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P.17080 DPW OSHOEK SITE CLEARANCE

ELECTRICAL STATUS QUO REPORT

FINAL REPORT
REVISION 00

DECEMBER 2017



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EXECUTIVE SUMMARY

This report serves to collate the electrical status quo findings from site inspections held at the Oshoek border post. This included the visual inspections of the electrical installation and infrastructure, namely transformers, backup generator, distribution kiosks, and external light fittings.

The existing electrical infrastructure throughout the site is generally in good condition.

The size of the Eskom connection to the site is currently unknown. The main substation transformer is rated 400 kVA, with the other pole mounted transformers totaling 800 kVA. This means that the total connected load has the potential to be up to 1 200 kVA. There is also a 280 kVA standby diesel generator. It is unknown which loads are connected to this generator.

Contact has not yet been established with Eskom. Delta BEC is currently in the process of determining the connection size and spare capacity in the area. Once this information has been received, it will be included in the services report that will be generated in the next stage of the project.

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1 INTRODUCTION

1.1 BACKGROUND

Delta Built Environment Consultants (Pty) Ltd (Delta BEC) was appointed by the National Department of Public Works for planning services related to the Oshoek Land Port of Entry (PoE) area site clearance. The project was initiated by the National Department of Public Work's which is the Border Control Operational Coordinating Committee (BCOCC).

1.2 PURPOSE OF REPORT

This report presents findings relating to the status of the electrical installation, including the Eskom connection, local substation, pole-mounted transformers, diesel generator, distribution kiosks and the external lighting.

1.3 STRUCTURE OF REPORT

The report comprises the following sections:

- Section 2: Approach
- Section 3: Property Description
- Section 4: Electrical Infrastructure
- Section 5: Conclusion

1.4 TERMS AND ABBREVIATIONS

Table 1-1: Terms and abbreviations

Term	Definition
Delta BEC	Delta Built Environment Consultants (Pty) Ltd
DPW	Department of Public Works
PoE	Port of Entry
MV	Medium Voltage
LV	Low Voltage

2 APPROACH

The following approach was used:

- Determine current connection size of the border post
- Determine Eskom's spare capacity for future growth in the area
- Site visit to determine capacity and condition of existing electrical infrastructure and supply cables

3 PROPERTY DESCRIPTION

3.1 PROPERTY DESCRIPTION

The Oshoek port of entry (PoE) is the main point of entry into South Africa from Swaziland. The N17 national road starts here. The area on the Swaziland side of the border is known as Ngwenya and the road leads directly to Mbabane. The Oshoek PoE is situated within the Mpumalanga Province and lies within the jurisdiction of the Albert Luthuli Local Municipality. The Oshoek PoE is located approximately 123 km from Ermelo and 162km from Nelspruit.

The study area measures approximately 26.99 hectares in extent.

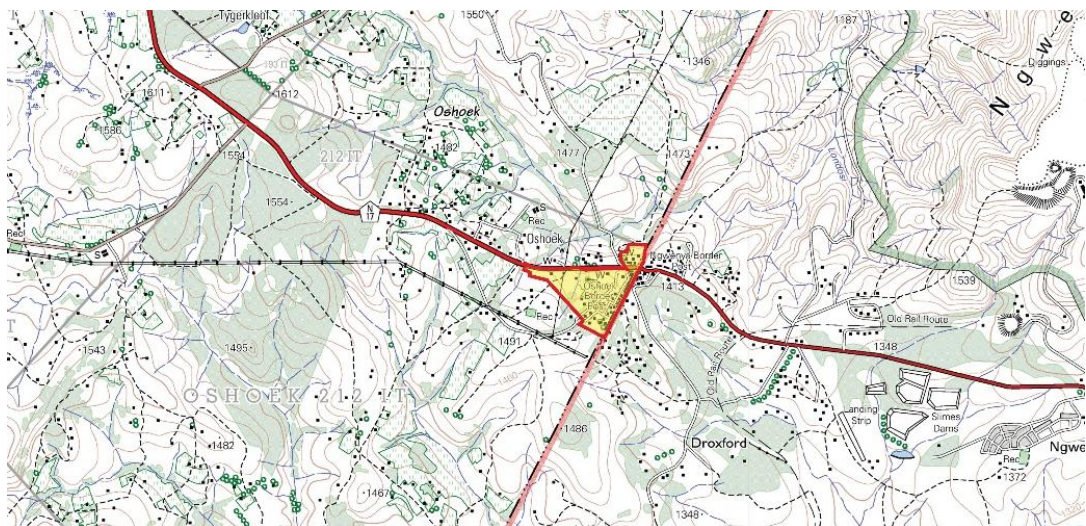


Figure 3-1: Study Area Locality

The Oshoek border is made up of the border post complex, the water treatment works located north of the border post complex and the living quarters located to the south of the border post complex.

3.2 LOCATION

The GPS coordinates of the border are 26° 12' 45.72" S, 30° 59' 19.32" E.

4 ELECTRICAL INFRASTRUCTURE

This section describes the following electrical infrastructure elements:

- Electrical connection
- Site reticulation
- Diesel generator
- Distribution kiosks and LV reticulation
- Area lighting

4.1 ELECTRICAL CONNECTION

4.1.1 SUPPLY AUTHORITY

Electricity to the site is supplied by Eskom.

4.1.2 CONNECTION SIZE

The connection size is currently unknown. The main substation transformer is rated 400 kVA, with the other pole mounted transformers totalling 800 kVA. This means that the total connected load has the potential to be up to 1 200 kVA.

Contact has not yet been established with Eskom. Delta BEC is currently in the process of determining the connection size and spare capacity in the area. Once this information has been received, it will be included in the services design report that will be generated in the next stage of the project.

4.1.3 SPARE CAPACITY

The spare capacity is currently unknown and will be provided once contact with Eskom is made and included in the services design report that will be generated in the next stage of the project.

4.2 SITE RETICULATION

4.2.1 MV DISTRIBUTION

The main incomer appears to be a 22 kV overhead Eskom line, metered at 22 kV. At the metering point, the overhead line splits into two to feed the port of entry's main substation, and several pole-mount transformers in the residential area, respectively.

Electrical reticulation throughout the site is achieved by overhead and underground MV and LV cables supplying the local substation and various buildings and distribution kiosks.

The condition of the underground cables could not be determined visually. The overhead lines appear to be in a good condition. They are operational and no faults have been reported.

4.2.2 LOCAL SUBSTATION

The capacity of the supply is currently unknown. However, a 400 kVA, 22 kV / 400 V main transformer is installed in a substation building to the right of the main entrance, next to the generator room. The transformer nameplate is shown below. The transformer was found in good working condition. No leaks were found and the cable terminations appeared to be in good condition.

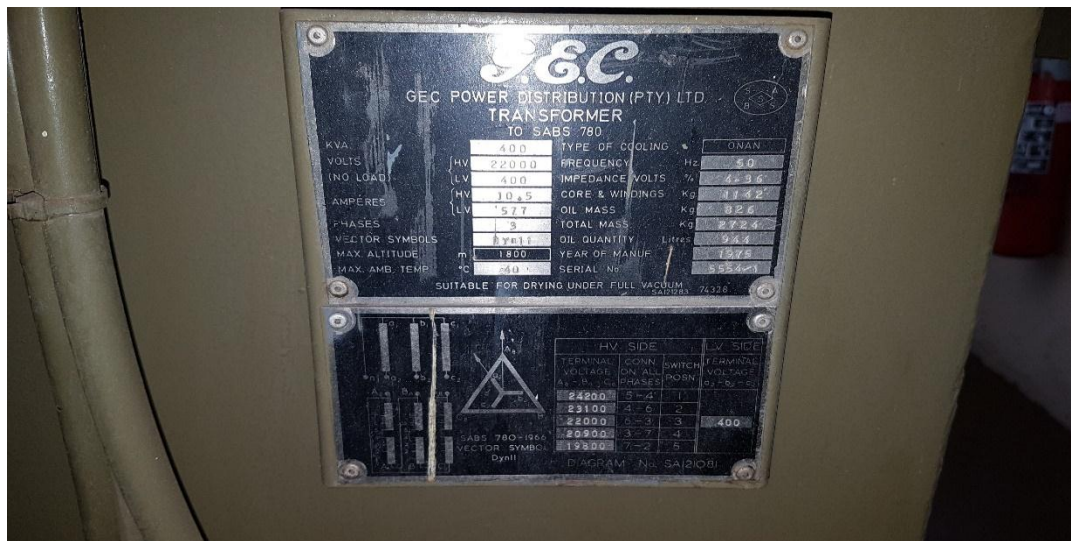


Figure 4-1: Nameplate of the main transformer located to the right of the main entrance

4.2.3 POLE-MOUNTED TRANSFORMERS

There are currently five pole mounted transformers on site.

Table 4-1: Pole-mount transformer sizes

Transformer Location	Size (kVA)
Transformers 1 and 2 is south of the border post complex	50
Transformer 3 is in the residential area, south of the border post complex	200
Transformer 4 is to the far south of the border post complex	500
Transformer 5 is next to the water reservoir	Unknown

Two of these transformers are clustered together and are located directly to the right of the main entrance. Both transformers are rated 50 kVA.



Figure 4-2: Two pole mounted transformers located directly to the right of the main entrance

A third pole mounted transformer is located to the right of the main entrance, just after the two pole mounted transformers mentioned above. This transformer is rated 200 kVA.



Figure 4-3: Pole mounted transformers located south of the main entrance

A fourth pole mounted transformer is located towards the far right of the main entrance along the road towards the water reservoir. The transformer is rated 500 kVA. The transformer seems to supply several distribution kiosks along the road.



Figure 4-4: Pole mounted transformer located to the far right of the main entrance

The fifth transformer is located two houses below the water reservoir, towards the right. The transformer is unlabelled and seems to have been disconnected from the supply. From visual inspections, it seems to have been replaced by the pole mounted transformer down the street from its location (that transformer is described above).



Figure 4-5: Disconnected pole mounted transformer located close to the water reservoir

4.3 DIESEL GENERATOR

The generator room is to the south of the public parking area, behind the light vehicle inspection area (inbound) and contains a Barlow world (CAT) 280 kVA generator. It is currently unknown which loads are fed from this generator.



Figure 4-6: Diesel generator

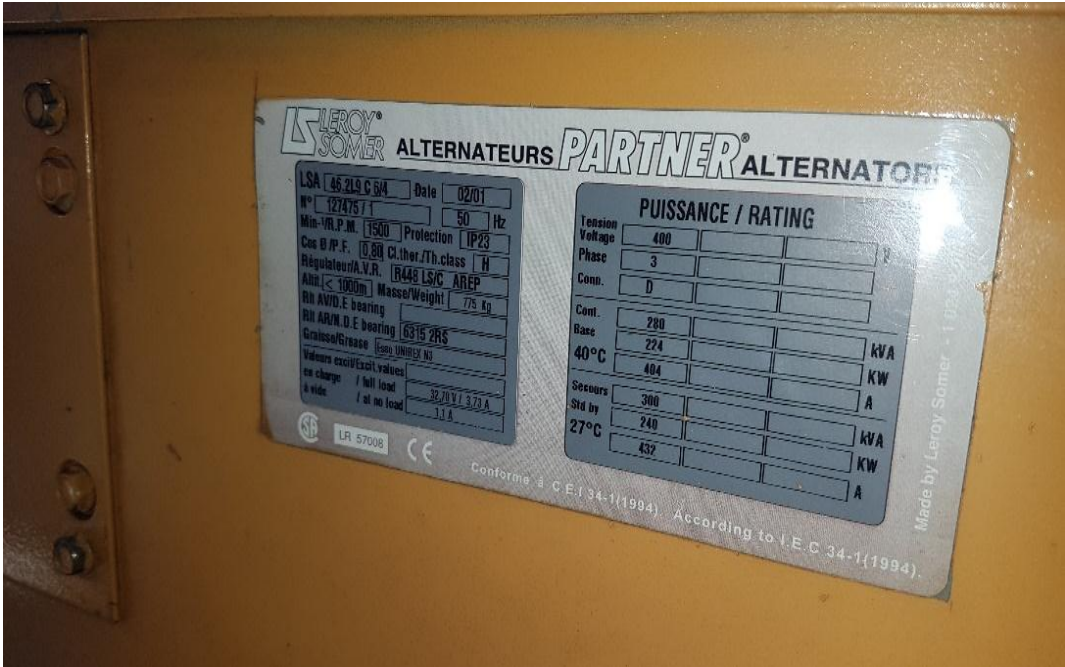


Figure 4-7: Diesel generator nameplate

4.4 DISTRIBUTION KIOSKS AND LV RETICULATION

A basic electrical assessment of the distribution kiosks and equipment was conducted to provide data on the current condition of the electrical installations and are described below.

There is a 320 V rotor pump control panel for the Water Treatment Plant to the north of the border post, behind the vehicle impound.



Figure 4-8: Rotor pump control panel for the waste water treatment plant

There are 16 distribution kiosks in total, two located just after border post, three to the north of the border post and 12 in the residential area to the south of the border post.

Most of the distribution kiosks have nameplates but do not indicate where they are fed from or where they supply power to. The kiosks were locked at the time of inspection and therefore the capacity of the main breakers is unknown. Pictures of the distribution kiosks are show in Appendix A.

4.5 AREA LIGHTING

The lighting on site is achieved by pole mounted street lights and high-mast area lights for the border post, and Post top light fittings for the residential area.

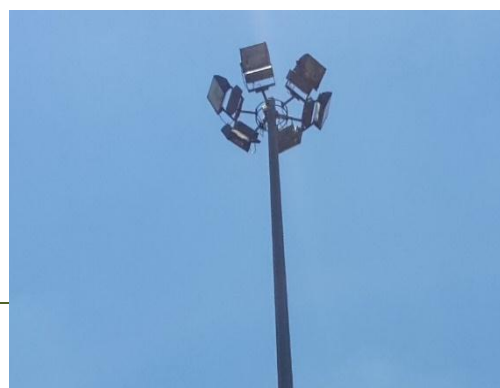
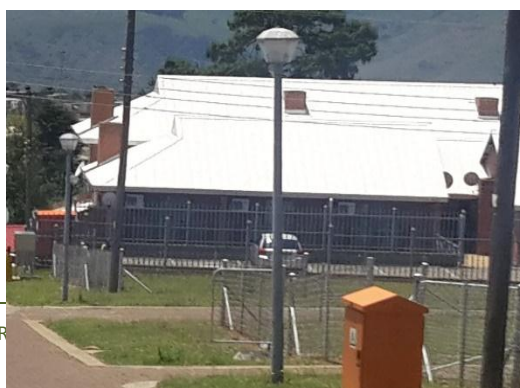


Figure 4-9: Post-top lights and high-mast lights

5 CONCLUSION

The existing electrical infrastructure throughout the site is generally in good condition. The main substation transformer is rated 400 kVA, with the other pole mounted transformers totalling 800 kVA. This means that the total connected load has the potential to be up to 1 200 kVA. There is also a 280 kVA standby diesel generator. It is unknown which loads are connected to this generator.

The size of the Eskom connection to the site is currently unknown. Contact has not yet been established with Eskom. Delta BEC is currently in the process of determining the connection size and spare capacity in the area. Once this information has been received, it will be included in the services design report that will be generated in the next stage of the project.

APPENDIX A: PICTURES OF DISTRIBUTION KIOSKS



Figure 5-1: Kiosk K1



Figure 5-2: Kiosk K2 located next to the vehicle impound the main entrance.



Figure 5-3: Distribution kiosk 4 located behind the public parking area



Figure 5-4: Distribution kiosk 5 located behind the generator room



Figure 5-5: Main distribution kiosk located directly below the pole mounted transformer 3.



Figure 5-6: Distribution kiosk 1 located next to the main distribution kiosk



Figure 5-7: Distribution kiosk 2 located next to distribution kiosk 1



Figure 5-8: Distribution kiosk 3 located to the left of distribution kiosk 2



Figure 5-9: Unlabelled distribution kiosk located to the right of the main distribution kiosk



Figure 5-10: Distribution kiosk 4 located next to the unlabelled distribution kiosk



Figure 5-11: Distribution kiosk 5 located next to distribution kiosk 4



Figure 5-12: Distribution kiosk 7 located down the street from the water reservoir

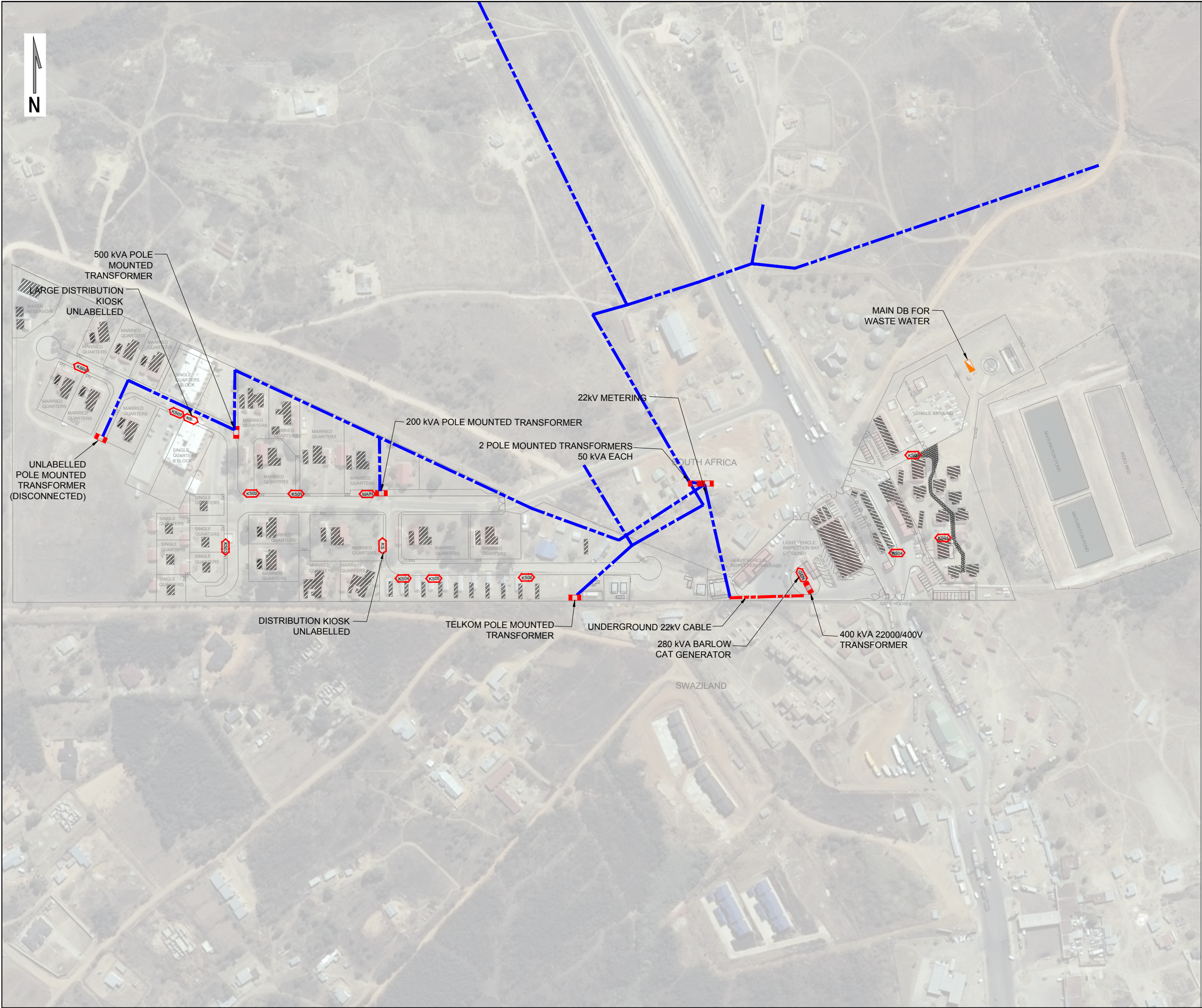


Figure 5-13: Distribution kiosk 8 located down the street from the water reservoir



Figure 5-14: Unlabelled large distribution kiosk located outside the single quarters (B block)

APPENDIX B: SITE LAYOUT DRAWING WITH ELECTRICAL INFRASTRUCTURE



LEGEND:	
ICON	DESCRIPTION
	OVERHEAD 22kV LINE
	UNDERGROUND 22kV CABLE
	DISTRIBUTION KIOSK
	GENERATOR
	TRANSFORMER
	DISTRIBUTION BOARD

STATUS QUO

Rev	Date	Description of changes	By
a	2017/11/06	ISSUED FOR STATUS QUO	AR

REVISIONS

Client



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THE MASTER HELD AT DELTA BUILT ENVIRONMENT CONSULTANTS
BEARS THE ORIGINAL SIGNATURE OF APPROVAL.

SIGNATURE: NAME: DATE:

Project

DPW OSHOEK

Project Description

SITE CLEARANCE

Drawing Title

EXSITING ELECTRICAL
INFRASTRUCTURE

Drawing Units METERS Drawing Size A2

Date	Scale	Designed By
NOVEMBER 2017	1:2000	M.GRIFT

Checked By	Drawn By	Approved By
M.GRIFT	R.RAMPHAL	A.RINGELMANN

Drawing No.	Rev
P17080-SQ-01-SP-901	a