

**VP INVESTMENTS HOLDINGS (PTY) LTD**

**ENGINEERING REPORT**

**PENNINGTON DEVELOPMENT  
PORTION 1 –148 OF THE FARM  
ALICEVILLE NO. 2147  
PROPOSED RESIDENTIAL DEVELOPMENT  
247 SITES**



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**14141**  
**FEBRUARY 2008**

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## 1. **INTRODUCTION**

Kantey and Templer (Pty) Limited were appointed by VP Investment Holdings (Pty) Ltd to carry out an investigation and report on the Bulk Services and Engineering Design for the Development on Portion 1-148 of the Farm Aliceville No 2147

This report is based on a proposed layout which has been prepared by Greene Land, a copy of which is attached in Annexure A.

## 2. **ENGINEERING DEVELOPMENT PROPOSAL**

### 2.1 **General**

The following engineering services for the development of the area are proposed. These are based on the following assumptions.

- (a) The level of service will be that which will cater for the High income group.
- (b) All proposed services will tie into existing Bulk Services which have been provided by the applicable local authorities.
- (c) The provision of services to the proposed development will be designed to ministerial norms and standards and generally in accordance with the "Guidelines for the Provisions of Engineering Services and Amenities in Residential Township Developments" (Red Book).

### 2.2 **Layout Plan**

The proposed layout consist of 247 sites between 500m<sup>2</sup> to 1500m<sup>2</sup> with an average plot size of 800 m<sup>2</sup> .

### 2.3 **Bulk Services**

#### 2.3.1 **Bulk Road**

A Traffic Impact Statement has been compiled by BCP Engineers. This report recommends that three access points connect the following roads :

Elizabeth Avenue Point B  
Dirk Uys Street and Point D  
Minevia Avenue Point E

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### 2.3.2 Bulk Storm-water

Storm water will be discharged from the site via four natural valley lines. Annexure A indicates the main areas of discharge as Points A, C,D and E.

In terms of the Record of Decision issued by Department of Agriculture and Environmental Affairs a storm water management plan must be approved by DWAF and the local authority. The storm water will be discharged in the Local Authority storm water network and for Points D and E will tie in with the road access work which will need to be under taken for the project

### 2.3.3 Bulk Sewer

A full summary of the demand is provided in Annexure C.

Annual Average Daily Demand (AADD) 247 kl/day.

All sites gravity feed down to tie into water born sewerage network provided by District Municipality. The key tie in points are indicated in the Plan in Annexure A as Points A,C,D and E.

### 2.3.4 Bulk Water

A full summary of the demand is provided in Annexure C.

Annual Average Daily Demand (AADD) 341 kl/day.

The proposed water reticulation will tie into existing water mains. The key tie in points are indicated in the Plan in Annexure A as Points A,C,D and E

## 2.4 Internal Services

### 2.4.1 Internal Road

All roads will be constructed to Municipality Standards which stipulates surfaced road with a minimum width of 5,5m. The following criteria will be used in the design of the roads.

Main Street Roads:	5.5 m wide
Secondary Roads:	4.5 m wide
Design Speed:	40 km/hr
Crossfall:	4%
Min. K Value:	4
Min V L length:	20 m
Cut and fill slopes	1 :1,5
Longitudinal gradient	Close to natural ground
Pavement design	Detailed below



## Pavement Design Method TRH 4 : 1996

Road Category		D	C	B	A
Structural Design Period	(T3)	10 Years	15 Years	20 Years	25 Years
Vehicle per day per lane	(T4)	>20	>220	>700	>2000
Pavement Class	(T4)	ES 0.03	ES 0.3	ES 3	ES 30
Design Reliability	(P13)	50 %	80%	90%	95%

	Access	Residential	Residential Collector	Bus Route	
Road Width	3.0m	4.5m	4.5 m	5.5m	
TRH 4 : 1996 Class	ES 0.03	ES 0.1	ES 0.3	ES 3	
Vehicle per day per lane	(T4)	10 – 20	20 – 75	75 – 220	220 – 700
Cum E80 over Design (*10 <sup>6</sup> )	(T4)		0.03 – 0.1	0.1 - 0.3	0.3 - 1.0
Heavy Vehicle Traffic		0 per day	5 per day	10 per day	25 per day
Heavy Vehicle Factor	(T5)	0.0	0.6	1.2	2.0
Growth Rate	(T10)	4%	4%	4%	4%
Fy= 20 years	(T12)	11303	11303	11303	11303

**Road Category : C**

### Traffic Analysis

Estimated initial commercial vehicles per day ( T4) 75  
 Growth rate (T10) 4 %  
 Estimated E80's per commercial vehicle (T5) 0.6  
 Cumulative E80 loading

$(75^{*}_{(Table\ 4)}\ cvpd \times 11303_{(Table\ 12)} \times 0.6_{(Table\ 5)}\ E80's/cv)$   $0.05863 \times 10^6\ E80'$   
 Design traffic class  
 $0.03 - 0.1 \times 10^6\ E80's$  ES0.1

**Subgrade Analysis** (See attached materials reports)

Material depth (Table 15) 1000mm

	CBR	
SG1	>15	0 layer + Rip & Re-compact In-situ
SG2	7 TO 15	1 layer + Rip & Re-compact In-situ
SG3	3 To 7	2 layer + Rip & Re-compact In-situ
SG4	>3	Special Treatment

Subgrade design CBR (@95% Mod.AASHTO) 11  
 Insitu material classification G10  
 Subgrade CBR classification (Table 16) SG2

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Selected layer-works and subgrade (TRH4:1990 Table 22) :

- 150mm G7
- 150mm Insitu rip and re-compact

The insitu material quality is to be corroborated at the time of construction. Should material be encountered that is worse than that encountered in the design sample, additional subgrade improvement layers of either G9 quality material, dump-rock or free draining coarse river sand will be required to satisfy at least the material depth. The thickness of this layer may need to be verified by a materials specialist should conditions on site be found to be unfavourable.

#### 2.4.2. Internal Storm-water

The approach to the internal storm water will be to design the roads to accommodate sheet flow. Sheet flow will result in storm water being discharged from hardened surfaces onto natural ground thereby retaining the natural hydrology. This will ensure that a minimum of underground piping is required which will reduce discharge quantities and facilitate infiltration.

Storm water generated from roofs could be accommodated in either soak pits or alternatively water is attenuated on site by directly discharging water from roofs into areas planted with suitable plant material.

In the four natural valley lines underground piping will be required where road crossings occur. These pipes will direct the storm-water into the existing water courses and erosion protection will be provided (Gabion baskets and Reno mattresses). Allowance will also be made for subsoil drains. A larger number of small outlets would be preferred to fewer larger outlets limiting soil erosion.

In terms of the Record of Decision issued by Department of Agriculture and Environmental Affairs a storm water management plan must be approved by DWAF and the local authority.

#### 2.4.3. Internal Sewer Reticulation

A water borne sewerage system is proposed with individual connections to each site. The design of the sewer network has been based on the following:

Average dry weather flow	:	1000 l/erf/day
Peak factor (PF)	:	According to the Hacmon formula
Daily peak demand	:	2.5 X PSD
Infiltration	:	15%
Ultimate Design Factor	:	1.5
Maximum velocity of flow	:	2.5 m/sec
Fire risk	:	Low
Minimum diameter of pipes	:	160 mm
Minimum cover over pipes	:	900 mm

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#### 2.4.4. Internal Water Reticulation

The design of the water reticulation has been based on the following:

Average daily demand (ADD)	:	1350 litre/erf/day
Peak summer demand (PSD)	:	15 x ADD
Daily peak demand	:	2.4 x PSD
Maximum velocity of flow	:	2.5M/SEC
Fire risk	:	Low Risk
Minimum diameter of pipes	:	75mm
Minimum cover over pipeline	:	900mm

### 3. SUMMARY AND CONCLUSION

We wish to express our sincere thanks for the opportunity afforded to this firm to complete and submit this report and trust that it is sufficiently comprehensive for the necessary decisions to be made. Should any further information or details be required, please do not hesitate to contact the author of this report.

**KANTEY AND TEMPLER**



**ANDREW SMITH**  
Pr.Eng 960264

ANNEXURE A	:	Bulk Services
ANNEXURE B	:	uGu District Municipality Bulk Confirmation
ANNEXURE C	:	Calculation of Bulk Sewer and Water Demand

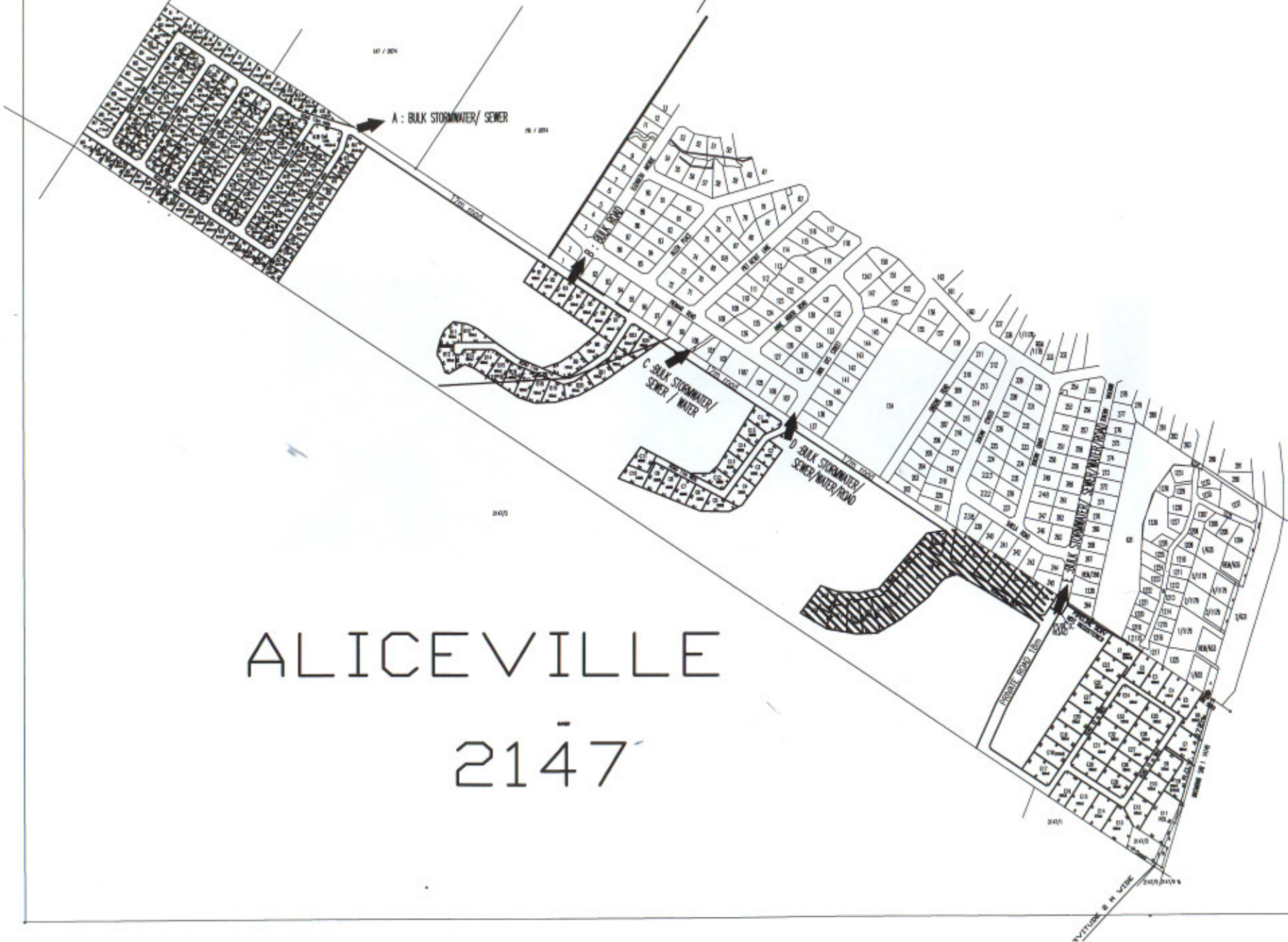
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**ANNEXURE A**  
**BULK SERVICES**



# PTNS 1 - 246 (OF REM) OF THE FARM ALICEVILLE NO 2147

Situate in the Umdoni Municipality, Registration Division ET, Province of KwaZulu-Natal.



# ALICEVILLE 2147

FILE NO : 347  
PLAN NO : 347D  
October 2007  
SCALE 1:2000

PREPARED BY  
**GREENE LAND**  
LAND AND PLANNING LAY  
SUBSIDIARIAL COMPANY

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**ANNEXURE B**

**uGn DISTRICT MUNICIPALITY BULK CONFIRMATION**





Ugu District Municipality  
Distrik Munisipaliteit  
Umasipala Wesifunda

PO Box 33 Port Shepstone 4240  
96 Marine Drive  
Oslo Beach  
Tel.: 039 6885840  
Fax: 039 6824598

**Office of the General Manager: Water Services**

YOUR REF: 14141

OUR REF: 2005/13

7 September 2005

Kantey & Templer (Pty) Ltd  
P O Box 82  
Durban  
4000

Dear Sir/ Madam

**RE: PROPOSED RESIDENTIAL HOUSING ON REM OF THE FARM ALLICEVILLE  
No. 2147 PENNINGTON – BULK WATER & SEWER SUPPLY.**

I refer to your letter dated 24 August 2005.

Ugu District Municipality hereby confirms that water is available for the above development. Water will only be connected once our requirements have been met. Please find these listed below.

- 1 There will be a water contribution payable of R5080.00 per site.
- 2 There will be a sanitation contribution payable of R6660.00 per site.
- 3 An approved plan of the development and internal reticulation is to be submitted and approved at our Water Services Department (Oslo Beach).
- 4 All internal water and sewer reticulation is to be installed by the developer.
- 5 Cost of a builder's connection and deposit is to be paid.

Once each site requires its own water meter there will be a cost of R2688.37 (20mm) and a water deposit of R550.00 per site. Please note that all amounts quoted above and subject to change and we do not bind our selves to them, amounts will be recalculated on the date payments are made. I do trust that you will find the above in order, should you require any further information, in regards to the above, please do not hesitate to contact me at the above given number or address.

Yours Faithfully

**A SCHUTTE**  
**DEVELOPMENT & PLANNING – WATER SERVICES**

**RECEIVED**

2005 -09- 12

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**ANNEXURE C**

**CALCULATION OF BULK SEWER  
AND  
WATER DEMAND**



**WATER**

**Domestic Demand**

No. of Stands **247**  
 Average Stand Area **800 m<sup>2</sup>**  
**0.08 ha**  
 AADD **1,350 l/day/stand** *Red Book Fig. 8.26*

		k/day	kl/hr	l/min	l/s
AADD (Total)		333	13.9	232	3.86
Summer Peak Factor	1.5	500	20.8	347	5.79
Daily Peak Factor	2.4	800	33.3	556	9.26
Instantaneous Peak	4.0	1,334	55.6	926	15.44

**Frail care center**

AADD **1,900 m<sup>2</sup>**  
**400 l/day/100m<sup>2</sup>** *Ref New Red Book Ch9 Pg 20 Tab 9.13*

k/day	kl/hr	l/min	l/s
7.6	0.3	5.3	0.09

**Fire Fighting**

Fire Flow Requirement/ hydrant **1,296** **54** **900** **15.00** *Ref New Red Book Ch9 Pg 37 Tab 9.23*  
 Low-risk - Grp 1(l hydrant only for <2000 DU's)

k/day	kl/hr	l/min	l/s
1,296	54	900	15.00

**SUMMARY**

		k/day	kl/hr	l/min	l/s
Average	AADD	341	14	237	3.95
Peak	PADD	508	21	353	5.88
	Daily Peak	808	34	561	9.35
	Peak Instantaneous	2,637	110	1,832	30.53

*summer peak excluding fire fighting*  
*daily peak excluding fire fighting*  
*instantaneous peak including fire fighting*

**SEWER**

AVERAGE DAILY DEMAND **247 UNITS** **1000** **247.00**  
**247.00** k/day  
 PEAK DEMAND **2.5** **617.5** k/day