

**BULK
SERVICE REPORT
FOR CIVIL INFRASTRUCTURE
FOR THE DEVELOPMENT OF ERF 4162
FISHERHAVEN
KNYSNA**

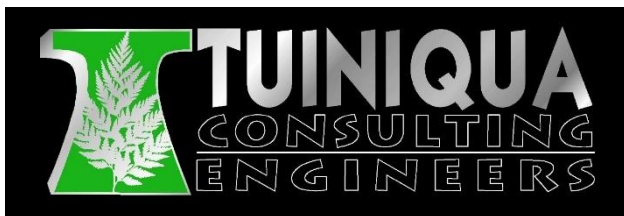
**FOR
MAGDA ZAKREWSKI**

Bulk services

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TK 1738



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BULK SERVICE REPORT FOR CIVIL INFRASTRUCTURE ERF 4162 KNYSNA

1 INTRODUCTION

This report provides information regarding the civil infrastructure required for the proposed development of Erf 4162, Fisherhaven into 36 residential apartments.

Tuiniqua Consulting Engineers has been appointed by Me. Magda Zakrewski , as Structural and Civil Engineers for this project.

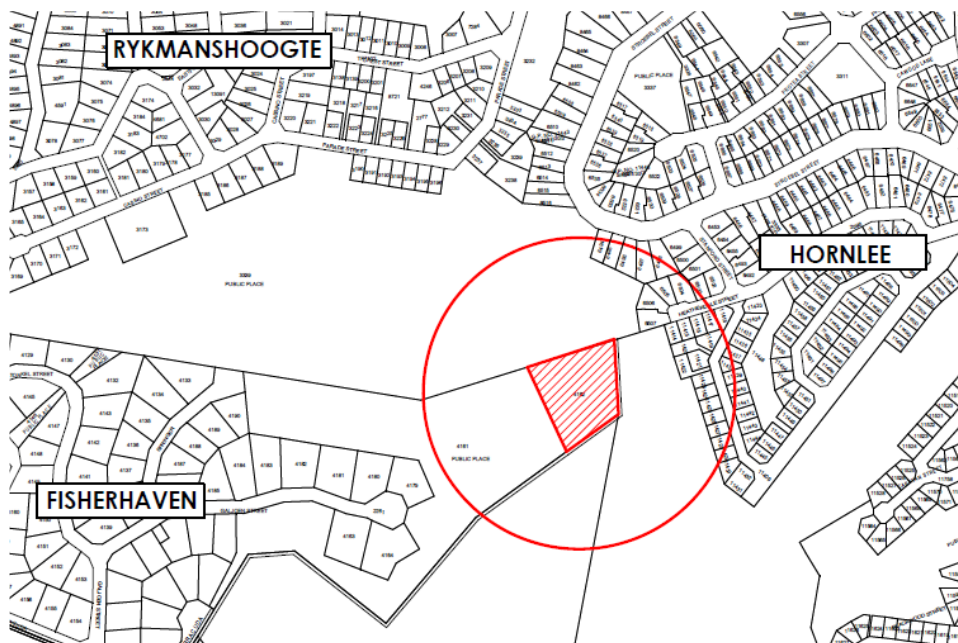
Application will be for the rezoning of Knysna Erf 4162 from “Undetermined” to “General Residential”.

The site will be developed as follows:

54 Parking bays in a basement and upper basement and outside parking area,
36 residential apartments.

2 LOCATION

Erf 4162 is situated in Fisher Haven, to the west of the end of Galjoen street.



3 TOPOGRAPHY AND ACCESS

SUPPLY AUTHORITY

BULK SERVICES

A new 250mm diameter pipe from the Municipal Reservoir to the west of the development (on erf 4161) will be provided to Erf 4162.

A new 160mm Diameter sewer gravity is will connect the proposed development to the existing municipal manhole in Heatherdale street to the south of stand 6504.

5.3 ROADS

Access to the development will be obtained from Baracuda Avenue in Fisherhaven along the side of the mountain on an existing dirt road and servitude.

The width of the existing servitude is 6.3 m.

According to TMH16 Volume 2 Tabel 26, the minimum driveway width for this development will be 5m if a one-way driveway with passing lanes is provided.

Table 26 Minimum driveway widths

Description of driveway		Minimum width (m)
Residential	Single family	3
	Low density (10 units)	5
	Medium density (20 units)	6
	High density one-way	5
	High density two-way	7
Other developments	One-way	5
	Two-way	7
Trucks	One-way	5.5
	Two-way	7.5

The total road infrastructure including retaining walls, storm water drainage and to make provision for an acceptable horizontal alignment (curve of road) will require a wider servitude than the existing 6.3 m. The existing road follows the topography of the site and coincides with the servitude at certain points however, not all the way. The servitude will have to be updated and widened to the coincide with the final required road reserve.

We recommend a two-strip road with passing lanes as shown on Drawings TK 1738 30 R0- Proposed layout and TK 1738 02 R1- Proposed cross section of road.

Stormwater will be channelled next to the road and will be discharged at outlet points to suit the conditions on site.

5.4 STORMWATER

The stormwater from the area above the proposed development will be collected in a stormwater channel above the parking area and will be diverted to the lower portion of the site in stormwater pipes, running down both sides of the development, to be released in the natural watercourse.

5.5 AUGMENTATION

The total footprint of the proposed development will be as follow:

Residential = 1110m².

Where 1 equivalent erf use 400kl/year and 1.2kl/m²/year

$$\frac{1.2 \times 1110 \text{ kl/year}}{400 \text{ kl/year/equivalent erf}} = 3.33 \text{ equivalent erven}$$

Augmentation for 3.33 ee will be due on water and sewerage.

6 INTERNAL SERVICES

6.1 WATER RETICULATION

The proposed water demand is taken from the "THE NEIGHBOURHOOD PLANNING AND DESIGN GUIDE: SECTION J WATER SUPPLY."

Section J.4

Table J.2: Recommended unit Average Annual Daily Demands

*Residential stands– High Density small sized (36x.6 kL/unit/day) = **21.6kL/day for 36 units (0.25l/s)***

Total Average Annual Daily Demand (AADD) for the development is 21.6kL/day. (0.25l/s)

Peak demand

Table J.9: Recommended peak hour, day and week factors, based on land use.

Residential (RES) < 1000kL/d TAADD PF_{hour} 4.6

Peak Hour Demand

*RES: 0.25 l/s*4.6 =1.15l/s*

75mm connection will be required for water reticulation only. Pipe size for fire reticulation to be determined by a fire specialist.

6.2 SEWER RETICULATION

The proposed sanitation demand is taken from the "THE NEIGHBOURHOOD PLANNING AND DESIGN GUIDE: SECTION K SANTATION."

The design criteria for the sewer reticulation will be as follows:

SECTION K.4

Table K.4: Demands and hydrographs for different land use categories.

*High density, small sized(0.6kl/unit/dx70%) 0.42kL/unit/day **15.12kL/day for 36 units***

Total Average Annual Daily Demand (AADD) for the development is 15.12 kL/day.

Discharge & Flow:

- The average discharge of 15.12kL/day.

- A peak factor of 1.8 for residential and 1.3 for commercial is assumed.
- Infiltration rate of 0.03 (L/min/m pipe/m Ø)
- Sewer Pipe approximately 150m in length and 160mm Dia.
- Assume stormwater ingress of 30% as recommended for reticulation.
- Minimum flow velocity in pipes of 0.6m/s.
- Maximum flow velocity in pipes of 2.5m/s.

Materials:

- Pipes are SANS approved, Class 34 heavy duty, solid wall uPVC pipes, on Class C bedding.
- Minimum pipe diameter is 110mm for house connections and 160mm for main pipe to municipal connection.
- Minimum sewer gradient for 160mm pipe is 1:100.
- Minimum cover on sewer pipes to be 1m. See Bedding detail below.
- Maximum distance between manholes is 60m.

Calculations:

Instantaneous peak dry weather flow (IPDWF) Excluding Infiltration:

$$\begin{aligned} \text{Residential IPDWF} &= 16 \text{ Units} \times 0.42 \text{kl/d/unit} \times 1.8 \times 1000 / (24 \times 60 \times 60) \\ &= 0.315 \text{ l/s} \\ \text{Total IPDWF} &= 0.315 \text{ l/s (27kL/d)} \end{aligned}$$

Average Daily Dry Weather Flow (ADDWF):

$$\text{ADDWF} = \frac{0.315}{1.8} = 0.175 \text{ l/s (15.12kL/d)}$$

Groundwater infiltration flow:

$$\begin{aligned} \text{Infiltration flow} &= 0.03 \times 150 \text{m} \times 0.160 \div 60 \text{ sec} \\ &= 0.012 \text{ l/s} \\ &= 1 \text{ kl/d} \end{aligned}$$

Instantaneous peak dry weather flow (IPDWF) Including Infiltration:

$$\begin{aligned} \text{IPDWF} &= 0.315 \text{ l/s} + 0.012 \text{ l/s} \\ &= 0.327 \text{ l/s (28kL/d)} \end{aligned}$$

Design flow or IPWWF (instantaneous peak wet weather flow)

$$\text{IPWWF (l/s)} = \text{IPDWF incl infiltration (l/s)} / (1 - \text{stormwater ingress})$$

$$\begin{aligned}
 &= 0.327/(1 - 0.012) \\
 &= 0.32 \text{ l/s} \\
 &= 28 \text{ kl/d}
 \end{aligned}$$

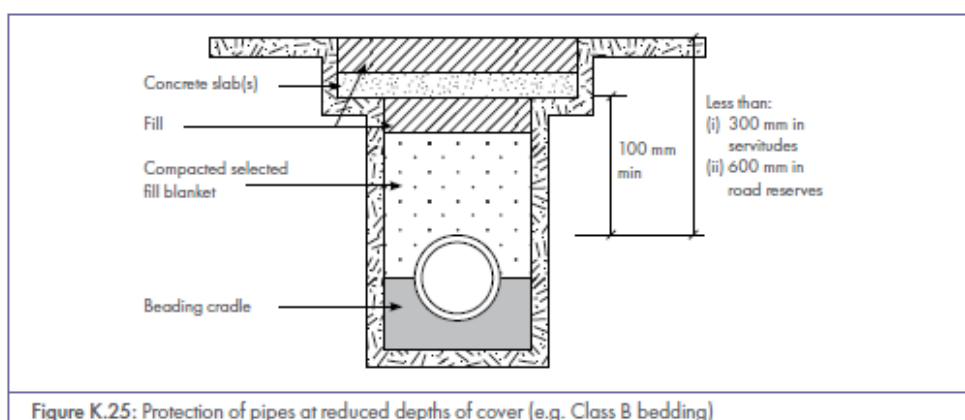


Figure K.25 taken from the “THE NEIGHBOURHOOD PLANNING AND DESIGN GUIDE: SECTION K SANITATION.”

6.3 SOLID WASTE MANAGEMENT

- A Waste collection station will be provided as shown on the SDP. Wheelie bins will be stored in these areas. Residents will bring their waste to these stations and assorted colour bags will be used for general and recyclable waste.
- The stations will have separate containers for general and recyclable waste.
- The estimated volume of waste is typically 0.15m³ per week per household for residential units.
- The volume of one wheelie bin is 0.24m³.
-

Type of User	Load/week/unit	Units	Gross load to municipal system/w	Bins/week
Res Unit	0.15m ³	36	5.4m ³	22
Business	0.48m ³	0	0m ³	0
Gross load to municipal system			5.4m ³	22
Volumes indicated are in uncompacted form				

The collection and disposal of the solid waste will be done by the Knysna Municipality and from the Refuse rooms provided.

6.4 STORM WATER

The stormwater system will be designed to follow the principles of Sustainable Drainage Systems (SuDS).

Storm water will be collected in the basement-parking area from the roofs of the development.

From the basement the water will be discharged into pipes connected to the main storm water pipes at the sides of the building to be released into natural water courses.

7 Conclusion and summary

The demands that will be placed on the municipal system by the subdivision of erf 4162 will be as follows:

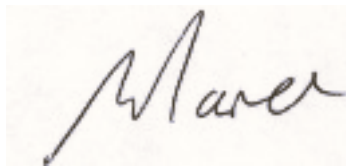
7.1 Water Demand: 21.6 kl/day (Total peak hour demand 1.15 l/s)

7.2 Sewer Load: 15.12 kl/day

7.3 Solid Waste: 5.4 m³/week

We trust the information provided will allow the Knysna Municipality to make an informed decision regarding the requirements for the development.

Yours faithfully

A handwritten signature in dark ink, appearing to read 'Maree', is written on a light-colored rectangular background.

SVW Maree Pr Eng
Tuiniqua (Pty) Ltd