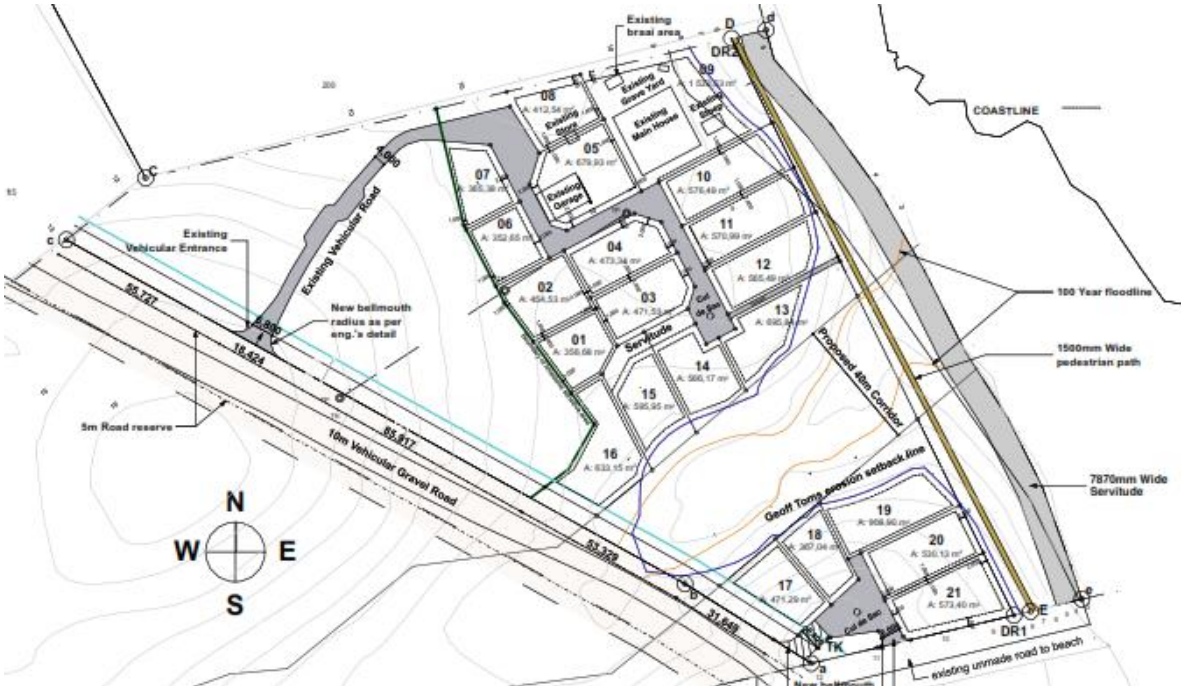
CAPE INFANTA HOUSING SCHEME



ERF 134 CAPE INFANTA

ELECTRO TECHNICAL REPORT FOR THE EXTERNAL AND INTERNAL SERVICES

Submitted by:
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Date: 01 April 2020
Reference: GRG298, Revision 03

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ISO 9001:2015 CERTIFIED CESA
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TABLE OF CONTENTS

1. SCOPE

This report covers the electricity supply to the proposed new housing development on erf 134, Infanta. It will cover the external as well as the internal electrical reticulation network.

Due to the energy saving requirements of the supply authority, energy efficiency and renewable energy is also addressed. The objectives of the energy efficient requirements are as follows:

- To ensure the right fuel or energy source is used for end applications;
- To avoid wasteful and misuse of scarce national energy resources;
- To encourage the deployment of all energy resources in a prudent and environmentally responsible manner.

2. INTRODUCTION

The development consists of 21 single residential units and is situated next to the access road into Infanta as shown on the map below.

The development is within the licensed electricity distribution area of Eskom.

3. EXISTING INFRASTRUCTURE

Eskom supplies the area with a 22kV overhead line network. The formalised Infanta residential area has underground reticulation networks, whilst the various farms in the area are fed via an overhead line network.

4. CAPACITY OF THE EXISTING INFRASTRUCTURE

Eskom indicated that sufficient capacity exists on the 22kV network to supply the required load. See the confirmation letter attached.

5. EXPECTED DEMAND

The estimated load is calculated as follows:

Description	Estimated Load (ADMD)	Total
28 Residential erven	5kVA	105 kVA
General Supply	10kVA	10 kVA
Total Load Required		**115 kVA**

The maximum expected electricity demand for the development is 115 kVA After Diversity Maximum Demand (ADMD) and the average demand 70 kVA.

6. PROPOSED ENERGY SAVING METHODS

Eskom's pre-requisites will apply. See section 11 of this report.

7. PROPOSED ELECTRICITY DISTRIBUTION NETWORK

For developments supplied by Eskom there are two options based on the type of development. In both cases the responsibility for the network up to the metering point stays with Eskom, after construction.

Should the development consist of sectional title units with a "Body Corporate", it shall be metered in bulk by Eskom and a single account will be established for the "Body Corporate". The internal reticulation, after the bulk metering point, will remain the responsibility of the "Body Corporate".

Should the development consist of single residential erven, Eskom will prefer it to be individually metered by them and a single account will be established for each home owner. The internal reticulation, up to the metering points, will remain the responsibility of the Eskom. A single account shall be established for the Home Owners Association (HOA) for the general supplies including street lighting. Eskom will not take over any street lighting. This will be the responsibility of the local Municipality or the HOA.

Details of the proposed electrical distribution network is summarised as follows:

Point of supply:

The development will be supplied from the existing 22kV overhead line network along the access road going into Infanta. The existing house is fed from a 25kVA pole transformer. This transformer will have to be upgraded to accommodate the required 115kVA and establish sufficient capacity for the development.

Medium voltage network:
Alterations or upgrades to the existing 22kV infrastructure are not required, except for the transformer, which will be upgraded to establish sufficient capacity for the development.

Low voltage network:
The low voltage distribution system will be supplied from the above mentioned transformer via underground copper cable supplying strategically positioned distribution kiosks. The supply cables to the kiosks will be protected with optimally specified feeder breakers housed at a distribution box at the transformer.

Connections to the buildings will be done with suitably rated underground cables from the distribution kiosks, ending at the distribution boards inside the various buildings as applicable.

Street lighting:
The area is very sensitive to area lighting and it is recommended that no area lights be installed. Should the developer however wish to install area lighting, energy efficient type lighting will be introduced, positioned according to the final design. Luminaires will be of the low level, low glare type along the main routes. Some wall mounted footlights to low "werf" type boundary walls, which would demarcate the movement routes could also be considered.

8. CONSUMPTION METERING

The metering configuration will depend on the type of development as stated in section 7.

Development consisting of sectional title units with a “Body Corporate” shall be metered in bulk by Eskom. A sub metering and billing system shall be established for the internal distribution network.

Development consisting of single residential erven, is preferred to be individually metered by Eskom and a single account will be established for each homeowner.

9. ESKOM RATES

The standard Eskom rates and tariffs will be applicable.

10. IMPACT

10.1. 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 supplied directly from the existing 22kV overhead network with adequate capacity.

10.2. Impact on the operating costs

The development will have no negative effect on the electrical operating costs of the Eskom, due to the fact that the complete electrical infrastructure required for the development will be supplied and installed by the Developer. Maintenance on the proposed electrical network will be minimal due to the proposed complete underground distribution system and/or bulk meters that will be provided. Electricity sales to the new customers will in actual fact contribute to the profits made by the electricity service of the Eskom.

10.3. 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.

11. ESKOM REQUIRMENTS

This section covers the energy efficiency requirements that shall be met by all new or additional electricity supplies that involve a supply greater than 100kVA. This specification was written to accommodate most consumers, such as commercial and factories. Due to the fact that this is a residential development, most of the requirements are not applicable. The final Eskom requirements at the time of construction will also be applicable.

Lighting

- No incandescent or other inefficient lighting technologies may be used.
- In all applications, the most efficient lamp must be used to attain the required levels of illumination.
- Occupation sensors must be utilised where practically possible. **(N/A to residential developments)**

- Automatic lighting control systems with relevant occupancy sensors to be deployed in low traffic building areas such as stairwells, store areas and underground secure parking areas. **(N/A to residential developments)**
- Non occupied office space lighting to be put off at night or level of illumination reduced to conserve electricity. **(N/A to residential developments)**
- Use daylight whenever possible in lieu of artificial light.
- External lighting for pathways, pedestrian areas etc to deploy renewable solar lighting where ever practical to do so.
- All relevant new building codes of practice and health and safety legislation to be fully adhered to, where applicable.

Appliances

- All electrical appliances to be SABS approved.
- Electronic equipment such as computers, computer peripherals photocopying machines to be switched OFF at night and other times when not in use, when it is safe and efficient to do so.
- All heavy duty electrical appliances that require periodic servicing and maintenance, according to manufacturer's instructions, are covered with an appropriate service contract. **(N/A to residential developments)**

HVAC (N/A to residential developments)

- Employ only high efficiency HVAC systems and make use of occupancy sensors where practical.
- Make use of most-efficient HVAC control systems to create optimum working environment using minimum energy.
- Ensure new HVAC plant have regular maintenance and service contracts in place with professional service companies.

Water heating

- Employ solar water heating and heat pump technologies only. (Either option to be implemented)
- Insulate hot water pipes and hot water storage tanks.
- Properly functioning thermostatic controls are a core feature of all hot water systems and must be properly maintained
- Thermostats must be set at the most efficient level.
- Low flow shower heads must be used, where applicable.

High-efficiency motors (N/A to residential developments)

- High-efficiency motors are available up to 90kW rating and these must be used in all applications of 90kW or less.

- Variable speed drives (VSD) should be used in all parts of the process where output and/or quality of product will not be compromised.

Steam generation (N/A to residential developments)

- Steam must not be generated using electricity. Alternative energy sources such as solid fuel, heavy fuel oil and other liquid fuels should be deployed. In exceptional cases where environmental considerations preclude the use of alternative fuel, electricity may be used only with the explicit approval of the distributor.
- Optimum insulation thickness must be used for the boiler and all steam and condensate pipe work.
- Regular service and boiler maintenance contracts should be in place.

Electrical infrastructure

- Use appropriate electrical conductor size on new installations to reduce distribution losses.
- Optimise plant and large motor power factors to reduce maximum demand and to ensure a power factor of 0.9 lagging or better at all times.
- Exploit off peak electricity tariffs where they are available and it is practical to do so.
- Deploy automatic electricity control technology where ever it is prudent and practical to do so. Examples include automatic time control clocks and thermostatic controls.

Compressed air (N/A to residential developments)

- Employ a compressor load management systems if 2 or more compressors are to be used.
- Design pneumatic systems to minimise losses and wastage.
- Where practical and if alternative more efficient technologies / tools exist, preference should be given to these over pneumatic applications.

Buildings

- Insulate walls, ceilings and roofs **(At least one of these shall be implemented)**.
- Increase light reflectance on walls and ceilings.
- Use daylight whenever possible in lieu of artificial light.
- Employ a load management system to interrupt non-essential load when possible. **(N/A to residential developments)**
- Use energy efficient glass or 3M film and shade windows from direct sun. **(N/A to residential developments)**
- Design the electrical installation to ensure that non-essential loads are grouped on the same circuits. This will facilitate future remote shedding of these non-essential

circuits by the distributor (using smart meter technologies) **(N/A to residential developments)**
- Where possible, orientate the building to maximize energy efficiency.

Lifts and escalators (N/A to residential developments)

- Escalators to switch to crawl or OFF when not in use.

Process efficiency (N/A to residential developments)

- Avoid the use of electricity in any thermal process application, unless only possible with an electrical technology.
- Optimise process to ensure maximum efficiency; benchmark against best practices.
- Where possible, waste heat must be recovered and used elsewhere in the process.
- Prior to ordering manufacturing equipment, where possible, procure machinery which uses forms of energy other than electricity.

Cooking and Food Preparation

- Maximise the use of gas for cooking instead of electric hotplates, where feasible.
- Deploy electric micro wave rather than conventional electric cooking where ever possible to do so.
- Deploy highly insulated containers for hot water dispensers for beverages. **(N/A to residential developments)**

Renewable Energy

- Any opportunity to use renewable forms of energy must be used, where feasible.
- Renewable energy may be used alone or in combination with limited electricity top up for various end use applications. Examples include solar hot water systems and solar lighting.

Co-generation (N/A to residential developments)

- Co-generation should be considered where possible and where sufficient quantities of waste heat and/or process by-product are available or when superheated steam can be generated and the low pressure steam used for process heating.
- Electricity so generated may either be used locally to offset own consumption, sold to any other party and wheeled across the networks of the distributor or it may be sold to Eskom / the distributor in terms of a Power Purchase Agreement (PPA)

12. CONCLUSION

Communication between BDE and Eskom regarding the bulk supply for the development is summarised as follows:

The development consists of 21 single residential units and is situated next to the access road into Infanta.

The development will be supplied from the existing 22kV overhead line network along the access road going into Infanta. Eskom indicated that sufficient capacity exist on the 22kV network to supply the required load.

Alterations or upgrades to the existing 22kV infrastructure are not required, except for the transformer, which will be upgraded to establish sufficient capacity for the development.

Eskom's pre-requisites regarding energy saving shall apply if still applicable at construction.

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