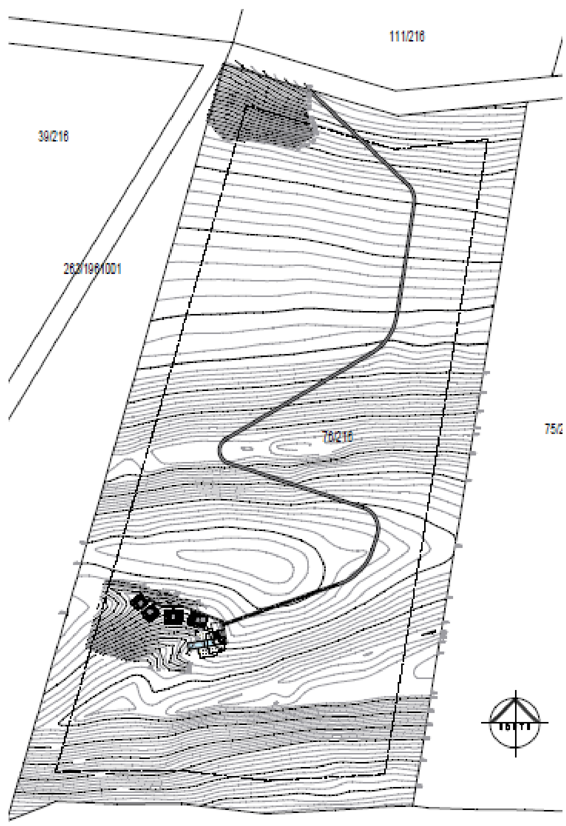
PROPOSED NEW DEVELOPMENT ON PORTION 76 OF THE FARM UITZICHT NO 216, DIVISION KNYSNA, WESTERN CAPE



Submitted by:

BDE Consulting Engineers

03 MAY 2019

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1 INTRODUCTION AND SCOPE

This electrical engineering services report covers the external bulk electricity supply (municipal point of supply) or own generation to the proposed Development.

The supply authority is Knysna Municipality.

Annexures to this report:

- Annexure A – Municipal electrical supply
- Annexure B – Typical solar system

The development will be for a residential property.

2 LOCATION

The farm is located to the West of Brenton on Sea (South of the Main Entrance Road as indicated above).

3 EXISTING INFRASTRUCTURE

There is no existing electrical infrastructure on the farm or the adjacent road reserve to the North.

The closest electrical network is located at CR Swart Drive to the North and to the East as per Annexure A in Magenta colour.

The far distance to the nearest network also dictates the usage of 11000 V lines should this be the chosen option and also private property crossings where servitudes will be required.

4 EXPECTED DEMAND

The maximum expected electricity after diversity demand (ADMD) for the development is 15 kVA.

The maximum demand as indicated will be impacted by any energy saving measures implemented as well as the final design.

5 CAPACITY OF THE EXISTING ELECTRICAL network

The nearest network is a 11000 V supply with adequate capacity but far away.

6 PROPOSED ELECTRICITY DISTRIBUTION NETWORK

The recommended electricity network is a Solar generation network with a diesel generator.

6.1 Municipal supply

The option of a municipal supply cable is only indicated here for information purposes. The new network installation and all costs will be the responsibility of the developer and not the supply authority irrespective of whether Solar or Municipal supply is chosen. The distance of the house from the municipal network is too far for a low voltage network and will therefor require an intermediate 3300 Volt system up to the main house – This option is not explored further as a Solar system is recommended. The costs of a municipal supply network can be from R 476 000.00 up to R 616 000.00 excl VAT. Please see Annexure A attached in this regard.

6.2 Solar plant

6.2.1 Type and system

The solar plant shall be an Off- Grid installation where the sun powers the load during the day and the batteries at night.

Grid-Tie PV Inverters can also be connected to this micro-grid (AC Coupling) should the demand exceed the generation.

6.2.2 Plant location

A roof mounted plant is recommended and to be installed on the roofs of the main house and the out building units should more generating capacity be required.
The main house Northern face roof (assumed $46m^2$) can fit about 23 panels (7 kW)

6.2.3 Plant capacity

The current proposed system is a 15 kWp system.
The peak usage is estimated to peak at 30 kwh per day but permanent residence is not envisaged at this stage.

6.2.4 Energy Storage

A Lithium Iron Phosphate sealed battery system is proposed with a lifetime of more than 10 years (@70% depth of discharge) as well as a quick charging time.

6.2.5 Distribution Network

A small distribution network of underground cabling will be required from the main house to all the units. A trench of 450mm wide and 800mm deep is normally excavated to bury the cables or this can be fixed to walkways on cable trays.

Remote equipment requiring electricity like boreholes can be self-sustained (Solar pump) with a dedicated panel or alternatively a cable can be laid depending on the position from the main house should this be allowed.

6.3 Consumption Metering

There will be no municipal electricity metering.

6.4 Area/Street lighting

Road lighting will be low intensity, low level, bollard type luminaires powered individually by a small solar cell and only activate with motion.

7 ENVIRONMENTAL IMPACT

7.1 Impact on existing electricity consumers

The development will have a minimal effect on the quality of supply to the existing customers due to the fact that the development will be off-grid.

7.2 Environmental impact

The entire internal electrical distribution network will be carefully designed to blend in with the development as well as the natural environment as a whole. All structures, equipment and switchgear will be low profile following natural contours.

The colours and shapes of all structures, equipment and switchgear, will be selected carefully to blend in with the environment.

Services will generally be located within the road reserves to prevent additional disturbance of vegetation. The environmental management plan for the development will form an integral part of the specification and requirements for the electrical construction work.

8 ENERGY EFFICIENCY AND RENEWABLE ENERGY

The use of cost effective alternative energy sources, such as gas and LED lighting will be considered as well as the installation of energy efficient installations as required by the National Building regulations.

Energy efficient equipment will also lower the demand and consumption for a smaller solar system.

9 CONCLUSION

A solar system with minimal environmental impact is proposed for the development but with Generator back-up.

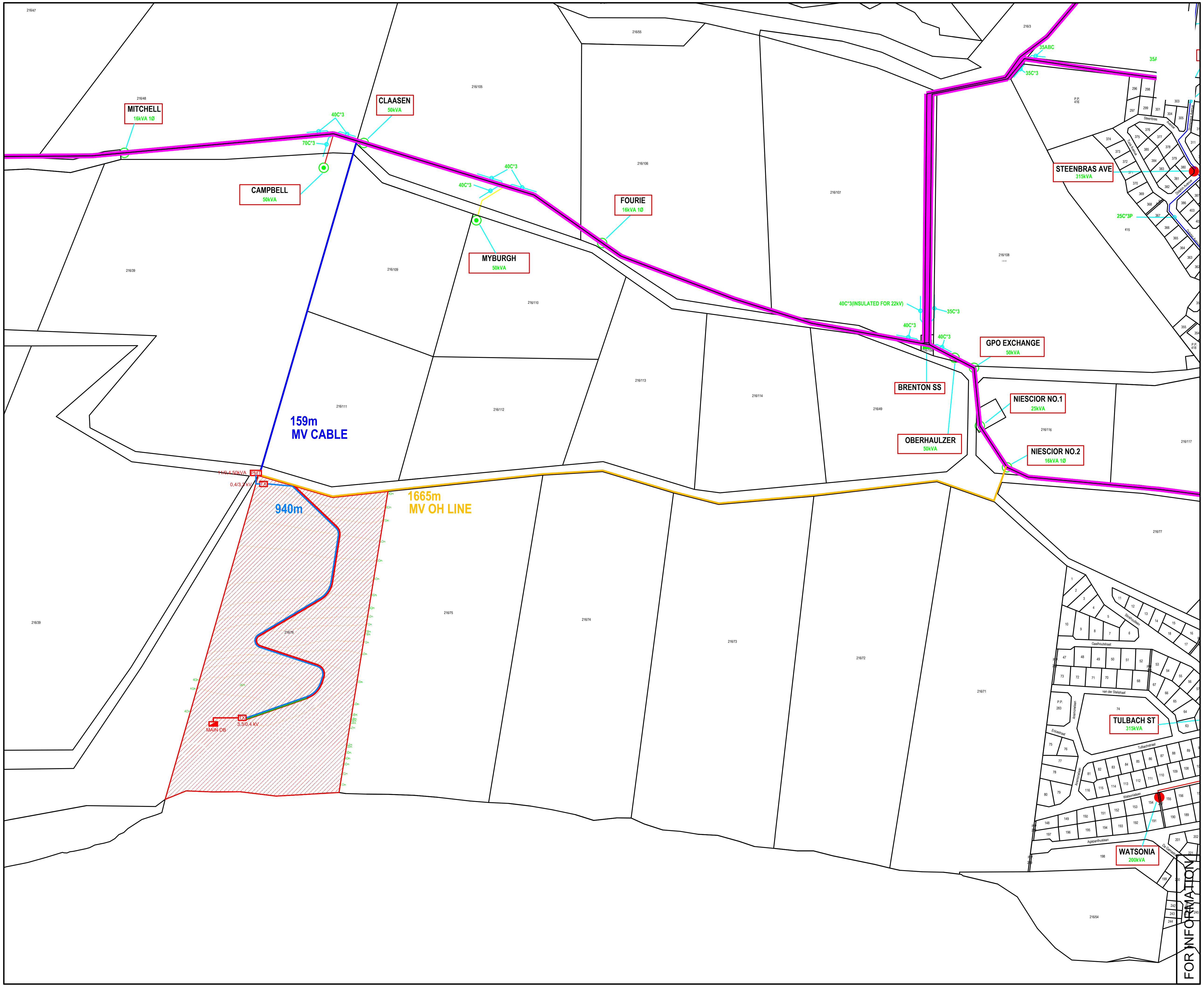
A municipal electrical supply is possible but not recommended due to the costs.

Please contact BDE should there be further details required.

Yours faithfully

Danie de Vries Pr.Eng.
On behalf of **BDE CONSULTING ENGINEERS**

****END****



NR. NO.	DATUM DATE	WYSIGINGS AMENDMENTS
0	2018-10-24	FOR INFORMATION ONLY

DESIGNATION	NAME	SIGNATURE	DATE
SUPPLY AUTHORITY			
TELKOM			
CLIENT			

KLIENT / CLIENT

UITSICHT

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PROJEK / PROJECT

UITSICHT, ERF 216/76

TEKENING BESKRYWING / DRAWING DESCRIPTION

PROPOSED MV LAYOUT

TEKENING NR. / DRAWING NO.	REV
KNY 226/RT/MV/01	0

CAD NAAM / CAD NAME: KNY 226/RT/MV/01 2018-10-24	GOEDGEKEUR / APPROVED
SKAAL / SCALE: A3 - 1:1000	NAGEGAAN / CHECKED
LEêR NR. / FILE NO.: 226 KNY	CAD NAGEGAAN / CAD CHECKED
AANVANGSDATUM / COMMENCE DATE: 2018	GETEKEN / DRAWN: UDJ

European Commission

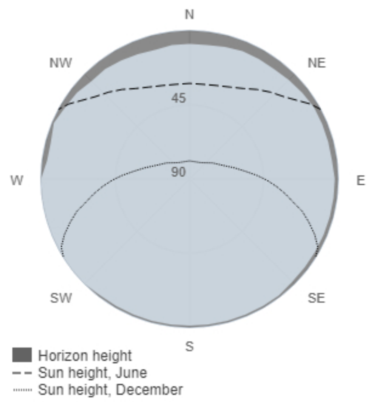
Performance of off-grid PV systems

PVGIS-5 estimates of solar electricity generation

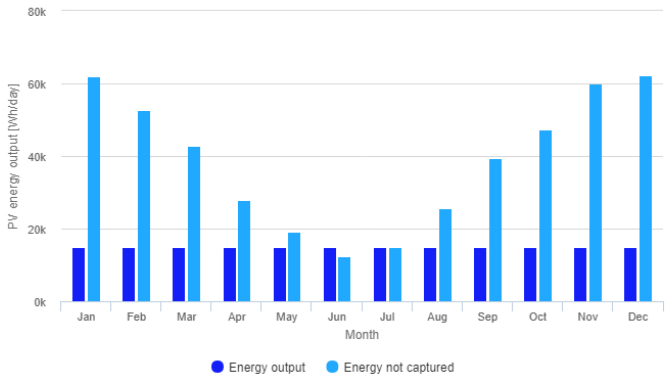
Provided inputs

Latitude/Longitude:	-34.069, 23.002	Slope angle:	0 °
Horizon:	Calculated	Azimuth angle	0 °
Database used:	PVGIS-CMSAF	**Simulation outputs**	
PV installed:	15000 Wp	Percentage days with full battery:	97.7 %
Battery capacity:	30000 Wh	Percentage days with empty battery:	0.16 %
Cutoff limit:	30 %	Average energy not captured:	39718.76 Wh
Consumption per day:	15000 Wh	Average energy missing:	900.3 Wh

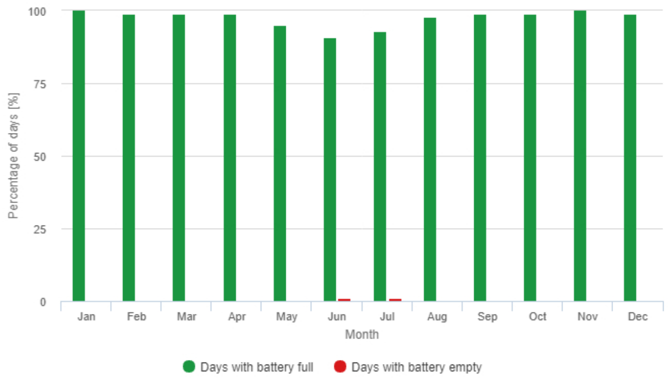
Outline of horizon at chosen location:



Power production estimate for off-grid PV:



Battery performance for off-grid PV system:

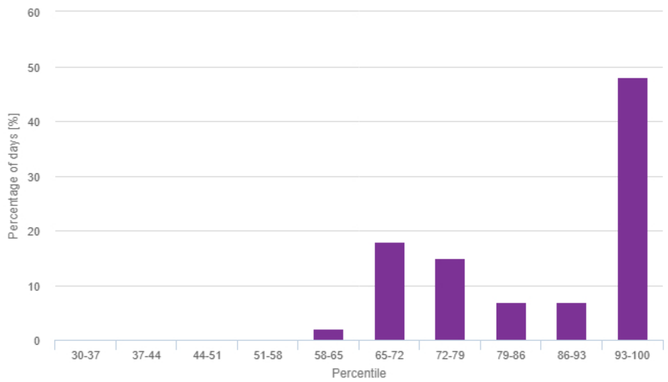


Monthly average performance

Month	Ed	El	Ff	Fe
January	14952.17	61834.9	100	0
February	14988.68	52637.8	99	0
March	14974.02	42795.5	99	0
April	14994.49	27841.2	99	0
May	15004.11	19043.5	95	0
June	14984.8	12504.5	91	1
July	14995.16	14859.9	93	1
August	15008.38	25686.2	98	0
September	15011.22	39453.5	99	0
October	15008	47349.3	99	0
November	15011.8	60018.1	100	0
December	15002.05	62330.9	99	0

Ed: Average energy production per day [Wh/day].
El: Average energy not captured per day [Wh/day].
Ff: percentage of days when battery became full [%].
Fe: percentage of days when battery became empty [%].

Probability of battery charge state at the end of the day:



Cs	Cb
30-37	0
37-44	0
44-51	0
51-58	0
58-65	2
65-72	18
72-79	15
79-86	7
86-93	7
93-100	48

Cs: Charge state at the end of each day [%].
Cb: percentage of days with this charge state [%].

Joint Research Centre

Report generated on 2019/05/03