



SERVICES REPORT

FOR

**THE REMAINDER OF THE FARM BOSCH HOEK 3345
NEWCASTLE**

June 2011

PREPARED FOR:

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Ons Verw/Our ref **23 June 2011**

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Sir

**SERVICES REPORT FOR THE REMAINDER OF THE FARM BOSCH HOEK 3345
NEWCASTLE**

Herewith the Services Report for the proposed township on the remainder of the farm Bosch Hoek 3345 for your attention.

Yours sincerely

J.J.J. VAN RENSBURG Pr. Eng.

p. KBK ENGINEERS

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1. **INTRODUCTION**

The Developer St Leger Denny Developments appointed KBK Engineers (Pty) Ltd as Consulting Civil Engineers for the design of internal and external civil engineering services for the proposed development.

The proposed township development to be on the remainder of the farm Bosch Hoek 3345, but exclude portion one of the farm Bosch Hoek 3345, to be developed by the Newcastle Local Authority.

The document prepared by KBK Engineers is for the following services:

- Roads
- Stormwater
- Domestic water supply
- Sewage
- Solid waste disposal

The purpose of this report is to provide information on current services, planned for services as well as the overarching principles that would be adhered to for the design and specifications of the new services.

The Newcastle Municipality will, after the installation of the services and after approval by the Engineer and the Municipality, take over all services.

This report only addresses the items mentioned above. The drawing of the proposed township layout, included in Annexure A should only be used as a reference. This report must also be read in conjunction with the traffic impact study done by others and reported separately.

2. **RELEVANT INFORMATION**

2.1 **THE DEVELOPER:**

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2.2 **CIVIL CONSULTING ENGINEER:**

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2.3 LOCATION AND EXTENT

The site of the proposed development is on the remainder of the farm Bosch Hoek 3345.

The proposed development with approximately 2 800 erven (affordable housing), with erven soned for General Business, Churches, Schools, Crèches, Clinics, Sport Facilities and Open Space covers an area of 137 ha. The development is bordered by the Normandien Provincial Road P39-1 to the west, Fairleigh Township to the south and portions of the farm Bosch Hoek 3345 to the south and east.

The composition of the proposed township, with reference to the layout included in Annexure A is:

- Erven for affordable houses - 2 700 erven
- General Business - 7 erven (5,575 ha)
- Sport - 1 erven (1,288 ha)
- School - 3 erven (10,616 ha)
- Creche - 4 erven (0,918 ha)
- Church - 3 erven (0,571 ha)
- Clinic - 1 erven (0,623 ha)
- Public Open Space - 2 erven (0,558 ha)

The areas indicated between the floodlines, areas earmarked as wetlands and vegetation sensitive areas, where development will not be allowed, are not included in the above.

2.4 NATURE OF SITE

The farm is mostly in an undisturbed condition with small areas cultivated to produce grass for feeding cattle. The vegetation on the site exists mainly of natural grass land, marshy areas along the low-lying areas with scattered bush. The natural ground slope of the site is generally steep with a slope between 5% and 13% and in one area up to 20%.

2.5 ACCESS TO THE TOWNSHIP

The proposed development will gain access from the Provincial Road P39-1 to the west and eventually also from the new proposed Ring-Road to the north passing through portion 1 of Bosch Hoek 3345 to be developed by the Newcastle Municipality. It is therefore important to establish a cooperation agreement with the Local Authority during the planning phase of both proposed townships. This is also applicable for sewage and water.

3. ROADS

3.1 DESIGN STANDARD

The design and construction of all the roads for the proposed development will be designed and constructed according to the AGuidelines for Human Settlement Planning and Design@ by Department of Housing (Red Book) and to the minimum Standards of the Local Authority where

applicable.

3.2 **SCOPE OF WORK**

3.2.1 **External Roads**

WSP Engineers has been appointed by the Developer to conduct a Traffic Impact Study with specific reference to the major routes to and from the site taking into consideration the present Spatial Development Framework. WSP will compile a report to be read together with this Service Report.

The proposed routes to and from the site is schematically indicated in Annexure B of this report. This proposal may still be adjusted by WSP in their final report.

At present the main access to the site will be from the Provincial Road P39-1 between Newcastle and Normandien and this road will traverse in an easterly direction through the proposed development to eventually connect to the N11 from Newcastle to Ladysmith. Provision is also made for a south-north route for the proposed development connecting to the future planned Ring-Road (Major arterial) directly north of the proposed development.

This development will not be responsible for the construction of any of the future external road networks as discussed above except to provide for these routes in the proposed township layout and to upgrade the intersection on P39-1 to the standards set by the Provincial Roads Department.

3.2.2 **Internal Roads**

The proposed township layout makes provision for Collector roads, Bus routes and Access streets of varying road reserve and road widths.

Road reserve widths will vary between 20 m, 16 m, 13 m and 8 m with road widths between 10,5 m and 4,0 m. Collector and bus routes will be paved and standards of all other roads to be agreed upon in cooperation with the Local Authority.

The construction cost of all internal roads will be at the cost of the Developer.

4. **STORMWATER**

4.1 **DESIGN STANDARDS**

Stormwater run-off will be calculated using a hydrological rainfall run-off simulation model AHydrosim@. All designs will be done according to the AGuidelines for Human Settlement Planning and Design@ Department of Housing (Red Book) and General Engineering Practices which must also allow for the 1 in 2 year (Micro) and 1 : 20 year (Macro) recurrence periods.

4.2 SCOPE OF WORK

4.2.1 External stormwater

The proposed development is traversed by two well defined natural water ways into which stormwater will be released. No external stormwater upgrading will be required.

4.2.2 Internal stormwater management

Stormwater from rainfall would mainly be generated on the site itself. The development is traversed by two well defined natural waterways running in a south-north direction through the site. Stormwater from the site will be released, on a regular, into these water waterways.

Stormwater will be collected via catchpits within paved roads and then piped and discharged into the waterways. If alternative roads, for instance gravel roads, be considered stormwater will be managed via open canals at the elevated side of the road reserve with concrete or gabion drifts where these canals crosses any road intersection. These canals will also discharge into the waterways.

Pipes will be concrete pipes with ogee joints and pipes to be installed to the appropriate trenching and bedding requirements as per SANS1200.

The rainfall average for this area is 820 mm/year with average rainy days of 120 days/year.

In terms of Section 144 of the National Water Act (Act 36) of 1998 the proposed township is affected by two 1 : 50 and 1 : 100 flood lines. The floodlines as indicated on the drawing were calculated by SRK Engineers and their report is available separately to this report.

5. WATER

5.1 STANDARD AND SPECIFICATIONS

The water reticulation will be designed and constructed according to the "Guideline for Human Settlement Planning and Design – Department of Housing (Red Book).

5.2 SCOPE OF WORK

5.2.1 External water supply

Water for the town of Newcastle is supplied from the Ngagane water purification plant. This plant is at present running at 110% of the design capacity with the consequence that no water is available for any new development within Newcastle. The supply line for raw water, from the Ntshingwayo dam, is also at capacity.

A new pumpline was designed to pump water from the purification plant to a new proposed reservoir positioned close to the northeast corner of Bosch Hoek 3345. This pumpline can also

provide water for the proposed Bosh Hoek townships. The pumpline and reservoir still have to be put out on tender for construction. The size of the reservoir (5 Ml at present) has to be re-evaluated in the light of this new proposed township and other areas that may benefit from such a reservoir.

The Municipality has appointed consultants (SSI) to do a complete network analyses of the existing water network and will extend their appointment to also include the upgrading of the water purification works, raw water supply and reservoir size for Bosch Hoek.

Mr R Gillmer of Uthukela Water indicated that, due to the above constraints, water for the proposed Bosch Hoek township and Siyhlalala Project will not be available within two years at the earliest.

The old, decommissioned water purification works on the Bosch Hoek farm can be re-commissioned to provide partially in the required water demand. This however is not an option for the development as raw water supply to the plant from the river cannot be guaranteed over a 12 month period due to flow constrains of the river especially during dry spells.

5.2.2 Internal water supply

The water supply network within the boundaries of the proposed township will be designed according to the Red Book Standards.

The water pipes to be used will be uPVC pipes, Class 12, with a minimum size of 75 mm diameter up to sizes as indicated from the network analyses to be done.

Fittings will be uPVC and cast iron. Valves and fire hydrants will be to the requirement of the Municipality and Local Fire Department.

The internal pipe network will be installed at the cost of the Developer.

The calculated water demand for the proposed development is based on the proposed layout at this stage and is briefly calculated below:

Affordable houses	:	2 700 erven x 600 l/erf	=	1 620 kℓ/day
General Business (9 sites)	:	5,575 ha/100 m ² x 0,5 x 400 ℓ	=	112 kℓ/day
Sport (1 site)	:	1,288 ha x 12,5 kℓ/ha	=	16 kℓ/day
School (3 sites)	:	10,616 ha x 15,0 kℓ/ha	=	159 kℓ/day
Crèche (4sites)	:	0,919 ha x 12,5 kℓ/ha	=	12 kℓ/day
Church (3 sites)	:	3 x 2 000 ℓ/erf	=	6 kℓ/day
Clinic (1 site)	:	0,623 / 100 m ² x 0,5 x 500 ℓ	=	16 kℓ/day
Total water demand per day			=	1 941 kℓ/day
			→	2 000 kℓ/day

Reservoir capacity required for storage of 48 hours is thus 4 Mℓ excluding fire storage requirements.

6. **SEWERS**

6.1 **STANDARDS AND SPECIFICATIONS**

The sewerage reticulation will be designed and constructed according to the A Guideline for Human Settlement Planning and Design – Department of Housing (Red Book).

6.2 **SCOPE OF WORK**

6.2.1 **External sewage accommodation**

The sewer network within the proposed township will be a full waterborne sanitation system and will drain in a northwest direction to connect to the network of the proposed Siyhlalala Project.

The existing outfall sewer to service these developments is at present a concrete pipe sewer and no spare capacity is available to accommodate the additional sewage flow. The pipe is also in a poor condition and has to be upgraded or replaced with a new pipeline.

This outfall sewage line drains to the Voortrekker pump station. The sewage is then pumped from Voortrekker pump station to pump station no. 1 and from there to the treatment works. To accommodate the additional sewage generated by the proposed developments the following needs to be done as indicated by Mr R Gillmer:

- The pump station at Voortrekker is too small and has to be upgraded.
- The capacity and condition of the rising main to pump station No. 1 needs to be evaluated.
- The pumps at pump station No. 1 are in good condition and will have capacity but the temporary storage facility needs upgrading.
- The pumpline and outfall pipelines to the treatment works also need maintenance and/or upgrading.

It was indicated by the Municipality that they will also appoint Consulting Engineers (SSI) to investigate and prepare a report on the actions to be implemented and associated costs.

This proposed development on the remainder of Bosch Hoek 3345 as well as the Siyhlalala Project cannot be developed before the above upgrading takes place.

A time frame was not provided but can be done within the two year period required for the upgrading of the bulk water supply.

6.2.2 **Internal sewer network**

The sewer network within the boundaries of the proposed township will be designed according to the Red Book Standards and specific requirements of the Local Authority.

All erven will be provided with a 110 mm diameter sewer connection to the main sewer. The

main sewer lines will have a minimum diameter of 160 mm. The sewer connection to business and school erven will be a 160 mm diameter connection. The sewer pipes to be used will be Marley Twinwall heavy duty pipes. Manholes will be 1 000 mm diameter chamber precast manholes or as specified by the Local Authority.

The installation of the internal sewer network will be at the cost of the Developer.

The calculated sewage flow for the proposed development is based on the proposed layout at this stage and is briefly calculated below:

Affordable houses	:	2 700 x 500 ℓ/erf	=	1 350 kℓ/day
General Business (7 sites)	:	5,575 ha/100 m ² x 0,5 x 400 ℓ	=	112 kℓ/day
Sport (1 site)	:	500 m ² /100 m ² x 300 ℓ	=	2 kℓ/day
School (3 sites)	:	10,616 ha/100 m ² x 0,1 x 600 ℓ	=	64 kℓ/day
Crèche (4 sites)	:	0,919 ha/100 m ² x 0,2 x 600 ℓ	=	11 kℓ/day
Church (3 sites)	:	0,571 ha/100 m ² x 0,3 x 300 ℓ	=	5 kℓ/day
Clinic (1 site)	:	0,623 ha/ 100 m ² x 0,5 x 500 ℓ	=	16 kℓ/day
Design flow			=	1 560 kℓ/day

7. SOLID WASTE DISPOSAL

The responsible authority for solid waste disposal will be the Newcastle Municipality.

ANNEXURE A

DRAWING

ANNEXURE B

WSP SITE PLAN

**MAJOR AND MINOR ARTERIAL AND
COLLECTOR ROADS**