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# **POPO MOLEFE INFORMAL SETTLEMENT BOITEKONG EXT 39**

## **ELECTRICAL SERVICES REPORT**

FOR

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BY

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## Table of Contents

<b>1.</b>	<b>INTRODUCTION .....</b>	<b>2</b>
1.1	PROJECT BRIEF .....	2
1.2	AIM OF THIS REPORT .....	2
1.3	APPOINTMENT .....	2
1.4	IQ SOLUTIONS.....	2
1.5	STRUCTURE OF THIS REPORT .....	2
<b>2.</b>	<b>DEVELOPMENT INFORMATION .....</b>	<b>2</b>
2.1	GEOGRAPHICAL POSITION .....	2
2.2	GPS COORDINATES .....	3
2.3	LAYOUT AND LAND USE INFORMATION.....	3
2.4	SOCIO-ECONOMIC INFORMATION .....	5
2.5	LICENCED SUPPLY AREA .....	5
2.6	EXISTING SERVICES.....	5
2.7	HOUSES.....	5
<b>3.</b>	<b>DESIGN PARAMETERS.....</b>	<b>5</b>
3.1	GENERAL .....	5
3.2	DESIGN REQUIREMENTS .....	5
3.3	DESIGN PARAMETERS.....	6
3.4	SUPPLY AUTHORITIES REQUIREMENTS AND APPROVAL PROCEDURES .....	6
3.4.1	Approval .....	7
3.4.2	Handing over .....	7
<b>4.</b>	<b>BULK SUPPLY .....</b>	<b>7</b>
4.1	GENERAL .....	7
4.2	EXISTING NETWORK ANALYSIS .....	7
<b>5.</b>	<b>PROPOSED ELECTRICAL SERVICES .....</b>	<b>8</b>
5.1	BULK SUPPLY.....	8
5.2	MEDIUM VOLTAGE RETICULATION .....	8
5.3	LOW VOLTAGE RETICULATION .....	8
5.4	LOW VOLTAGE CONNECTIONS .....	8
5.5	METERING.....	8
5.6	STREET AND AREA LIGHTING .....	8
5.7	SERVITUDES .....	8
<b>6.</b>	<b>COSTS.....</b>	<b>8</b>
6.1	COST ESTIMATION .....	8
<b>7.</b>	<b>SUMMARY .....</b>	<b>9</b>
7.1	SUMMARY .....	9

## 1. INTRODUCTION

### 1.1 **Project brief**

The project brief as understood by IQ Solutions is summarized as follows:

- a) The main objective of this report is the bulk services investigation for the proposed development.
- b) Proposals in this report is based on preliminary designs only.

### 1.2 **Aim of this report**

The aim of this report is to provide the necessary information and technical details for providing electrical services for the proposed development. This information is intended to be used by all parties involved to review and approve the technical, operational and financial considerations.

### 1.3 **Appointment**

IO Solutions has been appointed by Akha Maduna Property Developers (Pty) Ltd for the Electrical Services investigation of the proposed development.

### 1.4 **IQ Solutions**

IQ Solutions is Electrical Engineers specializing in designing of electrical installations and reticulation. A full scope of professional services is rendered to our clients All the phases in the project life cycle are included in our services

Our services also include Project Management.

### 1.5 **Structure of this report**

The report summarizes information on the proposed development, Supply Authority, demand, bulk service, required standards & specifications, proposed services and proposed way forward.

## 2. DEVELOPMENT INFORMATION

### 2.1 **Geographical position**

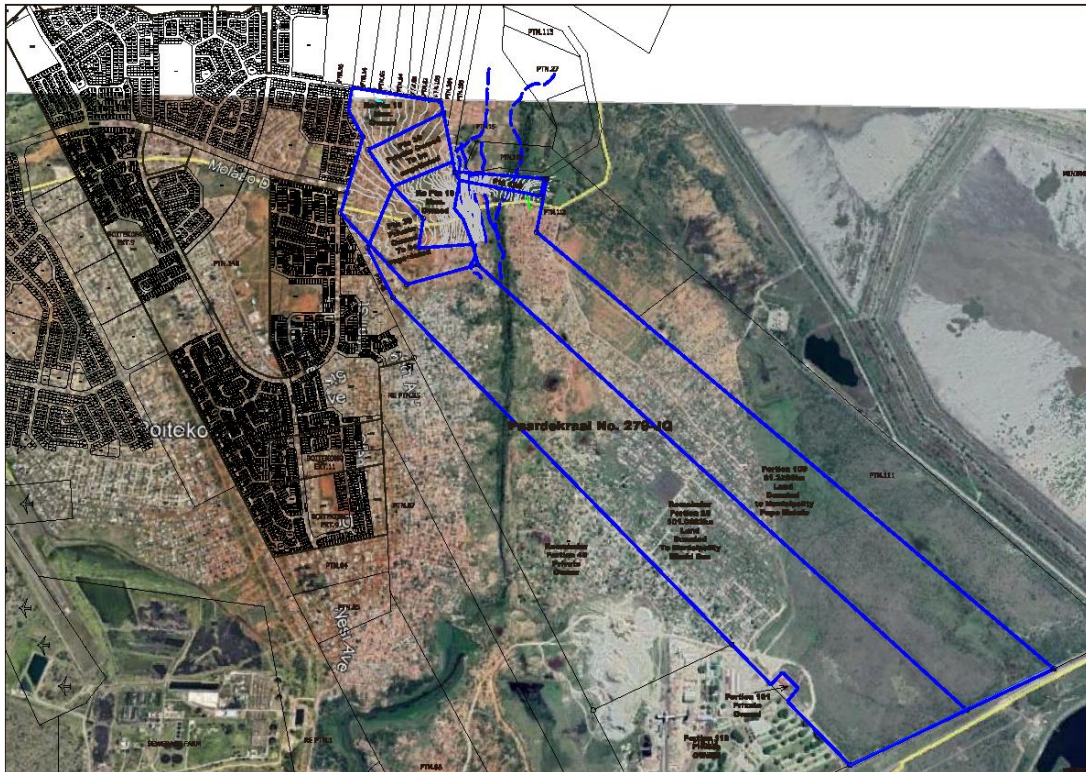
The proposed township establishment of Popo Molefe Informal Settlement (Boitekong Extension 39) is located in Rustenburg Local Municipality as can be seen in Figure 1.

2.2 **GPS Coordinates**

S 25° 28' 0.16"

E 27° 17' 23.8"

Figure 1- Geographical position



2.3 **Layout and Land use information**

Land use information is summarized in the following table.

Table 1

LAND USE INFORMATION					
Item	Zoning	Land Use	Numer of Stands	Units	Area
1	Residential	Residential 3	4239	4239	220 sq m ave per unit
2	Municipal	Municipal	1	1	
3	Business	Business	18	18	
LAND USE INFORMATION - Continued					



## 2.4 **Socio-economic information**

This Development is intended primarily for Township Establishment of 4239 Residential units, Municipal unit, Business units, Clinics, Crèches, Schools, Community Centers, Taxi Ranks, Churches and Recreational areas.

## 2.5 **Licenced supply area**

The Development is situated within the licensed supply area of Rustenburg Local Municipality and the jurisdiction of Bojanala Platinum District. The electricity supply to Boitekong is from the Eskom 22kV Feeder at Boitekong Substation. Eskom is also responsible for the operation and maintenance of the electrical network within Boitekong.

## 2.6 **Existing Services**

There is no existing electrical networks or services installed in the new proposed area.

## 2.7 **Houses**

Houses as well as open spaces do exist in the area

# 3. DESIGN PARAMETERS

## 3.1 **General**

Electrical services will be designed towards an economic trade-off between financial constraints and optimum technology by taking the following into consideration:

- a) Statutory voltage limits;
- b) Acceptable supply availability and reliability;
- c) Financing constraints and affordability;
- d) Acceptable aesthetics and safety

## 3.2 **Design Requirements**

All the relevant standards and equipment types have been verified with the Supply Authority which with the following guidelines will be taken into consideration:

a) All electrical services shall be designed in terms of the standards, specifications and equipment types and ranges of the Supply Authority by a Professional Electrical Consulting Engineer.

b) The electrical infrastructure will be designed to comply with the standards and requirements of the Supply Authority, where appropriate, in accordance with (but not limited to) NRS 034-1:1999 Electricity Distribution – Guidelines for the provision of electrical distribution networks in residential areas, SANS 10142-1 The Wiring of Premises – Low Voltage Installations & SANS 10142-2 The Wiring of Premises – Medium Voltage Installation above 1kV not exceeding 22kV. The

electricity distribution system will be designed for the anticipated maximum load to avoid the need for future upgrading of the electricity distribution system.

c) The maximum demand will be calculated in accordance with (but not limited to) SANS 204 Energy Efficiency in Building, SANS 10142-1 The Wiring of Premises – Low Voltage Installations & SANS 10400 Part X & XA Application of the National Building Act – Energy usage.

### 3.3 **Design Parameters**

Design parameters to be use are as follows:

Table 2: Design Parameters

Item	Description	Unit	Parameters
1.	<b>System</b>		
	Source		MV C/B in SUB
	Nominal system voltage	kV	22
	Frequency	Hz	50
	Phase rotation		RYB
	Nominal Voltage at source	%	0.98
	3 Phase Fault Level at source	kA	20
2	<b>Design Limits</b>		
	Voltage drop	%	10%
	MV and LV cable thermal loading	%	80%
	TRF Thermal loading	%	80%
3	<b>ADMD</b>		
	Method		Empirical
	Diversity		AMEU
	Unbalance		AMEU
	ADMD Stand Residential	KVA	$0.6 \times 4239 = 2543$
	ADMD Stand Business	KVA	$5 \times 18 = 90$
	ADMD Stand Clinic	KVA	$5 \times 3 = 15$
	ADMD Stand Crechel	KVA	$8 \times 9 = 72$
	ADMD Stand Church	KVA	$5 \times 12 = 60$
	ADMD Stand School	KVA	$12 \times 3 = 36$
	ADMD Stand Hall	KVA	$5 \times 3 = 15$
	ADMD Stand Municipality	KVA	$8 \times 1 = 8$
	ADMD Stand taxi rank	KVA	$0.6 \times 2 = 1.2$

The total maximum demand determined for this development is 2840kVA or 41000A, 3-phase.

### 3.4 **Supply Authorities requirements and approval procedures**

The requirements and approval procedure of the Supply Authority which is Eskom for Boitekong Ext 39, are summarized as follows:



### 3.4.1 Approval

- a).Detail designs shall be submitted for review and approval by the Supply Authority before construction can commence.
- b) The developer shall submit a “formal application” for each MV/LV electrical connection to the Supply Authority.
- c) The developer accepts the conditions as set out in the “formal application” and that all connection costs and any other costs with regards to special arrangements are paid in full.
- d) The Supply Authority reserves the right to only confirm the availability of bulk supply capacity at final application thereof.
- e) Services agreement is drafted, reviewed and signed between the Developer & Supply Authority.

### 3.4.2 Handing over

- a).The electrical infrastructure must be tested and approved on the conditions laid down by the Supply Authority.
- b) The Supply Authority will authorize the energizing of the electrical network once the final tests have been successfully passed.
- c) A provisional asset register will be submitted to the Supply Authority once the design documentation has been approved. This asset register will be updated once the services have been installed and the network accepted by the Supply Authority.
- d) Ownership of electrical services, will be transferred from the developer to the Supply Authority upon the successful testing and commissioning of the services. The Supply Authority will therefore be responsible for the maintenance of the electrical services.

## 4. BULK SUPPLY

### 4.1 General

There are currently no known capacity constraints on the existing network. A detail Service Agreement with all relevant information for the proposed township establishment need to be compiled and submitted to Eskom for approval.

### 4.2 Existing network analysis

An existing 22kV overhead network feeding from Eskom’s Boitekong 88/22kV Substation currently supplies electricity to the surrounding areas of Boitekong. It is proposed to extend the existing overhead network from the Substation for electrical supply to Boitekong Ext 39 Pope Molefe Informal Settlement.

Pole Mounted Transformers with overhead MV and LV networks will be used to create capacity and to distribute supply to the various Households.

## 5. PROPOSED ELECTRICAL SERVICES

The following electrical services are proposed.

### 5.1 **Bulk Supply**

As per Bulk Supply Proposal.

### 5.2 **Medium Voltage reticulation**

Capacity will be created by way of an overhead MV network and various Pole Mounted Transformers to create capacity.

### 5.3 **Low Voltage reticulation**

Electricity will be distributed by overhead ABC bundle conductors.

### 5.4 **Low Voltage connections**

Each stand will be connected via 10mm<sup>2</sup> Airdec SNE + 2 Comms wires.

### 5.5 **Metering**

Split pre-paid meters will be used

20A single phase split pre-paid meter to Residential units

60A 3 phase split pre-paid meter to Business units.

### 5.6 **Street and Area lighting**

Street lighting shall be included in designs.

LED type luminaires shall be used.

### 5.7 **Servitudes**

None identified at time of report.

## 6. COSTS

### 6.1 **Cost Estimation**

A Cost estimate for the Proposed Township Development can only be made after compiling and submitting a Service Agreement and Preliminary Design to the Local Supply Authority which is Eskom in this case, for review and recommendation.

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## 7. SUMMARY

### 7.1 Summary

There is a definite need for Township Development in the Boitekong Extension 39 area.

Service delivery is at its very low and providing electricity to the Household will be a major benefit for the community.

This Township Development is therefore recommended for implementation.

**END OF REPORT**