses and 32 m buffer from the edge to be excluded from any construction disturbance - thus no towers or new tracks should occur within these systems, i.e. only the cables must span the aquatic system.
- Vegetation clearing should occur in a phased manner in accordance with the construction programme to minimise impacts. This should also be coupled to a rehabilitation and monitoring programme for disturbed areas.

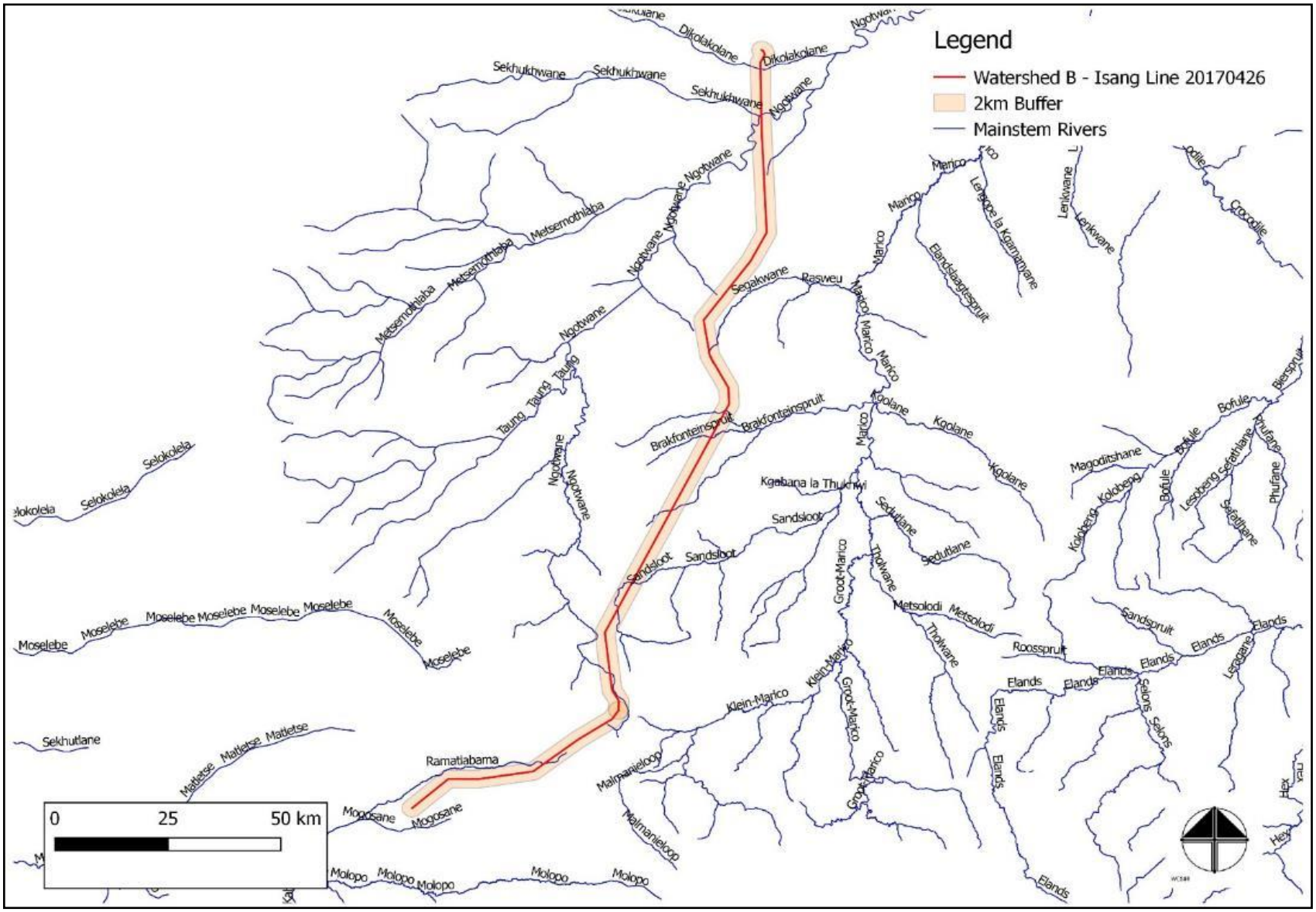


Figure 41: Mainstem rivers found within the study area

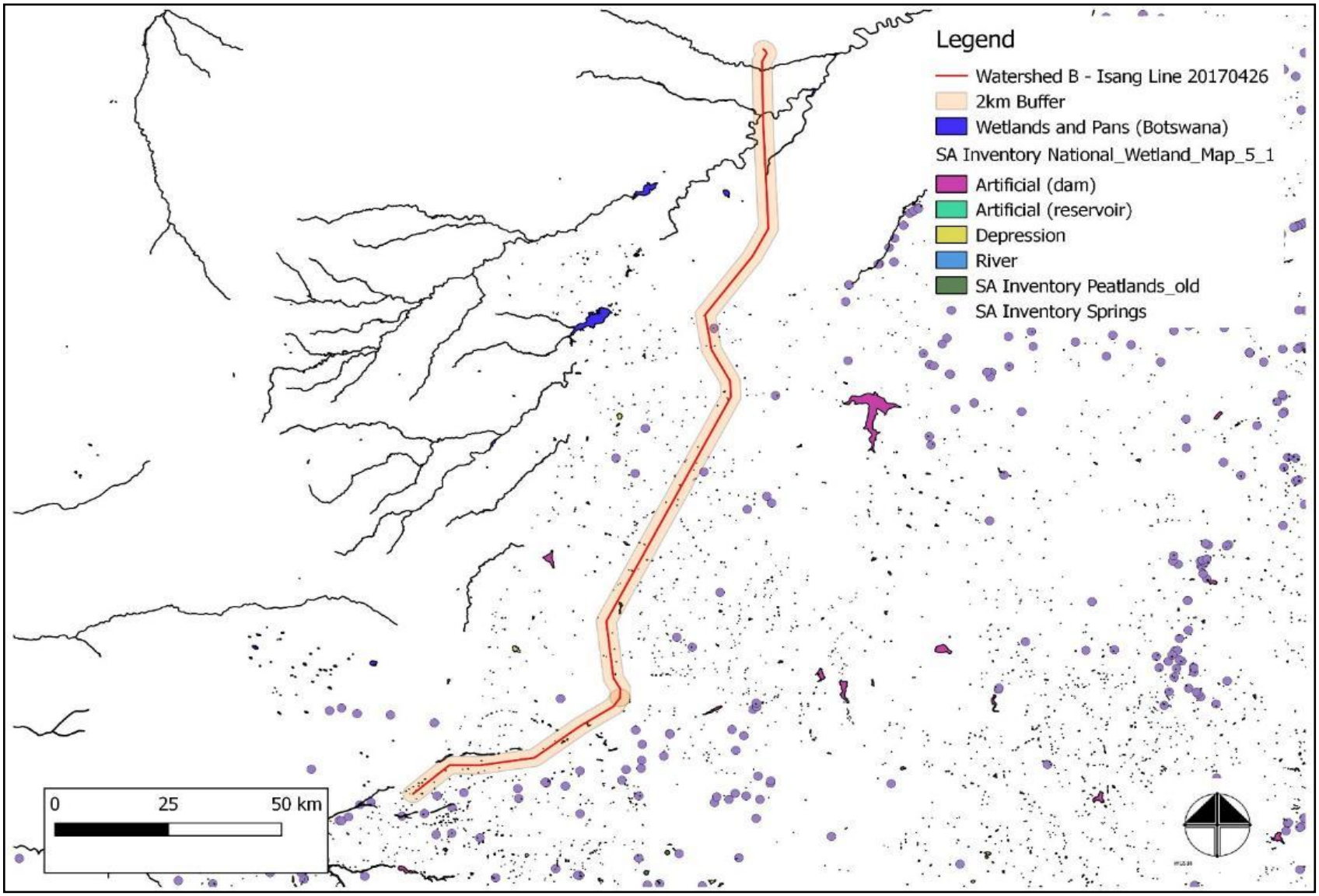


Figure 42: Known wetlands within the study area, consisting mostly of pans, riverine floodplains, alluvial systems and artificial dams

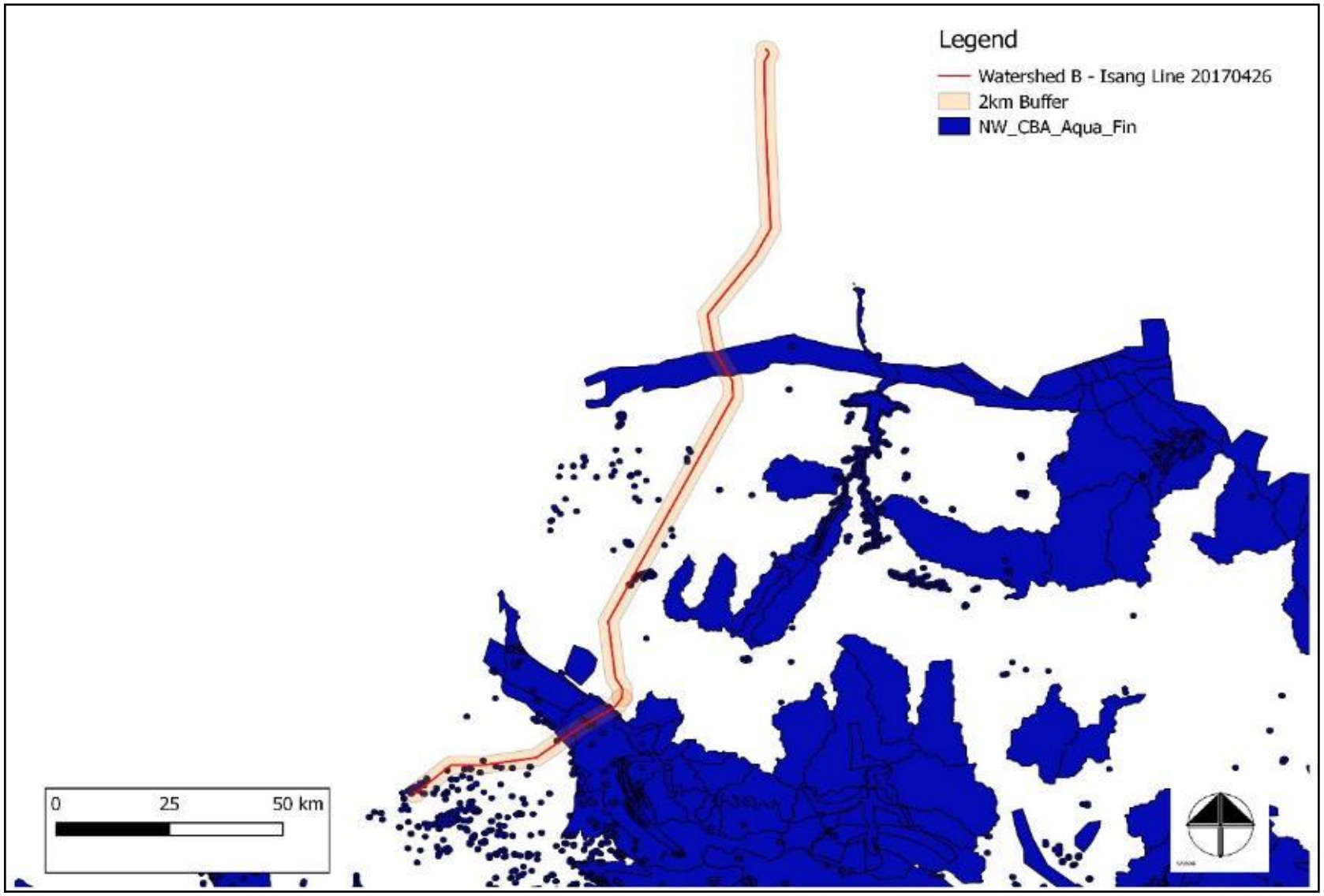


Figure 43: Aquatic Critical Biodiversity and Support Areas as per the NWBSP (2015)

5.5.2.3 *Potential impact on localised surface water quality*

South Africa	Botswana
Applicable	Applicable

Watercourses close to the working areas, are prone to pollution from accidental substance spillages, discharge of wastewater and washing of sediments.

Mitigation Measures:

- All construction materials including fuels and oil should be stored in demarcated areas that are contained within berms / bunds to avoid spread of any contamination. Washing and cleaning of equipment should also be done in berms or bunds, to trap any cement and prevent excessive soil erosion. Mechanical plant and bowsers must not be refuelled or serviced within or directly adjacent to any channel. It is therefore suggested that all construction camps, lay down areas, batching plants or areas and any stores should be more than 50 m from any demarcated water courses.
- Chemicals used for construction must be stored safely on site and surrounded by bunds. Chemical storage containers must be regularly inspected so that any leaks are detected early;
- Littering and contamination of water sources during construction must be prevented by effective construction camp management;
- Emergency plans must be in place in case of spillages onto road surfaces and water courses;
- No stockpiling should take place within a water course;
- All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds;
- Stockpiles must be located away from river channels;
- Erosion and sedimentation into channels must be minimised through the effective stabilisation (gabions and Reno mattresses) and the re-vegetation of any disturbed riverbanks;
- The construction camp and necessary ablution facilities meant for construction workers must be beyond the 32 m buffer described previously; and
- No transmission line towers must be placed within any water courses or their 32 m buffer or within 59 m of any wetlands.

5.5.2.4 *Potential loss of ecosystem services*

South Africa	Botswana
Applicable	Applicable

Loss of wetland systems may result in loss of ecosystems attached to them.

Mitigation Measures:

- No transmission line towers must be placed within any water courses or their 32m buffer or within 50m of a wetland

The assessment of the impacts listed above is summarised in Table 35 in **Section 5.5.6.**

5.5.3 Cumulative impacts

Cumulative impacts are not significant for this transmission line as this project would result in a new transmission line servitude with no others such lines in close proximity. If the towers are kept out of aquatic areas and the cables span such systems, there will be no cumulative impacts on the systems, as there will be no occurrences of the same impact along numerous waterbodies in the area.

5.5.4 Assessment of no-go alternative

The no-go alternative will have a neutral impact on the aquatic ecosystems in the area as they will remain undisturbed and the surface water resources will continue to provide freshwater ecosystem services to the aquatic life and the local people and their livestock.

5.5.5 Conclusion

All the anticipated impacts of the development on the aquatic ecosystems were rated as **Low (-ve)** and **Very Low (-ve)** after mitigation. Although the impacts are expected to low, it is recommended that that a detailed walk down should be completed, that will allow for the micro-siting of the towers to further reduce the significance of the impacts, i.e. avoid any wetlands (incl. buffers), span water courses. The walk down will also allow for identification of watercourses (mainly within 500m of working areas) that will require a Water Use Licence in terms of the NWA in South Africa.

5.5.6 Summary of the impacts

Table 35: Summary of ecological impacts (aquatic) of the proposed development on the proposed site and proposed mitigation measures

Impact	Pre-mitigation:						Recommended mitigation	Post-mitigation:					
	Duration	Extent	Intensity	Conseq-uence	Proba-bility	Signifi-cance		Duration	Extent	Intensity	Conseq-uence	Proba-bility	Signifi-cance
Loss of riparian systems and disturbance of water courses	Long-term	Local	Moderate negative	Moderately detrimental	Fairly likely	Low - negative	• All water courses and 32m buffer to be excluded from any construction disturbance. • Vegetation clearing should occur in a phased manner in accordance with the construction programme to minimise impacts.	Short-term	Site specific	Moderate negative	Slightly detrimental	Very unlikely	Very low - negative
Increase in sedimentation and erosion	Long-term	Local	Moderate negative	Moderately detrimental	Fairly likely	Low - negative	• All water courses and 32m buffer to be excluded from any construction disturbance. • Vegetation clearing should occur in a phased manner in accordance with the construction programme to minimise impacts.	Short-term	Site specific	Moderate negative	Slightly detrimental	Very unlikely	Very low - negative
Potential impact on localised surface water quality	Medium term	Site-specific	Moderate negative	Slightly detrimental	Fairly likely	Low - negative	• All construction materials including fuels and oil should be stored in demarcated areas that are contained within berms / bunds to avoid spread of any contamination. • Chemical storage containers must be regularly inspected so that any leaks are detected early; • Littering and contamination of water sources during construction must be prevented • Emergency plans must be in place in case of spillages onto road surfaces and water courses; • No stockpiling should take place within a water course; • All stockpiles must be protected from erosion • Stockpiles must be located away from river channels;	Short term	Site-specific	Moderate negative	Slightly detrimental	Very unlikely	Very ow - negative

							• Erosion and sedimentation into channels must be minimised • The construction camp and necessary ablution facilities meant for construction workers must be beyond the 32m buffer described previously; and • No transmission line towers must be placed within any water courses or their 32m buffer or within 59m of any wetlands.						

5.6 Avifaunal Biodiversity

Chris van Rooyen Consulting was appointed to compile a specialist avifaunal assessment report that details the sensitive bird habitats within the study area and the potential bird related impacts associated with the proposed power line project.

The study is based on the following assumptions and limitations:

- Coverage by South African Bird Atlas 2 (SABAP2) has not been extensive, for most of the pentads[19] through which the proposed corridor traverses. During the assessment phase, a site visit was conducted whereby the status of the available avifaunal habitats were confirmed as far as possible.
- The authors have worked extensively on avifaunal impact assessments in various parts of southern Africa since 1996. Personal observations and experience have therefore been used to supplement the secondary data sources and in identifying likely bird/habitat associations related to the proposed BOSA Transmission Interconnection Project.
- Predictions in this study are based on experience of these and similar species in different parts of southern Africa. Bird behaviour can never be entirely reduced to formulas that will hold true under all circumstances. Therefore, professional judgment based on extensive field experience, played an important role in this assessment. It should also be noted that the impact of power lines on birds has been well researched with a robust body of published research stretching over thirty years.

Refer to **ANNEXURE G.4** for the detailed Avifaunal Assessment Report.

19 A pentad grid cell covers 5 minutes of latitude by 5 minutes of longitude (5'× 5'). Each pentad is approximately 8 × 7.6 km.

5.6.1 Status quo

SOUTH AFRICA

Important Bird Areas (IBAs)

The proposed BOSA 400 kV power line does not traverse an IBA. However, one IBA does occur within the broader area. The closest IBA (Botsalano Nature Reserve) is located approximately 40 km north of central Mahikeng near the border with Botswana. This nature reserve supports both grassland and woodland dependent bird species and is of interest from an ornithological point of view as it is one of very few reserves in South Africa that holds the western population of the Short-clawed Lark (*Certhilauda chuana*) and Melodious Lark (*Mirafra cheniana*) (Chris van Rooyen Consulting, 2017).

The reserve is near Botswana, and has extensive rural landscape management and a number of globally threatened species regularly occur within the reserve i.e. Lappet-faced Vulture (*Torgos tracheliotus)*, breeding White-backed Vulture (*Gyps africanus)*, Cape Vulture (*Gyps coprotheres)*, Martial Eagle (*Polemaetus bellicosus)*, Tawny Eagle (*Aquila rapax)* (**Figure 44**) *and* Bateleur (*Terathopius ecaudatus)* amongst others, all occurring in good numbers (Chris van Rooyen Consulting, 2017).

Figure 44: tawny eagle (Marnewick *et al.*, 2015)

Coordinated Waterbird Count (CWAC)

A CWAC site is any body of water, other than the ocean, which supports a significant number (set at approximately 500 individual waterbirds, irrespective of the number of species) of birds which use the site for feeding, and/or breeding and roosting. This definition includes natural pans, vleis, marshes, lakes, rivers, as well as a range of manmade impoundments (i.e. waste water treatment works). There are however, no CWAC sites within the broader area. The closest sites are Leeupan and Barberspan which are approximately 75 km south of the study area. The distance between these sites and

BOTSWANA

Important Bird Areas (IBAs)

The proposed BOSA 400 kV power line does not traverse an IBA in Botswana. However, two IBAs do occur within the broader area. These are discussed in detail below (Chris van Rooyen Consulting, 2017):

(i) *Mannyelanong Hill* (BW007). This IBA is located between 15 km west of the proposed BOSA 400 kV power line and lies south-east of the village of Otse in the hardveld of south-east Botswana, with its undulating plains and scattered rocky hill ranges. The cliff and its lower wooded slope is fenced off to serve as a sanctuary for the important nesting population of Cape Vulture, one of only two localities currently used by this species in Botswana. The current population consists of about 70 breeding pairs, and is now one of Botswana's largest vulture colonies.

(ii) The South-east Botswana IBA (BW011) is located 50 km west of the proposed BOSA 400 kV power line. This is an extensive 750,000 ha area that is comprised of Pitsane grasslands as well as mixed savanna, low rolling hills and farmland. This IBA was established on the occurrence of an important population of the restricted-range Short-clawed Lark *Certhilauda chuana*, which is prevalent and locally abundant in the area. In addition, Blue Crane *Anthropoides paradise* **(Figure 46),** Lesser Kestrel *Falco naumanni* and Pallid Harrier *Circus macrourus*. The site also supports many species which occur in Botswana only, these include Orange River Francolin *Francolinus*

Figure 46: Blue Crane (Marnewick *et al.*, 2015)

the study area will result in little to no direct impact on these sites or the species that these areas support.

Description of bird habitat classes

The greatest proportion of the study area is situated in the **Savanna biome** which is characterised by a grassy under-storey and a distinct woody upper-storey of trees and tall shrubs.

The woodland supports a large variety of bird species, but very few bird species are restricted to this biome. Woodland is particularly rich in raptors, and forms the stronghold for Red List species such as Bateleur, Martial Eagle, Tawny Eagle, Lanner Flacon, Red-footed Falcon *Falco vespertinus*, Lappet-faced Vulture and African White-backed Vulture *Gyps africanus*. It also supports several non-Red List raptor species, such as the Booted Eagle *Aquila pennatus*, Brown Snake-Eagle, African Fish-Eagle *Haliaeetus vocifer*, Black-chested Snake-Eagle and a multitude of medium-sized raptors.

Apart from raptors, open woodland and savanna areas are suitable for a wide range of other power line sensitive Red List species, i.e. Kori Bustard, Southern Ground Hornbill *Bucorvus leadbeateri*, White-bellied Korhaan, Short-clawed Lark, European Roller *Coracias garrulus*, Secretarybird and Abdim's Stork *Ciconia abdimii.*

A smaller proportion of the study area is situated in the **Grassland biome** and consists predominantly of the Carltonville Dolomite Grassland and Klerksdorp Thornveld vegetation types. Grasslands represent a significant foraging area for many bird species. Specifically, open grassland in the greater area typically attract the Red List, Lanner Falcon, Red-footed Falcon, White-bellied Korhaan, Black-winged Pratincole Glareola nordmanni, European Roller, Yellow-throated Sandgrouse, Secretarybird and Abdim's Stork, the majority of which are power line sensitive species. The grassland patches are also a favourite foraging area for game birds such as francolins and Helmeted Guineafowl *Numida meleagris*. This in turn attracts large raptors e.g. Martial Eagle, because of both the presence and accessibility of prey.

Rivers, Wetlands and Dams

The main river system in the South African portion of the broader area is the Marico River with several tributaries including the Brakfonteinspruit, Klein-Marico and many

levaillantoides, White-bellied Korhaan *Eupodotis cafra* (two records only), Cape Longclaw *Macronyx capensis* and Long-tailed Widowbird *Euplectes progne*.

Description of bird habitat classes

The entire study area in Botswana is in the **Savanna biome**. The woodland consists of Tree Savanna comprised of mixed *Vachellia* sp. and *Combretum apiculatum* woodland. The same complement of species which could potentially occur in woodland on the South African portion of the study area could also be encountered in woodland in the Botswana portion of the study area.

Figure 47: Grassland in the South African section of the study area (Chris van Rooyen Consulting, 2017)

associated unnamed ephemeral drainage lines. The proposed alignment does not cross any of these rivers, but it does cross some ephemeral drainage lines. Rivers and drainage lines are important habitat for birds in that they act as corridors of microhabitat for waterbirds, while the riparian vegetation on the banks provide potential cover for skulking non-Red List species.

Relevant to this study and the rivers, drainage lines and surrounding riparian habitat could attract Red List species such as Black Stork, Yellow-billed Stork *Mycteria ibis*, Marabou Stork *Leptoptilos crumeniferus*, Half-collared Kingfisher *Alcedo semitorquata,* as well as many other non-Red List waterbirds including Reed Cormorant *Phalacrocorax africanus*, White-breasted Cormorant *Phalacrocorax crbo*, African Darter *Anhinga rufa*, African Black Duck *Anas sparsa*, African Openbill *Anastomus lamelligerus*, Osprey *Pandion haliaetus*, and African Spoonbill *Platalea alba.*

Wetlands also provide habitat for many water birds. The precarious conservation status of many of the bird species that are dependent on wetlands reflects the critical status of wetlands worldwide, with many having already been destroyed. Of the collision-sensitive Red List species found within the broader area, Pallid Harrier *Circus macrourus,* Greater Painted-snipe *Rostratula benghalensis*, Yellow-billed Stork and Marabou Stork could potentially use these wetlands.

The South African portion of the broader area contains many dams, including some large ones e.g. the Molatedi Dam, Marico Bosveld Dam and the Kromellenboog Dam. Whilst dams have altered flow patterns of streams and rivers, and affect many bird species detrimentally, many species have benefited from their construction. Apart from the water quality, the structure of the dam, and specifically the margins and the associated shoreline and vegetation, plays a big role in determining the species that will be attracted to the dam. Common species in the study area that could use dams and dam edges (including sewage ponds) include Reed Cormorant, White-breasted Cormorant, African Darter, African Black Duck, African Openbill, Osprey, African Spoonbill and Red-billed Teal *Anas erythrorhyncha*. Red List species recorded in the study area by SABAP2 that are likely to be attracted to dams include Lesser Flamingo *Phoenicopterus minor* and Greater Flamingo *Phoenicopterus ruber* amongst others. The proposed alignment itself is not situated close to any major dams.

Rivers, Wetlands and Dams

Figure 48: Lesser and Greater Flamingo (Marnewick *et al.,* 2015)

The main river system in the Botswana portion of the study area is the Ngotwane River, with tributaries Dikolakolane, Metsemothlaba, Taung and several unnamed associated ephemeral drainage lines. The characteristics of these rivers, and the avifauna associated with them, are similar to those in the South African portion of the study area. The proposed alignment crosses the Ngotwane River near Isang.

The broader area in Botswana is quite arid, but there are small seasonal wetlands and pans present, as well as wetland areas associated with the ephemeral rivers and sewage works. Species that could be attracted to these wetland areas are listed in the previous paragraph.

The Botswana portion of the broader area contains a number of important large dams, namely the Bokaa Dam, Gaborone Dam and Ngotwane Dam. The same complement of species could be present at these and other smaller dams and sewage ponds as discussed in the previous paragraph. The proposed alignment itself is not situated close to any major dams.

Agricultural clearings and old lands

Dryland subsistence cultivation is dominant form of agricultural activity in the Botswana portion of the study area. The agricultural activity is largely centred around villages and towns. The same complement of species is likely to be found in this habitat as discussed in the previous paragraph.

Agricultural clearings and old lands

Arable or cultivated land may represent a significant feeding area for many bird species in any landscape. During the dry season, arable lands often represent the only green or attractive food sources in an otherwise dry landscape. The South African portion of the study area contains extensive agricultural clearings mostly in the form commercial dryland cultivation, irrigated pivots and dryland subsistence cultivation.

In general, agricultural areas are of lesser importance for most Red List species recorded in the study area, compared to the natural habitats (i.e. woodland, rivers and wetlands). The Red List species recorded in the study area that are most likely to utilise agricultural lands and clearings in the study area are Pallid Harrier, Black-winged Pratincole, Abdim's Stork and Red-footed Falcon. The clearings, including those areas of abandoned old lands could also be utilised by Kori Bustard, Lanner Falcon and Secretarybird and other large, non-Red List power line sensitive species such as White Stork *Ciconia* and Spur-winged Goose may also use freshly ploughed fields / areas in the study area to feed.

Mountains

Topographically, most of the study area is flat. However, mountainous areas and examples of ridges and rocky outcrops are found within the study area and are potentially suitable roosting and breeding habitat for the Red List Lanner Falcon, Verreaux's Eagle and non-Red List species such as Peregrine Falcon *Falco peregrinus* and Rock Kestrel.

Exotic or Alien Trees

Although stands of Eucalyptus are strictly speaking alien invader species, they have become important refuges for certain species of raptors, including Martial Eagle and Verreaux's Eagle, a non-Red List Palearctic migrant, which will commonly roost in small stands of Eucalyptus. In addition, other non-Red List species such as Black Sparrowhawk, Little Sparrowhawk *Accipiter minullus* and African Cuckoo Hawk

Figure 49: Subsistence agriculture in Botswana (Chris van Rooyen Consulting, 2017)

Mountains

There are no mountains or rocky outcrops in the Botswana portion of the study area, except for one rocky outcrop.

Exotic or Alien Trees

There are also stands of alien trees found within the broader area in Botswana, although to a lesser extent than in South Africa.

Towns and settlements

The broader area in Botswana contains numerous villages. As is the case across the border in South Africa, built-up areas generally are of little value to sensitive Red List bird species due to their degraded nature and the associated disturbance factor.

Aviceda cuculoides may also utilise these trees for roosting and breeding purposes. Stands of alien trees are found all over the broader area.

Towns and settlements

The broader area in South Africa contains many villages and towns. These areas include surface infrastructure such as roads and buildings. Built-up areas generally are of little value to sensitive Red List bird species due to their degraded nature and the associated disturbance factor. They do however play an important role in providing safe refuge and foraging opportunities for small passerine species that have become common in urban environments. The Red List Lanner Falcon could be attracted to poultry in the settlements.

Figure 45: Alien trees in the South African study area (Chris van Rooyen Consulting, 2017)

Power line sensitive species potentially occurring in the study area (South Africa and Botswana)

A combined total of at least 404 bird species have been recorded within the relevant pentads within the combined broader area of South Africa and Botswana. The presence of these species in the combined broader area provides an indication of the diversity of species that could potentially occur along the proposed power line route. A total of 97 power line sensitive species have been recorded in the combined broader area during the SABAP2 atlassing period to date. Thirty of these are of conservation concern according to the 2015 Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland and the IUCN Red List (2016). These species include: *Terathopius ecaudatus, Ardeotis kori, Polemaetus bellicosus* and *Aquila rapax* amongst others.

Twenty-three globally threatened bird species occur in Botswana, 15 of which have been recorded within the broader area during the SABAP1 and SABAP2 atlassing periods. Although there has been an increase in the number of globally threatened birds in Botswana since 2000, generally the status of birds throughout the country is relatively good. The Egyptian Vulture, Basra Reed Warbler, Black Harrier, Blue Crane and Denham's Bustard are all in the IUCN Red List, but have not been listed by BirdLife Botswana as species of conservation concern. However, some species like the Wattled Crane, Short-clawed Lark (>90% of its global population in South-eastern Botswana) and Slaty Egret (85% of its global population in the Okavango Delta) have their core populations in Botswana. They, therefore, require special consideration to ensure that their populations remain stable and secure. It has been found that densities for most species, such as large raptors, are considerably higher in protected areas than in unprotected areas. Most species are highly sensitive to human disturbance, particularly when nesting. Other species like game birds and bustards are susceptible to hunting and snaring for food and, are therefore good indicators of human pressure on birds as food resources.

5.6.2 Potential impacts

Due to the size and prominence of electrical infrastructure, they constitute an important interface between wildlife and man. Negative interactions between wildlife and electricity structures take many forms, and these are discussed below (Chris van Rooyen Consulting, 2017):

5.6.2.1 Electrocution

South Africa	Botswana
Applicable	Applicable

Electrocution refers to the scenario where a bird is perched or attempts to perch on the electrical structure and causes an electrical short circuit by physically bridging the air gap between live components and/or live and earthed components. Electrocution risk is strongly influenced by the power line voltage of the and design of the pole structure and mainly affects larger, perching species, such as vultures, eagles and storks, easily capable of spanning the spaces between energized components. However, due to the large size of the clearances on most overhead lines of above 132 kV, the chances of electrocutions very low as even the largest birds cannot physically bridge the gap between dangerous components.

Mitigation Measures:

- This greatest impact will be at the substation yard, which does not form part of this ESIA, as the hardware is too complex to warrant any mitigation for electrocution at this stage. However, it is recommended that if on-going impacts are recorded once operational, site specific mitigation be applied reactively. This is an acceptable approach because Red List bird species are unlikely to frequent the substation or the line and be electrocuted.

5.6.2.2 Collisions

South Africa	Botswana
Applicable	Applicable

Collisions are probably the biggest single threat posed by power lines to birds in southern Africa. Most heavily impacted upon are bustards, storks, cranes and various species of waterbirds. These species are mostly heavy-bodied birds with limited manoeuvrability, which makes it difficult for them to take the necessary evasive action to avoid colliding with power lines.

A potential impact of the proposed power lines is collisions with the earth wire present on the proposed power line. Many variables play a role in determining collision risks posed by the powerline infrastructure, this includes weather, age, flocking behaviour, power line height, light conditions, topography, population density and so forth.

With reference to this development, collisions are likely to be linked to the following habitat types and/or specific sets of circumstances:

- Lines crossing rivers. These are important habitat for a variety of Red List species, and the constant movement of birds up and down the river in search of food creates a collision risk.
- Proximity of breeding Red List raptors and vultures to the proposed power lines. In this scenario, the young, recently fledged birds would be most at risk of collisions in the woodland biome.
- Lines crossing or skirting areas of natural grassland or old and fallow lands in commercial farming areas.
- Lines crossing agricultural fields surrounded by natural woodland are important for other large terrestrial species, which are highly susceptible to the collision impact.
- Vultures feeding on a carcass near the proposed lines. Vultures descending to a carcass are at risk of collisions with a nearby power line. Birds will also be at risk when rapidly taking off at the carcass if disturbed by people or mammalian predators.
- Vultures roosting and perching (sometimes overnight) on existing 400 kV transmission infrastructure may result in them being vulnerable to collisions with the overhead earth wires.

Mitigation Measures:

- High risk sections of power line must be identified by a qualified avifaunal specialist during the walk-through phase of the project, once the alignment has been finalized.
- If power line marking is required, bird flight diverters must be installed on the full span length on each of the conductors (according to BPC or Eskom Guidelines).
- Light and dark colour devices must be alternated to provide contrast against both dark and light backgrounds respectively. These devices must be installed as soon as the conductors are strung.

5.6.2.3 Displacement due to habitat transformation and disturbance

South Africa	Botswana
Applicable	Applicable

During the construction phase and maintenance of power lines and substations, some habitat destruction and transformation inevitably takes place. This will happen with the construction of access roads, the clearing of servitudes and the levelling of substation yard. These activities have an impact on birds

breeding, foraging and roosting in or near of the servitude through transformation of habitat, which could result in temporary or permanent displacement.

The risk of displacement of Red List species due to habitat transformation is likely to be fairly limited given the low reporting rate for Red List species in the broader area. The biggest potential impact would be the removal of large trees that could potentially serve as nesting substrate for large Red List raptors although it is noted that reporting rates for these species are very low.

Apart from direct habitat destruction, the abovementioned construction and maintenance activities also impact on birds through disturbance; this could lead to breeding failure if the disturbance happens during a critical part of the breeding cycle. Construction activities in close proximity could be a source of disturbance and could lead to temporary breeding failure or even permanent abandonment of nests. The relatively low reporting rates for Red List species in the study area are an indication that they are not regularly utilising the area for breeding.

Mitigation Measures:

- Careful selection of the optimal route for the lines through the proposed corridor, which has already been implemented as part of route selection and MCDM process. This ensures that sensitive habitats (e.g. riparian vegetation and water bodies) are avoided as far as possible.
- 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.
- Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum.
- The recommendations of the ecological and botanical specialist studies must be strictly implemented, especially as far as limitation of the construction footprint and rehabilitation of disturbed areas is concerned.
- The final powerline alignment must be inspected on foot by the avifaunal specialist prior to construction to ascertain if any Red List species nests are present. All relevant detail must be recorded i.e. species, coordinates and nest status. Should any nests be recorded, it would require management of the potential impacts on the breeding birds once construction commences, which would necessitate the involvement of the avifaunal specialist and the ECO.
- An effective communication strategy should be implemented whereby the avifaunal specialist is provided with a construction schedule which will enable him/her to ascertain when and where such breeding Red Data species could be impacted by the construction activities. This could then be addressed through the timing of construction activities during critical periods of the breeding cycle, once it has been established that a particular nest is active.

5.6.3 Cumulative impacts

The cumulative impacts of the identified impacts on avifauna are summarised below:

- **Electrocution:** The proposed powerline will not increase the risk of powerline electrocutions for Red List avifauna, therefore the cumulative impact of this potential impact is zero for all practical reasons.
- **Collision:** The cumulative impact of collision mortality on several Red List species in the greater area is likely to be moderate, although the actual figures are not known. i.e. it is not known how many vultures are killed annually through powerline collisions in the greater area, although the number of flights across and especially roosting on existing powerlines could be significant. Specific

concern exists for vultures because they are vulnerable to collisions, especially in high risk areas such as near vulture restaurants or at powerline roosts. The additional powerline will likely result in a moderate increase of the cumulative collision impact of existing powerlines on Red List avifauna in the greater area.

- **Displacement and habitat fragmentation:** Although each power line probably affects a relatively small proportion of the landscape, there are already several existing activities, e.g. agriculture, and infrastructure, e.g. powerlines, roads and mining, in the greater area, that has resulted in significant habitat transformation. An additional 400 kV powerline will add to these impacts, and will result in additional fragmentation of the habitat. The additional powerline will therefore result in a moderate increase of the cumulative displacement impact of existing anthropogenic activities on Red List avifauna in the area.

The assessment of the impacts listed above is summarised in **Section 5.6.6.**

5.6.4 Assessment of no-go alternative

The no-go alternative will have a neutral impact on the avifaunal biodiversity, as the flight paths, and habitats or nesting grounds of the sensitive birds will remain undisturbed.

5.6.5 Conclusions

In both countries, the habitat in which the proposed power line corridor is located is moderately sensitive from a potential bird impact perspective. The natural habitats are likely to support a diversity of Red List power line sensitive species. However, there is evidence of anthropogenic impacts in the broader area, particularly in the form of urbanisation, mining, cultivation and pastoral activities which is visible in the disturbed state of the natural habitat. The levels of disturbance associated with these land use practices are significant and have therefore had a negative impact on avifaunal diversity and abundance reflected in the low reporting rates for most of the power line sensitive Red List species.

Despite the possible impacts of the project, the construction and operation of the proposed 400 kV powerline should result in manageable impacts on Red List avifauna, provided the recommended mitigation measures are diligently implemented, including the monitoring requirements as detailed in the ESMP **(ANNEXURE H).**

5.6.6 Summary of the impacts

Table 36: Summary of ecological impacts (avifauna) of the proposed development on the proposed site and proposed mitigation measures

Impact	Pre-mitigation:						Recommended mitigation	Post-mitigation:					
	Duration	Extent	Intensity	Conseq-uence	Proba-bility	Signifi-cance		Duration	Extent	Intensity	Conseq-uence	Proba-bility	Signifi-cance
Electrocution	Long-term	Local	Negligible	Negligible	Very unlikely	Very low – negative	• It is recommended that if on-going impacts are recorded once operational, site specific mitigation be applied reactively.	Long-term	Local	Negligible	Negligible	Very unlikely	Very low - negative
Collision	Long term	Local	High negative	Highly detrimental	Fairly likely	Moderate: - negative	• High risk sections of power line must be identified by a qualified avifaunal specialist during the walk-through phase of the project • Bird flight diverters must be installed on the full span length on each of the conductors • Light and dark colour devices must be alternated to provide contrast against both dark and light backgrounds respectively	Long-term	Local	High negative	Highly detrimental	Unlikely	Low - negative
Displacement	Short term	Site-specific	Moderate negative	Slightly detrimental	Fairly likely	Low - negative	• Careful selection of the optimal route for the line • Construction activity should be restricted to the immediate footprint of the infrastructure. • Access to the remainder of the site should be strictly controlled • Measures to control noise should be applied according to current best practice • Maximum use should be made of existing access roads • The recommendations of the ecological and botanical specialist studies must be strictly implemented • The final powerline alignment must be inspected on foot by the avifaunal specialist prior to construction	Short term	Site-specific	Moderate: negative	Slightly detrimental	Very likely	Very low - negative

5.7 Land Use

The impact assessment of the project on the landuse formed part of the social impacts detailed in **Section 6.8.2.**

5.7.1 Status quo

SOUTH AFRICA

The study area consists of several game and cattle farms. Game farms provide for the management of large areas of natural rangeland with the commercial objective of producing livestock or game animals for hunting. There are also cultivated farming activities (i.e. croplands) located north east of Mahikeng, lying west of the proposed alignment. Most of these farming activities are concentrated close to larger towns.

Mining and its related activities (waste dumps, settling ponds) are concentrated around formalised towns or cities such as Ottoshoop (Chrome mining) and Nietverdiend (Fluorspar mining). The closest mine is located 7km away from the proposed alignment.

Settlements consists of both rural and urban settings. Larger formalised towns include Mahikeng, Ottoshoop, Zeerust and Nietverdiend. These towns consist of a combination of commercial, educational, institutional, business and residential land uses. Conversely, the rural settlements include villages and gardens of traditional areas. Large rural settlements are sparsely located north of the N4 (**Figures 50 and 51**).

The largest part of the study area consists of natural areas with wilderness characteristics, which comprises of wetlands, woodlands, indigenous forest and shrub land. The area also consists of many formalised protected areas, the largest one being the Madikwe Nature Reserve.

Figure 50: Typical rural settlement with a formal concrete brick house and traditional garden area

Figure 51: Typical farming activities located close to Bewley

Table 37: Nature reserves bordering the proposed transmission corridors in South Africa

Name	Ownership / management	NEMPAA Status	Name	Ownership / management	NEMPAA Status
Druprenella Private Nature Reserve	Individual landowners	Protected Area	Drie Annies Private Nature Reserve	Individual landowners	Protected Area
J.H Klopper Private Nature Reserve	Individual landowners	Protected Area	Nellie Private Nature Reserve	Individual landowners	Protected Area
Olyvenbult Private Nature Reserve	Individual landowners	Protected Area	Tweekoppiesfontein Private Nature Reserve	Individual landowners	Protected Area
Thys Snyman Nature Reserve	Individual landowners	Protected Area	Weltevrede Nature Reserve	Individual landowners	Protected Area
Koos Swart Private Nature Reserve	Individual landowners	Protected Area	Weldere Private Nature Reserve	Individual landowners	Protected Area
Madikwe Game Reserve	NW Parks board	Protected Area			

BOTSWANA

The study area's land cover consists of the small-scale farming activities, which are associated with small rural settlements. The only formalised town identified is Mochudi, which lies west of the proposed alignment (**Figures 52 to 54**).

The natural landscape is also the largest part of the study area in Botswana. These types of landscapes have important well - being value contributing to the sense of place and aesthetic appeal. The type of natural landscapes includes riverine, wetlands grassland and shrubland.

Figure 52: Typical farming activities north of the South Africa Botswana border

Figure 53: Larger formalised town

Figure 54: Typical rural settlement with subsistence farming

Refer to **Section 5.9** for the detailed impact assessment associated with land use or landscape type.

5.8 Social

Aurecon was appointed to undertake a Social Impact Assessment (SIA). The purpose of the study was to illustrate the socio-economic baseline environment of the affected communities in the study area, and forecast the possible impacts that the proposed development may have on the host communities.

The SIA was subject to the following assumptions and limitations:

- The socio-economic profile presented is partially presented on data from the most recent Statistics SA and Botswana Census Survey results, which was conducted in 2011. Characteristics of the study area may have changed significantly since then and, although every attempt was made to supplement this with more recent data, some aspects of the profile may still not be completely accurate. Despite this limitation, however, the author is confident that in all respects where the nature or magnitude of potential socio-economic impacts is dependent on accurate and current baseline data, these have been sufficiently updated from the supplementary sources.
- In many respects, the proposed project is still in the early stages of design. Hence, figures quoted in the estimates of certain impacts (e.g. numbers of employment opportunities that will be created) may be subject to change. In such cases, conservative estimates were employed.

Refer to **ANNEXURE G.6** for a detailed Social Impact Assessment (SIA) Report.

NOTE: As part of the SIA, a Livelihood Restoration Plan was proposed in the Plan of Study and approved by DEA. During the assets surveys along the proposed route, two households were identified for resettlement. As a result, a Resettlement Policy Framework (RPF) was developed (originally called a Resettlement Action Plan (RAP) in the Draft ESIA), which will later be developed into a RAP at the time of the proposed implementation in late 2010. Some of the required information will only be available closer to the project implementation time.

5.8.1 Status quo

SOUTH AFRICA

The study area falls within the Ngaka Modiri Molema District Municipality (NMMDM). Ramotshere Moiloa and Mahikeng Local Municipalities are the two Local Municipalities that is affected by the proposed project. The main towns and settlements within 10 km of the study area are Ikopeleng, Khunotswana, Lehurutshe, Mantsie, Motswedi, Driefontein, Miga and Supingstad.

Population demographics:

The population of North West makes up 6.8% of the population of South Africa and is ranked seventh in terms of population size. A total of 3,509,953 out of the 51,770,560 people in South Africa live in the North-West Province. The sex ration in North-West Province is 102.9, with 1,779,903 males and 1,730,049 females. Ngaka Modiri Molema District Municipality recorded the second highest population size in 2011 (842,699) which amounts to 24.0% of the population in North West. The sex ratio 96.3% - more females than males. In terms of ethnicity groups, the district is mainly made up of Black African (94%), while whites make up 3.7%, and Coloured 1.6%, Asian 0.9% and other 0.2%.

Education:

In Ngaka Modiri Molema District Municipality, 12.8% of the population (>20 years old) had no formal schooling in 2011, with high population of female (149,114) compared to male (146,056) on a provincial level. The total population that completed secondary is 14.2% in the district, of which the majority is female population in the North-West Province. Only 5.3% had attained a higher level of education in 2011 in the District. From a provincial level, more males (79,955) completed higher education in the same year compared to females (8,506).

BOTSWANA

The proposed development falls within the Kgatleng and South-East Regions in Botswana. South-East District has two sub-districts namely; Ramotswa sub-district and Tlokweng sub-district. The major settlements close to the proposed development are: Monametsana, Malotwana, Mochudi, Dikwididing, Mokatse and Modipane.

Population Demographics:

The population of Botswana is largely concentrated in the eastern part of the country. Botswana's main ethnic groups are Tswana/ Setswana and Kalanga. Other groups of ethnicities in Botswana include whites and Indians, both groups being roughly equally small. According to the 2011 census, the South-East District has a total population of 85,014 with 86% of its population living in the urban centres. Kgatleng District has a total population of 91,660 with 61% living in the urban centres and 39% living in rural settlements. Most of the population living in the Botswana districts are Batswana, only 8% in South-East and 5% in Kgatleng Districts are non-Batswana. In Botswana, Setswana is the national language, and English is an official language. Setswana is the first language for most people living the South-East and Kgatleng Districts. Approximately 88% of people in the South-East and 94% of people in the Kgatleng District speaking Setswana.

Education:

According to the 2011 statistics 27% of the population, both for the South-East and Kgatleng District, aged twelve years and over, has attained Form 1 – 3 as the highest level of education. In both cases, it is mostly females. A further 23% of the population in the South-East District and 14% of the population in the Kgatleng District, aged twelve years and over, has attained Form 4 to 6 as the highest level of education, mostly made up of the female population in both districts. The population with no formal education is higher in Kgatleng compared to South East. In both districts the females make up the most numbers.

Employment:

The unemployment rate is the percentage of people in the labour force who do not work and are available to work. The North-West Province has 31.5% unemployment rate, which is lower than the unemployment rate in Ngaka Modiri Molema (33.7%) in 2011. This district has the second highest unemployment in the province. The total percentage of people that are employed (formal or informal employment) is 44.0% in Ngaka Modiri Molema which is below the employment rate in the North West (54.2%).

Household Income:

The average household income for the Mahikeng Local Municipality recorded in 2011 was R81,965.00 which is much higher as the average household income for Ramotshere Moiloa Local Municipality of R51,26.00. This average income is also higher than that of the District Municipality which was R63,778.00 in the same year.

Household Services:

Census 2011 recorded that 54.9% of the households in the Ngaka Modiri District Municipality removed their own refuse and a further 35.9% of households had their rubbish removed at least once a week. 32% of the households in the Ngaka Modiri Molema District Municipality used flush toilets. However, most of the households in other districts used other types of facilities. In terms of electricity more than 84% of households in North West use electricity for lighting, compared to 73% in 2001 and 43% in 1996. Ngaka Modiri Molema recorded the lower proportion of households with access to electricity for lighting with 80.7% in 2011 compared to the provincial statistics (84.3%).

Economic Activities:

The main economic driver of the North-West Province is mining, which contributes more than 50% towards the Province's gross domestic product (GDP) and provides employment for about 25% of its workforce. North West is also known as the Platinum Province, as almost all South Africa's platinum is found in North West.

Employment:

As per the 2011 Botswana statistics, 53% of the population aged 12 years and over are economically active in the South-East District, 13% is actively seeking work and a further 27.3% of the population are students. 50% of the population aged 12 years and over in the Kgatleng District is economically active, another 11.6% of the population is actively seeking work and 23.2% is in the student category.

Household Agriculture:

Cattle, goats, poultry and donkey/ mules are the main livestock owned by households in both districts. Raising cattle has long been the most profitable farming activity in Botswana. The beef industry is well established, and over 95% of production is exported, much of it to Europe. Botswana's land is generally unsuitable for crops and many foods are imported. However, a narrow corridor on the south-eastern side of the country is more suitable for agriculture. This is where most of the population lives. The main crops planted by households in the South-East and Kgatleng Districts are maize, beans, sweet reeds and sorghum.

Household services:

Botswana has set in place a very efficient power distribution utility. Botswana more than doubled its electrification rate between 2006 and 2008, pushing it from 22% to 50%. Between 2004 and 2007, rural access to electricity also doubled, to 44%; which is a major improvement even though still falling short of national targets.

Botswana also has a high access rate to improved water sources, with more than 90% of the total population with access to an improved water source, which has increased in both urban and rural areas. About 30.2% of housing units have access to piped water indoors and a further 39.9% of housing units have access to outdoor piped water. 14.8% of housing units have access to a communal tap and 4.9% of housing units utilise boreholes for their water supply.

In the case of sanitation, Botswana has managed to improve service options by moving people from traditional to improved latrines and by increasing access to flush

Figure 55: Khunotswana village, South Africa

Cultural Activities or Customs (South Africa and Botswana):

The line will traverse predominantly rural community areas for its length in Botswana and along a significant portion of the land in South Africa. The areas in both South Africa and Botswana have similar norms and cultures.

Ancestors: Tswana people believe in the help of the dead, who ultimately find their way to a world to protect them. These ancestors continue to take an active interest in the fortunes of their living descendants. For those that still follow a traditional belief system especially in the villages, ancestral worship is central to their daily religious practice.

Labour division: Fixed gender roles are common amongst Batswana people, where the women are responsible for gathering food and water and domestic duties, while men look after livestock, engage in warfare and participate in public political matters. The division of labour became less strict as more men migrated for wage labour and women increasingly engaged in livestock activities.

Leadership: Botswana has a long-held belief in democracy. Traditional towns and villages have a kgotla, where the local residents discuss matters of economic or political importance to the family or community, it's also a meeting place where everybody can have their say and decisions are taken by consensus [20].

toilets, therefore reducing the practice of open defecation. Even though these improvements are significant, access to flush toilets is still at 34.1%.

Economic Activities:

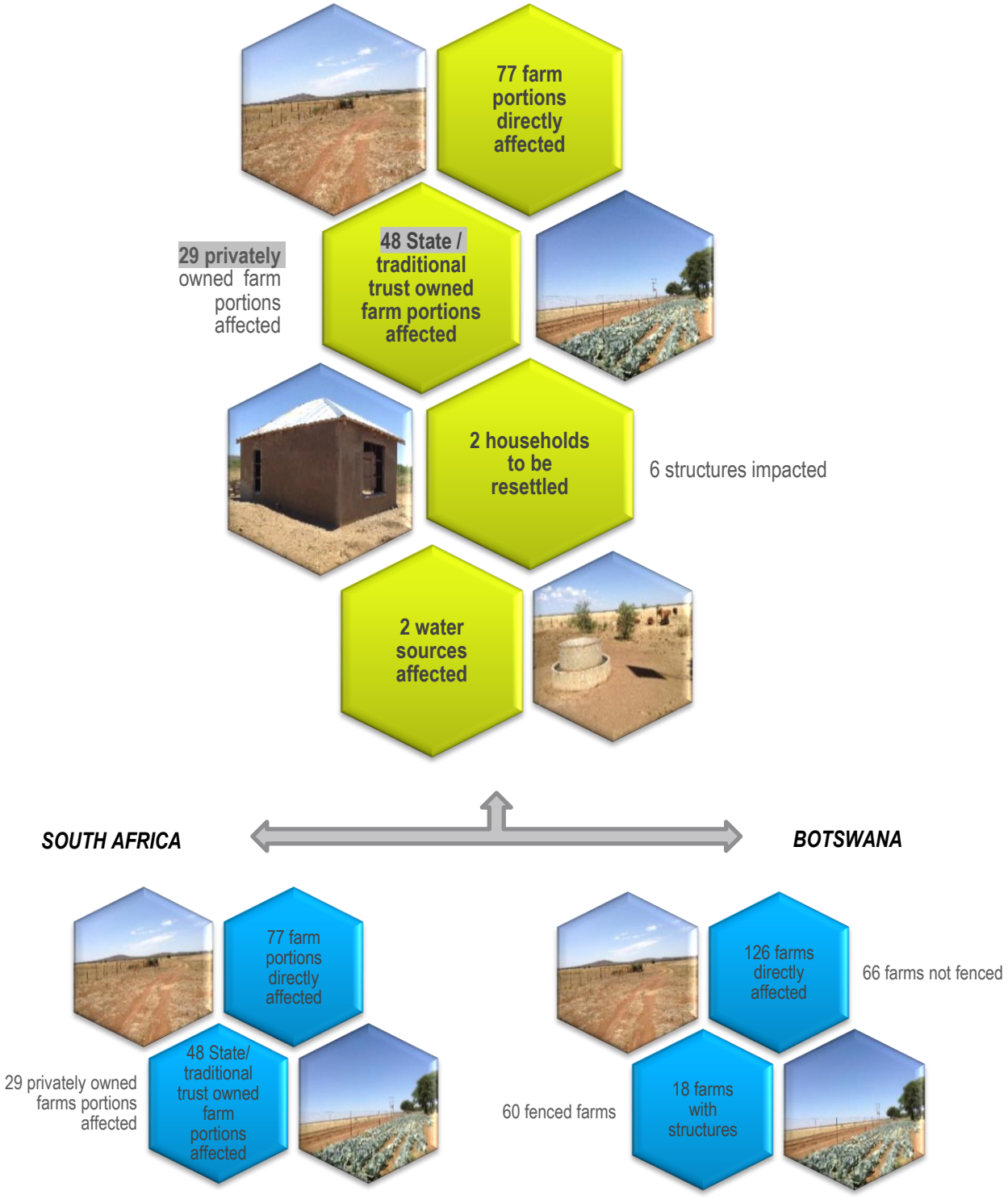
Botswana has benefited from a stable social structure and a wealth of natural mineral resources and has one of Africa's highest sustained records of economic growth since independence. However, the economy is dependent on mining and agriculture, and has had to cope with the vagaries of the diamond market and frequent droughts.

[20] Denbow, J. and Thebe, P.C. 2006. Culture and Customs of Botswana. Greenwood Press: London.

Figure 56: Mochudi, Botswana

As part of the RPF an asset and infrastructure survey was conducted in October and November 2017, to attain what assets and infrastructures are impacted by the proposed project. The RPF identifies the process to be followed for compensation.

The findings from the asset and infrastructure survey are indicated below:



5.8.2 Potential impacts

The following socio-economic impacts are likely to arise because of the proposed developments in proposed project area in both countries:

5.8.2.1 Creation of permanent and temporary employment opportunities

South Africa	Botswana
Applicable	Applicable

The results of the socio-economic survey indicate that the environment surrounding the project is characterised by some levels of poverty and underdevelopment, while some of the households in the project area face significant socio-economic challenges. The creation of employment opportunities can therefore be a significant positive impact on the surrounding communities, even if these opportunities are only of a temporary nature and the numbers are limited.

Mitigation Measures:

- The contractor should be required to employ local labour, where possible. The requirement for the employment of local labour should be formalised by incorporating it into the contractor's contract. Follow-up compliance monitoring should also be undertaken.
- Quotas for local employment should be set based on the availability of appropriate local skills as indicated in the skills databases. The contractor's contract should specify that these positions may only be filled by persons outside of these categories if it can be demonstrated that no suitable persons are recorded in the skills register to fill these positions, and no other candidates could be identified through local advertising.
- Tender criteria should require training and skills development of the contractor workforce by the contractor. Where possible, training should be aimed at providing skills to employees that might allow them to apply for permanent positions during the operation of the plant.
- Recruiting by the contractor must be conducted through one or more central office; no on-site hiring should be allowed. The location of these offices will require further investigation.
- Opportunities should be investigated for encouraging indirect employment creation in the informal sector. Such an investigation can either be conducted in-house by SAPP, Eskom and BPC or by a specialist consultant.
- Where possible, labour-based methods of construction should be used (e.g. for the construction of access roads).
- Women must be provided with access to types of work traditionally seen as male.

5.8.2.2 Opportunities for local sourcing of goods and services

South Africa	Botswana
Applicable	Applicable

The local procurement of goods and services is a manner that these communities can successfully partake in the development project. Local procurement can provide a fundamental linkage between the project implementers and the local communities.

Mitigation Measures:

The measures suggested above to maximise local employment will also serve to maximise the positive impacts of the project on the local economy. In addition, the following measures are recommended to optimise the positive influence on the local economy:

- Where feasible, procurement of materials, goods and services from local suppliers should be encouraged.

5.8.2.3 Local and regional economic benefits

South Africa	Botswana
Applicable	Applicable

In addition to the economic benefits derived from employment, the development will also contribute to the local and regional economy in other ways. For instance, local expenditure by employees will have multiplier effects in various sectors of the economy, thereby stimulating business activity and further employment creation.

Mitigation Measures:

In addition to the above-mentioned mitigation measures, the following measures are recommended to maximise the positive influence on the local economy:

- A clause stipulating the use of Botswanan and South African sub-contractors where possible should be included in the agreement between the respective utilities and the main contractor responsible for construction. Where possible these local contractors should be recruited from the nearby towns.
- Development of a register of local small-medium, and micro sized enterprises (SMMEs) and the types of goods and services provided by them, as recommended in the previous study. The details of local suppliers may also be obtained from the local municipal office in South Africa and in the relevant office in Botswana.
- Establishment of linkages with other institutions involved in skills development and SMME development. These linkages can then be used to recruit apposite contractors. The performance indicator of this measure shall be minutes of meetings conducted with representatives of these institutions.
- Where appropriate SMMEs do not exist, investigation of the possibility of launching a training/ skills development initiative to develop local entrepreneurial skills should be undertaken.

5.8.2.4 Increased of stable and reliable electricity supply

South Africa	Botswana
Applicable	Applicable

The proposed development will contribute towards and increased availability of stable and reliable electricity in both regions. Subsequently this will enable sufficient supply of electricity to existing economic activities and take full advantage of several downstream socio-economic development opportunities with extensive positive socio-economic impacts in different spheres in society.

Mitigation Measures:

- SAPP, ESKOM and BPC should take steps to ensure that the benefits and costs of the proposed project are shared equitably. This may require implementing special measures to ensure that the communities hosting the proposed project or other infrastructure related to grid interconnection also

benefit from it, e.g. in terms of rural electrification programmes, job creation and/ or corporate social investment. A possible rural electrification project could be, for example, to provide solar panels to schools that do not have access to electricity. This can have a positive impact on the whole community as schools can be used by different members of the community. Eskom normally has a community support initiative for all their community-based projects. The community initiative for this project will be discussed and agreed upon with the relevant traditional authorities, councillors and local municipality as they have a better understanding of the community needs. In this context, it would also be necessary to ensure that specific individuals and groups do not end up taking more than their share of benefits.

- The project's construction and operation should be planned to maximise social benefits and avoid social costs.
- It is recommended that SAPP, ESKOM and BPC should establish a local Stakeholder Liaison Committee. This committee should involve communities and stakeholders who will experience the impacts of the proposed project. The committee could take up where the stakeholder engagement process of the ESIA left off. During construction and operation, the committee could help to ensure that stakeholders/ communities are kept up to date on planned construction activities, job opportunities, and other relevant issues. This committee could serve as a channel of communication between SAPP, ESKOM, BPC and neighbouring communities/ stakeholders.

5.8.2.5 Social and cultural disruption and conflict due to population influx

South Africa	Botswana
Applicable	Applicable

Large projects of this nature offer people a unique opportunity for employment as well as access to better services and infrastructure. Such opportunities are rare in the north-western rural areas in South Africa and south-eastern rural areas in Botswana. It is therefore anticipated that job seekers will travel from their place of origin to perceived sources of employment. This will result in substantial economic migration within South Africa and Botswana. Consequently, the area surrounding the site may experience an influx of job seekers.

The influx of job-seekers and construction workers is expected to have a variety of social consequences, including:

- Additional demand for services and infrastructure.
- Tension or conflict can be created because of religious or ethnic rivalries.
- Negative perception that outsiders are taking up jobs that could have gone to unemployed local residents.
- If any outsiders instigate sexual relationships with wives, daughters or girlfriends of locals, this would also exacerbate the problem.

Mitigation Measures:

To reduce the risk of conflict or competition between locals and newcomers, it is recommended that*:*

- The recruitment policy used to employ people on the project is fair and transparent;
- The intention of giving preferential employment to locals is clearly communicated, to discourage an influx of job-seekers from other areas;
- Liaison occurs with local community structures to identify mutually acceptable means of controlling the influx of job seekers or, if this is not possible, to mitigate the negative effects of such an influx;
- Recruitment is to be conducted via the Employment Forum and not within the project area itself;

- Involvement of local community structures to assist in communicating the intention of SAPP, ESKOM and/ or BPC to give preference to local labour, and to assist by developing a skills database and residents' status for the labour pool in their community: and
- Implementation of measures to monitor and evaluate the impact on gender relations.

To mitigate the effects of increased pressure on local services and infrastructure, it is recommended that:

- SAPP, ESKOM and/ or BPC or the appointed construction contractor should provide the local municipalities with information on the number of jobs that will be created, so that potential changes in influx trends can be planned for; and
- Services for the additional skilled labour be sourced from the local municipalities, who must be informed well in advance of the anticipated timeframe and of the nature of services that will be required.

5.8.2.6 Possible social pathologies arising from the population influx

One major potential social pathology that may arise from a rapid increase in population numbers in an existing underdeveloped area is an increase in crime levels. The extra strain that the influx of job seekers will place on limited employment opportunities in the area will potentially increase the unemployment rate, which will increase the crime rate. Even if instances of crime are not because of the newcomers, they may still be attributed to them by local communities.

Another possibility is that a population influx will contribute to alcoholism, drug abuse, prostitution and the spread of sexually transmitted diseases in the local population. This impact may be aggravated by the presence of a temporary construction workforce. With a predominantly male population, construction camps often become a focal point for promiscuous sexual activities.

Another major concern relates to the management of housing for the construction workers who are employed by the contractors. If there is inadequate housing facilities for the workers, this can result in the expansion of informal settlements and encourage more crime.

Mitigation Measures:

Measures to combat HIV/ AIDS and other social ills:

- The contractor is to implement HIV/ AIDS, alcohol abuse, drug abuse, and domestic violence prevention and awareness campaigns in the communities.
- SAPP, ESKOM and/ or BPC and the appointed construction contractor should ensure the health of its employees and their dependants by adopting rigorous health programmes, which should, at a minimum, include programmes to combat HIV/ AIDS and TB.
- The contractor should make HIV/ AIDS and STD awareness and prevention programmes a condition of contract for all suppliers and sub-contractors.
- The contractor should provide an adequate supply of free condoms to all workers. Condoms should be located in the bathrooms and other communal areas on the construction site.
- A voluntary counselling and testing (VCT) programme should be introduced during the construction phase and continued during operations.
- The contractor should undertake a HIV/AIDS and STD prevalence survey amongst all workers on a regular basis. It will involve a voluntary test available to 100% of the workforce. The results of the survey will help to determine the HIV/ AIDS and STD strategy. When, and if, statistically

representative results are obtained, the results of the survey should be made available to management and workers at the same time. Results should be presented in statistical terms to ensure confidentiality.

- SAPP, ESKOM and/ or BPC and the appointed construction contractor should align awareness campaigns with those of other organisations in the area. These campaigns should use various common-practice methodologies to ensure social and cultural sensitivity.
- Access at the construction site should be controlled to prevent sex workers from either visiting and/ or loitering at or near these locations.

Measures to address crime:

- Cease construction activities before nightfall, if possible.
- Construction workers should be clearly identifiable by wearing proper construction uniforms displaying the logo of the construction company. Construction workers could also be issued with identification tags.
- The appointed contractor should establish clear rules and regulations for access to the construction site and offices to control loitering. Consultation should occur with the local police branch to establish standard operating procedures for the control and/ or removal of loiterers.
- Liaison structures are to be established with local police to monitor social changes during the construction phase. Liaison should also be established with existing crime control organisations.

5.8.2.7 Construction-related health, safety and aesthetic impacts

South Africa	Botswana
Applicable	Applicable

Construction impacts are related to the physical presence of project-related infrastructure and the intrusion this imposes on surrounding communities. Such intrusion could impinge on the lives of surrounding communities by affecting the area's sense of place. The impacts of the construction activities on the immediate physical environment include:

- Noise and dust generated by vehicles and machinery;
- Safety impacts (not only because of increased traffic, but also due to the risk of community members and animals wandering onto the construction site); and
- Visual intrusion by the construction activities and constructed structures, which may impact negatively on the aesthetic character of the pristine desert landscape.

Mitigation Measures:

- The implementation of adequate rehabilitation measures to return the landscape and other changes to at least its original state when the construction period has ended.
- It is anticipated that communities' negative experience of the nuisance impact of construction activities can be further mitigated through the benefits derived from local job creation on the project and by clear communication of the long-term positive impacts that the intended project will have.
- The implementation of good housekeeping measures included in the environmental and social management plan (ESMP) will assist in mitigating the negative impacts associated with the project.

Traffic:

- Safe travelling speeds must be determined for access routes close to populated areas, and measures implemented to ensure that these restrictions are enforced.

- Such measures may include monitoring vehicle speeds, erecting speed limit signs and installing speed humps.
- Roads must be adequately maintained and rehabilitated after use to previous state or better if needed, to prevent deterioration of road surfaces due to heavy vehicle traffic.
- Junctions of access roads and public roads must be regulated at all times, with construction vehicles yielding to oncoming traffic.
- Where possible, construction traffic should make use of alternative access routes not involving public roads.

Unauthorised access:

- Unauthorised access to the construction site must be prevented through appropriate fencing and security.

Community education:

- It is recommended that a community awareness campaign be implemented in the community to sensitise the community members to traffic and other construction-related safety risks.
- Activities undertaken as part of the awareness campaign and the education/ communication programme should be recorded and reflected in a formal progress report compiled on a quarterly basis.
- Mechanisms must be established to ensure that problems are dealt with promptly. In this regard, it is recommended that a team of community liaison officers (CLOs) be appointed from all affected communities. The CLOs should be local residents, as they will serve as points of contact between the community and the ECOs responsible for monitoring construction activities.
- Feedback sessions should be arranged with community leaders and ECOs to assess the impact of this programme in terms of knowledge, attitudes and behaviour.

5.8.2.8 Land use impacts and impacts on common property resources

South Africa	Botswana
Applicable	Applicable

There is a probability that the project will result in impacts on traditional land rights, occupations and production systems, which can result in increased and unsustainable utilisation of local natural resources as well. There may be a loss or reduction in existing land use, potential land use, access to or quality of natural resources on which communities depend now or in the future.

Access to common property resources that are at risk with linear projects include access to water, grazing, hunting and fishing areas, timber and fuel wood, medicinal and herbal plants, craft materials and seasonal uses may all be under threat. It is not just access to and availability of these communal resources that are threatened but the construction phase poses an imminent risk to the quality of these resources, especially water resources.

Mitigation Measures:

- The proposed alignment must be designed within the approved corridor in such a way as to avoid common resources and other important points, such as community cemeteries.
- Where construction of the line obstruct access to common resource (i.e. water points) alternative access roads should be provided to the affected households and/ or alternative water points should be provided.

5.8.2.9 Physical or economic displacement

South Africa	Botswana
Applicable	Applicable

Displacement-related impacts encompass both physical displacement (the loss of a home and the necessity of moving elsewhere) and/ or economic displacement (the loss of productive assets such as cultivated fields or business stands). The project will involve establishing a permanent servitude along the transmission line, as well as for ancillary infrastructure like access roads and certain land use restrictions will be permanently in force within this servitude. Households and communities residing or owning assets in either of these reserves (or in the areas earmarked for surface infrastructure) will therefore experience physical and/or economic displacement because of the project. In addition, construction activities may cause a temporary disruption in access and communities' daily movement patterns from one side of the transmission route to the other. Physical and economic displacements have the potential to give rise to severe negative impacts for resettled communities – i.e. they are left with no land; no job, loss of access to common property resources and marginalised.

Mitigation Measures:

A suitable Resettlement Policy Framework must be drafted to minimise the adverse effects of displacement. This has been done and is included as **ANNEXURE G7**. The IFC recommends that project sponsors undertake the following actions on behalf of all affected people, including members of the host communities in which displaced people will be settled:

- Inform affected people of their options and rights concerning resettlement. A clear and coherent information and sensitisation campaign is a crucial component of the resettlement process;
- Provide technically and economically feasible options for resettlement based on consultation with affected people and assessment of resettlement alternatives;
- Whether physical relocation is required or not, provide affected people with prompt and effective compensation at full replacement value for loss of assets due to project activities;
- Where physical relocation is necessary, help with relocation expenses (moving allowances, transportation, special assistance and health care for vulnerable groups);
- Where physical relocation is necessary, provide temporary housing, permanent housing sites, and resources (in cash or in kind) for the construction of permanent housing, inclusive of all fees, taxes, customary tributes, and utility hook-up charges, or as required, agricultural sites for which a combination of productive potential, locational advantages, and other factors are at least equivalent to the advantages of the old site;
- Provide affected people with transitional financial support (such as short-term employment, subsistence support, or salary maintenance);
- Where necessary, provide affected people with development assistance in addition to compensation for lost assets described above such as land preparation, agricultural inputs, and credit facilities and for training and employment opportunities;
- The payment of compensation should be monitored and verified by representatives of Eskom or BPC as well as representatives of the affected communities; and
- Eskom and/ or BPC should establish a method for delivering compensation (either cash payments or in-kind allocations, as in the case of land-for-land compensation).

The assessment of the impacts listed above is summarised in **Section 5.8.6.**

5.8.3 Cumulative impacts

The possible cumulative socio-economic impacts that are expected to occur as result of the combined effect of the proposed project and other current or planned operations in the area that were identified are the impacts related to population influx and impacts on the visual surroundings and sense of place.

- **Population influx** of job seekers will create spontaneous and informal settlements. The expansion of informal settlements may also result in many other cumulative impacts, such as social pathologies and increase pressure on local services and resources.
- The proposed project will **impact on the visual surroundings and sense of place**, considering both the current and planned activities and infrastructure (i.e. roads, pipelines and transmission lines).
- The project is also likely to have cumulative impacts on the **ecosystem services**. However, due to the nature of the project and the measures put in place to avoid major and important ecosystems, the impact will be minimal.

5.8.4 Assessment of no-go alternative

The no-go alternative will have significant socio-economic impacts as the need to alleviate the current electricity supply constraints and contribute towards energy security of supply in the long run between the two countries will not be achieved. This will subsequently result in unreliable supply of electricity for the existing and future economic activities.

5.8.5 Conclusion

Many of the significant socio-economic impacts of the proposed BOSA Transmission Interconnection Project will occur during their construction phase. Positive impacts include temporary and permanent creation of employment opportunities as well as associated economic benefits and possible creation of opportunities for local sourcing of goods and services as well as anticipated positive impacts on local micro, small and medium enterprises and increased availability of electricity. Negative impacts include the potential influx of job seekers, possible social pathologies arising from the influx of construction workers and job seekers, construction-related health, safety and aesthetic impacts, impacts related to a construction camp as well as displacement. Cumulative impacts include impacts related to population influx such as the creation of spontaneous and informal settlements and the increased pressure on local services/ resources and further the impact on the visual surroundings and sense of place.

5.8.6 Summary of the impacts

Table 38: Summary of socio-economic impacts and proposed mitigation measures

Impact	Pre-mitigation:						Recommended mitigation	Post-mitigation:					
	Duration	Extent	Intensity	Conseq-uence	Proba-bility	Signifi-cance		Duration	Extent	Intensity	Conseq-uence	Proba-bility	Signifi-cance
Job creation	Short-term	Local	Moderate: - positive	Slightly beneficial	Very likely	Low - positive	• Maximise and monitor local recruitment • Promote employment and training (incl. women and youth) • Where possible use labour-intensive methods of construction • Procurement of materials, goods and services from local suppliers • Encourage indirect employment creation in the informal sector • Liaise with local community structures to identify local labour pool	Short-term	Local	High positive	Moderately beneficial	Certain	Moderate positive
Opportunity for local sourcing of goods and services	Short-term	Local	Moderate: - positive	Slightly beneficial	Very likely	Low - positive	• Local procurement opportunities. • Implement community contracting and training. • Create a platform where development of micro, small and medium enterprises is developed through LSD.	Short-term	Local	High positive	Moderately beneficial	Certain	Moderate positive
Local and regional economic benefits and multiplier effects	Short-term	Local	Moderate: - positive	Slightly beneficial	Very likely	Low - positive	• Develop register of local SMMEs • SMME skills development as part of CSI programme • Community education	Short-term	Local	High positive	Moderately beneficial	Certain	Moderate positive
Increased availability of stable electricity	Long-term	Regional	High: - positive	Highly beneficial	Fairly likely	Moderate - positive	• Establish a Stakeholder Liaison Committee • Plan the project in such a way to minimise social costs and maximise the benefits discussed	Long-term	Regional	High positive	Highly beneficial	Very likely	High positive

Impact	Pre-mitigation:						Recommended mitigation	Post-mitigation:					
	Duration	Extent	Intensity	Conseq-uence	Proba-bility	Signifi-cance		Duration	Extent	Intensity	Conseq-uence	Proba-bility	Signifi-cance
Population influx	Short-term	Local	High: - negative	Moderate detrimental	Very likely	Moderate negative	• Fair and transparent recruitment policy • Use of community structures to identify local labour pool • Inform local municipalities well in advance of the anticipated timeframe and of the nature of services that will be required.	Short-term	Local	Moderate positive	Slightly detrimental	Fairly likely	Low negative
Increased social pathologies	Long-term	Regional	Very high: - negative	Extremely detrimental	Certain	Very high negative	• Extensive HIV/AIDS, drug abuse and domestic violence awareness campaigns • A voluntary counselling and testing (VCT) programme should be introduced • Align awareness campaigns with those of other organisations in the area • Provision of sufficient entertainment facilities in construction camps • Control of access to construction camp • Cease construction activities before nightfall, if possible Liaison with police, community policing forum and security stakeholders • Housing of construction workers in a construction village site • Maximisation of the proportion of job opportunities allocated to locals • Demolishing construction village after construction activities have finished, or donating the construction camp to the local municipality	Long-term	Regional	High positive	Highly detrimental	Certain	Moderate negative

Impact	Pre-mitigation:						Recommended mitigation	Post-mitigation:					
	Duration	Extent	Intensity	Conseq-uence	Proba-bility	Signifi-cance		Duration	Extent	Intensity	Conseq-uence	Proba-bility	Signifi-cance
Physical intrusion: construction-related health and safety, and aesthetic impacts	Short-term	Local	High: - negative	Moderate detrimental	Very likely	Moderate negative	• Implement measures to regulate and monitor traffic to decrease threat to community safety • Implement mitigation measures mentioned in the ESMP • Maintain and rehabilitate roads • Unauthorised access to the construction site must be restricted • Implement community awareness campaign to sensitise community members to safety risks • Rehabilitation measures to return the landscape and other changes to its original state. • For impacts on visual environment, noise, vibration, air quality and traffic mitigation measures are discussed in separate specialist study: as per relevant specialist reports.	Short-term	Local	Moderate positive	Slightly detrimental	Fairly likely	Low negative
Land use impacts and impacts on common property resources	Long-term	Site-specific	Very high: - negative	Highly detrimental	Certain	High negative	• Avoid shared resources where possible; • Provide alternative access and water points if needed;	Short-term	Site specific	Moderate positive	Slightly detrimental	Certain	Low negative

Impact	Pre-mitigation:						Recommended mitigation	Post-mitigation:					
	Duration	Extent	Intensity	Conseq-uence	Proba-bility	Signifi-cance		Duration	Extent	Intensity	Conseq-uence	Proba-bility	Signifi-cance
Displacement of current land uses	Long-term	Site-specific	Very high: - negative	Highly detrimental	Certain	High negative	Avoid settlements, if unavailable, proactively manage: • A clear and coherent information and sensitisation campaign is a crucial component of the resettlement process • Adequate compensation • The payment of compensation should be monitored and verified by representatives of the Eskom as well as representatives of the affected communities. • Eskom should establish a method for delivering compensation (either cash payments or in-kind allocations, as in the case of land-for-land compensation). • Proper grievances measures. • Prepare and implement a Relocation Action Plan. • Engagement with affected households	Long-term	Site specific	High negative	Moderately detrimental	Very likely	Moderate negative

5.9 Visual Resources

A Landscape Architect from Aurecon was appointed to conduct a Visual Impact Assessment (VIA). The scope of the study was to define the spatial context of influence of the proposed development/s in terms of the visibility of the overhead transmission lines, the substation and to identify potential sensitive receptor locations.

The following limitations and assumptions are applicable to this study:

- Determining a visual resource in absolute terms is not achievable. It is a complex procedure since it is determined through a combination of quantitative (visibility) and qualitative (aesthetic value) criteria. Therefore, a VIA cannot be entirely objective in this sense as individuals will evaluate a landscape differently, based on experience, culture and social background.
- Various factors can enhance or reduce the visual impact of the proposed project, for instance, vegetation near a receptor's view of the proposed project. Other factors include weather, climatic conditions and seasonal change. It is therefore difficult to determine the visual impact of the proposed project from the viewpoint of each individual receptor.
- The layouts and technical designs provided are conceptual. Therefore, the possibility of adaption exists. Should there be any significant changes in the designs of the proposed infrastructure, these changes may have to be re-assessed.
- The exact position for construction camps and laydown areas are not available at this stage therefore related detailed viewpoints towards the proposed impact cannot be determined.
- It is assumed that the substation will not be more than 6m high.

Refer to **ANNEXURE G.2** for the detailed VIA Report.

5.9.1 Status quo

Topography is an important informant for the VIA and is discussed in some detail in this section.

SOUTH AFRICA

The topography between the Mahikeng substation area and the South Africa – Botswana border is predominantly uniform with the dominant topographical feature being flat plains. A series of consecutive ridges and isolated higher lying topographical areas are located north of the N4 and south of the South Africa - Botswana border. The lower lying areas between the consecutive ridges consists of drainage lines. Mean elevation ranges from 779 meters above mean sea level (mamsl) in the lowest point to 2328 mamsl at the highest point (Aurecon, 2017b).

The proposed overall study area has a rural feel with an even outstretched natural landscape, intercepted by dispersed rural settlements, homesteads and infrastructure associated with commercial agricultural activities.

In terms of the Visual Absorption Capacity (VAC), the landscape is uncluttered, creating a homogenous visual quality with minimal vertical elements. Lower shrubland type vegetation with sparsely spaced trees and cultivated fields are predominantly spread over the study area. The VAC in terms of topography is moderate to low, pattern/diversity is low and for vegetation height is moderate to low.

The overall landscape quality is considered moderate - high because of the dominant horizontal scale of the study area, minimal man-made structures, little visual discontinuity and interruption of the natural environment. The low growing vegetation and the predominant flat topography provides little potential to conceal infrastructure of this size.

BOTSWANA

The uninterrupted flat terrain defines the dominant horizontal scale of the landscape north of the South Africa Botswana border towards Mochudi. The proposed corridor crosses two river valleys, north of Mochudi, offering some variation on the largely even topography (Aurecon, 2017b).

The landscape character is characterised by open and expansive semi-arid landscape is separated by patchworks of subsistence farming and is further defined by a flat to slightly undulating terrain. Vast tracks of open dirt roads connect various smaller settlements and towns

The landscape is uncluttered, creating a homogenous landscape quality with minimal vertical elements. Lower shrubland type vegetation with sparsely spaced trees (becoming even more dispersed as one moves northwards) and cultivated fields are predominantly spread over the study area. The VAC in terms of topography is low; pattern/diversity is low and vegetation height is moderate to low.

The overall landscape quality is considered moderate to high because of the dominant horizontal scale of the study area, minimal man-made structures, little visual discontinuity and interruption of the natural environment. The low growing vegetation and the predominant flat topography provides little potential to conceal infrastructure of this size.

Figure 57: View of the landscape on the South African stretch of land

Figure 58: Typical natural landscape with vast tracks of open dirt roads in South Africa

Figure 59: Formally protected area with ridges in the background in South Africa

5.9.1.1 Receptors

Receptors for visual impacts are potential viewers of the proposed development. Receptor sensitivity refers to the degree that a development affects people, while receptor sensitivity depends on the number of people viewing the project and their perceptions of the study area (Aurecon, 2017).

SOUTH AFRICA		BOTSWANA
People permanently residing in the area (formal residential as well as informal settlements). These areas are associated with main towns as well as dispersed settlements mostly located north of the N4 and north of Mahikeng).	**Most sensitive receptors**	People permanently residing in the area (formal residential as well as informal settlements). These areas are associated with main towns as well as dispersed settlements mostly located east of Gaborone.
Tourism industry and its related accommodation clientele from nearby game farms and formal conservation areas, these include tourists visiting nearby game lodges, such as The Bush House and Impodimo Lodge located within the greater Madikwe Nature Reserve.	**Other receptors**	People within vehicles traveling on the National Road A1.
Moderate to high in isolated areas where the visual amenity plays a significant part in the tourism industry.	**Overall receptor sensitivity**	Moderate to low as - previous experience indicates that lower income residents may view transmission lines as a sign of progress.

5.9.2 Potential impacts

The visual impacts identified are the following:

5.9.2.1 Visual impact of construction camps and laydown areas in natural areas

South Africa	Botswana
Applicable	Applicable

The potential visual impacts of construction camps and laydown areas relate to the possible clearing of vegetation and the foreign scale and aesthetics of the structures during construction, security and stockpiled materials.

Mitigation Measures:

- Locate construction camps outside of visually sensitive areas and away from critical view sources such as main roads, existing urban and rural settlements and public gathering areas such as schools, sporting facilities, community halls etc.
- Where possible locate campsites in areas of low visual quality.
- Do not locate campsites in areas where it will be necessary to remove trees and shrubs or large areas of well-established vegetation.

- Limit the contrast between the vertical scale of the receiving environment and that of the camp infrastructure and material stockpiles.
- Locate laydown areas and construction camps close to existing stands of exotic species which can serve as a screen or a backdrop to the camp.
- Where possible make use of sites which have been previously disturbed and that may not have been re vegetated.
- Stockpiles must not be higher than 3m.

5.9.2.2 Visual impact of transmission lines in natural areas

The potential impacts related to the transmission line relate to the towers with heights of up to 30.75m and the metallic, industrial aesthetic that contrasts with the typically flat and rural character of the study area.

Mitigation Measures:

- The management of the potential visual impacts associated with the transmission line should focus on careful alignment to avoid sensitive areas such as elevated ridges, koppies and pans that could be conserved as visual assets for tourist related activities, which was done as part of the route selection process.
- Where possible, a minimum buffer of five times the height of the towers should be allowed between the alignment and any of the natural features.
- Advantage should be taken of existing vertical features such as rows of tall trees to serve as a backdrop or screen for the transmission line.
- The alignment of the transmission line should maintain as much distance as possible from large concentrations of potential viewers.
- The design of the tower structure should attempt to reduce the bulk of the steel girders thereby presenting a lighter structure with lesser silhouette.
- Where the route crosses over several ridges, running parallel to the proposed route, the alignment should be in the lower section so that the ridge lines form a visual screen from both sides

5.9.2.3 Visual impact of transmission lines in protected areas

The potential impacts related to the transmission line relate to its height of up to 30.75m and the metallic, industrial aesthetic that contrasts with the typically flat and natural character of the study area.

Mitigation Measures:

- The management of the potential visual impacts associated with the transmission line should focus on careful alignment to avoid sensitive areas such as elevated ridges, koppies and pans that could be conserved as visual assets for tourist related activities, which was done as part of the route selection process.
- Where possible, a minimum buffer of five times the height of the towers should be allowed between the alignment and any of the natural features.
- Advantage should be taken of existing vertical features such as rows of tall trees to serve as a backdrop or screen for the transmission line.
- The alignment of the transmission line should maintain as much distance as possible from large concentrations of potential viewers.
- The design of the tower structure should attempt to reduce the bulk of the steel girders thereby presenting a lighter structure with lesser silhouette.
- Where the route crosses over several ridges, running parallel to the proposed route, the alignment should be in the lower section so that the ridge lines form a visual screen from both sides.

5.9.2.4 Visual impact of access roads in protected areas

The potential visual impacts associated with construction and maintenance of access roads are related to the need to clear vegetation and carry out minor changes to the topography. The clearance of vegetation has the greatest potential to produce visual impacts. Clearing of vegetation especially in long straight lengths impacts on the sense of place, visual quality and landscape character.

Mitigation Measures:

- Make use of existing access roads where feasible.
- Locate access roads so that it minimises modification of the existing topography and the removal of large trees, roads should curve around natural features, mature trees and shrub thickets.
- New access roads should not extend in straight lines for distances of more than 50 m.
- Match the alignment and construction method of new access roads to the topography and to the surrounding farm roads or tracks.
- Locate new access roads away from visual assets such as pans, ridges and koppies.
- New access roads must be at a minimum width requirement.
- Where access roads are constructed in agricultural areas, the shortest routes should be followed to the adjacent farm roads.
- Where the transmission line crosses a main road and views along the access roads extend for a significant length, the sightline should be reduced to a couple of meters by either curving the road or by aligning it alternatively on either side of the transmission line servitude.
- Access roads shall not cross over the crest of elevated landforms such as koppies and ridges.

- Roads shall run parallel to and at a minimum distance of at least the height of the feature from the outline of the foot slopes.

5.9.2.5 Visual impact of cleared servitudes in natural areas

South Africa	Botswana
Applicable	Applicable

The potential visual impacts associated with the initial clearing and on-going maintenance of servitudes are related to the need to clear vegetation over a certain height as they could pose a fire risk to the transmission line. The clearing of vegetation would most likely result in a loss of visual quality and reduced visual absorption capacity along the servitude.

Mitigation Measures:

- Avoid a linear path of cleared vegetation that would strongly contrast with the surrounding landscape character.
- Where the alignment should pass over dense stands of trees and shrubs or over areas of tall trees, either increase the height of the transmission line above the safe margin or reduce the extent of flammable material while allowing a natural transition of vegetation height and allowing tall trees to remain.
- The vegetation within the servitude should not be cut to an even height across the servitude instead the vegetation mass should rather be reduced by removing material from each of the vegetation layers, allowing for a diversity of height and plant material.

The assessment of the impacts listed above is summarised in **Section 5.9.6**.

5.9.3 Cumulative impacts

Although the proposed substation is not part of this application, the line will connect to it. It is located within a natural landscape, which can visually be regarded as a “greenfield” area. It will not add cumulatively to the visual impacts of any other existing or planned transmission lines, since there is no such facility of similar nature within 30 km of the proposed project site.

The proposed 400 kV transmission line will in specific areas visually add to the existing smaller scale transmission line network and thus increase the visual impact. The cumulative impact of the transmission line will be moderately significant as the visual character of the area is not defined by similar industrial type infrastructure.

5.9.4 Assessment of no-go alternative

Visually, the no-go alternative will have a neutral impact, as the natural landscape features will remain undisturbed.

5.9.5 Conclusion

The construction and operation of the proposed 400 kV transmission line will result in visual impacts within the study area and the project activities or components will noticeably change existing features or qualities of the visual resource. The transmission line will constitute change to the overall sense of place and character as it introduces new features which are uncharacteristic with the existing character. Receptors that will be highly sensitive to the project include motorists traveling on the N4 or N18 and tourist visiting

lodges and game farms in the vicinity. Based on the theoretical methodology, the significance of the visual impacts will be moderate in most locations, due to the relative scale of the structures and the high visibility based on the generally flat topography and low vegetation height within the study area.

5.9.6 Summary of the impacts

Table 39: Summary of potential impacts on visual resources and proposed mitigation measures

Impact	Pre-mitigation:						Recommended mitigation	Post-mitigation:					
	Duration	Extent	Intensity	Conseq-uence	Proba-bility	Signifi-cance		Duration	Extent	Intensity	Conseq-uence	Proba-bility	Signifi-cance
Visual impacts of construction camps and laydown areas	Short-term	Local	Moderate: negative	Slightly detrimental	Very likely	Low - negative	• Locate construction camps outside of visually sensitive areas or in low visual quality • Do not locate campsites in areas where it will be necessary to remove trees • Limit the contrast between the vertical scale of the receiving environment and that of the camp infrastructure and material stockpiles • Locate laydown areas and construction camps close to existing stands of exotic species which can serve as a screen • Where possible make use of sites which have been previously disturbed • Stockpiles must not be higher than 3m	Short-term	Site-specific	Low: negative	Negligible	Very likely	Very low
The visual impact of transmission lines in natural areas	Long-term	Local	Moderate: negative	Moderately detrimental	Very likely	Moderate: - negative	• Avoid sensitive areas such as elevated ridges, koppies and pans • Minimum buffer of five times the height of the towers should be allowed between the alignment and any of the natural features. • Advantage should be taken of existing vertical features to serve as a backdrop or screen for the transmission line. The alignment of the transmission • Maintain as much distance as possible from large concentrations of potential viewers. • Where possible, located the line in the lower section so that the ridge lines form a visual screen.	Long-term	Site-specific	Low: negative	Slightly detrimental	Very likely	Low - negative

The visual impact of access roads in protected areas	Long-term	Site-specific	High: negative	Moderately detrimental	Fairly likely	Low - negative	• Make use of existing access roads where feasible • Minimise modification of the existing topography and the removal of large trees • Roads should curve around natural features, mature trees and shrub thickets • New access roads should not extend in straight lines for distances of more than 50m • Match the new access roads to the topography and to the surrounding farm roads or tracks • Locate new access roads away from visual assets • New access roads must be at a minimum width requirement • Where the transmission line crosses a main road, sightline should be reduced • Access roads shall not cross over the crest of elevated landforms • Roads shall run parallel to and at a minimum distance of at least the height of the feature from the outline of the foot slopes • If possible, access roads should not be in protected areas	Long-term	Site-specific	Moderate: negative	Moderately detrimental	Fairly likely	Low - negative
The visual impact of cleared servitudes in natural areas	Long-term	Local	Moderate: negative	Moderately detrimental	Very likely	Moderate: - negative	• Avoid a linear path of cleared vegetation • Increase the height of the transmission line above the safe margin or reduce the extent of flammable material while allowing a natural transition of vegetation height and allowing tall trees to remain. • The vegetation within the servitude should not be cut to an even height across the servitude.	Long-term	Local	Low: negative	Moderately detrimental	Very likely	Moderate: - negative
The visual impact of transmission lines in	Long-term	Local	High: negative	Highly detrimental	Fairly likely	Moderate: - negative	• Avoid sensitive areas such as elevated ridges, koppies and pans • Minimum buffer of five times the height of the towers should be allowed between the alignment and any of the natural features.	Long-term	Site-specific	Low: negative	Slightly detrimental	Fairly likely	Low: - negative

protected areas							• Advantage should be taken of existing vertical features to serve as a backdrop or screen for the transmission line. The alignment of the transmission • Maintain as much distance as possible from large concentrations of potential viewers. • Where possible, located the line in the lower section so that the ridge lines form a visual screen.						

5.10 Heritage

G&A Heritage Consultants were appointed to undertake a Heritage Impact Assessment (including Archaeological, Cultural heritage, Built Heritage and Paleontological Assessment) determine the impacts on heritage resources within the study area. The study involved the assessment of important cultural heritage resources along the preferred powerline corridor.

The limitations and assumptions associated with this heritage impact assessment (HIA) done in South Africa are as follows:

- Field investigations were performed on foot and by vehicle where access was readily available.
- Sites were evaluated by means of description of the cultural landscape, direct observations and analysis of written sources and available databases.
- Service Delivery Action at Dinokana with protestors blocking the road leading to limited access in certain areas due to a safety concern.

No limitations were identified in the HIA done form Botswana. Clearance for the line in Botswana has been granted by the Department of National Museums and Monuments **(ANNEXURE G.5c)**.

Refer to **ANNEXURE G.5** for the detailed Heritage Impact Assessment (HIA) Report.

5.10.1 Status quo

SOUTH AFRICA

The proposed alignment runs through only two narrow corridors of high palaeontological deposits. However, no signs of fossiliferous material were found the areas investigated along the route during the fieldwork. The power line construction is also not expected to be intrusive and the possibility of it impacting on palaeontological sites is very small.

The archaeological sites recorded in the area and its surroundings include:

- **Stone Age:** Several occurrences of Late-and Middle Stone Age artefacts were identified on the proposed route **(Figure 60).**
- **Iron Age:** Iron Age is well represented in this area. Loose scatters of potsherds were noticed throughout the study area, however the provenance of these could not be determined. The area is known for small Early Iron Age (EIA) sites such as Schietkraal connected to the Early Moloko tradition as well as megalithic Late Iron Age (LIA) sites associated with the Sotho Tswana. A small version of such a site is found to the east of the study area close to Lehurutshe Unit 3. No such sites could be identified within the study corridor.
- **Built environment:** The study area runs through numerous villages and built up areas. Several farm homesteads also fall within the study area. All the areas are mostly of recent construction and only a few religious structures and some schools have any heritage value. The only other aspect that is of heritage significance are the community cemeteries (**Table 40**).

BOTSWANA

Gaborone is in south-eastern Botswana, which is one of the richest regions in country in terms of archaeological, historical and heritage resources (both tangible and intangible). The archaeological sites recorded in the area and its surroundings include Early Stone Age (ESA), Middle Stone Age (MSA) and Later Stone Age (LSA) sites. Many archaeological sites associated with the Middle Iron Age (Eiland traditions) and Late Iron Age (LIA) Madikwe and Letsibogo facies of the Moloko tradition were also found in the greater region of the area, as well as abandoned cattle posts and sites of historical value. The LIA discoveries can be interpreted as a tentative implication that some communities of the early Sotho--Tswana settled in this area sometime between 1500 AD and 1700 AD.

The Botswana part of the BOSA power line project covers four 1:50 000 maps, namely; 2426 A1, 2426 A3, 2426 A4, and 2426 C1. The following archaeological site have been recorded in Botswana National Museum and Monuments (BNMM) database for each of these map

2426 A1	2426 A3
No sites have been documented	**26 archaeological sites** - which include the Matsieng footprints site, 2 MSA and 23 Iron Age sites in the area around Morwa Hills.
2426 A4	**2426 C1**
No sites have been documented	**19 sites** - comprising of 8 MSA and 11 Iron Age sites which includes the Modipe Hill sites

Specifically, **7 archaeological sites** and **one site of social significance** were recorded in and around the power line corridor area (refer to **Section 5.10.12**).

5.10.1.1 South Africa

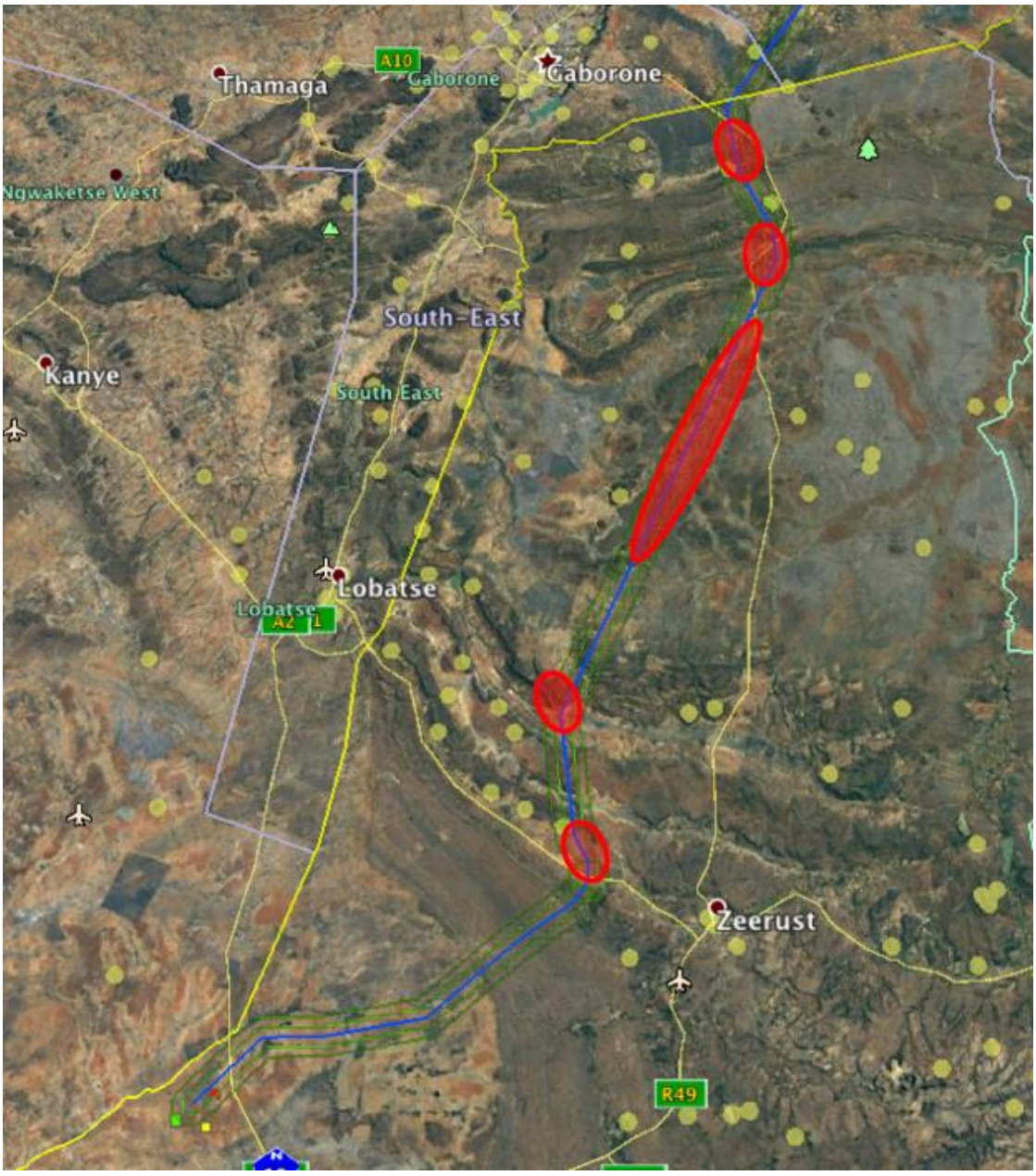
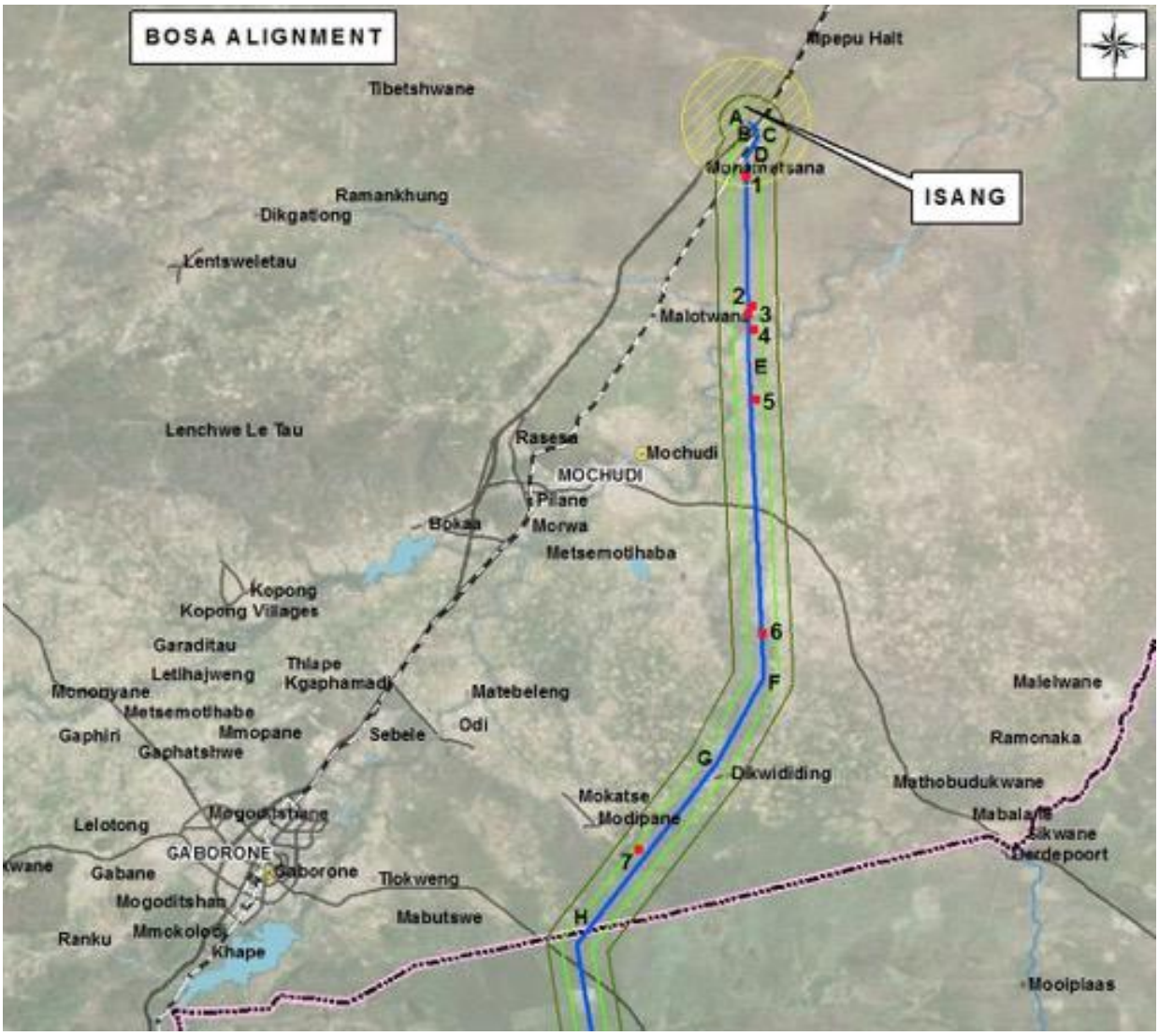


Figure 60: Possible high-risk area for Stone Age Sites

Table 40: Community cemeteries identified along the proposed corridor

Location	Community
S 25° 39' 10,7" E 25° 33' 37,1"	Miga
S 25° 38' 39,3"; E 25° 32' 26,9"	Romatlabana,
S 25° 34' 21,7"; E 25° 49' 02,7"	Khuinotswana
S 25° 27' 07,1"; E 25° 52' 37,2" S 25° 29' 48,7"; E 25° 55' 59,7"	Dinokana
S 25° 17' 40,8"; E 25° 55' 13,4"	Poosedumane

5.10.1.2 Botswana



1	Middle Stone Age	3	Middle Stone Age	5	Abandoned homestead
2	Abandoned historical homestead	4	Late Iron Age settlement	6	Middle Stone Age
7	Late Iron Age town – Modipe Hill				

Figure 61: Location map showing the BOSA power line development (blue) and the sites are indicated red.

Table 41. Description of heritage sites in Botswana related to map in Figure 61.

SITE 1 (Figure 62)	SITE 2 (Figure 63)
The site is located on the raised limestone outcrops situated on the northern and southern embankment of the Monametsana River and about 300 m in length along the transmission line corridor. The limestone outcrops were exposed by natural erosion of the river embankment. MSA artifacts are eroding out of and are still imbedded in the gravel soils and limestone bedrock in a ± 100 m zone along the exposed outcrops. In the river bed and along the western embankment a few tools were documented. Stone artifact types that were identified consisted of flakes, waste, cores and a number of formally retouched samples. The MSA formal tools consist of spear points, blades and scrapers and were primarily produced from quartzite, CCS and fine--grained shale.	The abandoned historical homestead is situated in an open clearing in the natural vegetation on the rise in the landscape on the northern embankment of the Notwane River. Two soil mounds of about 4 m in diameter demarcate the house remains. To the southern side of the house remains a kraal deposit of 15 m in diameter was documented. The area surrounding the house foundations exhibit a low--density scatter of artifacts comprising of ceramics, pieces of glass and metal fragments. A lower grinding stone and upper grinding stones were also documented at the site. It is estimated that the homestead was abandoned more than 60 years ago, judging from the artefacts found around the site.

Figure 62: LEFT: Exposed pebble on limestone outcrops; RIGHT: MSA artefacts identified

Figure 63: LEFT: Artefacts identified at the site; RIGHT: View of the house foundations

SITE 3 (Figure 64)

The site is located on the northern embankment of the Notwane River. MSA artifacts were identified in an area of 100 m along the power line corridor and wereeroding out of the top Kalahari sand member overlaying the sandstone bedrock on the embankment.

The MSA formal tools consist of spear points, blades and scrapers and were produced from quartzite, quartz and fine--grained shale. Artifact ratios (artifacts: m²) varied from 1:25 to 1:50.

Figure 64: LEFT: View of the river embankment; RIGHT: MSA artefacts identified

SITE 4 (Figure 65)

The site is located on the rise in the landscape on the southern embankment of the Notwane River. The site measures about 50 m in diameter and is characterized by a scanty kraal and midden deposit.

The kraal deposit extends approximately 10 m in diameter and is demarcated by grey soils with a bordering midden deposit of 5 m in diameter. Burrowing animals exposed a low density of artefacts consisting of mainly undecorated ceramics. No grain bin or hut remains were identified at the site. The low density of artefacts gives the impression of a shorter occupation period for the site. Unidentified graves may be present at the site.

Figure 65: LEFT: Ceramics identified at the site; RIGHT: View of the house foundations

SITE 5 (Figure 66)

The abandoned homestead is situated within an open clearing in the natural vegetation. The site involves an area of about 200 m in length along the transmission line corridor. It consists of the remains of 2 yards with houses and scanty middens. The house foundations are demarcated by 4 m in diameter circular soil mounds. The area surrounding the house foundations exhibits a low--density scatter of artifacts comprising of pieces of glass, ceramic and metal. The older homestead was abandoned about 70 years ago, judging from the artefacts found around the site.

Figure 66: LEFT: Artefacts identified at the site.; RIGHT: View of the abandoned homestead

SITE 6 (Figure 67)

The site is located on the flood plains of a fossil riverbed, the site involves an area of about 20 km in length along the transmission line corridor. Concentrations of pebbles and MSA artefacts were found on the floodplains, widely but thinly distributed along the proposed power line corridor. Some exposed gravel concentrations contain raw materials that were ideal sources to produce stone tools from.

The MSA artifacts were found eroding out of and still imbedded in the clay soils around and in between the exposed gravel concentrations. The raw material used by the toolmakers to produce the MSA artifacts consisted of nodules from the gravel concentrations which includes materials like quartzes, quartzites and Crypto Crystalline Silicates (CCS). The MSA formal tools consist of spear points, blades and scrapers.

Figure 67: LEFT: MSA tools identified; RIGHT: Exposed artefacts in the clay soils

SITE 7 (Figure 68)

The site is located on the eastern base in the waist of Modipe Hill. It is declared as a National Monument and is demarcated by a BNMM signpost. The settlement measures about 200 m across (±4 ha) with more than 50 rubble concentrations demarcating burnt down houses of about 4 m in diameter each. The remains of grain bin platforms constructed with stones packed in ±1.5 m circles are spaced amongst the rubble concentrations.

Natural erosion of the site has exposed the rubble concentrations together with a fair amount of cultural material in the middens around them. The middens are characterized by a typical ash--grey deposit containing cultural material such as pottery and faunal remains. The ceramic decorations on the pottery are representative of the Madikwe and Letsibogo facies. On the hill slope above the site numerous low stonewalls and packed terraces have also been recorded. The site was researched by Pearson (1995) and carbon dated to the 15th century.

Figure 68: LEFT: The BNMM sign post demarcating the site; RIGHT: General view of the site

5.10.2 Potential impacts and mitigation measures

Any destruction, damage or removal of archaeological or historical sites and/or resources that may occur that may be present in the construction servitude is a negative impact. Negative impacts on archaeological or historical heritage resources have been identified along the proposed corridor:

5.10.2.1 National Monument – Modipe Hill Iron Age sites

South Africa	Botswana
Not Applicable	Applicable

The proposed power line development bypasses the outskirts of Modipe Hill Iron Age sites (Site 7) approximately 400 m to the east. The site will not be impacted on by the proposed development.

Mitigation Measures:

- The site is declared as a National Monument, which implies that it should be protected at all costs. The site should be conserved and it is recommended that a watch brief and monitoring program be implemented during development to protect it from any disturbance.
- The final tower placements should be subjected to a walk-down survey to verify that no sites will be affected.

5.10.2.2 Middle Stone Age Sites

South Africa: Not Applicable

Botswana: Applicable

The Middle Stone Age Sites (Site 1, 3 & 6) is situated within the transmission line corridor and will be impacted on by the development.

Mitigation Measures:

- Due to the wide distribution and lower density of artefacts these sites are not deemed to be considered for mitigation and the documentation thereof is adequate. Therefore, no archaeological mitigation is required prior to development.
- The final tower placements should be subjected to a walk-down survey to verify that no sites will be affected.

5.10.2.3 Iron Age and historical sites

South Africa: Not Applicable

Botswana: Applicable

Site 2 is a Late Iron Age settlement which borders the proposed power line development and could be impacted on by the development. There is also an abandoned historical homestead (Site 4) situated within the transmission line development area and will be impacted on by the development.

Mitigation Measures:

(Applicable to both Site 2 and 4)

- No archaeological mitigation is required prior to development.
- Due to the possible occurrence of unidentified graves, it is recommended that a watch brief and monitoring program be implemented during development.
- The final tower placements should be subjected to a walk-down survey to verify that no sites will be affected.

5.10.2.4 Site of social significance

South Africa: Not Applicable

Botswana: Applicable

An abandoned homestead (Site 5) borders the transmission line corridor area and will be impacted on by the development.

Mitigation Measures:

- Recommendations in the social impact assessment should be complied with.
- Due to the possible occurrence of unidentified infant burials under the house foundations it is recommended that a watch brief and monitoring program be implemented during development at these sites.
- The final tower placements should be subjected to a walk-down survey to verify that no sites will be affected.

5.10.2.5 Burial sites

South Africa — Applicable

Botswana — Not Applicable

The aspect of heritage significance identified within the built environment and along the proposed corridor are the community cemeteries.

Mitigation Measures:

- The final tower placements should be subjected to a walk--down survey to verify that no sites will be affected.

The assessment of the impacts listed above is summarised in **Section 5.10.6.**

5.10.3 Cumulative impacts

According to the heritage assessment, the anticipated impacts of the development on heritage resources/ sites are likely to have medium cumulative effects.

5.10.4 Assessment of no-go alternative

The no-go alternative will have a neutral impact on the sites and resources with heritage significance, as the areas will remain intact and undisturbed.

5.10.5 Conclusion

A number of sites with heritage significance were documented during the survey in and around the power line corridor area. For some sites, no archaeological mitigation is required prior to development, however it is recommended that a watch brief and monitoring program be implemented during development at these sites. With the appropriate mitigation measures, the significance of all the direct and indirect impacts will be Low (-ve). If heritage resources or sites are encountered during construction a heritage specialist and relevant authorities should be notified as soon as possible (please refer to Heritage Management Plan for the detailed procedure to be followed – **ANNEXURE H**).

5.10.6 Summary of the impacts

Table 42: Summary of heritage potential impacts at the proposed site and proposed mitigation measures

Impact	Pre-mitigation:						Recommended mitigation	Post-mitigation:					
	Duration	Extent	Intensity	Conseq-uence	Proba-bility	Signifi-cance		Duration	Extent	Intensity	Conseq-uence	Proba-bility	Signifi-cance
Paleontological sites within the high-risk areas	Long-term	Regional	High: negative	Highly detrimental	Very likely	Moderate: - negative	• A watch brief and monitoring program be implemented during development to protect it from any disturbance. • The final tower placements should be subjected to a walk-down survey.	Long-term	Regional	Low: negative	Moderately detrimental	Unlikely	Low - negative
Stone Age Sites	Long-term	Regional	High: negative	Highly detrimental	Very likely	Moderate: - negative	• No archaeological mitigation is required prior to development. • The final tower placements should be subjected to a walk-down survey.	Long-term	Regional	Low: negative	Moderately detrimental	Unlikely	Low - negative
Iron Age Sites	Long-term	Regional	High: negative	Highly detrimental	Very likely	Moderate: - negative	• No archaeological mitigation is required prior to development. • A watch brief and monitoring program be implemented during development. • The final tower placements should be subjected to a walk-down survey.	Long-term	Regional	Low: negative	Moderately detrimental	Unlikely	Low - negative
Built environment (abandoned homestead)	Long-term	Regional	High: negative	Highly detrimental	Very likely	Moderate: - negative	• Recommendations in the social impact assessment should be complied with. • A watch brief and monitoring program be implemented during development at these sites. • The final tower placements should be subjected to a walk-down survey.	Long-term	Regional	Low: negative	Moderately detrimental	Unlikely	Low - negative
Burial sites	Long-term	Regional	High: negative	Highly detrimental	Very likely	Moderate: - negative	• The final tower placements should be subjected to a walk--down survey to verify that no sites will be affected.	Long-term	Regional	Low: negative	Moderately detrimental	Unlikely	Low - negative

5.11 Impacts assessed that did not form part of the Plan of Study for Scoping

The impacts assessed below were not considered as major issues for specialist assessment and were thus not highlighted in the Plan of Study for Scoping approved by DEA. However, the impacts that arise need to be managed. As such, a high-level assessment of the impacts has been undertaken by the EAP to inform the management of such impacts, based on experience of such impacts in the construction phase of other projects.

5.11.1 Soils and Land Capability

No independent assessment study was done for the project area to assess the impacts of the project on soil type, structure and its agricultural potential, due to the limited scale of physical disturbance.

5.11.1.1 Status quo

No baseline study was undertaken to investigate the type of soil and land capability of the affected areas. However, the impacts of the project on subsistence farming and livelihoods in general was considered and will form part of the RPF.

5.11.1.2 Potential impacts and mitigation measures

The construction phase of the proposed development is anticipated to have direct impacts on soil and land capability. These impacts and recommended mitigation measure are discussed in the following subsections.

5.11.1.2.1 Soil erosion

South Africa	Botswana
Applicable	Applicable

Site clearing, site establishment and excavation activities will result in loss of vegetation cover and topsoil which could lead to increased soil erosion. The release of excess sediments is likely to pollute local streams, especially during the wet seasons.

Mitigation Measures:

- Construction activities must be phased to minimise the area of disturbance at one time.
- Vegetation must be cleared only immediately prior to construction works commencing to minimise the chance of exposing the soil to wind erosion.
- Vegetation clearing on tower sites must be kept to a minimum. Big trees with large root systems shall be cut manually and removed, as the use of a bulldozer will cause major damage to the soil when the root systems are removed.
- Preserve existing vegetation to the extent possible.
- Areas having to be stripped of topsoil for construction purposes must be kept to a minimum and only stripped when work is about to take place.
- The contractor shall devise a soil conservation and stockpiling plan. The stockpiles must be stored in a demarcated area protected from wind and rain.
- Trenches will remain open for the shortest duration possible and prevailing weather conditions will be taken into consideration.

- Disturbed areas no longer used for construction purposes shall be stabilised and re-vegetated immediately.
- Dust and erosion of stockpiled topsoil from runoff must be minimised through appropriate watering and the avoidance of transporting and placing of topsoil in areas exposed to high wind or excessively rainy conditions.

5.11.1.2.2 Soil contamination

South Africa

Applicable

Botswana

Applicable

During construction, the soil will be subject to potential contamination due to incidental spills or leak of hazardous substances used on site.

Mitigation Measures:

- No concrete batching on bare soil shall be permitted. Batch plant must be established on an impermeable surface.
- Fuel and other hazardous substances must be stored in above ground storage tanks or sealed containers, contained within a bunded area with sump drainage to capture and spills and leaks.
- Where possible and practical all maintenance of vehicles and equipment must take place in the workshop area.
- The contractor must ensure the absorbent and/or clean-up kit are readily available on site to clean up any spillages.
- Spillages must be cleaned up immediately.
- Soil contaminated during leakage or spillage of hazardous substance shall be disposed of as hazardous waste.

5.11.1.2.3 Loss of arable land

South Africa

Applicable

Botswana

Applicable

The proposed development is likely to have the following impacts on arable land:

- Temporal withdrawal of land from subsistence farming activities such as planting crop and livestock grazing.
- Decrease in soil quality or fertility due to soil compaction and erosion.

Mitigation Measures:

- Vegetation must be cleared only immediately prior to construction works commencing to minimise the chance of exposing the soil to wind erosion.
- Vegetation clearing on tower sites must be kept to a minimum. Big trees with large root systems shall be cut manually and removed, as the use of a bulldozer will cause major damage to the soil when the root systems are removed.
- Preserve existing vegetation to the extent possible.
- Areas having to be stripped of topsoil for construction purposes must be kept to a minimum and only stripped when work is about to take place.

- Restrict all intrusive surface disturbance to the localised vicinity of the power line support towers as far as practically possible to allow the prevailing land uses to continue with their operations, where feasible.
- The people using the land needed for construction must be notified at minimum six months prior to commencement of construction and clear line of communication between the Contractor and affected households throughout the construction.
- Disturbed areas no longer used for construction purposes shall be stabilised and re-vegetated immediately.

The assessment of the impacts listed above is summarised in **Section 5.11.1.6.**

5.11.1.3 Cumulative impacts

Depending on the farming methods that are being practised on the affected land and the current agricultural potential or soil fertility, there may be cumulative impacts on soil capability during construction (**Medium (-ve**)). However, bearing in mind the limited disturbance and with appropriate mitigation measures, the impacts will be reduced to **Low (-ve)**.

5.11.1.4 Assessment of no-go alternative

The no-go alternative will have a neutral impact, the natural or current conditions of the soil and land capability will remain.

5.11.1.5 Conclusion

The identified soil and land capability impacts, except for loss of land for the tower areas, are considered to be temporary in nature, as they will be experienced during the construction activities. The significance of all the identified soil and land capability impacts ranged from Low to Very Low (-ve). However, after mitigation their significance is Very Low (-ve).

5.11.1.6 Summary of the impacts

Table 43: Summary of potential impacts of the project on soil and land capability at the proposed site and proposed mitigation measures

Impact	Pre-mitigation:						Recommended mitigation	Post-mitigation:					
	Duration	Extent	Intensity	Conseq-uence	Proba-bility	Signifi-cance		Duration	Extent	Intensity	Conseq-uence	Proba-bility	Signifi-cance
Soil erosion	Short-term	Site-specific	Low - negative	Negligible	Very likely	Very Low	• Phase construction activities • Vegetation must be cleared only immediately prior to construction works • Vegetation clearing on tower sites must be kept to a minimum. • Preserve existing vegetation to the extent possible. • Soil stripping must be kept to a minimum • Devise a soil conservation and stockpiling plan. • Trenches will remain open for the shortest duration possible • Disturbed areas shall be stabilised and re-vegetated immediately when no longer required. • Implement dust suppression.	Short-term	Site-specific	Low: - negative	Negligible	Fairly likely	Very Low
Soil contamination	Short-term	Site-specific	Moderate-negative	Slightly detrimental	Fairly likely	Low - Negative	• No concrete batching on bare soil shall be permitted. • Batch plant must be established on an impermeable surface. • Fuel and other hazardous substances must be stored in above ground storage, within a bunded area with sump drainage. • Maintenance of vehicles and equipment must take place in the workshop area. • Clean-up kit must be readily available • Spillages must be cleaned up immediately. • Contaminated soil shall be disposed of as hazardous waste.	Short-term	Site-specific	Low: - negative	Negligible	Fairly likely	Very Low
Loss of arable land	Short-term	Site-specific	Moderate-negative	Slightly detrimental	Very likely	Low - Negative	• Vegetation must be cleared only immediately prior to construction works commencing.	Short-term	Site-specific	Low: - negative	Negligible	Very likely	Very Low

							• Vegetation clearing on tower sites must be kept to a minimum. • Topsoil stripping must be kept to a minimum and only stripped when work is about to take place. • Restrict all intrusive surface disturbance to the localized vicinity of the power line. • Establish and maintain clear communication channel between the Contractor and affected households. • Disturbed areas no longer used for construction purposes shall be stabilised and re-vegetated immediately.						

5.11.2 Traffic

No baseline study was done for the project area to assess traffic patterns within the vicinity of the project area.

5.11.2.1 Status quo

The South African section of the line crosses three major roads, namely; the N4, R503 and the R49 (three times) and only one major road crossing in Botswana, which is A1, north of Mochudi. Numerous private farm roads may also be affected.

5.11.2.2 Potential impacts

The traffic impacts that are likely to be experienced during the implementation of the proposed development include the following:

5.11.2.2.1 Traffic congestion

South Africa	Botswana
Applicable	Applicable

Increased-traffic congestion during construction due to increased number of vehicles in the area. This may also inconvenience road users (especially during peak hours).

Mitigation Measures:

- The most appropriate route for large vehicles (such as trucks) transporting equipment, materials and employees to and from the site shall be determined in consultation with the local municipality, local road traffic authorities and the local community.
- The site access will be clearly sign posted and shall not be located to cause a traffic risk.
- Traffic calming measures must be implemented in consultation with the provincial traffic department.
- Materials and labour shall, as far as possible, be sourced locally to minimise transport related impacts and transport safety risks.
- Deliveries should preferably be scheduled for off-peak hour traffic times to avoid causing an impact on commuters.
- Access roads should be planned so that only minimum linear distances are developed.
- Where construction will obstruct existing access, be sure to allow for alternative temporary access routes.

5.11.2.2.2 Road safety

South Africa	Botswana
Applicable	Applicable

Potential accidents are likely to happen within the villages where there are school children and roaming or unsupervised livestock.

Mitigation Measures:

- The Contractor is to provide and traffic install signs along public roads used by the Project, where public signs are inadequate.
- Allow for safe pedestrian crossings where necessary.

- Ensure that appropriate speed limits for construction vehicles for the specific road are determined and enforced.

5.11.2.2.3 Damage to existing road infrastructure

South Africa

Applicable

Botswana

Applicable

The use of public roads by heavy construction vehicle or negligence driving impacts on existing road conditions (i.e. development of potholes or decrease in the surface quality of roads) or can cause further damage to the community roads that are already in a poor state.

Mitigation Measures:

- Existing road surfaces must be utilised and maintained within the baseline levels.
- Maintain storm water control mechanisms.
- All equipment and/ or materials transported to or from site shall be appropriately secured to, or contained in, vehicles.
- All vehicles used during the project shall have the appropriate load-bearing capacity for the materials and/or equipment intended to be transported.
- Repair must be undertaken to fix any damages to public or private roads caused during construction.

The assessment of the impacts listed above is summarised in **Section 5.11.2.6**

5.11.2.3 Cumulative impacts

The cumulative impacts of the proposed development on traffic is considered to moderate on the main roads. The R49 is particularly a busy road going to the border post between South African and Botswana.

5.11.2.4 Assessment of no-go alternative

The no-go alternative will not have an impact on the traffic patterns.

5.11.2.5 Conclusion

The proposed project is likely to affect traffic patterns on busy roads during construction, and have no impacts during the operation phase. Where there are construction activities close to the communities, it is important to ensure that traffic is managed in a manner that facilitates efficiency as well as ensuring the safety of the local residents (especially school children and roaming or unsupervised livestock). Traffic impacts can be minimised to very low impacts if appropriate measures are put in place.

5.11.2.6 Summary of the impacts

Table 44: Summary of traffic potential impacts at the proposed site and proposed mitigation measures

Impact	Pre-mitigation:						Recommended mitigation	Post-mitigation:					
	Duration	Extent	Intensity	Conseq-uence	Proba-bility	Signifi-cance		Duration	Extent	Intensity	Conseq-uence	Proba-bility	Signifi-cance
Increased-traffic congestion	Short-term	Local	Moderate: - negative	Slightly detrimental	Fairly likely	Low - Negative	• The most appropriate route for large vehicles transporting equipment, materials and employees to and from the site shall be determined • The site access will be clearly sign posted • Traffic calming measures must be implemented • Materials and labour shall, as far as possible, be sourced locally • Deliveries should preferably be scheduled for off-peak hour traffic times • Access roads should be planned • Allow for alternative temporary access routes for other road users	Short-term	Site specific	Negligible	Slightly detrimental	Fairly likely	Very Low
Road safety	Short-term	Local	Moderate: - negative	Slightly detrimental	Fairly likely	Low - Negative	• Install traffic signs along public roads used by the Project • Allow for safe pedestrian crossings where necessary	Short-term	Site specific	Negligible	Slightly detrimental	Unlikely	Very Low
Damage to existing road infrastructure	Short-term	Local	High: - negative	Moderately detrimental	Fairly likely	Moderate - Negative	• Existing road surfaces must be utilised and maintained within the baseline levels • Maintain storm water control mechanisms. • Equipment and/or materials transported to or from site shall be appropriately secured • Vehicles shall have the appropriate load-bearing capacity for the materials and/or equipment intended to be transported. • Repair any damages to public or private roads caused during construction.	Short-term	Site specific	Low - Negative	Slightly detrimental	Fairly likely	Low - Negative

Refer to a Traffic Management Plan included in the ESMP **(ANNEXURE H)** for detailed management measures.

5.11.3 Noise

No baseline study was done for the project area to assess ambient noise levels in the project area.

5.11.3.1 Status quo

Most the proposed alignment transverse predominantly through an area of farms and natural areas, typical of rural environments which generally have low ambient noise levels. Disturbing noise may also be augmented by a variety of activities across the construction site.

5.11.3.2 Potential impacts

The anticipated noise impact associated with the construction activities is discussed below:

South Africa	Botswana
Applicable	Applicable

Noise generated from the construction vehicles and the construction activities. Increased noise levels will be experienced on site and area within the vicinity of the site.

Mitigation Measures:

- Construction may only occur during the day.
- Should construction have to continue after hours, all residents affected must be notified;
- All machinery and equipment must be maintained in good working order.
- The Contractor shall take preventative measures where practical to minimise complaints regarding noise and vibration nuisance from sources.
- All equipment shall be turned off when not in use.
- Prior to any particularly noisy processes identified, the nearest affected landowners must be informed of the proposed timing of the specific works in their properties.
- Assess and manage all noise complaints.

The assessment of the impacts listed above is summarised in **Section 5.11.3.6.**

5.11.3.3 Cumulative impacts

The potential for cumulative noise impacts exist due to the proximity of the site to main roads which are the source of traffic noise.

5.11.3.4 Assessment of no-go alternative

The no-go alternative will not have an impact on the ambient noise.

5.11.3.5 Conclusion

Disturbing noise may be augmented by various activities during the implementation of the project. The noise impacts will only be experienced during the construction phase of the project and will be managed by various mitigation measures to ensure compliance with the applicable SANS guidelines. The potential impact of noise is therefore anticipated to be of low.

5.11.3.6 Summary of the impacts

Table 45: Summary of noise impacts at the proposed site and proposed mitigation measures

Impact	Pre-mitigation:						Recommended mitigation	Post-mitigation:					
	Duration	Extent	Intensity	Conseq-uence	Proba-bility	Signifi-cance		Duration	Extent	Intensity	Conseq-uence	Proba-bility	Signifi-cance
Increased level of noise generation (and potential vibrations)	Short-term	Site-specific	Moderate: - negative	Slightly detrimental	Very likely	Low - Negative	• Construction may only occur during the day. • Should construction have to continue after hours, all residents affected must be notified. • All machinery and equipment must be maintained in good working order. • Minimise noise and vibration nuisance. • All equipment shall be turned off when not in use. • Nearest affected landowners must be informed of the proposed timing of the specific works in their properties. • Assess and manage all noise complaints	Short-term	Site-specific	Low: - negative	Negligible	Fairly likely	Very Low

Refer to a Noise and Vibrations Management Plan included in the ESMP **(ANNEXURE H)** for detailed management measures.

5.11.4 Air quality

No assessment study was done for the project area to assess the ambient air quality in the project area.

5.11.4.1 Status quo

The air quality of construction areas and its immediate surroundings is inevitably negatively impacted on during construction activities – the severity of which is dependent on the magnitude and duration of the construction activities.

5.11.4.2 Potential impacts and mitigation measures

Construction sites involving heavy engineering generally are sources of air pollution impacts. Anticipated impacts include dust generation and release of noxious fumes and greenhouse gases from construction vehicles.

5.11.4.2.1 Air pollution from dust generation

South Africa	Botswana
Applicable	Applicable

Dust emissions from loading/unloading of material, stockpiling of material, excavations, construction of access roads. Dust from construction activities, can potentially have negative effects on households near the project site, cause nuisance and decreased road visibility.

Mitigation Measures:

- Areas having to be stripped of topsoil for construction purposes must be kept to a minimum and only stripped when work is about to take place.
- Dust suppression is to be conducted during construction.
- Dust suppression measures such as water or non-toxic chemical dust suppression can be used. Any chemicals utilised must be of a biodegradable nature and approved by the ECO.
- Plan the site activities so that machinery and dust generating activities are located away from sensitive receptors (i.e. households), as far as possible.
- Limit the height and slope of material stockpiles to reduce wind entrainment. Stockpiles exceeding 3m in height are more likely cause dust during windy conditions.
- Exposed stockpiles can also be sprayed with water, covered or orientated such that they are protected from wind erosion.
- Establishment and enforcement of vehicle speed limits on haul roads and construction camp to reduce the generation of dust.
- All access roads must be adequately compacted and periodically graded and maintained.
- Disturbed areas no longer used or required for construction purposes shall be re-vegetated immediately.
- No overloading of fine material must be permitted and where necessary the truck loads transporting fine material must be covered with a tarpaulin to prevent dust.
- Any dust complaints received from the community will be recorded, promptly investigated and addressed.

5.11.4.2.2 Air pollution from vehicle exhaust emissions

South Africa	Botswana
Applicable	Applicable

Construction vehicles are also the main source of noxious fumes and greenhouse gases. These emissions are hazardous to human health and can compromise air quality.

Mitigation Measures:

- Plant and equipment to function at an optimal level.
- Where possible low sulphur containing diesel to be used.
- All vehicles and equipment must be maintained and serviced according to manufacturer's specifications.
- Ensure all new plant / equipment being delivered to site has undergone inspection.
- Avoid unnecessary idling of vehicle engines while parked.
- Appropriate PPE must be worn at all times when working in areas exposed to hazardous emissions.

The assessment of the impacts listed above is summarised in **Section 5.11.4.6.**

5.11.4.3 Cumulative impacts

It is unlikely that there will be cumulative impacts associated with dust or vehicle exhaust emissions, as these impacts are temporary in nature and there are no activities near the site that contributing to air pollution.

5.11.4.4 Assessment of no-go alternative

The no-go alternative will not have an impact on ambient air quality.

5.11.4.5 Conclusion

Construction activities associated with the proposed project are likely to result in air pollution. This impact is however temporary as it will be experienced only during the construction phase. The impacts can be reduced to **Very Low (-ve)** by implementing mitigation measures suggested.

5.11.4.6 Summary of the impacts

Table 46: Summary of air pollution potential impacts at the proposed site and proposed mitigation measures

Impact	Pre-mitigation:						Recommended mitigation	Post-mitigation:					
	Duration	Extent	Intensity	Conseq-uence	Proba-bility	Signifi-cance		Duration	Extent	Intensity	Conseq-uence	Proba-bility	Signifi-cance
Dust emission	Short-term	Site-specific	Moderate: - negative	Slightly detrimental	Very likely	Low - Negative	• Topsoil striping must be kept to a minimum. • Dust suppression is to be conducted during construction. • Dust generating activities are to be located away from sensitive receptors • Limit the height and slope of material stockpiles to reduce wind entrainment. • Exposed stockpiles can also be sprayed with water or covered • Establish and enforce vehicle speed limits on haul roads • Access roads must be adequately compacted • No overloading of fine material must be permitted • Dust complaints must be investigated and addressed. • Disturbed areas no longer used for construction purposes shall be re-vegetated immediately.	Short-term	Site-specific	Low: - negative	Negligible	Fairly likely	Very Low
Engine exhaust hazardous emissions	Short-term	Site-specific	Moderate: - negative	Slightly detrimental	Very likely	Low - Negative	• Plant and equipment to function at an optimal level. • Where possible low sulphur containing diesel to be used. • All vehicles and equipment must be maintained and serviced • Plant / equipment brought to site must undergo inspection. • Avoid unnecessary idling of vehicle engines while parked. • Appropriate PPE must be worn at all times	Short-term	Site-specific	Low: - negative	Negligible	Fairly likely	Very Low

Refer to Air Quality Management Plan included in the ESMP **(ANNEXURE H)** for detailed management measures.

5.12 Assessment against the No-go Alternative

With reference to **Section 4.4.4**, the "No-Go" alternative serves as a basis for comparison and can serve to validate the need and desirability for the project.

The "No-Go" alternative will have no impacts on the biophysical environment, as it will remain unchanged if proposed development does not go ahead. However, from a socio-economic perspective, the "No-Go" option would have a significant negative impact as the need to alleviate the current electricity supply constraints and contribute towards energy security of supply in the long run between the two countries will not be achieved. This will subsequently result in unreliable supply of electricity for the existing and future economic activities. This also means there would be no economic benefits for the local communities that would have been generated through job creation and procurement of local good.

5.13 Cumulative impacts

A cumulative impact is an incremental impact on an aspect of the environment from the proposed project, when considered together with past, present, and reasonably foreseeable activities in the geographical or social region, regardless of who has or will undertake such activities. The power line forms a relatively small proportion of the landscape. Densely developed, as well as protected and largely natural areas were avoided during the route selection phase. However, there is habitat transformation from agriculture and infrastructure, such as roads and mining in the greater area and the line passes through landscape that is predominantly rural agricultural. Because of the generally low levels of development other than roads, pipelines and agriculture, the focus was on whether there was other electricity infrastructure in the area that could have cumulative impacts. The cumulative impacts on the same resources were considered by the specialists as predominantly from transmission lines and other utilities already in the areas.

The ESIA assessment has focussed mainly on the impacts associated with the project in isolation. Each specialist also considered if the potential impacts would become more significant when considered in combination with the additional existing and proposed infrastructure in the area. However, very little is known about future development plans for the area, other than the Pluto / Mokoodi line and the proposed Mahikeng substation at to the south of the line. All electrical infrastructure, with the exception of the substations areas at the two ends of the proposed line are sufficiently far away from the project area so that it is reasonably expected that there will not be a significant increase to the potential direct impacts of the project.

While the transmission line itself will not increase cumulative impacts in terms of climate change, the fact that the energy sector in Southern Africa is dominated by coal means that cumulative impacts result from increased carbon emissions as GHGs which largely result from upstream processes such as manufacturing and power generation. There is no mitigation for this at a project level.

From an ecological perspective, cumulative impacts would result from disrupting the connectivity of the landscape and ecosystem processes. However, the impact on ecological resources is considered low because of the following factors:

- The footprint area of the tower structures is small;
- The lines can span sensitive aquatic areas;
- There was significant effort put in to the planning stages to ensure route selection to avoid sensitive or threatened vegetation types and water bodies; and
- Fauna will be able to continue to function under the power lines.

Cumulative impacts on avifauna will result from collision mortality on several Red List species, especially vultures in the greater area. Figures for the number of vultures killed annually through powerline collisions in the greater area is unknown but an additional powerline will likely have a moderate increase the

cumulative collision impact of existing powerlines on Red List avifauna in the greater area. Anthropogenic activities result in displacement and habitat fragmentation for avifauna and because of the existing transformation in the area, there will be a moderate increase in this impact on Red List avifauna.

Cumulative social impacts will result from an influx of job seekers who may create spontaneous and informal settlements. Expansion of informal settlements may also result in many other cumulative impacts, such as social pathologies and increase pressure on local services and resources. This can be mitigated by managing the expectations around employment opportunities and employing local labour through a formal process. The project can also have a positive cumulative impact in the area resulting from a stable regional electricity supply by supporting other opportunities for economic growth.

The proposed project will impact on the visual surroundings and sense of place, considering both the current and planned activities and infrastructure (i.e. roads, pipelines and transmission lines). This can impact on the tourism industry that relies on the quality of the landscape to provide an experience to the visitor.

Heritage resources gave been largely avoided but there is a potential for chance finds during construction and this increases the impact on heritage resources with each resource that is disturbed.

Overall however, the cumulative impact associated with this transmission line is considered within acceptable levels, due primarily to the route selection process that ensure avoidance of major impacts from the earliest stages.

5.14 Sustainability of the transmission line

Sustainability principles relate to ensuring that the transmission line is undertaken in a responsible manner by integrating precautionary environmental and social principles and considerations into decision making processes, and basing the project solely on technical and financial factors. This was done from the first stages of the project by allowing social and environmental constraints to dictate potential routes. These were then assessed in an integrated manner with the relevant specialists represented in a workshop environment (**Section 3.1 and 3.1**). The route options were scored on a technical, environmental (biophysical), social and strategic basis in an integrated model, where environmental and social considerations were weighted slightly more than the other criteria. This allowed for environmental and social sustainability principles to be embedded in the project, strengthening the overall sustainability of the project and allowing for the development of a stable electricity grid in two countries, thereby enhancing opportunities for economic growth

5.15 Assessment of Listed Activities

Table 47: Summary of the impacts associated triggered listed activities

Listed Activity	Impact	PRE-MITIGATION:						Proposed Mitigation Measures	POST-MITIGATION:					
		Duration	Extent	Intensity	Consequence	Probability	Significance		Duration	Extent	Intensity	Consequence	Probability	Significance
GN R983 Activity 11	Increased traffic during constriction	Short-term	Local	Moderate: negative	Slightly detrimental	Fairly likely	Low - Negative	Refer to **Section 5.11.3.6**	Short-term	Site specific	Negligible	Slightly detrimental	Fairly likely	Very Low
GN R983 Activity 12	Increase in sedimentation and erosion	Long-term	Local	Moderate negative	Moderately detrimental	Fairly likely	Low - negative	Refer to **Section 5.5.6**	Short-term	Site specific	Moderate negative	Slightly detrimental	Very unlikely	Very low - negative
	Loss of riparian systems and disturbance to water systems	Long-term	Local	Moderate negative	Moderately detrimental	Fairly likely	Low - negative		Short-term	Site specific	Moderate negative	Slightly detrimental	Very unlikely	Very low - negative
GN R983 Activity 14	Potential soil contamination	Short-term	Site-specific	Moderate - negative	Slightly detrimental	Fairly likely	Low - negative	Refer to **Section 5.11.1.6**	Short-term	Site-specific	Low - negative	Negligible	Unlikely	Very low
GN R983 Activity 19	Increase in sedimentation and erosion	Long-term	Local	Moderate negative	Moderately detrimental	Fairly likely	Low - negative	Refer to **Section 5.5.6**	Short-term	Site specific	Moderate negative	Slightly detrimental	Very unlikely	Very low - negative
GN R984 Activity 9	The visual impact of transmission lines in natural areas	Long-term	Local	Moderate: negative	Moderately detrimental	Very likely	Moderate: - negative	Refer to **Section 5.9.5**	Long-term	Site-specific	Low: negative	Slightly detrimental	Very likely	Low - negative
GN R985Activity 4	Potential soil contamination	Short-term	Site-specific	Moderate - negative	Slightly detrimental	Fairly likely	Low - negative	Refer to **Section 5.11.1.6**	Short-term	Site-specific	Low - negative	Negligible	Unlikely	Very low
GN R985 Activity 12	Increase in sedimentation and erosion	Long-term	Local	Moderate negative	Moderately detrimental	Fairly likely	Low - negative	Refer to **Section 5.5.6**	Short-term	Site specific	Moderate negative	Slightly detrimental	Very unlikely	Very low - negative
	Loss of riparian systems and disturbance to water systems	Long-term	Local	Moderate negative	Moderately detrimental	Fairly likely	Low - negative		Short-term	Site specific	Moderate negative	Slightly detrimental	Very unlikely	Very low - negative
GN R985 Activity 14	Loss of intact vegetation units / terrestrial habitats	Long-term	Regional	High negative	Highly detrimental	Fairly likely	Moderate: - negative	Refer to **Section 5.3.6**	Short-term	Site-specific	Moderate: negative	Slightly detrimental	Fairly likely	Low - negative
	Loss of Critical Biodiversity Areas and habitat fragmentation	Long-term	Regional	High: negative	Highly detrimental	Fairly likely	Moderate: - negative		Short-term	Regional	Moderate: negative	Moderately detrimental	Unlikely	Low - negative
	Impact on terrestrial fauna (Excluding birds)	Short-term	Local	High - negative	Moderately detrimental	Very likely	Low - negative	Refer to **Section 5.4.6**	Short-term	Local	Low - negative	Slightly detrimental	Fairly likely	Very low
	Increase in sedimentation and erosion	Long-term	Local	Moderate negative	Moderately detrimental	Fairly likely	Low - negative	Refer to **Section 5.5.6**	Short-term	Site specific	Moderate negative	Slightly detrimental	Very unlikely	Very low - negative
	Loss of riparian systems and disturbance to water systems	Long-term	Local	Moderate negative	Moderately detrimental	Fairly likely	Low - negative		Short-term	Site specific	Moderate negative	Slightly detrimental	Very unlikely	Very low - negative

SECTION 6

6 Environmental Impact Statement

This section provides a summary of the potential impacts of the proposed project according to their significance after mitigation, highlighting the areas of concern.

The impact assessment confirmed that certain proposed activities (without mitigation) are expected to have impacts of high significance rating. The section below summarises all the identified impacts and mitigation measures for the entire project for the different phases of the project to reduce the significance of the predicted impacts.

6.1 Summary of the impacts

6.1.1 Positive impacts

The project will have significant positive impacts which are summarised in **Table 48**. With implementation of the recommended mitigation measures, these impacts can be enhanced to moderate/high impacts.

Table 48: Summary of the positive impacts

	Pre-construction	Construction	Operation	Decommis-sioning	Before Mitigation	After Mitigation
Job creation		X			Low (+ve)	Moderate (+ve)
Opportunity for local sourcing of goods and services		X			Low (+ve)	Moderate (+ve)
Local and regional economic benefits and multiplier effects		X			Low (+ve)	Moderate (+ve)
Increased availability of stable electricity		X	X		Moderate (+ve)	High (+ve)

6.1.2 Negative impacts

A summary of the negative impacts in the order of their significance after implementing the proposed mitigation measures is provided in **Table 49**. Most of the impacts have a very low significance after mitigation. These impacts are easily manageable if the ESMP if implemented. 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.

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 49: Summary of the negative impacts

Impact	Pre-construction	Construction	Operation	Decommis-sioning	Before Mitigation	After Mitigation
VERY LOW IMPACTS AFTER MITIGATION						
Electrocution of birds			X		Very low (-ve)	Very low (-ve)
Flooding from high rainfall intensity events			X		Very low (-ve)	Very low (-ve)
Soil erosion	X	X		X	Very low (-ve)	Very low (-ve)
Soil contamination	X	X		X	Low (-ve)	Very low (-ve)
Loss of arable land	X	X			Low (-ve)	Very low (-ve)
Damage to infrastructure due to potential veld fires			X		Low (-ve)	Very low (-ve)
Displacement due to habitat transformation		X			Low (-ve)	Very low (-ve)
Visual impacts of construction camps and laydown areas	X	X			Low (-ve)	Very low (-ve)
Increased level of noise generation (and potential vibrations)	X	X		X	Low (-ve)	Very low (-ve)
Dust emission	X	X		X	Low (-ve)	Very low (-ve)
Engine exhaust hazardous emissions	X	X		X	Low (-ve)	Very low (-ve)
Increased-traffic congestion					Low (-ve)	Very low (-ve)
Road safety					Low (-ve)	Very low (-ve)
Loss of riparian systems and disturbance of water courses		X	X	X	Low (-ve)	Very low (-ve)
Increase in sedimentation and erosion		X	X	X	Low (-ve)	Very low (-ve)
Potential impact on localised surface water quality		X		X	Low (-ve)	Very low (-ve)
LOW IMPACTS AFTER MITIGATION						
The visual impact of transmission lines in natural areas			X		Moderate (-ve)	Low (-ve)
The visual impact of transmission lines in protected areas			X		Moderate (-ve)	Low (-ve)
Loss of intact vegetation units / terrestrial habitats		X		X	Moderate (-ve)	Low (-ve)
Loss of Critical Biodiversity Areas and habitat fragmentation		X		X	Moderate (-ve)	Low (-ve)

Loss of species of special concern	X	X	X	X	Moderate (-ve)	Low (-ve)
Birds collision			X		Moderate (-ve)	Low (-ve)
Paleontological sites within the high-risk areas	X	X		X	Moderate (-ve)	Low (-ve)
Stone Age sites	X	X		X	Moderate (-ve)	Low (-ve)
Iron Age site	X	X		X	Moderate (-ve)	Low (-ve)
Built Environment (abandoned homestead)	X	X		X	Moderate (-ve)	Low (-ve)
Burial sites (community cemeteries)	X	X		X	Moderate (-ve)	Low (-ve)
MODERATE IMPACTS AFTER MITIGATION						
The visual impact of cleared servitudes in natural areas		X	X		Moderate (-ve)	Moderate (-ve)
Reduced energy transmission from higher temperatures			X		High (-ve)	Moderate (-ve)
Physical and economic displacement		X			High (-ve)	Moderate (-ve)
Increased social pathologies	X	X			Very high(-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 ESMP. It is the responsibility of the applicant and appointed Contractor to then ensure that management of these impacts are given priority.

Most HIGH negative impacts with mitigation, will be reduced to a MEDIUM or LOW significance, and can be managed accordingly and the positive impacts of a regional significance, extending over the borders of two countries, namely South Africa and Botswana and linking to all countries within the SAPP network.

6.2 Summary of Mitigation Measures

The recommended mitigation measures are as follows:

CLIMATE CHANGE

- **CONSTRUCTION AND OPERATIONAL PHASES:**
- Decrease heat stress on the people working on the project
- Clear vegetation cover below the lines to reduce fire risk
- Monitor potential wildfires or ignition to implement fire supression early
- Forecast the rainfall events to prepare for the potential flooding impacts
- Implement measures to evacuate excess water away from installations

VISUAL

- **PRE-CONSTRUCTION AND CONSTRUCTION PHASES:**
- Avoid visually sensitive areas
- Limit the contrast between the vertical scale of the receiving environment
- Make use of sites which have been previously disturbed
- Use existing vertical features as a backdrop or screen for the transmission line
- Avoid areas with large concentrations of potential viewers
- Make use of existing access roads where feasible
- Minimise modification of the existing topography and the removal of large trees
- Match the alignment and access roads to the topography and to the surrounding farm roads or tracks

NOISE

- **PRE-CONSTRUCTION AND CONSTRUCTION PHASES:**
- Construction may only occur during the day
- Should construction have to continue after hours, all residents affected must be notified
- All machinery and equipment must be maintained in good working order
- Take preventative measures where practical to reduce opportunity for complaints regarding noise
- Turn off all equipment when not in use
- Assess and manage all noise complaints

FAUNA & FLORA

- **PRE-CONSTRUCTION AND CONSTRUCTION PHASES:**
- A walk-down must be conducted to finalise the tower positions in most suitable locations
- Vegetation clearing should occur in in a phased manner
- ECO with a good understanding of the local flora be appointed during the construction phase
- All alien plant re-growth must be monitored
- Where necessary, requisite permits for plant removal authorities must be obtained

AVIFAUNA

- **PRE-CONSTRUCTION AND CONSTRUCTION PHASES:**
- On-going electrocution impacts must be recorded once operational, site specific mitigation be applied reactively.
- The final powerline alignment must be inspected on foot by the avifaunal specialist
- If power line marking is required, bird flight diverters must be installed
- Light and dark colour devices must be installed as soon as the conductors are strung.
- Avoid sensitive habitats as far as possible.
- Construction activity should be restricted to the immediate footprint of the infrastructure.
- Access to the remainder of the site should be strictly controlled.
- Measures to control noise
- Maximum use should be made of existing access roads

AQUATIC

- **PRE-CONSTRUCTION AND CONSTRUCTION PHASES:**
- No construction disturbance on or with 32 m buffer of water courses
- Vegetation clearing should occur in a phased manner
- No waste water discharge into water courses or natural drainage
- Emergency plans must be in place in case of spillages onto road surfaces and water courses;
- No stockpiling should take place within a water course;
- Erosion and sedimentation into channels must be minimised

SOIL AND LAND CAPABILITY

- **PRE-CONSTRUCTION AND CONSTRUCTION PHASES:**
- Construction activities must be phased to minimise
- Minimise soil exposure
- Vegetation clearing must be kept to a minimum.
- Preserve existing vegetation to the extent possible.
- Devise a soil conservation and stockpiling plan.
- Trenches will remain open for the shortest duration possible
- Disturbed areas shall be stabilised and re-vegetated immediately.
- Avoid soil contamination and spillages must be cleaned up immediately.
- Contaminated soil shall be disposed off as hazardous waste.
- Restrict all intrusive surface disturbance to powerline footprint
- The people using the land needed for construction must be notified at minimum six months prior to commencement of construction

AIR QUALITY

- **PRE-CONSTRUCTION AND CONSTRUCTION PHASES:**
- Topsoil stripping must be must be planned and kept to a minimum
- Dust suppression is to be conducted
- Locate activities away from sensitive receptors as far as possible.
- Limit the height and slope of material stockpiles to reduce wind entrainment.
- Exposed stockpiles can also be sprayed with water
- Establishment and enforcement of vehicle speed limits on site
- All access roads must be adequately compacted
- Disturbed areas shall be re-vegetated immediately.
- No overloading of fine material must be permitted
- Plant and equipment to function at an optimal level and serviced.
- Where possible low sulphur containing diesel to be used.
- Avoid unnecessary idling of vehicle engines while parked.

TRAFFIC & ROAD CONDITIONS

- **PRE-CONSTRUCTION AND CONSTRUCTION PHASES:**
- The most appropriate route for large vehicles (such as trucks) transporting equipment, materials and employees must be planned
- Traffic calming measures must be implemented
- Materials and labour shall, as far as possible, be sourced locally
- Deliveries should preferably be scheduled for off-peak hour traffic times
- Alternative temporary access routes must be provided
- Allow for safe pedestrian crossings where necessary.
- Existing road surfaces must be utilised and maintained within the baseline levels.
- Maintain storm water control mechanisms.
- All vehicles used during the project shall have the appropriate load-bearing capacity for the materials
- Repair any damages to public or private roads caused during construction.

HERITAGE

- **PRE-CONSTRUCTION AND CONSTRUCTION PHASES:**
- A watch brief and monitoring program be implemented during construction
- No heritage resources or sites may be disturbed without authorisation
- The final tower placements should be subjected to a walk-down survey to verify that no sites will be affected.

SOCIO-ECONOMIC

- **PRE-CONSTRUCTION AND CONSTRUCTION PHASES:**
- Maximise and monitor local recruitment, create local procurement opportunities.
- Promote employment and training (incl. women and youth) and Encourage indirect employment creation
- Where possible use labour-intensive methods of construction
- Create a platform where development of micro, small and medium enterprises is developed through LSD.
- Develop register of local SMMEs
- Establish a Stakeholder Liaison Committee, use of community structures to identify local labour pool, implemnet fair and transparent recruitment policy
- Plan the project in such a way to minimise social costs and maximise the benefits discussed
- Use of community structures to identify local labour pool
- Align awareness campaigns with those of other organisations in the area
- Housing of construction workers in a construction village siteand control of access to construction camp
- Cease construction activities before nightfall, if possible
- Maximisation of the proportion of job opportunities allocated to locals
- Demolishing construction village after construction activities have finished, or donating the construction camp to the local municipality

6.3 Recommendations for Net-gain for the Project

The following recommendations are made, not to form part of any authorisation conditions but as additional considerations that can ensure that the project has a net positive contribution outside of mitigating impacts. These are as follows:

- One of the issues raised by communities is that they have poor electrification of areas and the power line will pass through their environments without bringing tangible benefits of a more secure and reliable power supply. To ensure a net positive gain from the project and to offset the negative impacts associated with lack of perceived benefits, it is recommended that the project sponsors assess which communities along the route are most affected by lack of power and install solar panels at community centres or schools to allow for a secure and reliable power supply in the communities that can assist in development.
- There is a project that is carbon dating trees in Southern Africa to determine historical climate change data and to link this to verification of project climate change in the region. There is a gap in the knowledge for the project area. It is recommended that camel thorn trees in the project alignment are identified and locations are provided to the researcher to allow for sampling of such trees, subject to the required authorisations. This will support an ongoing project and provide invaluable knowledge to the field of research into climate change.

THE SOUTHERN AFRICAN TREE CLIMATE PROGRAM

The Southern African Tree Climate Program is undertaken by Dr Stephan Woodbourne of the National Research Foundation (NRF) iThemba LABS in Gauteng. The basic premise is that trees contain climate information, and if tree are to be damaged in a development process, then part of the mitigation is to try to salvage the information contained inside them.

The study has used baobab trees in other parts of Southern Africa but these do not occur in dry areas so the research has looked at Camelthorns (*Acacia erioloba*) in certain areas. They yield good information on rainfall variability through time and they reach good age. In Namibia, seemingly small trees were dated that were 1000 years old. Trees are typically chosen from outside of drainage areas because as water retention within such systems will obscure the rainfall record. A disk cut is from the tree (normally about 3 to 5 cm thick). In the field a decision is made on how to trim this down to get a radius from pith to bark because it captures the full growth of the tree.

In the lab isotopic measurements are made the 13C/12C ratio. It is a standard approach and measurements are at a sub 1mm resolution. The age of the tree is determined using radiocarbon dating.

Linear development features are always good opportunities for this research as the often-span climate gradients that are sensitive to change. By comparing tree records along these transects it is possible to see how climate systems have shifted through time.

The hope is that any trees along the alignment that could be sampled would contribute towards an archive of samples that might be analysed in the future. This work is done in collaboration with international partners in the UK, Germany and Romania.

SECTION 7

7 Stakeholder Engagement Process

This section details the approach to the SE according to the legislative requirements and different activities of the SE conducted to date.

7.1 Consultation Process and Approach

Consultation with the public forms an integral component of the Environmental Authorisation (EA) process. This process enables I&APs (e.g. directly affected landowners, national-, provincial- and local authorities, and local communities etc.) to raise their issues and concerns regarding the proposed activities, which they feel should be addressed in the ESIA process. The Stakeholder Engagement (SE) Process has thus been structured to provide I&APs with an opportunity to gain more knowledge about the proposed project, to provide input through the review of documents/reports, and to voice any issues or concern at various stages throughout the ESIA process.

The following guideline documents were also used to inform the SE approach:

- International Finance Corporation (IFC). 2007. Manual Stakeholder Engagement: A Good Practice Handbook for Companies Doing Business in Emerging Markets;
- Integrated Environmental Management Guideline Series 7 – Public Participation in the EIA Process (DEA, 2010);
- Public Participation Guidelines, Guideline Document 4 (DEA, 2006);
- Public Participation Guidelines in terms of the National Environmental Management Act, 1998 Environmental Impact Assessment Regulations (DEA, 2017a);
- EIA Regulations, 2014 published in Government Notice No. 982 of 4 December 2014 (as amended)
- Botswana Environmental Assessment Act, 2011 (Act No. 10 of 2011); and
- Botswana Environmental Assessment Regulations, 2012 (Published on 2012).

The objectives of stakeholder engagement are to inform the public about the project on an ongoing basis, understand their concerns related to the project at an early stage, obtain local knowledge about the area and provide review opportunities at key stages in the process. It is important that this process is documented properly. To ensure that an equitable process is undertaken for the length of the route that meets both national standards and IFC requirements, the process has been standardised along the entire route and mirrored in both countries to ensure that it meets the requirements of both sets of national environmental legislation and international funder requirements (i.e. IRC and DBSA). To meet international requirements, the project must also be assessed in its entirety as one project.

The SE activities to date in South African are undertaken in terms of the NEMA, as amended and in Botswana, according to the EIAA, with differing requirements during the EA process indicated below (**Table 50**).

Table 50: Stages in which consultation is required for South Africa, Botswana and in terms of the IFC / DBSA Standards

ACTIVITY	NEMA IN SOUTH AFRICA	EIAA IN BOTSWANA	IFC / DBSA STANDARDS
Initial notification of stakeholders and circulation of Background Information Document (BID)	Optional stage	Required	Required

SE for **Draft Scoping Report** – meetings and circulation of project documentation	Required	Not required*	Required
SE for **Draft ESIA Report** – meetings and circulation of project documentation	Required	Not required*	Required
Public Hearings	Not required	Required	Not required

**NOTE: Although Botswana does not legally require a stakeholder engagement for draft scoping, the ESIA process in Botswana was subjected to public consultations to satisfy the requirements of the IFC and DBSA standards.*

The SE process has thus been structured to provide I&APs with an opportunity to gain more knowledge about the proposed project, to provide input through the review of documents/reports, and to voice any issues or concern at various stages throughout the ESIA process. The minimum requirements for stakeholder engagement for South Africa and Botswana, and best practise standards, are indicated in below, to indicate how these have been met in this ESIA process. Details of what was done and where this is referenced are included in **Table 51.**

Table 51: The minimum requirements for stakeholder engagement and best practise standards (Cross-reference Tables 28 and 29)

DESCRIPTION	PROJECT STATUS
BEST PRACTISE - IFC / DBSA (IFC, 2007)	
There is no one right way of undertaking consultation. Given its nature, the process will always be context-specific (IFC, 2007). However, basic principles outlined below apply.	
Stakeholder Identification and Analysis – Undertake analysis to determine those directly and indirectly affected and what their interests are, with a focus on vulnerable groups – Verify stakeholder representatives and engage with stakeholders in their own communities – Include government as a key stakeholder – Work with representatives and accountable NGOs and community-based organisations	A range of stakeholders were identified and included in database with indication of their interest groupings (**ANNEXURE E.1**). It is important to note that the stakeholder database is a dynamic document with stakeholders being added throughout the process. During the ESIA public participation meetings more landowners were identified. However, as their land resorts under various traditional leaders who were consulted throughout the process, they had been informed of the process through these channels and a number of these land owners did attend the consultation meetings.
Information Disclosure – Be transparent and apply good practice principles – Disclose early with the aim of providing relevant information to targeted stakeholders in advance of decision-making – Explain next steps and be clear about which project elements are fixed and which can be changed or improved – Provide meaningful information in a format and language that is readily understandable and tailored to the target stakeholder group	A BID was compiled during the early stages of the project and circulated to potentially I&APs to allow for early input into the process and to assist in identifying other parties to include. Summary pamphlets of the BID (simplified and not-technical) in Afrikaans, Tswana and Setswana were circulated to inform parties who did not speak English, of the process and how they could become involved (**ANNEXURE E 4)**.
Stakeholder Consultation – Document consultation activities and their outcomes – this is critical to effectively managing the stakeholder engagement process and allows for commitments to stakeholders to be documented, as well as forming part of the ESIA regulatory requirements and satisfying due	A Stakeholder Engagement Plan (SEP) has been compiled to guide and coordinate the consultation process in a way that can be carried over to other stages of the project (**ANNEXURE E 2**). A Comments and Response Report (CRR) has been compiled that records all comments made, and the

DESCRIPTION	PROJECT STATUS
diligence inquiries of potential financial institutions and other equity partners	response thereto (**ANNEXURE E 4)**. A Resettlement Action Plan has been undertaken **(ANNEXURE G 7)**.
Grievance Management – Allows for companies to respond to environmental and social grievances in a way that enhances business performance – Should be scaled to fit the level of risks and impacts of a project – Should flow from broader process of stakeholder engagement and business integrity principles and integrate the various elements of engagement	A Grievance Mechanism has been outlined in the SEP (**ANNEXURE E 2**).
Reporting to Stakeholders – Regularly update your commitments register and disclose progress to affected and interested parties – Publicise any material changes to commitments or implementation actions that vary from publicly disclosed documents – Report on the process of stakeholder engagement to those stakeholders who are directly engaged and to other interested parties – Translate information reported to stakeholders into local languages and easily understandable formats	The CRR is the first document that will be circulated to Parties to indicate how their comments have been responded to **(ANNEXURE E 4)**. The comments also informed the development of the ToR for the ESIA phase.
DESCRIPTION OF MINIMUM REQUIREMENTS - SOUTH AFRICA (DEA, 2017)	
Notify all potential Interested and Affected Parties (I&APs)	It is important to note that the owner of one portion of affected land could not be identified (Abjaterskop 940 belonging to Hentiq 2065 Pty Ltd, according to the deeds search). In the efforts to obtain the owner information the following steps were taken: in addition to this deeds search, consultation with the Local Municipality and the Local Farmers' Association, which shed no light on the details or whereabouts of the owner. The Local Tribal Authority was also requested to visit the portion to obtain information; however, no one was on this farm and no information on ownership could be gained. Adequate steps, in terms of the minimum requirements, were followed to inform land owners of the proposed project, as can be seen below.
– Place notice board on boundary of site and alternatives[21]	Notice boards (for Scoping and Assessment Phase) were placed in strategic places along the route **(**please refer to **ANNEXURE E 3.2)**
– Notify owners and occupiers of land next to site or alternative site in writing	Emails were circulated to those on the properties affected and to neighbouring landowners to inform them of the proposed project. No alternative routes were considered, based on the outcomes of the route selection process, as agreed to by DEA **(**Please refer to **ANNEXURE E 3.6** for proof of notifications**).**
– Notify owners and occupiers of land within 100 m of boundary of site or alternative site who may be directly affected	Emails were circulated to those on the properties affected and to neighbouring landowners to inform

[21] If an Application is for a linear or ocean-based activity and strict compliance with the above is inappropriate, the person conducting the public participation process may deviate from the requirements to the extent and in the manner as may be agreed to by the Competent Authority.

DESCRIPTION	PROJECT STATUS
	them of the proposed project **(**Please refer to **ANNEXURE E 3.6** for proof of notifications**).**
– Notify municipal councillor of ward for site or alternative site and any organisation of ratepayers representing the community	Affected Ward Councillors were notified of the project **(**Please refer to **ANNEXURE E 3.6** for proof of notifications**).**
– Notify representative of affected municipality	The farmers' organisations and the tribal authorities along the route were approached, as representatives of the communities **(**Please refer to **ANNEXURE E 3.6 for** proof of notifications**).**
– Notify organs of state with jurisdiction in terms of the activity	Relevant organs of state were informed - see **Table 52** for details **(**Please refer to **ANNEXURE E 3.6** for proof of notifications**).**
– Place advertisement in one local newspaper	Advertisements were placed in the Mafikeng Sun on the 30 June 2017 and 26 Jan 2018 during the Scoping and Assessment Phases (Please refer to **ANNEXURE E 3.1).**
– Place advertisement in one provincial newspaper or national newspaper, if impacts extend over boundaries of the metropolitan or local municipality	Advertisements were placed in the Daily Sun on the 30 June 2017 and 24 Jan 2018 during the Scoping and Assessment (Please refer to **ANNEXURE E 3.1).**
The notice and advertisement must indicate: – The application has been/will be submitted to the relevant Competent Authority – Indicate whether a BA or Scoping and EIA process is being undertaken – The nature and location of the activity – Where additional information can be obtained – How I&APs can make contact	The advertisements for Scoping and Assessment Phase are included in **ANNEXURE E 3.1**.
The notice board must be at least 60cm by 42cm and have a certain lettering and format	Appropriate notice boards were placed in strategic places along the route **(ANNEXURE E 3.2).**
The public participation manager must ensure that all relevant facts about the project are made available to potential I&APs and that they are given reasonable opportunity to comment on project documentation	The Draft Scoping and ESIA reports were made available for comment for 30 days and public meetings were organised to provide opportunities for detailed discussions **(**Please refer to **ANNEXURE E 4 and E 5)**
A register must be maintained which contains the names and addresses of – All persons who have submitted written comments or attended meetings related to the project – All persons who have asked in writing for their names to be placed on the register – All organs of state which have jurisdiction in respect of the activity Any person requesting to see the register in writing must be allowed to do so	A database is included in **ANNEXURE E 1.**
Registered I&APs must have opportunity to comment in writing on all written submission to the Competent Authority and raise comments and concerns within the timeframes (incl. approved extensions) set by the Competent Authority	The Draft Scoping and ESIA reports were made available for comment for 30 days and public meetings were organised to provide opportunities for detailed discussions. The records of all the meetings is included as **ANNEXURE E 5.** The CRR for the Final ESIA Report is included in **ANNEXURE E.4**.

DESCRIPTION	PROJECT STATUS
Any comments submitted directly to the Competent Authority must be forwarded to the Environmental Assessment Practitioner (EAP)	Comments from the DEA SA have been incorporated and/or addressed in this Final ESIA Report. Letter with comments from DEA SA is attached in **ANNEXURE C.2.**
I&APs must disclose any direct business, financial, personal or other interest which that party may have in the approval or refusal of the Application.	This is included in **ANNEXURE B.**
I&AP s must be given the opportunity to comment on draft copies of reports (BA, Scoping, Environmental Impact Reports, Environmental Management Plans and Specialist Reports) before submission to the Competent Authority	The Draft Scoping and ESIA reports were made available for comment for 30 days and public meetings were organised to provide opportunities for detailed discussions. The records of all the meetings is included as **ANNEXURE E 5.**
Written comments from registered I&APs must accompany the report when submitted to the Competent Authority	These are included in **ANNEXURE E 4.**
A registered I&AP may comment on any final report that is submitted by a specialist reviewer where the report contains substantive information not previously made available to a registered I&AP	The changes to the Draft ESIA Report were not substantive and the final report will be made available for the public.
Comments by I&APs must be recorded in reports submitted to the Competent Authority	This are included in **ANNEXURE E.4.**
DESCRIPTION OF MINIMUM REQUIREMENTS – BOTSWANA (Botswana EA, 2011)**;** (Botswana EA Regulations , 2012)	
The competent authority may request the developer to consult stakeholders22. Section 7(1) states an applicant must appoint a practitioner to do a scoping activity before undertaking an activity. Section 7(2) states the applicant must, as part of the scoping, (a) publicise once the intended activity, its effects and benefits in the mass media using the official languages for no less than 21 days; and after the 21 days (b) hold meetings with the affected people or communities to explain the nature of the activity and its effects. Stakeholder consultation must include a discussion of the objectives, methods and results of consultations with I&APs and relevant institutional stakeholders. A record of all stakeholders consulted and minutes of the meeting(s) must be annexed to the Scoping Report. The scoping exercise must the identification of relevant I&APs to be involved in the scoping exercise, which will differ from project to project. These should include: – The project developer to respond to comments and provide information – The competent authority to direct the procedural requirements for the scoping and issue directives on the scope of the EIA – Other government agencies to contribute detailed knowledge about specific issues under their jurisdiction – Environmental practitioners and specialists – Licensing or permitting authorities such as local Land Boards, Town and Country Planning Board, National Industrial Licensing Authority, Local Authorities, etc.	– Stakeholders were invited to participate and comment on the project in December 2016 – Digby Wells Environmental (DWE) Botswana sent out the initial notification documentation, comprising Project information in the form of a BID and summarised pamphlets in English and Setswana in December 2016 and January 2017 (**ANNEXURE E 3.5**) – Initial comments were received from some I&APs between January 2017 and April 2017 (**ANNEXURE E.4**) – Project information in the form of a Non-Technical Summary of the Scoping Report and summarised pamphlets in English and Setswana were distributed during June 2017 and July 2017 (**ANNEXURE E.3.3 and E.3.4**) – An advert was placed in the local newspaper on 28 July 2017; 21 days in advance of the first public meeting, in accordance with the EA (2011) (**ANNEXURE 3.1**) – Public meetings and/or public open house were held in various public venues. – A similar process to that for the Scoping phase will be held to present the findings of the ESIA Report to I&APs in Botswana.

[22] It should be noted that it is not mandatory for the developer to publicise the activity in the mass media as per Section 7 (2) (a) of the Act nor will the developer be obliged to prepare and submit the Scoping Report and terms of reference for developing the ESMP. However, where it is deemed necessary, the competent authority may at its discretion, require for such. (Reference, Botswana Regulations, 2012: Section g, page 17).

DESCRIPTION	PROJECT STATUS
– Those affected to identify issues and ensure the inclusion of local knowledge and values. These views must be considered when choosing between alternatives, in deciding on the importance of issues, and in framing mitigation measures, compensation provisions and management plans – Local authorities including local government, tribal leadership (Dikgosi) – The wider community including local, national and sometimes international NGOs. (Reference, Botswana Regulations, 2012: Section A, page 23)	
The Consultation Plan must indicate I&APS to be consulted and the method to be used for consultation and the venues and times of consultation. In designing the Consultation Plan, relevant methods for consulting different stakeholders must be considered, including questionnaire, polls and surveys; public notices describing the details of the project and issues involved placed at accessible locations; advertisements in the mass media; brochures, leaflets and information sheets; direct discussions between project staff and individuals interested in the effects of the project; workshops and presentations at community groups and public meetings.	As above In addition, a Stakeholder Engagement Plan (SEP) was compiled to coordinate how engagement would be undertaken (**ANNEXURE E.2**) A Resettlement Action Plan was undertaken, where one-on-one consultations were held with affected parties during the surveys
A Botswana Environmental Assessment Practitioners Association (BEAPA) registered environmental specialist must facilitate the consultation process and meetings; which includes the attendance of meetings, taking minutes of meetings, as well as other responsibilities in accordance with the relevant Code of Conduct (*Reference, Botswana Regulations, 2012: Form F (regulation 13(1)).*	This has been undertaken by Elmar Schuran Environmental Scientist (BEAPA: 2013:0041)[23] Tel: +(267) 390 5414; Fax: +(267) 397 5993 Elmar.Schuran@digbywells.com www.digbywells.com Unit 12, Kgale Court. Plot 127, GIFP, Gaborone, Botswana

7.2 Authorities Involved

The following state departments and/or authorities have been identified as the key stakeholders and have been involved throughout the ESIA process.

Table 52: Project Stakeholder Database

Authorities	South Africa	Botswana
Local Authorities	• Mahikeng Local Municipality • Ramotshere Moiloa Local Municipality • Ngaka Modiri Molema District Municipality • SAPS – Nietverdiend	Please refer to District Councils below

[23] The BEAPA registered consultant on the project has changed from Kagiso Sakarea to Elmar Schuran. The change has been formally submitted to DEA Botswana.

Authorities	South Africa	Botswana
Provincial Departments	• Department of Rural, Environment and Agricultural Development • North West Provincial Heritage Resources Authority • Department of Water and Sanitation • Department of Agriculture, Forestry and Fisheries – Regional Office • Department of Mineral Resources – Regional Office • Department of Public Works and Roads	Please refer to District Councils below
National Departments	• North West Provincial Heritage Resources Authority South African Heritage Resources Agency (SAHRA) • Department of Rural, Environment and Agricultural Development • Department of Energy • Department of Water and Sanitation • Department of Agriculture, Forestry and Fisheries • Department of Rural Development and Land Reform • South African Civil Aviation Authority (SACAA)	• Department of Waste Management & Pollution Control (DWMPC) • Water Utilities Corporation • Department of Lands • Department of Public Health • Department of Tourism • Department of National Museum and Monuments • Department of Wildlife • Department of Forestry • Department of Crop Production • Department of Veterinary Services • Department of Animal Production • Botswana Tourism Organisation
Parastatals	• Telkom • Transnet SOC Ltd • South African National Roads Agency (SANRAL) • Eskom	• Botswana Power Corporation (BPC)
Non-Authority Stakeholders	• Bird Life South Africa • Mafikeng Nature Reserve • Lichtenburg District Farmers Unite • Agri North West	• Businesses around/along site • Residents close to/along site • Bird Life Botswana • Kalahari Conservation Society

Authorities	South Africa	Botswana
District Councils	–	• Kgatleng District Council • Kgatleng District Council Fire Department • Kgatleng District Council Environmental Health • Kgatleng District Council Roads Division • Kgatleng Land Board • Tribal Administrations/ Authorities • Dikgosi, Headmen and Village Development Committees (VDCs) • Members of Parliament and District Commissioners • Tribal Administrations, Land Boards and sub-Land Board • Elected representatives-MPs • Kgatleng Constituency (MP)
Tribal Administrations/ Authorities	• Lehurutshe Tribal Council • Driefontein/Serake Tribal Authority • Moiloanyane Tribal Authority • Supingstad Tribal Authority • Klippan Farmers Association • De Jagers Farmers Association	• Dikgosi, Headmen and Village Development Committees (VDCs) • Members of Parliament and District Commissioners • Tribal Administrations, Land Boards and sub-Land Board • Elected representatives-MPs • Kgatleng Constituency (MP)

7.3 Stakeholder Engagement during the Notification Phase

Although the stakeholder engagement before the Scoping Phase is not legislated in South Africa and Botswana, in effort to engage the stakeholders in the early stages of the project and gather useful information the following activities were undertaken **(Table 53):**

Table 53: Stakeholder Engagement before the Scoping Phase

Task	Details	Date
Background Information Document (BID) and Notification letter	All potential I&APs, included affected landowners and neighbours, have received the Background Information Document and a notification letter. See **ANNEXURE E.3**	South Africa & Botswana 12 December 2016 to 3 February 2017

7.4 Stakeholder Engagement during the Scoping Phase

The SE continued during the Scoping Phase and the following tasks were undertaken **(Table 54).**

Table 54: Stakeholder Engagement during the Scoping Phase

Task	Details	Date
Notification Letters	All potential I&APs, included affected landowners and neighbours, have been informed of the availability of the DSR by means of post and / or email. Relevant government departments have also been notified of the availability of the report and requested to submit comments. I&APs have been given 30 calendar days within which to submit comments or raise any issues or concerns they have with regards to the proposed project or ESIA process. See **ANNEXURE E.4.4**	South Africa: 28 Jun 2017 (first round of PPP) & 16 Aug 2017 (second round of PPP)
Executive Summary	A Non-Technical Summary of the DSR was emailed and posted to the identified I&APs and other relevant stakeholders on the I&AP database, notifying them about the availability of the report for review. Pamphlets, outlining the DSR and translated into Afrikaans and Tswana in South Africa and Setswana in Botswana were hand delivered to community representatives during the community meetings. **South Africa:** • Bewley • Lehurutshe: Community Library • Serake/ Driefontein: Swartfontein Post office or shopping complex • Supingstad: Shop / spaza **Botswana** • Tlokweng – Main Kgotla • Dikwididi – Main Kgotla • Mochudi – Main Kgotla • Malotwane – Main Kgotla • Modipane – Main Kgotla • Mokatse – Main Kgotla • Monametsane – Main Kgotla Non-Technical Summaries and pamphlets are included in **ANNEXURE E.4.3**	South Africa: 28 - 30 Jun 2017 Botswana: 4 - 11 Jul 2017
Placement of the DSR in the public venues	A digital version of the DSR was uploaded onto the Aurecon website for perusal and download in http://www.aurecongroup.com/en/public-participation.aspx. Electronic copies of the report were made available to different stakeholders on request (on a CD). Hardcopies was made available for review at the following locations: **South Africa:** • Miga • Serake/ Driefontein **Botswana:** • No hard copies were distributed Proof of the DSR placed in the public venues in **ANNEXURE E.3**	Placed online on 28 June 2017 and remains available for duration of Project Placed in public venues in SA from 28 June 2017
Site notices	Site notices with a size of 600 mm x 420 mm were put up to inform the public of the proposed project and the SE process. These were placed strategically in public places along the proposed site namely:	South Africa: 28 - 30 Jun 2017 Botswana: 4 to 11 July 2017

<table>
<tr><th>Task</th><th>Details</th><th>Date</th></tr>
<tr><td></td><td>
<u>South Africa:</u>
<table>
<tr><th colspan="2">VENUES AND LOCATIONS WHERE NOTICES WERE PLACED</th></tr>
<tr><td>Miga</td><td>Supreme Poultry Ramatlabama;
Ramatlabama Border Control;
Klippan Boerevereniging.</td></tr>
<tr><td>Lehurutshe</td><td>Lehurutshe: Lehurutshe Community Library;
Lehurutshe Civic Centre.</td></tr>
<tr><td>Serake/ Driefontein</td><td>Serake/Driefontein: Driefontein Clinic – Stand no 99, Driefontein Swartfontein Post Office.</td></tr>
<tr><td>Supingstad</td><td>Supingstad Clinic
247 Monneng Section</td></tr>
</table>
<u>Botswana:</u>
<table>
<tr><th colspan="2">VENUES AND LOCATIONS WHERE NOTICES WERE PLACED</th></tr>
<tr><td>Mochudi</td><td>At the Spar mall (notice board), Choppies Mall (three notices on the notification board), and at the Main Kgoltla (notice board)</td></tr>
<tr><td>Mokatse</td><td>Main Kgotla (notice board), Clinic and at the local supermarket</td></tr>
<tr><td>Dikwididi</td><td>Main Kgotla, local supermarket and at the local restaurant (Notice boards)</td></tr>
<tr><td>Modipane</td><td>Main Kgotla, and at two local restaurants.</td></tr>
<tr><td>Malotwane</td><td>Main Kgotla, local supermarket, joint restaurant and at the local bar (three notices on notification walls)</td></tr>
<tr><td>Thlokweng</td><td>Main Kgotla (notice boards)</td></tr>
</table>
Photos of the site notices are included in ANNEXURE E.3
</td><td></td></tr>
<tr><td>Media adverts</td><td>
Advertisements were placed in the newspapers at the start of the public comment period to notify the public of the availability of the DSR. Site notices were placed in the following newspapers:
<u>South Africa</u>

One relevant local newspaper: Mafikeng Mail
One provincial or national newspaper: Daily Sun

<u>Botswana</u>

To be placed weekly for three weeks, the first advertisement 21 days before the public meeting date
National newspaper: The Daily News (government owned newspaper that comes out daily and is given freely to all communities around the country).

Proof of the advertisements in ANNEXURE E.4.1.
</td><td>
<u>South Africa:</u>
30 June 2017 in Daily Sun and Mahikeng Mail.

<u>Botswana:</u>
Adverts were placed in the Daily News on 28 July 2017; and 10 August 2017
</td></tr>
<tr><td>Public and focus group meetings</td><td>
Public meetings and/or public open house were held in the following public venues:
<u>South Africa</u>
<table>
<tr><th>COMMUNITY/ STAKEHOLDERS</th><th>LOCATION</th><th>DATES</th><th>PHASE</th></tr>
<tr><td>Tribal Leaders</td><td>Driefontein</td><td>12 Jul 2017</td><td rowspan="5">Scoping (First round of PPP)</td></tr>
<tr><td>Klippan Farmers Union</td><td>Klippan</td><td>17 Jul 2017</td></tr>
<tr><td>Lehurutshe community</td><td>Lehurutshe</td><td>17 Jul 2017</td></tr>
<tr><td>Driefontein community</td><td>Driefontein</td><td>18 Jul 2017</td></tr>
<tr><td>Supingstad Leaders</td><td>Supingstad</td><td>18 Jul 2017</td></tr>
</table>
</td><td>
<u>South Africa:</u>
17 - 18 July 2017 (first round of PPP)

23 – 24 Aug 2017 (second round of PPP)
</td></tr>
</table>

<table>
<tr><th>Task</th><th>Details</th><th>Date</th></tr>
<tr><td></td><td>
<table>
<tr><td>Tribal Leaders</td><td>Lehurutshe</td><td>23 Aug 2017</td><td rowspan="3">Scoping (Second round of PPP)</td></tr>
<tr><td>Office of the Mayor</td><td>Zeerust</td><td>23 Aug 2017</td></tr>
<tr><td>Supingstad community</td><td>Suppingstad</td><td>24 Aug 2017</td></tr>
</table>
<u>Botswana</u>
<table>
<tr><th>VENUE</th><th>LOCATION</th><th>DATES</th></tr>
<tr><td>Dikwididi</td><td>Main Kgotla</td><td>21 Aug2017</td></tr>
<tr><td>Modipane</td><td>Main Kgotla</td><td>22 Aug 2017</td></tr>
<tr><td>Mokatse</td><td>Main Kgotla</td><td>22 Aug 2017</td></tr>
<tr><td>Malolwane</td><td>Main Kgotla</td><td>23 Aug 2017</td></tr>
<tr><td>Mathubudi-kwane</td><td>Main Kgotla</td><td>23 Aug 2017</td></tr>
<tr><td>Ramonaka</td><td>Main Kgotla</td><td>23 Aug 2017</td></tr>
<tr><td>Oodi</td><td>Main Kgotla</td><td>24 Aug 2017</td></tr>
<tr><td>Sikwane</td><td>Main Kgotla</td><td>25 Aug 2017</td></tr>
<tr><td>Malotwane</td><td>Main Kgotla</td><td>25 Aug 2017</td></tr>
<tr><td>Mochudi</td><td>Main Kgotla</td><td>29 Aug 2017</td></tr>
<tr><td>Ramonaka</td><td>Main Kgotla</td><td>31 Aug 2017</td></tr>
<tr><td>Oodi</td><td>Main Kgotla</td><td>1 Sep 2017</td></tr>
<tr><td>Mathubudi-kwane</td><td>Main Kgotla</td><td>4 Sep 2017</td></tr>
<tr><td>Mabalane</td><td>Main Kgotla</td><td>5 Sep 2017</td></tr>
<tr><td>Tlokweng</td><td>Main Kgotla</td><td>15 Sep 2017</td></tr>
</table>
The minutes and comments from the meetings are included in ANNEXURE E.5.
</td><td><u>Botswana:</u>
21 Aug - 15 Sep 2017</td></tr>
<tr><td>Addressing comments received</td><td>All comments received on the DSR were collated into a Comments and Response Report (CRR). The responses to these comments from the applicant and the EAP is provided in the CRR in ANNEXURE E.4.</td><td>The CRR is updated as and when comments are received.</td></tr>
</table>

7.5 Stakeholder Engagement during the Assessment Phase

The stakeholder engagement continued during the Environmental and Social Impact Assessment Phase and the following tasks were undertaken **(Table 55):**

Table 55: Stakeholder Engagement during the Assessment Phase

<table>
<tr><th>Task</th><th>Details</th></tr>
<tr><td>Site notices</td><td>Site notices with a size of 600 mm x 420 mm <u>were</u> put up to inform the public of the assessment phase and the route realignment. These <u>were</u> placed strategically in public places along the proposed site namely:
<u>South Africa:</u>
<table>
<tr><th colspan="2">VENUES AND LOCATIONS WHERE NOTICES WERE PLACED</th></tr>
<tr><td>Miga</td><td>Ramatlabama <u>Breeders Farm</u>; Ramatlabama Border Control; Klippan Farmers Association, Miga Community Hall</td></tr>
<tr><td>Khunotswana</td><td>Khunotswana Community Hall</td></tr>
<tr><td>Lehurutshe</td><td>Lehurutshe Community Library; Lehurutshe Civic Centre; Ga Matshogo Village</td></tr>
<tr><td>Serake/ Driefontein</td><td>Driefontein Clinic; Swartfontein Post Office; Mantsie Village; Borakalalo Village</td></tr>
<tr><td>Supingstad</td><td>Supingstad Clinic</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Task</th><th>Details</th></tr>
<tr><td></td><td><u>Botswana:</u>
Affected people will be notified of meetings to be held in April 2018.</td></tr>
<tr><td>Media adverts</td><td><u>Media advertisements were</u> placed in the newspapers to <u>advertise the public community meetings and notify the I&APs about the release of the ESIA Report for public comment and the public meetings.</u>
<u>South Africa</u>
• One relevant local newspaper: Mafikeng Mail <u>(Date: 26 Jan 2018)</u>
• One provincial or national newspaper: Daily Sun <u>(Date: 24 Jan 2018)</u>
<u>Botswana</u>
Affected people will be notified of meetings to be held in April 2018.</td></tr>
<tr><td>Public and Focus Group Meetings</td><td>Public <u>and focus group</u> meetings <u>were</u> held in the following venues:
<u>South Africa</u>
<table>
<tr><th>TOWN / COMMUNITY</th><th>MEETING DATE</th><th>MEETING TIME</th><th>MEETING VENUE</th></tr>
<tr><td><u>Ramotshere Moiloa Local Municipality</u></td><td><u>16 Jan 2018</u></td><td><u>Focus group meeting</u></td><td><u>Ramotshere Moiloa Local Municipality offices</u></td></tr>
<tr><td>Miga</td><td>13 Feb 2018</td><td>11h00: Open House;
11h30: Public Meeting</td><td>Miga Community Hall</td></tr>
<tr><td>Khunotswana</td><td>13 Feb 2018</td><td>14h00: Open House;
14h30: Public Meeting</td><td>Khunotswana Tribal Authority Hall</td></tr>
<tr><td>Miga</td><td>14 Feb 2018</td><td>09:00 – 14:00</td><td>Meeting with individual farmers in their farms</td></tr>
<tr><td>Lehurutshe</td><td>14 Feb 2018</td><td>16h00: Open House;
16h30: Public Meeting</td><td>Lehurutshe Civic Centre</td></tr>
<tr><td>Serake, Driefontein</td><td>15 Feb 2018</td><td>10h00: Open House;
10h30: Public Meeting</td><td>Serake Tribal Office</td></tr>
<tr><td>Supingstad</td><td>16 Feb 2018</td><td>09h00: Open House;
09h30: Public Meeting</td><td>Ntlung Morafe</td></tr>
</table>
<u>Botswana</u>
Interested and Affected parties and stakeholders will be notified of meetings to be held in <u>April / May</u> 2018.</td></tr>
<tr><td>Addressing comments received</td><td>All comments received in the Assessment Phase <u>have been</u> collated into an updated CRR.</td></tr>
<tr><td>Placement of the Environmental Assessment Report in the public venues</td><td>A digital version of the Assessment Report <u>was</u> uploaded onto the Aurecon website for perusal and download in <u>http://www.aurecongroup.com/en/public-participation.aspx</u>.
Electronic copies of the report <u>were</u> made available to different stakeholders on request (on a CD). A hardcopy of the full ESIA Report <u>was</u> also available for review at the Lehurutshe Community Library.</td></tr>
</table>

SECTION 8

8 Conclusion and Recommendations

This section briefly concludes the report and outlines few key environmental issues, progress to date and recommendations going forward

As per the requirements of South African NEMA and Botswana EIAA, this study has reviewed and assessed a range of contemplated biophysical and social impacts associated with the proposed BOSA project. The main findings and recommendations of the ESIA 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. Most HIGH negative impacts with proposed mitigation, will be reduced to a MEDIUM or LOW significance, and can be managed accordingly.

8.1 Level of Confidence in the Assessment

The EAP believes that the information contained within this ESIA Report is adequate to inform the DEA 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.

It is acknowledged that the disconnection of the proposed powerline and Mahikeng substation in South Africa may impact on the environmental approval of this ESIA. Any deviations from what was assessed in this ESIA Report as a result of the approved location of the Mahikeng substation will be subject to further assessment in accordance with the DEA requirements.

8.2 Way Forward

This report (including the ESMP) has been advertised and made available for public review. Various public meetings were held during the comment period to discuss the project with the affected communities and stakeholder. All the issues and comments received during this period were documented and responded to in the CRR. This report was also updated and amended where necessary. Based on the information presented in this final ESIA, the DEA South Africa will be able to make a decision on the project in terms of the NEMA for the South African section of the proposed route.

8.3 Recommended Conditions of Environmental Authorisation

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 and heritage specialists 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 ESMP by:
  (i) Ensuring the Contractor has a permanent Environmental Officer based on site, to monitor adherence to the ESMP; 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 ESMP and environmental issues in relation to their individual areas of work.
- The EMSP should be included in the contractual obligations of the appointed EPC contractor.
- A Water Use Licence must be obtained from the Department of Water and Sanitation 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.

SECTION 9

9 Reference List

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