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Report Title : Final Basic Assessment for the Proposed Construction Of Queens 88/11kv Substation with the Loop-In Loop-Out 132 kV power line from the Existing Golf view-Tedderfield 132kv Power line and The Expansion Of RWB-Zwartkopies 88kv Substation with the 2.6km long 132kv distribution power line with 22m Servitude to the Existing Eyestone Substation Project.	

EXECUTIVE SUMMARY

Introduction

Due to increase demand of electricity in South Africa, Eskom realised the need to increase the capacity of electricity supply in Vereeniging within the jurisdiction of Midvaal Local Municipality (MLM) which forms part of the Sedibeng District Municipality in the Gauteng Province. To address this need Eskom proposed a new construction of substation called Queens with 2 distribution 132kV power lines as well as expanding the existing RWB Zwartkoppies Substation. The proposed project triggers activities from NEMA EIA 2014 regulations. To obtain the relevant license, Eskom has appointed Margen Industrial Services as an Independent Environmental Assessment Practitioner to conduct a Basic Assessment (BA) process.

Thus far, Margen Industrial Services has lodged an application for Environmental Authorization to the National Department of Environmental Affairs as the identified Competent Authority for the project. The reference number for this application has been issued and it is **DEA Ref: 14/12/16/3/1/1838**.

The project can be summarised in the following portions of work. Therefore, this Basic Assessment (BA) consists of two components:

- Construction of a new 200m x 100m area of Queens Substation with loop in loop out 132kv power lines from Golfview – Tedderfield power lines to the new Queens Substation;
- Expansion of the existing RWB Zwartkoppies substation and the new 2 distribution Zwartkoppies – Eyestone electricity powerlines of 2.6km long with 22m servitude.

LEGISLATIVE REQUIREMENTS

The National Environmental Management Act, Act No. 107 of 1998 has, in terms of sections 24(2) and 24D of the Act, established regulations to govern the conducting of EIA processes. The regulations, amended in 2017, refer to listed activities that require either a Basic Assessment process or a Scoping and Environmental Impact Assessment process to be undertaken before such activities can be authorized. Based on the project activities, the Environmental Assessment Practitioner (EAP) made application for environmental authorization to the Department of Environmental Affairs (DEA) subject to a scoping and environmental impact assessment process.

This proposed project triggers the National Environmental Management Act, (Act no 107 of 1998) EIA Regulation 2014, as Amended. Listing 1, GN R 983, activity 11 – *“the construction of facilities or infrastructure for the transmission and distribution of electricity outside urban areas or industrial complex with a capacity of more than 33 kilovolts but less than 275 kilovolts”*.

DESCRIPTION OF STUDY AREA

Some parts of the study area are characterized by ecological systems such as water courses and wetlands, and dams and grasslands. These characteristics contribute to the biodiversity of the region as well as indicating potential impacts by the proposed development. However, parts of the study area are also highly disturbed by existing farming and industrial activities.

Figures below showing the existing power lines next to which the proposed new line will be constructed and the proposed sites, A and B for the new Queens Substation.

Figure 1: Proposed New Queens Alternative Site A

Figure 3: Queens Substation Alternative Site B

Figure 2: Zwartkopies-Eyestone power line 22m Servitude

SUBSTATION SITES AND POWER LINE ROUTES

The New Proposed Queens Substation

The size required for the new proposed substation is 200m x 100m (64 ha). Identification of potential sites was extensively discussed with technical considerations and requirements in mind. Two (2) substation sites were identified for investigation, namely substation sites alternative A and B. It must be noted that site B has a small portion of land that is at time shown as site C on the report. However, the entire site is officially referred to as site B. Although there are one or two instances that this

reference may be seen in the report. For ease of reference, see map labelled Queens/RWB Zwartkopies Locality Map, Appendix A.

The integration of the new substation with the existing distribution network will be through the construction of four (2) 132kV distribution loop-in loop-out power lines from existing Golfview-Tedderfield power lines.

Expansion of the existing Zwartkopies Substation and the new Zwartkopies-Eyestone 2.6km long power line with a 22m servitude

The expansion of the western side of the existing RWB Zwartkopies 88kV Substation with an approximate area of 55 x 30 m² and the establishment of a new power line estimated to 2.6 km long with 22m servitude. The proposed route of the servitude will follow the existing loop-out 2 x 88KV lines from the Zwartkopies substation to Eyestone substation. It is important to note that there is no alternative for this line, because it traverse alongside the existing line with an existing servitude. The proposed route transverse through a permanent wetland to the Eyestone substation. Note that a detailed impact of the proposed servitude is outlined in the attached wetland report on **Appendix D1.1**.

PUBLIC PARTICIPATION PROCESS

Public participation is an integral part of the BAR process. It aims to involve Interested and Affected Parties (I&APs) in the process by notifying them of the proposed project. The Interested and affected Parties are encouraged to actively participate in the process by raising issues of concern regarding the project.

As part of the process to review the Draft Basic Assessment Report (DBAR) and EMP_r, registered I&APs were given 30 days to comment on the DBAR and EMP_r. The commenting period commenced on 12 October and ended on 13 November 2017. A full report with issues that were raised by the public is attached on **Appendix E6**.

Key activities undertaken as part of the public participation process include:

DATES	ACTIVITIES	Latest update
09 February 2016	PP documents generated and distributed to all identified stakeholders	Achieved
15 February 2016	Posters placed on site	Achieved
02 March 2016	Meeting with Midvaal Municipality	Achieved
09 February 2016	Public participation documents circulated to all identified stakeholders.	Achieved

Final Basic Assessment Report

DATES	ACTIVITIES	Latest update
15 February 2016	Site notices were placed	Achieved
02 March 2016	Focus group meeting (Midvaal Municipality)	Achieved
12 August 2016	Updated CRR and PP report and sent it to stakeholder for inclusion in the Final BAR	Achieved
12 August 2016	Availability of Draft Basic Assessment report was advertised	Achieved
15 August 2016	Notification of I&APs of the availability of draft Basic Assessment Report into the public domain for commenting was distributed.	Achieved
15 September 2016	Minutes circulated to stakeholder.	Achieved
28 October 2016	Dry run meeting at Eskom	Achieved
01 November 2016	Public participation meeting held	Achieved

CONSIDERATION OF SUBSTATION SITES AND ASSOCIATED SERVITUDE

There were two alternative sites proposed or earmarked for the construction of the new Queens substation. Alternative A was studied with two (2) more alternatives on the same location. After conducting a public participation on 1 November 2016, alternative A was rejected by the landowners and the members of the public, alternative B became the preferred site.

The two substation sites and associated power lines were investigated in line with various technical and environmental factors. After all the studies and assessment, site B remained the preferred site. Some of the factors taken into considerations were the proximity of the proposed expansion of Zwartkopies substation site and 2x 132KV, 2,6km long power line to existing access roads and water bodies. The proximity to the proposed Queens Substation alternatives to structures and existing land use practices (such as farming, nursery and settlement) that may be affected by or affect the proposed development were also considered.

SUMMARY OF FINDINGS FOR THE ASSESSMENTS UNDERTAKEN

VISUAL ASSESSMENT

The proposed expansion of the Zwartkopies substation and its power lines will not create visual impact as it will be only an expansion to existing structures. Also, the planned power line of 2.6km long with 22m servitude from Zwartkopies substation will have a low to medium visual impact as it will be following an already existing distribution line. Much of the visual impact will be during the construction due to vehicles including construction workers.

The new proposed Queens substation site A, is still natural with only one small old (half demolished) building. A construction of a new substation will therefore be clearly visible from the roads (Aloe ridge drive and the close by unnamed road), from Tedderfield and the Hertenbergfontein. The predicted life span of the visual impact will be permanent, where time will not mitigate the visual impact. The magnitude of the impact on views and scenic resources will be medium.

BIODIVERSITY

The study area falls within the Highveld grassland vegetation unit. The vegetation unit is classified as endangered due to the high transformation from activities such as cultivation and urban sprawl. Where possible the remaining intact grassland needs to be assessed before any development can occur. It was found during the site survey that no significant species occurred on Queens Alternative Site A or Site B. Therefore, both sites A and B, have low impact on biodiversity. Because site B is located in the middle of an inactive farming area it is therefore preferred site for development because it has lesser biodiversity than A.

WETLANDS

The study area is traversed by various wetlands, rivers and riparian areas, albeit of low ecological integrity. The proposed 2.6km long power line with a 22m servitude will have little impact negative impact on these systems. The study has taken into consideration number of inputs. These include the data presented in the wetland study report, see Appendix D1.1 for full report, observations made during the survey and if all necessary permits and license.

The line construction is thus recommended to proceed if these conditions are adhered to. This is primarily because the proposed power line will traverse alongside the existing loop-out 2 x 88KV lines from the Zwartkopies substation to Eyestone substation.

Figure 4: SITE A illustration of wetlands

Figure 5: Queens Alternative Site A

HERITAGE

According to Section 38 of the National Heritage Resources Act (Act 25 of 1999) “(1) Subject to the provisions of subsections (7), (8) and (9), *“any person who intends to undertake a development categorized as the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length, any development or other activity which will change the character of a site and exceeding 5 000 m² in extent should conduct a Phase 1 Heritage Impact Assessment.”* This is to determine if there are any heritage resources within the proposed site and how they will be impacted. If any resources are found, mitigation measures and recommendations for the protection of such resources need to be provided. The report will be submitted to the Provincial Heritage Resources Authority in Gauteng for comments and for a decision as per the National Heritage Resources Act (Act No 25 of 1999).

Expansion of an Existing Zwartkoppies substation and Zwartkoppies-Eyestone 2.6km distribution power line

It was assumed that no heritage resources would be found at the Zwartkoppies pumping station based on the previous disturbance of the existing substation. The same assumption was made for the Zwartkoppies-Eyestone 2.6km long distribution power line. These assumptions are based on the fact that these are existing structures and there were previous disturbances. The physical survey

conducted found that the site has been previously disturbed with construction of the structure found; farming, industrialization, borrow pit and the existing Zwartkoppies Substation. It was concluded based on the findings of the survey that the construction may proceed.

New Proposed Queens substation and 2x loop-in loop-out power lines

There were no heritage resources found on alternative site A, apart from a dilapidated structure, S26°22'53.8" E27°57'18.9", and piles of soil scattered around site. The structure found on site is not older than 60 years' old.

The substation site for alternative B is disturbed by farming and other activities. Several buildings were found on the substation's eastern boundary and also within the site. They all appear to be less than 60 years of age and are of no heritage significance. No heritage resources, including evidence of archaeological sites or artefacts, were found during the site inspection. No heritage resources were found along the alignment of power line route alternative 1. Power line alternative 2 crosses 2 structures which appeared to be less than 60 yrs. Nevertheless, it is recommended that the alignment of the alternative power line is moved 20 m to the north to avoid impacting on these structures. See Appendix A for the map.

SITE SELECTION BETWEEN QUEENS SUBSTATION ALTERNATIVE A AND B

The findings that were obtained from the various studies and investigation as well as the input from the general public and the registered interested and affected parties, recommend alternative site B. Alternative site A is not recommended, among other reasons is its close proximity to a school, a nursery and the community's land use activities and will also affect the visual of the area.

On the other hand, alternative site B has already been disturbed by agricultural activity thus has low environmental impacts. Therefore, proposed alternative Site B, with associated power lines infrastructure is therefore recommended and also the preferred site alternative to construct the new proposed Queens Substation.

POWER LINES ROUTE SELECTION

This aspect of the investigation is mainly determined by specialist reports and Eskom technical team that will come with a proposed route that may prove acceptable to all parties. Some of the criteria to used include that the route must cover the smallest area of cultivated fields and the smallest area of eroded soils. It should also be considerably shorter.

Overhead power lines have very little impact on grazing after they have been installed. Hence, option 1 for alternative site B (preferred site) is favoured by the above description thus, the preferred route for alternative site B (preferred site).

CONCLUSIONS AND RECOMMENDATIONS

For the proposed new Queens substation, alternative B is the recommended and preferred site for the construction of the proposed 88/11kv substation as it is close to the loop-in loop-out Golfview-Tedderfield 132kv line. It is also far from the nurse, Aloe Ridge School and the Community Businesses. Route option 1 recommended as there is already developed power lines along this route, this would minimise the cumulative impacts of having multiple power lines within a small area.

Nevertheless, the power lines should not cross the residential and offices of the landowner's, should rather be aligned along the access. Substation on this study area will have low impact on the environment as the area is already disturbed by agricultural activities.

The Zwartkopies substation expansion has no alternatives because it is an extension of an already existing Zwartkopies substation. This is also applicable to the Zwartkopies-Eyestone 2.6km long distribution power line with a 22m servitude, it will be constructed in an already existing servitude. Therefore, the construction of these structures is recommended based on their need and desire outlined in Chapter 1 of this report.

Recommendations:

- Construction of the Zwartkopies-Eyestone distribution power line can only take place after the necessary water use license has been obtained as it is traversing through a wetland;
- Vehicle access into wetland areas may only be allowed where absolutely necessary;
- During excavations soil stockpiling should take place outside the wetland edge keeping topsoil and sub-soil apart as far as possible. These stockpiles should then be backfilled in the right order placing topsoil on top of sub-soil.
- During the construction phase, the contractor should keep within the proposed servitude to avoid impacting on any heritage resources that may be found within the vicinity, especially within Zwartkopies pumping station.
- The possibility of uncovering unearthened burial grounds and graves during excavation should not be ruled out, especially at the proposed Queens Substation site since the area is an open land. Should potential human remains be found on site, the contractor should cease construction immediately and the South African Police Service, and Eskom should also be contacted.
- Any structures situated close to the substation site should be fenced off to prevent damaging them during the construction process.

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LIST OF ABBREVIATIONS

CCR	Comments and Response Report
DEA	Department of Environmental Affairs
DBAR	Draft Basic Assessment Report
DM	District Municipality
FBAR	Final Basic Assessment Report
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
GN	Government Notice
IDP	Integrated Development Plan
IWWMP	Integrated Water and Waste Management Plan
HIA	Heritage Impact Assessment
LM	Local Municipality
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act
NEMWA	National Environmental Management: Waste Act
NWA	National Water Act
PGDS	Provincial Growth and Development Strategy
PoS	Plan of Study
PPP	Public Participation Process
PSDF	Provincial Spatial Development Framework
SANBI	South African National Biodiversity Institute
WML	Waste Management Licence
WUL	Water Use Licence

1. INTRODUCTION, DESCRIPTION OF PROPOSED ACTIVITY AND LOCATION

Due to increase demand of electricity in South Africa, Eskom realised the need to increase the capacity of electricity supply in Vereeniging within the jurisdiction of Midvaal Local Municipality (MLM) which forms part of the Sedibeng District Municipality in the Gauteng Province. To address this need Eskom proposed a new construction of substation called Queens with 2 distribution 132kV power lines as well as expanding the existing RWB Zwartkoppies Substation. The proposed project triggers activities from NEMA EIA 2014 regulations. To obtain the relevant license, Eskom has appointed Margen Industrial Services as an Independent Environmental Assessment Practitioner to conduct a Basic Assessment (BA) process.

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- Expansion of the existing RWB Zwartkoppies substation and the new 2 distribution Zwartkoppies – Eyestone electricity powerlines of 2.6km long with 22m servitude.

1.1 Need and desirability of project

Problem Statement: Tedderfield 88/11 kV Substation

According to Eskom's Planning Department, the problem statement for Tedderfield 88/11 kV Substation is detailed as follows:

- The substation is 39 years old and has 727 customers mainly domestic.
- The substation is unfirm and was overloading since 2015.
- The 88kV breakers are oil filled breakers and need to be replaced with SF6 breakers.
- Control Plant and Switchgear Equipment's are kept in the same room which is a safety hazard.
- There is no back-feeding and spare capacity on Major Voltage (MV) feeders.
- MV feeders are depending on voltage regulators.

Problem Statement: Golfview 88/11 kV Substation

According to Eskom's Planning Department, the problem statement for Golfview 88/11 kV Substation is detailed as follows:

- The substation is 21 years old and has 1197 customers mainly domestic.
- The substation has poor back feeding capacity.
- Control Plant and switchgear Equipment's are kept in the same room (Safety concern for Eskom during maintenance of the Substation).
- The KPI's targets have been exceeded.
- Faroahsfontein 11kV feeder has low voltages and sometimes customers are complaining of low voltages in winter time. The feeder has been overloading since 2016.

1.2 Location of proposed activity

The proposed project is located within the Vereeniging area under the jurisdiction of Midvaal Local Municipality which form part of the Sedibeng District Municipality in the Gauteng Province. See attached **Appendix A**.

Figure 1-1: Location of the project

Zwartkopies substation

Province	Gauteng Province
District Municipality	Sedibeng District Municipality
Local Municipality	Midvaal Local Municipality
Ward Number(s)	12
Farm name and number	KROMVLEI 142-IR & ZWARTKOPJES 143-IR
Portion number	128
SG Code	T0IQ0000000014200000 & T0IQ0000000014300000

SUBSTATION SITE EXTENSION

28° 3' 46.0" -26° 20' 49.4"
28° 3' 47.1" -26° 20' 49.2"
28° 3' 47.4" -26° 20' 51.0"
28° 3' 46.3" -26° 20' 51.1"

ROUTE CENTRE LINE

28° 3' 47.1" -26° 20' 51.0"
28° 3' 50.5" -26° 21' 10.8"
28° 3' 49.5" -26° 21' 17.3"
28° 3' 10.4" -26° 21' 34.1"
28° 2' 45.0" -26° 21' 45.4"

New Proposed Queens substation

Province	Gauteng Province
District Municipality	Sedibeng District Municipality
Local Municipality	Midvaal Local Municipality
Ward Number(s)	07
Farm name and number	Hartsenberfontein 332-IQ
Portion number	77
SG Code	

PREFERRED SITE (SITE B)

27° 58' 13.8" -26° 22' 55.6"
27° 58' 20.7" -26° 22' 57.3"
27° 58' 18.8" -26° 23' 2.9"
27° 58' 11.9" -26° 23' 1.2"

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SITE ALTERNATIVE (SITE A)

27° 58' 11.9"	-26° 23' 1.2"
27° 58' 18.8"	-26° 23' 2.9"
27° 58' 17.4"	-26° 23' 7.6"
27° 58' 10.2"	-26° 23' 5.9"

ROUTE A CENTRE LINES 1 & 2

27° 58' 19.9"	-26° 22' 59.8"
27° 58' 29.0"	-26° 23' 2.0"
27° 58' 19.7"	-26° 23' 0.4"
27° 58' 28.7"	-26° 23' 2.6"

ROUTE B CENTRE LINES 1 & 2

27° 58' 19.2"	- -26° 23' 1.8"
27° 58' 28.2"	- -26° 23' 4.0"
27° 58' 19.0"	- -26° 23' 2.4"
27° 58' 27.9"	- -26° 23' 4.6"

ROUTE C CENTRE LINES 1 & 2

27° 58' 18.2"	-26° 23' 5.0"
27° 58' 27.0"	-26° 23' 7.1"
27° 58' 18.0"	-26° 23' 5.6"
27° 58' 26.7"	-26° 23' 7.8"

ROUTE D CENTRE LINES 1 & 2

27° 58' 15.3"	-26° 23' 2.1"
27° 58' 15.6"	-26° 23' 0.9"
27° 58' 28.2"	-26° 23' 4.0"
27° 58' 16.0"	-26° 23' 2.2"
27° 58' 16.1"	-26° 23' 1.7"
27° 58' 27.9"	-26° 23' 4.6"

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PROJECT DESCRIPTION:

The project can be described in a brief sentence as, a two parts project.

The first, is the expansion of the existing Zwartkopies substation and construction of a new distribution power line of 2.6 km with 22m servitude to the existing Golfview Tedderfield 88kv substation.

The second, is the construction of 200m x 150m new Queens 88/11kv Substation with new 4 x 132kv loop-in and loop out distribution power line from Golfview – Tedderfield 132kv.

Expansion of the existing Zwartkopies substation and the 2.6 km distribution power line

Eskom Holding proposes to expand the western side of the existing RWB Zwartkopies 88kV Substation with an approximate area of 55 x 30 m² with a new distribution power line of 2.6km long with 22m servitude. The site plan below, and the site photographs, depict the proposed expansion to an area that is currently being used for storing concrete blocks or culverts. The project will involve clearing of the land and relocation of the concrete currently being stored on site. This will also involve closing off of the currently used dirt site access road. Site clearance may also involve clearing of some sections of the *eucalyptus* plantation on site.

The proposed expansion of the RWB Zwartkopies 88kV Substation also includes a 2.6km with 22m servitude. The proposed route of the servitude will follow the existing loop-out 2 x 88KV lines from the Zwartkopies substation to Eyestone substation. The proposed route transverse through a permanent wetland to the Eyestone substation. The wetland report attached on appendix D1.1 will share more information on the potential impacts.

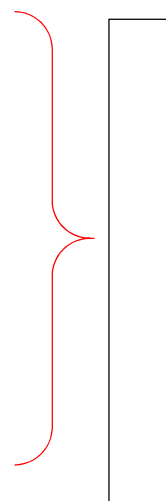


Photograph showing the proposed site for the expansion of the Zwartkopies substation



Photograph showing the existing 2x88Kv lines from the RWB Zwartkopies substation, also where the new distribution power line of 2.6km long with 22m servitude will be constructed.

Pictures Showing the monopoles that are going to be used in this project.



Construction of 200m x 150m Queens 88/11kv substation and Construction of 132kv loop-in and loop out distribution power line from Golfview – Tedderfield 132kv powerline.

A new proposed Queens substation of 2 x 10 MVA 88/11KV and 5 MV lines. The (m²) square meter area to be covered by this proposed infrastructure is 200 x 150 m². The proposed substation will constitute 2x HV Lines to loop-in and out from the newly constructed 2.6km long distribution power line. These lines will link the proposed Queens substation to the existing Tedderfield and Golfview substations.



Photograph showing the proposed alternative A site.



Photograph showing alternative B (preferred site)

1.3.1 Section Classification of Project and Period of Authorisation

The project falls within the sector classification: Infrastructure – electricity (Transmission).

It should be noted that the period for which the environmental authorisation (EA) is required for the life of its operation. The date on which the activity is concluded will be at the end of the life of the operation of the substation. Therefore, the authorisation is expected to last up to the end of the substation with will be at the decommissioning phase.

1.3.2 Siting Alternatives for the Project

The criteria used to identify the siting alternatives were as follows:

- An area that could provide the required footprint of between 6400m² and 10000m².
- Capital Cost
- Operational Cost
- Expandability
- Ability to use existing infrastructure, i.e. integration with existing infrastructure
- Existing access proximity to required interface points

There are no alternatives for the expansion of the RWB- Zwartkopies substation and the 2.6km with a 22 servitude. This is based on the fact that the expansion is of an existing substation so there is no other alternative that could be sought for this. The 2.6 km line also does not have alternative because it will be built alongside an existing line that already has an existing servitude.

There are two (2) alternatives for the Queens 88/11kV substation with 132kV loop-in and loop-out power lines. Alternative A is opposite the Aloe Ridge Primary school and alternative B is adjacent to R82.



Picture depicts a typical Substation facility

Figure 1-2 below shows an overview of the two (2) components of the Queens 88//11kV and the extension RWB- Zwartkopies showing the proposed siting alternatives for the Queens substation.

It is observed that the site illustrated as Queens site below, refers to the site A. the smaller one depicts the preferred site, site B. on the far right of the map, one can see the RWB Zwartkopies existing substation. **Figures 1-3 to 1-4** indicate the specific location of each alternative site.

Figure 1-2: Location of siting alternatives for this project

Figure 1-2 Shows the two alternative sites for the proposed Queens 88//11kV and the expansion RWB- Zwartkopies

Siting Alternative A

This site is situated opposite the Aloe Ridge school along Aloe Ridge Dr as depicted below in **Figure 1-3**.

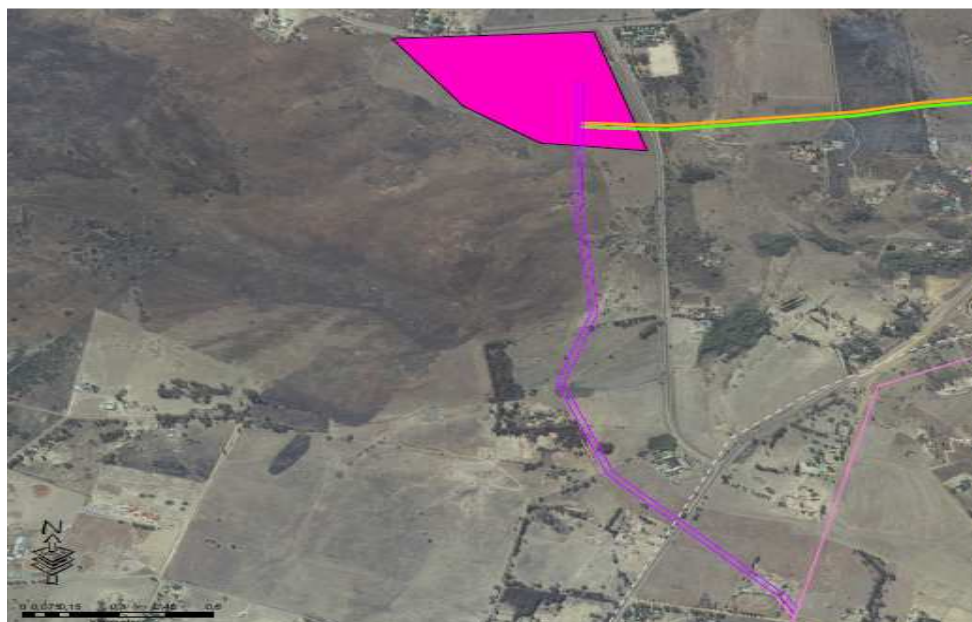


Figure 1-3: Siting alternative A

Siting Alternative B

Siting alternative B is situated close to the R82 (old Vereeniging road) between Johannesburg and Vereeniging in the Hartzenbergfontein Agricultural Holdings near Walkerville. (see **Figure 1-4** below).

The green and blue dotted lines and the yellow and pink dotted lines show the loop in and loop out power lines to the preferred site B.



Figure 1-4: Siting preferred alternative B

“No-go” Alternative

According to the 2014 Environmental Impact Assessment Regulations, consideration must be given to the option not to act. Although the no-go alternative has been considered, it is not a practical project alternative particularly in this case, were a stable electricity had to be provided stable in the Midvaal Municipality area

By not establishing a new substation in the Queens area and additional 132kV power lines there is likelihood of power disruptions in the near future due to constant rise in demand thus stifling local economic growth. The same applies if the proposed expansion of the existing Zwartkopies substation is not implemented. The demand is further created by the constrained owing to the fact that existing networks are operating at near-capacity already.

It is therefore envisaged that the expansion of the Zwartkopies substation and the construction of the power line will strengthen the grid supply in the Zwartkopies area. The no-go option alternative refers to the option of not undertaking the construction of the proposed infrastructure. This option is not preferred by Eskom for the following reasons:

- It implies no improvement in reliability of electricity systems which would benefit electricity users in the municipality, the region and country at large;
- Should it be adopted the municipality and community will be deprived of a much-needed essential service/facility, particularly given the already existing problem with energy supply in the country.

2. LEGISLATIVE ENVIRONMENT

Eskom appointed Margen Industrial services to manage and undertake the required environmental authorization process for the proposed development.

The National Environmental Management Act, Act No. 107 of 1998 has, in terms of sections 24(2) and 24D of the Act, established regulations to govern the conducting of EIA processes. The regulations, amended in 2017, refer to listed activities that require either a Basic Assessment process or a Scoping and Environmental Impact Assessment process to be undertaken before such activities can be authorized. Based on the project activities, the Environmental Assessment Practitioner (EAP) made application for environmental authorization to the Department of Environmental Affairs (DEA) subject to a scoping and environmental impact assessment process.

This proposed project triggers the National Environmental Management Act, (Act no 107 of 1998) EIA Regulation 2014, as Amended. Listing 1, GN R 983, activity 11 – “the construction of facilities or infrastructure for the transmission and distribution of electricity outside urban areas or industrial complex with a capacity of more than 33 kilovolts but less than 275 kilovolts”.

Pertinent legislation regarding the proposed development is provided below.

Table 2-1: Applicable Legislation, Policies and/or Guidelines

List all legislation, policies and/or guidelines of any sphere of government that are applicable to the application as contemplated in the EIA regulations, if applicable:

Title of legislation, policy or guideline & Date	SECTION	DESCRIPTION	APPLICABILITY/ RELEVANCE TO THIS PROJECT
National Environmental Management Act (No 107 of 1998) as amended	24 and 24D	List of activities requiring authorisation before commencing	Environmental approvals and conditions are made in terms of this act. (refer to Environmental Authorisation) If any additional activities listed are planned, then permission to commence needs to be applied for.
	S 28(1)	Duty of care responsibilities	Responsible for the duty of care of natural assets
National Environmental Management: Waste Act (No 59 of 2008)	Chapter 4 Pt 3 and 5	Regulates waste management in order to protect health and the environment.	Calls for reduction, re-use, recycling and recovery of waste, sets out requirements for storage, collection and transportation of waste
National Water Act (No 36 of 1998)	S 3(3)	Regulation of flow and control of all water in South Africa	Ensure usage of water remains within limits
	S 19	Pollution prevention	Prevent pollution of water sources e.g. via storm-water
	G.A. 3.7	Discharging of domestic and industrial wastewater into water resources	Sets water quality limits for waste water that may be directed into a water resource e.g. via storm-water
Conservation of Agricultural Resources Act (No 43 of 1983)	Reg. 15	Combating invader plants	Alien vegetation must be removed from premises.
Environment Conservation Act (No 73 of 1989)	Reg.	Noise regulations	Legislation that governs noise limits

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Title of legislation, policy or guideline & Date	SECTION	DESCRIPTION	APPLICABILITY/ RELEVANCE TO THIS PROJECT
Occupational Health and Safety Act (No 85 of 1993)	All	Primarily aimed at ensuring the health and safety of persons at work and visitors. Specifies the basic systems that need to be in place and measures that need to be taken.	The staff and visitors to site need to be protected from health and safety risks.
	S 9(1)	Every employer must conduct his undertaking so as to ensure that persons other than his employees who may be directly affected by his activities are not thereby exposed to hazards to their health and safety.	The development must minimise the hazards to both staff working on the site and visitors.
Hazardous Chemical Substances regulations (25 August 1995)	9A (1)	Storage and handling of hazardous chemical substances	Need to ensure the safety of staff working with hazardous chemicals (as well as safe storage, use and disposal of containers.
National Environment Management: Air Quality Act (No. 39 of	S 27, 32, 34, 35,	Prevention of air pollution (dust, smoke, noise and offensive odours)	The necessary steps to be taken in prevention of air pollution on site.
National Heritage Resources (Act No. 25 of 1999)	S 44(1)	Preservation and protection of Heritage resources	Protection of heritage resources that may be found on site.

Listed activities from these Regulations which are triggered by the proposed project are provided in **Table 2-2** below. In terms of the EIA Regulations of 2014, a Basic Assessment process was required for the proposed development.

Table 2 2: List of activities applicable to Queens Substation and RWB Zwartkopies Substation

Listed activity as described in GN R 983, 984 and 985	Description of project activity that triggers listed activity
<p>GNR 983 11</p> <p>The development of facilities or infrastructure for the transmission and distribution of electricity-</p> <p>i. Outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.</p>	<p>The proposed project entails the construction of 132kV loop-in Loop-out power lines. It triggers the listed activity as the capacity exceeds 33kV and is less than 275Kv.</p>
<p>GNR 983 19</p> <p>The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic from a watercourse.</p>	<p>The proposed 2.6km servitude will traverse through wetlands and the proposed 132KV loop-in and loop-out power lines will cross river systems.</p>
<p>GNR 983 27</p> <p>The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for-</p> <p>i. the undertaking of a linear activity; or</p> <p>ii. maintenance purposes undertaken in accordance with a maintenance management plan.</p>	<p>The construction of the Queens substation will involve clearing of at least 30 000m² (3 ha)</p> <p>The triggering of the sub activity is identified as the clearance of vegetation particularly on the actual substation new site, which may or may not be indigenous. Pending to the outcome of the biodiversity study.</p>
<p>GNR 985 14</p> <p>(ii) The development of infrastructure or structures with a physical footprint of 10 square metres or more;</p> <p>Within a watercourse</p>	<p>The proposed extension of the RWB Zwartkopies (55m x 30m) exceed 10 square metres and the proposed Queens substation (200m x 150m) will exceed 10 square meters' physical footprint.</p>

2.1 Regional plans

The following regional plans were considered during the execution of the Basic Assessment process:

- Spatial Development Frameworks
- Integrated Development Plans

2.1.1 Provincial Spatial Development Framework (PSDF)

The proposed project is in line with the Gauteng Spatial Development Framework 2030 as it supports the identified key infrastructure sectors such as Information Communication Technology. To achieve the desired results in implementing ICT projects, there is a need to have reliable electricity supply.

2.1.2 17 Strategic Integrated Projects (SIPs)

From a spatial analysis of the country needs, 17 Strategic Integrated Projects (SIPs) have been identified. The SIPs cover a range of economic and social infrastructure. All nine provinces are covered, with emphasis on poorer provinces. Of the 17 SIPs the proposed project can be categorised under Energy SIPs specifically SIP 10: Electricity Transmission and Distribution for all. The SIP states that the country need to “Expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development.”

2.1.3 Integrated Development Plan (IDP) and Spatial Development Framework (SDF) of the Walkerville Local Municipality

The proposed project aims at ensuring adequate and reliable supply of electricity to areas in the Municipality and therefore fits well into the Spatial Development Framework of the Midvaal Local Municipality. The project is a direct link and support through ensuring adequate and reliable supply of electricity to the Development Principle 7 and Development Principle 4 of the Municipality SDF.

In summary the said Municipality SDF states that municipality endeavours to, “To promote the development of a diverse range of industrial and commercial activities in the Midvaal area with specific focus along the R59-Corridor and at the designated nodal points” and “To pre-actively plan, design and facilitate the establishment of a Development Corridor along the R59 freeway, and to prioritise the bulk of short to medium term urbanisation as well as the upgrading/provision of engineering services in accordance with an Urban Development Boundary respectively.”

These development principles can only be met if there is adequate supply of electricity in the municipality.

3. DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

Margen Industrial Services was appointed by Eskom to undertake the Environmental Authorisation for a BA process for the proposed Queens substation and RWB- Zwartkopies substation.

The curriculum vitae of the team members as listed below is attached as **Appendix H**.

Table 3-1: Project team members

Name	Qualifications	Experience	Duties
Mr. S. Zulu	<ul style="list-style-type: none">BSc (Environmental Management)	17 years	Project Leader & EAP
Mr. M. Mahlangu	<ul style="list-style-type: none">BSc Honours (Botany and Plant Ecology)	21 years	Public Participation

4. Basic Assessment Process

Smaller scale activities, listed in Listing Notice 1 and Listing Notice 3 (in regard to specified geographical areas), require a basic assessment is conducted. The EAP must submit an application and conduct a public participation process. Regulation 22 of the EIA Regulations sets out the content of a basic assessment report and includes:

- A description of the activity and the environment that may be affected
- A summary of the issues raised in the public participation process
- A description of the need and desirability of the activity
- An identification of any alternatives to the proposed activity that are feasible and reasonable, including that the proposed activity and each alternative will have
- An assessment of the significance, nature, duration, extent, probability and reversibility of the environmental and cumulative impacts and whether these impacts can be mitigated
- Environmental management and mitigation measures that should be taken; specialist reports
- A draft environmental management programme
- A reasoned opinion as to whether the activity should or should not be authorised and any conditions that should be made in respect of that authorisation.

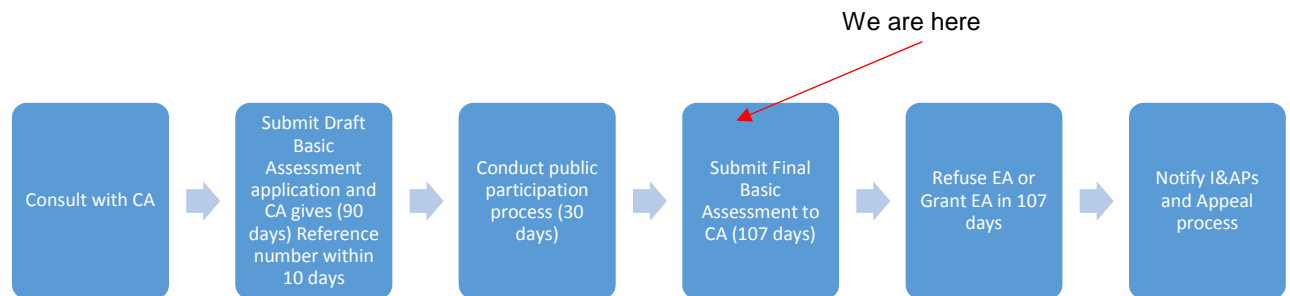


Figure 4-1: Simplified depiction of Basic Assessment process.

4.1 BA process

The public participation process that is being followed for this process is described in detail in Chapter 5 of this report. With the results of specialist studies, recommendations and input from I&APs and stakeholders, an EMPr has been prepared for the management and mitigation of potential impacts during the construction, operation and decommissioning phases of the Queens substation and RWB Zwartkopies extension.

The EMPr will be undertaken in accordance with **Appendix 4** of the EIA Regulations in terms of GNR 982 as well as complying with section 24N of NEMA. It is attached as **Appendix G** to this report.

4.2 Commenting authorities

Copies of this report and the draft EMPr will be sent to the following authorities for their comment and input:

- National Department of Environmental Affairs.
- Department of Water and Sanitation.
- Walkerville Local Municipality (WLM) in which the power station and proposed project fall
- Sedibeng District Municipality (SDM).

5 PUBLIC PARTICIPATION PROCESS

5.1. INTRODUCTION

The Environmental Impact Assessment Regulations of December 2014 as amended in April 2017, requires that during a Basic Assessment (BA) process, the organs of State together with interested persons and the general public be informed of the application and also be afforded an opportunity to comment on the application.

Public Participation Process (PPP) is a process that involves the public in problem solving and decision making and it forms an integral part of the BA process. The PPP provides people who may be interested in or affected parties (I&APs) by the proposed development, with an opportunity to provide comments and to raise issues or concern, or to make suggestions that may result in enhanced benefits for the project.

Chapter 6, Regulation 39 through 44, of the EIA Regulations stipulates the manner in which public participation process should be conducted as well as the minimum requirements for a compliant process. These requirements include (but not limited to):

- (a) Fixing a notice board at a place conspicuous to the public at the boundary or on the fence of ___
 - (i) the site where the activity to which the application relates is or is to be undertaken:
- (b) giving written notice to ___
 - (i) the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
 - (ii) the owners, or persons in control of, and occupiers of that land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
 - (iii) the municipal councilor of the ward in which the site or alternative site is situated and any organization of rate payers that represents the community in the area;
 - (iv) the municipality which has jurisdiction in the area;
 - (v) any organ of the state having jurisdiction in respect of any aspect of the activity; and
 - (vi) any other party as required by the competent authority;
- (c) placing an advertisement in_
 - (i) one local newspaper

The primary purpose of the report is as follows:

- to outline the PPP that was undertaken;
- to synthesize the comments and issues raised by the key stakeholders, Interested and Affected parties; and
- to ensure that the BA process fully address the issues and concerns raised, if any.

5.2. PUBLIC PARTICIPATION PRINCIPLES

The Public Participation principle holds that those who are affected by a decision have the right to be involved in the decision-making process i.e. the public's contribution will influence the decision. One of the primary objectives of conducting the PPP is to provide Interested and Affected Parties with an opportunity to express their concerns and views on issues relating to the proposed project. The principles of public participation are to ensure that the PPP:

- Communicates the interests of and meet the process needs of all participants;
- Seek to facilitate the involvement of those potentially affected;
- Involves participation in defining how they participate; and
- Is as inclusive and transparent as possible, it must be conducted in line with the requirements of Regulation 39 – 44 of the EIA Regulations.

5.3. APPROACH AND METHODOLOGY

The Public Participation approach adopted in this process was in line with the processes contemplated in Regulation 39 – 44 of the National Environmental Management Act, 1998 and EIA Regulations 2014 as amended.

5.3.1. Lapsing of Application Form

The application for this project has lapsed, as required by law all registered interested and affected parties were notified about the lapsing and submission of new application (**See Appendix E3**).

5.3.2. Generation of database

All list of potential I&APs (any person who is affected by and/or interested in the project) was compiled using information from previous projects in the area, using DEA recommendations, as well as through identifying authorities during site visits. This database will be updated on an ongoing basis as more I&APs register. The stakeholder database (**See Appendix E1**) for the project.

The National and Provincial authorities including DEA, Gauteng Department of Agriculture and Rural Development (GDARD), Gauteng Department of Water and Sanitation, Gauteng Department of Agriculture, Forestry and Fisheries, Provincial Heritage Resources Agency Gauteng and South African Heritage Resources Agency (SAHRA);

- District and local authorities, including the Sedibeng District Municipality, as well as Midvaal Local Municipality;
- NGOs;
- Agricultural and farmers' associations;
- Surrounding businesses;
- Surrounding landowners;
- Parastatals and infrastructure providers including SANRAL; and the
- General public.

5.3.3. Placement of notices

The site notices were placed at different key locations on the **15th of February 2016** to inform all Interested and Affected parties that were not identified including the general public (**See Appendix E2**).

5.3.4. Distribution of notices to surrounding Land owners/Occupiers

All identified I&APs were notified about the proposed project via emails and BID and maps were hand delivered to landowners of the land (**see Appendix E3**). The letter, a copy of Background Information Document (BID), Reply sheet and Maps were sent out on the **09th February 2016**. These notifications were informing the public of the project as well as affording them an opportunity to register as I&APs and also to comment or raise any issue that they might have. I&APs were given a 30-day calendar period to respond as per the NEMA EIA Regulations 2014.

5.3.5. Availability of draft BAR

I&APs were afforded an opportunity to comment on draft Basic Assessment Report (BAR). The draft BAR was placed at the Midvaal Local Municipality Public Library. The availability of dBAR was advertised in Mooivaal1 Ster, one of the local newspaper for 30 days' calendar public review on the **09th of February 2016**. (**See Appendix E2**).

5.3.6. Availability of Amended draft BAR

Due to the new site added in the study area, the initial Basic Assessment Report was amended. As it is required by the law, amended draft Basic Assessment Report were made available to the public from **13th of October 2017 to 13th of November 2017** and commenting period was extended until **20th of November 2017**. The report was also advertised in the Citizen newspaper on **13th of November 2017 (See Appendix E2 for proof of advert)**.

Due to lapsing of application form, Margen Industrial Services re –advertised the re-issued draft Basic Assessment Report in the Daily Sun Newspaper on the **15th of March 2018 (See Appendix E2)**. The re-issued draft BAR were made available to public from **26th of February 2018 to 09 April 2018 (See Appendix for proof of delivery)**

5.3.7. Meetings

The focus group meeting was held on the **03rd of March 2016**, public meetings on the **20th and 01st of November 2016** respectively (**See Appendix E4**). All identified and registered stakeholders were invited to meetings via email. All attendees of the meetings were registered and the meetings were minuted and circulated to all attendees (**see Appendix E4 for minutes and Appendix E7 for meeting registers**).

5.3.8. Reminder to comment

All registered stakeholders were reminded to comment on the Amended draft BAR five (5) days before and after the closing date of the comment period (**See Appendix E3 for the proof of emails sent**). Stakeholders were reminded to comment on the re-issued draft BAR on the **03rd of April 2018 (See Appendix E3)**

5.3.9. Issues and Response Report (CRR)

All issues and concerns raised during consultation were captured and addressed appropriately and recorded under Comments and Responses Report (**See Appendix E6**).

5.4. CONCLUSION

This report will be updated where necessary during the PP process until the authorization is being granted by the competent authority (DEA). Comments received from draft Basic Assessment Report were addressed by EAP and incorporated into this final Basic Assessment Report. All registered stakeholders will be afforded an opportunity to comment on the final Basic Assessment Report as a requirement of the NEMA EIA Regulations as amended in April 2017. The final BAR will be submitted to the Authority (DEA) for decision. All registered stakeholders will be notified of the decision and advised about the way-forward.

5 ENVIRONMENTAL ATTRIBUTES OF PROJECT AREA

Details on the baseline receiving environment were derived from the specialist studies undertaken for this project.

6.1 Climate

The climate of Midvaal is characteristic of the Highveld. It has warm summers with showers and thunderstorms commonly occurring in the late afternoon with rainfalls that vary between 700mm and 800mm. The area's Highveld climate contributes positively towards the increase of its agricultural and tourism potential. The winters are cool and dry.

6.2 Geology and soils

There are 3 distinct geological areas in Midvaal:

- Timeball Hill Formation. Pediment from granite covers the thick shale. Schale is not very permeable and limits the use of pit latrines in the area. The formation is known for its properties for brick making (an opportunity that should be further investigated).
- Vryheid Formation. This formation consists of sandstone and schale that erodes into clay.
- Klipriversberg Group. This is a sub-humid, dry zone implying that residual soils are formed during erosion with expansion possibilities.

6.3 Fauna and Flora

The region falls within the Grassland Biome, which covers the high central plateau of South Africa. Approximately one-third of the mammal species in South Africa occur in the biome. Most of the area is covered by Cymbopogon Themeda Veld Type 48b, Northern Variation. Setaria grass species and Themeda and Eragrostis species dominate this veld type. Naturally occurring trees and shrubs are limited to specialised niches, such as riverine fringes.

The North-Eastern area is covered by Babenveld type 61 b, which is underlain by the Venterdorp lava. This is a sour, unpalatable grassveld, which typically includes Trachypogon, Tristachaya, Setaria and Eragrostis grass species. Trees and shrubs, such as Protea and Caffra, Acacia Caffra and Celtis Caffra African, are common along rocky hills and ridges. No information is currently available on endangered species or biodiversity in the area. (See attached reports for site specific biodiversity assessment, **(see attached Appendix D1.4 and D2.1)**)

6.4 Topography

Sedibeng District's topography is gentle with the elevation above sea level varying from 1500m to over 1800m at the top of the Suikerbosrand which is the highest point in Gauteng. The major topographical highest points in the east and north of the districts are the Ventersdorp lavas and Witwatersrand quartzite. The gentle slopes make it possible to develop an integrated, cost-effective urban environment. The topographical features provide the potential for the introduction of passive recreational activities. The ridges are considered environmentally sensitive and any new development should be carefully considered.

6.5 Water resources

Hydrology and Drainage

The Midvaal area is located south of the sub-continental divide (viz. the Witwatersrand Ridge). Rain falling on the southern part of the divide, flows via the Vaal River into the Atlantic Ocean, while rain falling north of the divide flows via the Jukskei and Crocodile Rivers into the Indian Ocean.

The Vaal River Basin is the main hydrological system in the Sedibeng region and the tributaries of this river are non-perennial as a result of the dry weather in the area. The Vaal Dam is presently the most important source of water in Gauteng and has a water capacity of 2 536 million cubic metres. It supplies the mining, industrial, agricultural and other activity sectors in the region and in Gauteng as far as Rustenburg. A problem facing the hydrological system is the polluting of the water from urban and industrial run-off.

The Klip River is an important feature, landscaping the Midvaal area and currently provides a habitat for birds and small animals. The river course could also be used for various recreational activities and tourist attractions if developed in a sustainable and responsible manner. At present the quality of the water is a major concern as:

- Three municipal sewerage effluent plants as well as ERWAT dispose water into the river; Water from the outflows from storm water systems is disposed into the river;
- The outflow from sewerage works also disposes into the river; and
- The spillage of sewerage into the system.

This significantly increases the flow rate of the river and leads to the erosion of riverbanks, canalization, loss of surrounding wetlands and a reduction in the retention period in reed beds and wetlands necessary for purification. People use the river as a source of water and recreation. Quality checks on the water are only done on request if someone reports foul odours, dead fish or other concerns. This could cause a major problem and may even lead to a cholera problem.

Ridges and Wetlands

Wetlands occur on soil structures that are inundated with water for a significant period of time in a year. They occur along non-perennial rivers that are dry for a part of the year. The ridges should be protected as part of the Open Space System as well as for potential archaeological finds:

- Ridges: Ridges are dispersed throughout the Midvaal area mainly in a North-South direction.
- Wetlands: Several wetlands are found throughout the Midvaal area and are mostly located along non-perennial rivers (Site specific details are outlined in the attached Wetland delineation report, **(see attached Appendix D1.1)**)

River Systems

The Klip River watercourse drains into the Vaal River, which is the main water source for Gauteng. It is important therefore that the quality of the river is maintained and taken care of. The river also has tourism potential and is a habitat for various birds and small animals (Site Specific site hydrology is detailed in the Flood-line analysis study, **see attached Appendix D1.4)**

6.6 Socio-Economic Character

Level of Unemployment

The unemployment rate in the Midvaal Local Municipality is currently thirteen percent (13%) which includes an additional three percent (3%) of discouraged work seekers. Youth unemployment is said to be at twenty-five-point four percent (25.4%) of the total unemployed persons. The high youth unemployment is likely to have resulted in the high dependency ratio in the municipal area, which is estimated at forty-two-point nine percent (42.9%). The number of Not Economically Active people is approximately twenty nine percent (29%), which indicates that the population is characterised by a high number of young children, elderly and disabled.

The high levels of unemployment continue to be a concern and are the greatest threat to the financial stability of the municipality. Short term initiatives to alleviate poverty include the Expanded Public Works Programme (EPWP), and the Community Works Programme (CWP). Formal employment opportunities in the first economy are continually being provided along the R59 corridor as this has been identified as an area targeted for commercial and industrial developments.

Economic profile of local municipality

Midvaal Local Municipality can be described as a primarily rural area. It offers approximately 300 business sites and 450 industrial sites. The major urban area or Central Business District (CBD) within the municipality is in Meyerton, which is situated along the R59 highway. Walkerville, De Deur and Henley-on-Klip are smaller settlement areas characterised by agricultural holdings, rural residential uses, and farms while industrial/commercial activities are clustered along the main corridors such as the R82 and the R59.

The major employment sector is community services, followed by manufacturing. Figure below shows the percentage contribution of these sectors to the GDP of the municipality. Economic profile of local municipality

As can be seen in the table, mining has the smallest contribution to GDP in the Midvaal area (0.4 percent). The Glen Douglas mine, situated near Randvaal, extracts dolomite and is the only operational mine in the area. Proposals for further mining in the area are being explored by mining companies such as Exxaro.

Agricultural holdings occupy large parts of the north and north-western portion of the study area which vary in area. The Agricultural Holdings are utilized for several purposes ranging from rural residential and farming practices to commercial agriculture. Agricultural activity in Midvaal is characterised by diverse activities such as commercial farming operations (crop production including maize and grain and farming/production of other products including milk, beef, mutton and lamb, eggs and poultry). The performance of the agricultural sector is dependent on climatic conditions and may fluctuate from year to year.

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The total breakdown of Midvaal's economic sectors is illustrated in the figure below.

7 SUMMARY OF SPECIALIST STUDIES

The information below are summaries of the specialist studies that were undertaken for this project. Complete copies of which are attached to this report from **Appendix D**. The chapter provides the findings of the specialist studies, including potential impacts identified, in order to provide context for the reader in terms of the wider study area as well as to the assessment of impacts undertaken in Chapter 9 below.

7.1 Biodiversity study

The study area falls within the Highveld grassland vegetation unit. This vegetation unit is classified as endangered due to the high transformation from activities such as cultivation and urban sprawl. Where possible the remaining intact grassland needs to be assessed before any development can occur. It was found during the site survey that no significant species were found to occur on Queens Alternative Site A or Site B.

Impacts identified

The substation site and power line routes do not occur within any critical, endangered or vulnerable ecosystems. The development of this site will have a very low impact on the biodiversity of the area. The study area is mostly made up of vacant open land with some dwellings surrounding the site. The study area has been transformed over the decades by human settlement and livestock grazing. The site occurs within the Gauteng Shale Mountain Bushveld. This vegetation unit is classified as vulnerable due to the high transformation from activities such as urban sprawl. It was found during the site survey that no species of concern were found to occur on Site.

Site selection

Both sites, A and B, have low impact on biodiversity, however, because site B is located in the middle of an inactive farming area it is therefore preferred site for development as it has lesser biodiversity than A.

7.2 Heritage impact assessment

Zwartkopies substation expansion and Zwartkopies-Eyestone 2.6km power line

It was assumed that no heritage resources would be found at the Zwartkopies pumping station based on the previous disturbance of the existing substation and for the Zwartkopies-Eyestone 2.6km long power line given that the site is an open land and there are existing power lines in the area. The physical survey conducted found that the site has been previously disturbed with construction of the structure found; farming, industrialization, borrow pit and the existing Zwartkopies Substation. It was concluded based on the findings of the survey that the construction may proceed.

Queens substation and 4x loop-in loop-out power lines

There were no heritage resources found on alternative site A, apart from a dilapidated structure, S26°22'53.8" E27°57'18.9", and piles of soil scattered around site. The structure found on site is not older than 60 years old.

The substation site for alternative B is disturbed by farming and other activities. Several buildings were found on the substation's eastern boundary and also within the site. They all appear to be less than 60 years of age and are of no heritage significance.

Findings:

No heritage resources, including evidence of archaeological sites or artefacts, were found during the site inspection. No heritage resources were found along the alignment of power line route alternative 1. Power line alternative 2 crosses 2 structures which appeared to be less than 60 years.

The study recommended that: the alignment of the alternative is moved 20 m to the north to avoid impacting on these structures.

7.3 Visual Impact assessment

The proposed expansion of the Zwartkopies substation and its power lines will not create visual impact as it will be only an expansion to an area that already has similar structures and infrastructures. Also, the planned power line of 2.6km long with 22m servitude from Zwartkopies will have a low to medium visual impact as it will be following an already existing line. Much of the visual impact will be during the construction due to vehicles including construction workers.

The Queens substation area is still natural with only one small old (half demolished) building. Building a substation will therefore be clearly visible from the roads (Aloe ridge drive and the close by unnamed road), from Tedderfield and the Hertenbergonfontein and will create new infrastructure in areas where there was none before with a higher visual impact. The predicted life span of the visual impact will be permanent, where time will not mitigate the visual impact. The magnitude of the impact on views and scenic resources will be medium.

7.4 Flood-line Delineation Assessment

The modelled flood lines mark the extent of flood risk prone areas within which no construction development should occur. This is done to protect sensitive riparian zones or wetland areas from ecological decline, as well as protecting development structures and people from flood inundation and damage. The power lines should be placed in areas where flood encroachment will not occur. Infrastructure located within the brown-shaded area can be protected by placing perimeter berms or by constructing an attention structure upstream of the minor streams, details of which should be provided in the storm water management plan for this project site.

In light of the above discussion it is recommended that a Storm Water Management Plan be undertaken for the Eskom IRS Project Site to guide the aforementioned flood control measures.

7.5 Wetland assessment

The study area is traversed by various wetlands, rivers and riparian areas, albeit of low ecological integrity. The proposed 2.6km long power line with a 22m servitude will have little impact negative impact on these systems. Based on the data presented in the wetland study report as well as observations made during the survey and the comments above and if all necessary permits and licenses are obtained to continue with the development, it is recommended that construction can proceed. This is because the proposed power line will follow the existing loop-out 4 x 88KV lines from the Zwartkopies substation to Eyestone substation

Figure 7-1: Wetland delineation of RWB-Zwartkopies 2.6km power line with a 22 servitude

8 IMPACT ASSESSMENT METHODOLOGY

The significance of impacts identified was assessed according to the methodology described below. It should be noted that some of the specialists used the same criteria as that listed below but attributed different values or scores to the extent, duration, magnitude and probability of identified impacts. It is the opinion of the EAP that these differences do not have an impact on the assessment process in any way as the significance of the impacts are still evaluated in terms of the requirements of sections (h) and (i) of Appendix 3 of GNR 982 (2014 EIA Regulations). See attached **Appendix F** for the Impact Assessment.

Extent of the impact: the extent of the impact will be assessed according to the following parameters:

- (1) Limited to the site and its immediate surroundings.
- (2) Local/ Municipal extending only as far as the local community or urban area.
- (3) Provincial/Regional.
- (4) National i.e. South Africa.
- (5) Across International borders.

Duration of the impact: the lifespan of the impact will be assessed in terms of the duration of the impact, i.e.:

- (1) Immediate (less than 1 year).
- (2) Short term (1-5 years).
- (3) Medium term (6-15 years).
- (4) Long term (the impact will cease after the operational life span of the project).
- (5) Permanent (no mitigation measures or natural process will reduce impact after construction).

Magnitude of the impact: the magnitude or severity of the impacts will be indicated as either:

- (0) None (where the aspect will have no impact on the environment).
- (1) Minor (where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected).
- (2) Low (where the impact affects the environment in such a way that natural, cultural and social functions and processes are slightly affected).

(3) Moderate (where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way).

(4) High (where natural, cultural or social functions or processes are altered to the extent that it will temporarily cease)

(5) Very high / don't know (where natural, cultural or social functions or processes are altered to the extent that it will permanently cease).

Probability of occurrence: likelihood of impact actually occurring will be indicated as either:

(0) None (impact will not occur).

(1) Improbable (the possibility of the impact materializing is very low as a result of design, historic experience or implementation of adequate mitigation measures).

(2) Low probability (there is a possibility that the impact will occur).

(3) Medium probability (the impact may occur).

(4) High probability (it is most likely that the impact will occur).

(5) Definite / do not know (the impact will occur regardless of the implementation of any prevention or corrective actions or if the specialist does not know what the probability will be based on too little published information).

Status of the impact: the impacts will be assessed as either having a:

- Negative effect (i.e. at a cost to the environment).
- Positive effect (i.e. at a benefit to the environment).
- Neutral effect on the environment.

Reversibility

The degree to which the impact can be reversed.

Cumulative impact: the impact of the development is considered together with additional developments of the same or similar nature and magnitude. The combined impacts may be:

- Negligible – i.e. the net effect is the same as the single development

- Marginal – i.e. the impact of two developments of a similar nature is less than twice the impact of a single development. This implies it is better to place the two developments in the same environment rather than in separate environments.
- Compounding – the impact of two developments is more than twice the impact of two single developments therefore it is better to split the two developments into separate environments.

Significance of the impact:

Based on a synthesis of the information contained in the points above, the potential impacts will be assigned a significance weighting (S). The weighting is formulated by adding the sum of the numbers assigned to extent (E), duration (D) and magnitude (M) and multiplying this sum by the probability (P) of the impact hence $S=(E+D+M) *P$.

Table 8-1: Significance score and associated description

Significance	Significance Score	Description
Negligible	0	There is no impact
Low	1-15	Impact is of a low order; mitigation measures are easy and simple or not required
Low-Medium	16-30	Impact is higher but with limited effect, mitigation measures are feasible and easily achieved
Medium	31-45	Impact is real but not substantial and mitigation is both feasible and fairly easily possible
Medium-High	46-60	Impact is substantial and mitigation measures are difficult, expensive and time consuming
High/Fatal Flaw	>60	Impact is of the highest order and there are few, if any, mitigation measures to offset impact

9. ASSESSMENT OF IMPACTS

The proposed project will cause impacts to the biophysical and socio-economic environment. Specific environmental and socio-economic impacts will occur at different phases of the proposed project. These phases are:

- Construction of the Queens substation and the expansion of the RWB-Zwartkopies and associated infrastructure.
- Operation of the Queens substation and the extension of the RWB-Zwartkopies.
- Decommissioning / closure of the Queens substation and the extension of the RWB-Zwartkopies.

The impact assessment takes cognisance of the biophysical, socio-economic and cultural environments that could be impacted by the proposed Queens substation and the extension of the RWB-Zwartkopies. The following aspects were evaluated:

- Biodiversity
- Heritage
- Visual
- Wetland; and
- Flood line delineation

The biodiversity and heritage specialists undertook the impact assessment using the same criteria (extent, duration, magnitude, probability) as that described in Chapter 8 but with a different scoring system. These scoring systems are provided below for information purposes.

It should be noted that due to the close proximity and similar environment in which the four alternatives sites are located, the specialists did not assess the sites individually.

9.1 Biodiversity assessment

The assessment methodology used for this study is tabulated below in **Table 9-1 and Table 9-2** with the actual assessment of impacts in **Table 9-3**.

The biodiversity assessment indicated the most of the potential impacts fall into a low-moderate rating in all phases of the project. Dust creation was the aspect that was rated at a moderate rating during the construction phase which can be effectively mitigated. With adequate mitigation measures; the specialist anticipated that the impacts could be controlled and reduced to a satisfactory level to ensure minimal effect on biodiversity.

Table 0-1: Biodiversity impact rating scale

Nature	Category	Rating	Description
Probability	Improbable	0	Less than 40% sure of a particular fact or likelihood of impact occurring.
	Possible	1	40% to 70% sure of a particular fact or the likelihood of that impact occurring.
	Probable	2	70% to 90% sure of a particular fact or the likelihood of that impact occurring.
	Definite	3	More than 90% sure of a particular fact or the likelihood of that impact occurring.
Extent	Site	1	Immediate project site
	Local	2	Up to 5km from the project site
	Regional	3	20km radius from the project site
	Provincial	4	Provincial
	National	5	South Africa
	International	6	Neighboring countries/overseas
Duration	Very-short term	1	Less than 1 year
	Short term	2	1-5 years
	Medium term	3	5 to 10 years
	Long term	4	10 to 15 years
	Very long term	5	Greater than 15 years
	Permanent	6	Permanent
Intensity	Very low	0	Where the impact affects the environment in such a way that

Nature	Category	Rating	Description
			natural, cultural and social functions are not affected.
	Low	1	Where the impact affects the environment in such a way that natural, cultural and social functions are only marginally affected.
	Medium	2	Where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way.
	High	3	Where natural, cultural and social functions or processes are altered to the extent that it will temporarily cease.
	Very high	4	Where natural, cultural and social functions or processes are altered to the extent that it will permanently cease.

Table 0-2: Significance rating of impacts

Significance Rating	Description	Colour
2-4	Low	Light Green
5-7	Low to moderate	Green
8-10	Moderate	Yellow
11-13	Moderate to High	Orange
14-16	High	Red
17-19	Very High	Dark Red

Table 0-3: Biodiversity

Description of Impact	Probability	Extent	Duration	Intensity	Significance	Management and mitigation measures
<p>Site project establishment and construction of infrastructure; each of the biodiversity aspects that have been studied will be impacted on by different phases of the project. The impacts that might affect each of the biodiversity impact are as below:</p> <ul style="list-style-type: none"> ✓ clearing of vegetation or habitat due to the servitude of the proposed cooling water treatment plant ✓ establishment/upgrading of ready existing access road to the proposed site ✓ construction of cooling treatment plant 						
<p>Clearing/disturbance of vegetation and habitat</p> <p>The proposed Queens substation and RWB Zwartkopies extension with a 2.6km power line with a 22m servitude will require a land/ servitude to enable construction and easy access. These actions will lead to the clearing of present vegetation within the proposed/preferred site to locate the project. These will negatively affect biodiversity aspects in the following way;</p> <ul style="list-style-type: none"> ✓ Vegetation: clearing of vegetation will lead to loss of certain Graminoids within the proposed sites where the proposed project will be built. The clearing or human-induced disturbance of land could also lead to introduction of alien plant species. 	3	1	2	1	7 Low to Moderate (-)	<p>The most effective mitigation measure to decrease the impact of vegetation loss and consequent habitat loss is to adhere to already developed areas (such as using existing access roads, adhere to inductions and awareness programmes, confine clearing to the minimal area necessary to facilitate construction activities and replanting species removed) which could result in the least area of vegetation being lost; since the project is located within an already impacted surrounding; the mitigation is known as corridor sharing and will be beneficial since it concentrates similar works and land uses and if an impact is created it is an incremental as opposed to new impact.</p> <p>The main objective of the mitigation is to prevent</p>

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Description of Impact	Probability	Extent	Duration	Intensity	Significance	Management and mitigation measures
<p>✓ Mammals/Reptiles (Terrestrial animals): clearing of vegetation will lead to habitat loss with the removal of certain plants that are favorable to the antelopes (evidence of presence of faeces used as a survey method) such as Water-berry as observed on site. The proposed cooling water treatment plant may form a physical barrier which would impact on the movement of animals within and between habitats. If there's an increase to human-induced disturbance, it is possible that the mammalian/reptilian habitat will experience transformation.</p> <p>✓ Amphibians: vegetation loss affects the terrestrial aspects of an ecosystem, since amphibians inhabit areas around water bodies (water cooling areas); they are likely to experience habitat loss or fragmentation around their surroundings</p>						<p>the destruction of Graminoids Species and other terrestrial animals and plants within the proposed site, ensure the protection of mature trees, limit degradation and destruction of natural environment to designated project areas and restrict establishment of alien invasive plants. These aims can be achieved by implementing the following;</p> <ul style="list-style-type: none"> ✓ clearance of vegetation of land to accommodate proposed works should be within the footprint of proposed site ✓ indigenous seedlings should be planted around the plant after completion of the construction phase ✓ The footprint of the disturbed area should be restricted to the minimum ✓ Disturbance during construction and operational phases should be minimised by means of continuous rehabilitation to reduce the risk of open areas occurring; and ✓ Monitoring of influx of alien invasive species generally and if necessary develop and implement an eradication programme.

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Description of Impact	Probability	Extent	Duration	Intensity	Significance	Management and mitigation measures
<p>Dust generation</p> <p>All construction activities will result in the generation of dust. This dust will settle on the vegetation within the vicinity of the subject project. The presence of dust influences the palatability and photosynthesis capability of vegetation for secondary consumers, whether animals or humans.</p>	3	1	2	2	8 Moderate (-)	<p>During construction phase, access roads would require an effective dust suppression management Programme such as regular wetting by water on road surfaces, low speed limits and optimal use of paved roads.</p>
<p>Accidental oil and diesel (flammable liquids) spillages</p> <p>Site establishment, project footprint and construction of infrastructure will involve the use of heavy machinery. Possible oil leaks and spills might occur.</p>	1	1	2	0	3 Low (-)	<p>The topsoil should be stripped off so that material can be replaced during the rehabilitation phase.</p> <p>Ensure that proper measures are in place to prevent and contain any oil and diesel leakages or spills.</p> <p>Proper handling and storage practices, as well as readily available oil-spill kits should minimize the risks associated with such spills.</p> <p>Spills should be cleaned up immediately by removing the spills together with the polluted soil and disposing thereof at a registered waste disposal facility.</p>

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Description of Impact	Probability	Extent	Duration	Intensity	Significance	Management and mitigation measures
<p>Increased potential of invasion by alien invasive species</p> <p>Preparation of the project footprint areas and construction of infrastructure will result in disturbance. Alien invasive species tend to invade areas that have been disturbed.</p>	2	1	2	0	5 Low-Moderate	The best mitigation measure for alien and invasive species is the early detection and eradication which will be ensured with the use of a monitoring Programme
<p>REHABILITATION PHASE</p> <p>Rehabilitate the disturbed area to a state approximating the same as the pre-development state. Prepare soil for re-vegetation, e.g. by removing potentially contaminated soil (for disposal at a suitable site), "ripping" compacted soil and adding organic material.</p> <p>Re-establish locally indigenous vegetation under the guidance of an ECO. Re-vegetation can take the form of seeding (or hydro-seeding) broad areas with a mix of indigenous grass seeds, and planting of individual indigenous trees and shrubs. Methods and timing of rehabilitation must be prescribed by an ecologist based on site conditions at the time, and species composition should be dictated by the vegetation communities in open areas in the vicinity. Prevent colonization by alien invasive species. No alien plant species should be established on the site during rehabilitation. Any alien vegetation on the site must be eradicated before seeding / planting of indigenous vegetation. The site must be regularly monitored for re-growth of alien invasive species, and any new seedlings etc. eradicated using methods appropriate for the particular species, whether mechanical, chemical or biological.</p>						
<p>Ecological impact Assessment: Operational phase</p>						
<p>Operational activities of the water cooling water treatment plant</p>						
<p>Accidental oil and diesel (flammable liquids) spillages</p>	0	1	1	0	2 Low	<p>The topsoil should be stripped ahead of construction so that material can be replaced during the rehabilitation phase.</p> <p>Ensure that proper measures are in place to contain any oil and diesel leakages or spills. Proper</p>

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Description of Impact	Probability	Extent	Duration	Intensity	Significance	Management and mitigation measures
						<p>handling and storage practices, as well as readily available oil-spill kits should minimize the risks associated with such spills. Spills should be cleaned up immediately by removing the spills together with the polluted soil and disposing thereof at a registered waste facility. Suitably covered containers should be provided and conveniently placed for waste disposal.</p> <p>All used oils, grease or hydraulic fluid should be placed therein and these containers should be removed from the site on a regular basis for disposal at a registered waste facility.</p> <p>Institute detailed water monitoring systems that are capable of detecting pollution at the earliest possible stage in order that rapid and effective management actions are undertaken to address the pollution source and minimize it to the fullest extent possible.</p>
Closure phase:						
Demolishing of structures						

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Description of Impact	Probability	Extent	Duration	Intensity	Significance	Management and mitigation measures
Dust generation	3	1	1	1	6 Low to Moderate (-)	During the decommissioning phase, an effective dust suppression management Programme, such as regular wetting by water that would retain moisture, must be continued with the Programme for the duration of the project
<p>Re-establishment of species</p> <p>During the decommissioning phase rehabilitation of the affected areas will occur. Naturally occurring flora species will be established and the area could, to a certain degree, return to its pre-project state. This will, in turn, result in fauna species returning to the area.</p> <p>During rehabilitation the natural vegetation in the area will be restored implying that suitable habitats for fauna and flora species will also be established. Most fauna species are highly mobile and will return to the area in a short period of time.</p>	3	1	1	1	6 Low to Moderate (+)	Re-establishment of species will have an overall positive impact on the area. Topsoil must be analyzed for its fertility and if reduced, fertilizers must be used to increase the fertility of the soil prior to rehabilitation. Revegetate the area with plant species consistent with the post construction land use. Re-vegetate with indigenous species.

9.2 Heritage assessment

Cultural heritage resources are protected in terms of the National Heritage Resources Act. The scope and extent of the proposed development is such that it falls within the requirements of section 38 of the above Act that requires the undertaking of a heritage impact assessment (HIA) hence the recommendation that such an assessment be conducted.

The substation site is disturbed by farming and other activities. There were pockets of bush and trees on the site and on the area immediately north of the substation. Several buildings were found on the substation's eastern boundary and also within the site. They all appear to be less than 60 years of age and are of no heritage significance. No heritage resources, including evidence of archaeological sites or artefacts, were found during the site inspection. The methodology used by the specialist to score or weight the impact significance is tabulated below with the actual assessment provided in **Table 9-3**.

Table 0-3: Heritage weighting scales

Aspect	Description	Weight
Probability	Improbable	1
	Probable	2
	Highly Probable	4
	Definite	5
Duration	Short term	1
	Medium term	3
	Long term	4
	Permanent	5
Scale	Local	1
	Site	2
	Regional	3
Magnitude/Severity	Low	2
	Medium	6
	High	8
Significance	Sum (Duration, Scale, Magnitude) x Probability	
	Negligible	≤20

Aspect	Description	Weight
	Low	>20≤40
	Moderate	>40≤60
	High	>60

Table 0-4: Significance of impacts on heritage resources

Aspect	Description	Weight
Probability	Improbable	1
Duration	Short term	1
Scale	Local	1
Magnitude/Severity	Low	2
Significance	Sum (Duration, Scale, Magnitude) x Probability	
	1+1+2x1 =4	
	Negligible	≤20

9.3 Wetland assessment

There are a number of water bodies in the study area with the probability that the proposed development of both the substation and power lines could impact on these resources. Hence the impacts of the development on wetland ecosystems, dams and riparian zones of water courses needs to be assessed with specialist input.

The wetland delineation was completed with the aid of aerial imagery, as well as verification in the field. Three primary HGM units were recorded, namely: hillslope seeps, channelled valley bottom wetlands and the Vaal River floodplain, as listed below; in addition to Mac Dam to the north of the site. Due to historical development, much of the infrastructure for the power station was located in wetland areas; that were traversed by numerous roads. The methodology used by the specialist to score or weight the impact significance is tabulated below with the actual assessment provided in Table 9-5.

Scoring guideline		Relative confidence	
Natural, Unmodified 0	0	Very high	4
Largely Natural	1	High	3
Moderately modified	2	Moderate	2
Largely modified	3	Low	1
Seriously modified	4		
Critically modified	5		

Table 9-5: Scoring Guideline

Table 9-6: Summary of significance of impacts

Phase	Aspect	Impact description	Significance rating
Construction	Biodiversity	Clearing / disturbance of vegetation and habitat	Low-moderate (-)
		Dust generation	Moderate (-)
		Oil and diesel spillages	Low (-)
		Spread of invasive species	Low-moderate (-)
	Heritage	Destruction of / damage to heritage resources	Negligible
		Improvement in local economy as those employed will have money to spend at supermarkets, etc	Low-moderate (+)
		Health and safety risks to local community: construction trucks speeding, increased levels of litter and fires	Low (-)
		Influx of construction workers & those seeking work may lead to conflict with local communities, illegal squatting, etc	Low-moderate (-)
	Wetland	Vegetation clearance, stripping and stockpiling of topsoil and subsoil could have an adverse impact on groundwater quality	Low (-)
		Reduction in recharge to aquifer system due to compaction of the surface of roads and foundation layers.	Low (-)
		Rainwater infiltrating through overburden stockpiles could pollute aquifers through increased salt load and metals.	Low (-)
		Oil/fuel spillages originating from machinery and vehicles may collect in the soil.	Low (-)
		Storage of hazardous products may have a negative effect on ground-water quality through spillage/leaks	Low (-)
		Degree of the primary aquifer dewatering depends on the extent and depth of the foundation pits.	Low (-)
Operation	Biodiversity	Fuel spillages	Low (-)
	Wetland	Fuel spillages leading to contamination of groundwater	Low (-)
Closure	Biodiversity	Dust generation	Low-moderate (-)
		Re-establishment of species	Low-moderate (+)

Table 9-10 shows that the majority of impacts attributed to the construction and operation of the Queens substation and the extension of the RWB- Zwartkopies substation with a 2.6km power line and a 22m servitude fall in the Low and Low – Medium significance rating. The moderate negative impacts relate to dust generation and the loss of soil resources during the construction phase.

Overall the impact of the proposed Queens substation and the extension of the RWB- Zwartkopies substation with a 2.6km power line and a 22m servitude is considered to be manageable with no fatal flaws or ‘no-go’ areas identified during the assessment process.

The WET-Health tool (as prescribed by Kotze et al. 2007) was used to determine the Present Ecological State (PES) of wetlands associated with the study site. The health of a wetland can be determined from a measure of the deviation of wetland structure and function from the wetland’s natural reference condition (Macfarlane et al. (2007)). The health assessment attempts to evaluate the hydrological, geomorphological and vegetation health in three separate modules to attempt to estimate similarity to or deviation from natural conditions. The PES is determined according to Table9-7.

Table 9-7: EIS Determination & Recommended Management Class

Ecological Importance and Sensitivity	Category (EIS) Range of Median	Recommended Management Class
Floodplains that are considered ecologically important and sensitive on a national or even international level. The biodiversity of these floodplains is usually very sensitive to flow and habitat modifications. They play a major role in moderating the quantity and quality of water of major rivers	>3 and <=4	A
Floodplains that are considered to be ecologically important and sensitive. The biodiversity of these floodplains may be sensitive to flow and habitat modifications. They play a role in moderating the quantity and quality of water of major rivers.	>2 and <=3	B
Floodplains that are considered to be ecologically important and sensitive on a provincial or local scale. The biodiversity of these floodplains is not usually sensitive to flow and habitat modifications. They play a small role in moderating the quantity and quality of water of major rivers.	>1 and <=2	C
Floodplains that is not ecologically important and sensitive at any scale. The biodiversity of these floodplains is ubiquitous and not sensitive to flow and habitat modifications. They play an insignificant role in moderating the quantity and quality of water of major rivers.	>0 and <=1	D

10 SITE SELECTION

Two site alternatives for the Queens Substation were assessed for the placement of the Queens substation. The preferred site is explained below.

The findings and recommendation of the specialist's studies supports the use of alternative site B. Alternative A is not recommended because of its close proximity to a school, a nursery and the community's land use activities and may also affect the visual of the area.

On the other hand, alternative site B has already been traversed through agricultural activity and has low environmental impacts. Queens Substation Site B, with associated power lines infrastructure is therefore recommended as the preferred site alternative.

11 ENVIRONMENTAL STATEMENT

It is a reasoned opinion of the EAP that the construction of the Queens substation and the expansion of RWB-Zwartkopies should be authorised taking into account the mitigation measures as set out in the attached EMP. The significance of the identified impacts of the Queens substation and the extension of RWB-Zwartkopies on the environment were assessed to be predominantly of a low to low medium impact providing a clear indication that the overall impact of the Queens substation and the extension of RWB-Zwartkopies is manageable. No fatal flaws were discovered during the environmental authorisation process.

12 UNDERTAKING

I, Siphon Zulu, hereby confirm that the information provided in this report is correct at the time of compilation and was compiled with input provided by the Applicant, Eskom Holdings SOC Limited.

I, hereby, also confirm that the comments received from I&APs have been included in the Final BAR that will be submitted to the DEA. This will be in the form of a Comment and Response Report.

13 CONCLUSION

For Queens substation, alternative B is the recommended and preferred site for the construction of the proposed 88/11kv substation as it is close to the loop-in loop-out Goldview-Tedderfield 132kv line therefore will have less power line route impact. It is also far from the nursery, Aloe Ridge School and the community businesses. In terms of the routes, it is recommended for route option 1 to be developed as there is already developed power lines along this route. In this way, cumulative impacts of having multiple power lines within a small area will be minimised.

Nevertheless, a stern warning issued that the power lines should not cross the residence and offices of the landowner. It is recommended that it should rather be aligned along the access road to the landowner's property.

Substation B on this study area will have low impact on the environment as the area is already disturbed by agricultural activities. The Zwartkopies substation expansion has no alternatives as it is the extension of the already existing Zwartkopies substation. The Zwartkopies-Eyestone 2.6km long power line with a 22m servitude also has no alternative as it will be constructed in an already existing servitude. Therefore, the construction of these structures is recommended based on their need and desire outlined in Chapter 1 of this report.

Recommendations:

- Construction of the Zwartkopies-Eyestone power line can only take place after the necessary water use license has been obtained as it is traversing through a wetland.
- Vehicle access into wetland areas may only be allowed where absolutely necessary.
- During excavations soil stockpiling should as far as possible take place outside the wetland edge keeping topsoil and sub-soil apart as far as possible. These stockpiles should then be backfilled in the right order placing topsoil on top of sub-soil.
- During the construction phase, the contractor should keep within the proposed servitude to avoid impacting on any heritage resources that may be found within the vicinity, especially within Zwartkopies pumping station.
- The possibility of uncovering unearthened burial grounds and graves during excavation should not be ruled out, especially at the proposed Queens Substation site since the area is an open land. Should potential human remains be found on site, the contractor should cease construction immediately and the South African Police Service, and Eskom should also be contacted.
- Any structures situated close to the substation site should be fenced off to prevent damaged to them during the construction process.

14 REFERENCES

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APPENDICES

APPENDIX A – SITE PLANS/MAPS

APPENDIX B – SITE PHOTOGRAPHS

APPENDIX C – FACILITY ILLUSTRATIONS

APPENDIX D – SPECIALISTS STUDIES

APPENDIX E – PUBLIC PARTICIPATION PROCESS

APPENDIX F – IMPACT ASSESSMENT

APPENDIX G – EMPr

APPENDIX H – SPECIALISTS DECLARATION FORM OF INTERESTS

APPENDIX I – OTHER INFORMATION (EAP CVs)