MEMORANDUM
PROPOSED TOWNSHIP ESTABLISHMENTS:
TSHING EXTENSION 8
ON
A PORTION OF THE REMAINING EXTENT OF PORTION 3 (A PORTION OF PORTION 1) OF THE FARM DOORNPAN NO. 193-IP
AND
VENTERSDORP EXTENSIONS 11 AND 12
ON
A PORTION OF THE REMAINING EXTENT OF PORTION 25 (A PORTION OF PORTION 8) OF THE FARM ROODEPOORT NO. 191-IP

CHAPTER 1: INTRODUCTION

1.1 BACKGROUND

Maxim Planning Solutions (Pty) Ltd was appointed by the Ventersdorp Local Municipality to attend to the establishment of the proposed township areas of Tshing Extension 8, Ventersdorp Extension 11 and Ventersdorp Extension 12. In terms of the approved Spatial Development Framework of the Ventersdorp Local Municipality (2011), there are 1100 informal houses that are not located on stands with an additional 2560 informal structures in backyards. This culminates in a total informal housing backlog in the Ventersdorp urban area of 2660 houses.

In terms of the Spatial Development Framework, the main development strategy for residential development should be based on the following principles:

- Infill development of vacant areas
- Integration of areas
- Densification of areas
- New community based residential development to be based on the Breaking New Ground Principles (BNG) for sustainable human settlements

Apart from subsidised housing provision must also be made for affordable (bonded) institutional and low income rental units (CRU). CRU's can play an important role in addressing the housing needs of low income group (up to R3500 p.m.) and can include people who already obtained subsidies in other areas, temporary workers or people not interested in a subsidised house. (Development of CRU's can also be integrated in the urban renewal programmes).

According to the analysis the current housing stock of the urban area consist of the following:

- Formal houses - 3890
- Informal on stands - 656
- Informal in backyards - 2560
- Informal not on stands - 1100

- Land needs (for 3660 households) - 224 ha (based on an average density of 15 units per ha)

- Total housing need (backlog) is estimated at 4316

- Based on the average income structure of the municipality the housing needs for subsidised housing, institutional housing and bonded housing is estimated as follows:

	Income Categories	%	2010	2015	2020	Total Units
Subsidised Housing	R0 – R3500	68%	2873	177	140	3190
Institutional Housing	R3501 - 7500	13%	549	34	26	609
Bonded Housing	R7501 +	19%	803	49	40	892
Total units			**4225**	**260**	**206**	**4691**
Total land needs (ha)			**224**	**17**	**14**	**n/a**

As far as land allocation is concerned the first priority will be to concentrate on land that is owned by the municipality namely:

Options for Residential Development on Municipal land – Ventersdorp:

Property Description	Remarks	Area (Ha)
Re of Ptn 25 of the Farm Roodepoort No. 191 – IP	Municipal land	23.089
Re of Ptn 25 of the Farm Roodepoort No. 191 – IP	Municipal land	6.833
Re of Ptn 25 of the Farm Roodepoort No. 191 – IP	Municipal land	4.999
Ventersdorp Ext 10 (Erf 893-904)	Vacant Industrial stands (12 stands)	4.151
Re of Ptn 25 of the Farm Roodepoort No. 191 – IP	Municipal land	8.198
Toevlug	Installation of services in process	15.258
Re. of Ptn 3 of the Farm Doornpan, 193 -IP	Currently occupied 853 informal structures	19.607
Re. of Ptn 25 of the Farm Roodepoort *No.* 191-IP	Municipal land	11.081
TOTAL		**93.936**

The spatial and environmental issues affecting the development of the urban area of Ventersdorp as identified in terms of the Spatial Development Framework of the Ventersdorp Local Municipality are reflected on Map 19 of the fore-mentioned Spatial Development Framework attached herewith.

In terms of the Spatial Development Framework, the main development strategy for residential development should be based on the Breaking New Ground Principles (BNG) for sustainable human settlements which can be summarised as follows:

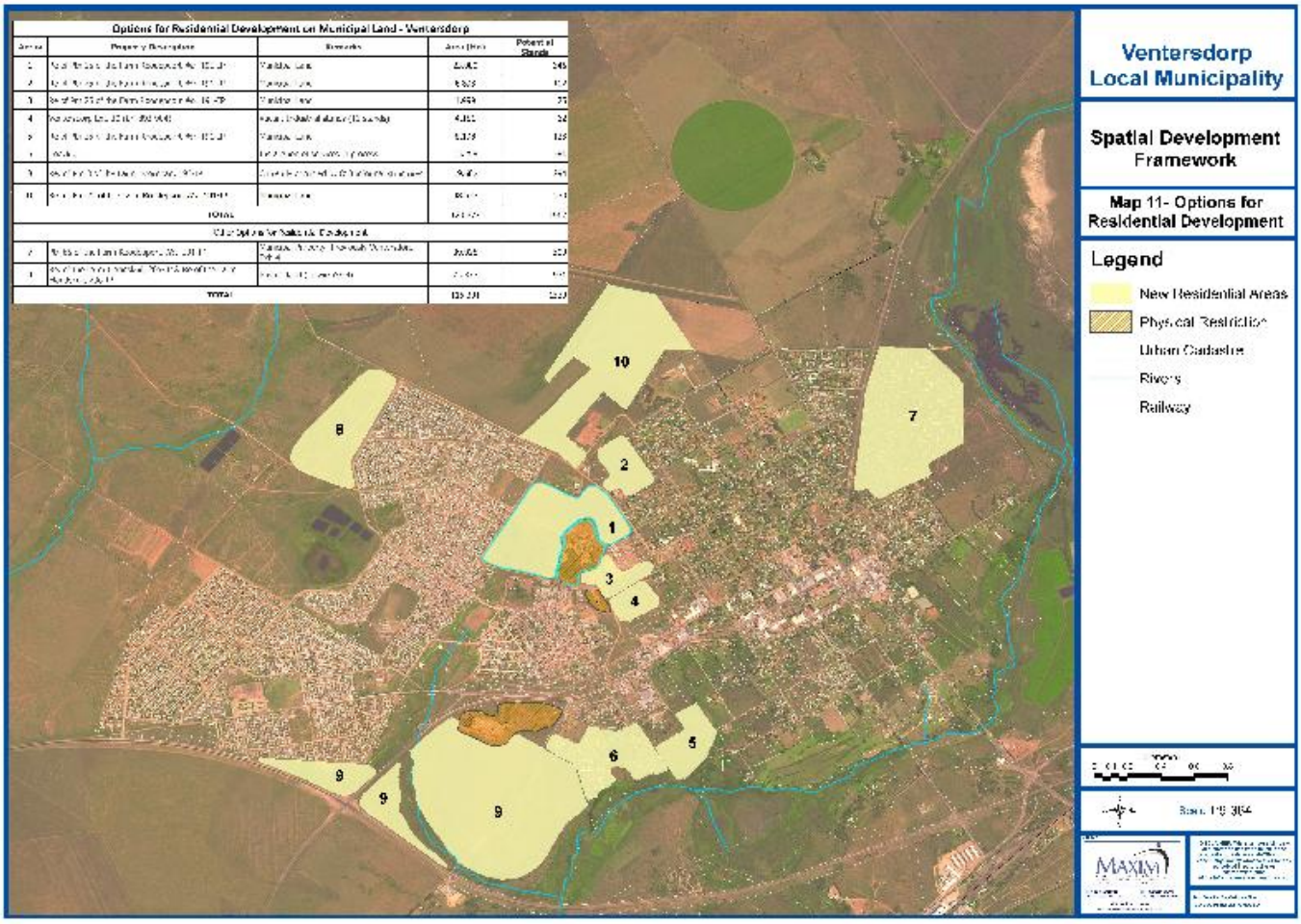
- Most housing projects are not guided by the new principles of Breaking New Grounds Strategy (BNG)
- This result in almost all low-income housing projects being located on the periphery of urban areas.
- This contributes to urban sprawl and fails to address the legacies of apartheid.
- Most current housing projects are targeted to Greenfields developments and little attention is paid to urban renewal or infill planning projects.
- While market forces also dictate middle and high income developments, low-income developments are mostly driven by the proliferation of informal settlements and the availability of housing subsidies. There is little private sector investment in low income areas.

- The focus of this policy is to change the delivery of housing at scale, to ensuring that housing delivery results in the creation of sustainable human settlements.

The objectives of this policy are:

- To ensure that sustainable housing development takes place.
- To integrate housing with other municipal services in order to establish sustainable human settlements, in support of spatial restructuring.
- To coordinate municipal departments in order to work together in planning and implementing
- To promote middle and high income housing which will in turn generate resources to improve low income areas.
- To promote environmental and energy efficient housing.

During 2010, Maxim Planning Solutions (Pty) Ltd in consultation with the Ventersdorp Local Municipality identified ten (10) distinctive land parcels as options for residential development purposes:



The Spatial/Environmental Proposals as contained in the Spatial Development Framework similarly indicated the areas earmarked for residential development purposes as reflected on the attached Map 22.

In an attempt to alleviate the plight of the residents of informal structures residing on community facility erven and on the land west of the existing township area of Tshing Extension 5, the Dr. Kenneth Kaunda District Municipality during the latter part of 2010 set out a tender for the establishment of 1002 residential erven in the Ventersdorp urban area. This tender was awarded to Maxim Planning Solutions and included the utilization of land parcels 1, 2, 3, 4, 5 and 8 as identified on the following map:

The development options identified above entails the following properties:

- **Area 1**: Portion of the Remaining Extent of Portion 25 (a portion of Portion 8) of the farm Roodepoort No. 191-IP
- **Area 2**: Portion of the Remaining Extent of Portion 25 (a portion of Portion 8) of the farm Roodepoort No. 191-IP
- **Area 3**: Portion of the Remaining Extent of Portion 25 (a portion of Portion 8) of the farm Roodepoort No. 191-IP

- **Area 4**: Erven 893 to 904 in the proclaimed township area of Ventersdorp Extension 10
- **Area 5**: Portion of the Remaining Extent of Portion 25 (a portion of Portion 8) of the farm Roodepoort No. 191-IP
- **Area 8**: Portion of the Remaining Extent of Portion 3 (a portion of Portion 1) of the farm Doornpan No. 193-IP

As integral part of the township establishment process, the following studies were commissioned by the Dr. Kenneth Kaunda District Municipality:

- Contour survey conducted by Sky Eye Aerial
- Detail infrastructural site survey conducted TMK Professional Land Surveyors.
- Geotechnical investigation of the development areas conducted by Geoset CC.
- Cultural Heritage Resources Impact Assessment conducted by African Heritage Consultants CC.
- 1:100 year floodline determination conducted by E-Square Engineering (Pty) Ltd
- Detail engineering services investigation conducted by Aurecon South Africa (Pty) Ltd
- Environmental Impact Assessment conducted by the NWU EIA Pro Bono Unt Group 1.

The results of the studies referred to above will be addressed in the respective sections of this Memorandum.

Maxim Planning Solutions (Pty) Ltd subsequently attended to the compilation of layout plans in respect of the various development areas. The layout plan of the development areas were presented to the Ventersdorp Local Municipality on 11 May 2012 and we were instructed to continue with the statutory processes required for the development of Areas 1, 2, 3, 4, 5 and 8.

Cognisance should be taken of the fact that Area 4 that was identified for development purposes comprises an existing proclaimed township area that was established during the period 1998 to 2004 and was earmarked for industrial purposes (“Industrial 2” erven). Development of this township area however never occurred. As the township area of Ventersdorp comprises a proclaimed township area, a separate application will be submitted to the Department of Local Government and Traditional Affairs in terms of Section 89(1) read with Section 106 of the Town planning and Townships Ordinance, 1986 (Ordinance 15 of 1986) for the amendment of the General Plan of the township area of Ventersdorp Extension 10 by the re-layout of the erven in the concerned township area into fourty seven (47) “Residential 1” erven.

This chapter will provide a concise background to the project as well as a project outline.

1.2 APPLICATION

Maxim Planning Solutions (Pty) Ltd is hereby applying on behalf of the Ventersdorp Local Municipality for the:

- Establishment of the proposed township Tshing Extension 8 on a portion of the Remaining Extent of Portion 3 (a portion of Portion 1) of the farm Doornpan No. 193-IP in terms of the provisions of Chapter IV of the Town Planning and Townships Ordinance, 1986 (Ordinance 15 of 1986);
- Establishment of the proposed township Ventersdorp Extension 11 on a portion of the Remaining Extent of Portion 25 (a portion of Portion 8) of the farm Roodepoort No. 191-IP in terms of the provisions of Chapter IV of the Town planning and Townships Ordinance, 1986 (Ordinance 15 of 1986); and
- Establishment of the proposed township Ventersdorp Extension 12 on a portion of the Remaining Extent of Portion 25 (a portion of Portion 8) of the farm Roodepoort No. 191-IP in terms of the provisions of Chapter IV of the Town planning and Townships Ordinance, 1986 (Ordinance 15 of 1986)

1.3 PUBLIC PARTICIPATION

The application in respect of the establishment of the proposed townships Tshing Extension 8, Ventersdorp Extension 11 and Ventersdorp Extension 12 will be advertised in accordance with Section 108(1)(a) of the Town Planning and Townships Ordinance, 1986 (Ordinance 15 of 1986) in the Beeld, Citizen and North West Provincial Gazette on 26 June 2012 and 03 July 2012. Objectors will be afforded a period of 28 days from 26 June 2012 to submit objections or comments in respect of the proposed township areas to the Municipal Manager.

The application will also, in accordance with the prescriptions of Section 108(1)(b) of the Town Planning and Townships Ordinance, 1986 (Ordinance 15 of 1986) be referred to the following external organizations / departments for comments or objections:

- Department of Transport, Roads and Community Safety
- Telkom SA Limited
- Eskom
- Dr. Kenneth Kaunda District Municipality
- Department of Minerals and Energy
- Department of Agriculture
- Department of Water Affairs and Forestry
- Department of Local Government and Traditional Affairs
- Department of Education
- Department of Health
- South African Post Office

- Spoornet
- South African Heritage Resources Agency
- South African National Roads Agency Limited

The fore-mentioned organizations / departments will be afforded a period of 60 days to comment in this matter in accordance with the prescriptions of Section 108 (1) of the Town Planning and Townships Ordinance, 1986 (Ordinance 15 of 1986).

1.4 STUDY AREA DELINEATION

The proposed development areas comprises a portion of the Remaining Extent of Portion 3 (a portion of Portion 1) of the farm Roodepoort No. 193-IP and various parts of the Remaining Extent of Portion 25 (a portion of Portion 8) of the farm Roodepoort No. 191-IP as described in detail in section 2.1.

1.5 REPORT OUTLINE

The remainder of the report is structured in terms of the following main headings:

- Chapter 2: Particulars of the development area
- Chapter 3: Physical aspects
- Chapter 4: Proposed development
- Chapter 5: Provision of Engineering Services
- Chapter 6: Conclusion

CHAPTER 2: PARTICULARS OF THE DEVELOPMENT AREAS

2.1 LOCALITY

The various proposed township areas are located as follows:

- **Tshing Extension 8**:
  Located directly adjacent and to the west of the existing township area of Tshing Extension 5 in the far north-western portion of the urban area of Ventersdorp. The proposed township will be located on a portion of the Remaining Extent of Portion 3 (a portion of Portion 1) of the farm Doornpan No. 193-IP.
- **Ventersdorp Extension 11**:
  This township area comprises two (2) separate areas located respectively adjacent and to the south-west of Ventersdorp Extension 3 and bordered to the south-east by Ventersdorp Extension 1. This township area is located adjacent to the Ventersdorp reservoir site. The other portion of the township area is located south-west of Dock Street and partially borders onto the Department of Transport, Roads and Community Safety works site and also borders onto the south-eastern boundary of Tshing Extension 5. The proposed township area will be located on a portion of the Remaining Extent of Portion 25 (a portion of Portion 8) of the farm Roodepoort No. 191-IP. The development area is located centrally within the built-up urban area of Ventersdorp.
- **Ventersdorp Extension 12**:
  Located within the far southern portion of the urban area of Ventersdorp and is bordered to the north by Vlei Street (not constructed) and borders onto the north-eastern boundary of the township area of Toevlug Extension 1. The south-eastern boundary of the proposed development area borders onto the floodline area of the Schoonspruit. The proposed township area will be located on a portion of the Remaining Extent of Portion 25 (a portion of Portion 8) of the farm Roodepoort No. 191-IP.

The proposed township areas detailed above are all located within the area of jurisdiction of the Ventersdorp Local Municipality which in turn falls within the area of jurisdiction of the Dr. Kenneth Kaunda District Municipality.

2.2 SG DIAGRAMS

The Remaining Extent of Portion 3 (a portion of Portion 1) of the farm Doornpan No. 193-IP is reflected on SG Diagram A2081/1905 (attached as **Annexure D** to the application for township establishment).

The Remaining Extent of Portion 25 (a portion of Portion 8) of the farm Roodepoort No. 191-IP is reflected on SG Diagram A2869/1905 (attached as **Annexure D** to the application for township establishment).

2.3 OWNER

The Remaining Extent of Portion 3 (a portion of Portion 1) of the farm Doornpan No. 193-IP is currently registered in the name of the Ventersdorp Local Municipality by virtue of Crown Grant G204/1906 (document attached as **Annexure E** to the application for township establishment).

The Remaining Extent of Portion 25 (a portion of Portion 8) of the farm Roodepoort No. 191-IP is similarly currently registered in the name of the Ventersdorp Local Municipality by virtue of Crown Grant G203/1906 (document attached as **Annexure F** to the application for township establishment).

2.4 AREA

The Remaining Extent of Portion 3 (a portion of Portion 1) of the farm Doornpan No. 193-IP comprises a total area of 487,5986 hectares. The Remaining Extent of Portion 25 (a portion of Portion 8) of the farm Roodepoort No. 191-IP comprises a total area of 80,1199 hectares.

The proposed township areas comprise the following areas:

- Tshing Extension 8: 32,4215 hectares
- Ventersdorp Extension 11: 24,2310 hectares
- Ventersdorp Extension 12: 8,1861 hectares

2.5 EXISTING LAND USE AND ZONING

The proposed development areas are currently utilised for the following purposes:

- **Tshing Extension 8:**
  The proposed development area is currently predominantly vacant with the exclusion of informal housing structures located within the south-eastern section of the proposed township area. A community hall is also located within the development are of Tshing Extension 8 and this facility was accommodated in the layout plan of the proposed township area.

Plate 1: View of informal settlement adjacent to Tshing Extension 5

The land on which the proposed township Tshing Extension 8 is to be established is currently zoned "Agricultural" in terms of the Ventersdorp Land Use Management Scheme, 2007.

- **Ventersdorp Extension 11:**
  The proposed development area is currently predominantly vacant with the exclusion of informal housing structures located within the western portion of the proposed township area bordering onto the existing township area of Tshing Extension 5.

Plate 2: View of informal housing structures located within western section

A telecommunication mast was also recently erected adjacent to the extension of Doc Street and opposite the Ventersdorp reservoir site and the fore-mentioned structure is located within the proposed township area.

Plate 3: View of telecommunication mast

The northern section of the proposed township area is currently vacant with the exclusion of weather station equipment located adjacent to the Ventersdorp reservoir site.

In terms of the Ventersdorp Land Use Management Scheme, 2007 the land portions on which the proposed township Ventersdorp Extension 11 is to be established are currently zoned “Agricultural”.

The proposed township area of Ventersdorp Extension 11 is bordered by the following land uses / infrastructure:

Plate 4: Ventersdorp Reservoir infrastructure

Plate 5: Eskom Substation

Plate 6: Dwelling houses in Ventersdorp Extension 3

Plate 7: Ventersdorp vehicle test station

Plate 8: Public Works site

Plate 9: Public Works site

- **Ventersdorp Extension 12:**
  The proposed township area of Ventersdorp Extension 12 is currently entirely vacant.

Plate 10: View of proposed township area

In terms of the Ventersdorp Land Use Management Scheme, 2007 the subject property is currently zoned “Municipal”.

2.6 MINERAL RIGHTS

According to Crown Grant No. G203/1906 (attached as **Annexure E** to the application for township establishment), the rights to minerals in respect of the Remaining Extent of Portion 25 (a portion of Portion 8) of the farm Roodepoort No. 191-IP have been reserved in favour of the Ventersdorp Local Municipality by virtue of Certificate of Minerals Rights K1204/2002RM.

The above-mentioned reservation of rights to minerals is however subject to the provisions of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002) that came into force on 01 May 2004. The application for township establishment will subsequently also be referred to the Department of Minerals and Energy for its consent in respect of the proposed townships.

2.7 RESTRICTIVE TITLE CONDITIONS

According to Crown Grant No. G204/1906, the Remaining Extent of Portion 3 (a portion of Portion 1)of the farm Doornpan No. 193-IP is subject to the following title conditions, which will be dealt with as indicated:

- *"This GRANT shall be subject to all conditions and stipulations contained in the Town Land Ordinance 1904, and any amendment thereof, and shall be subject to all rights and servitudes which now affect or at any time hereafter may be found to affect the title to the land hereby transferred or to be binding on the Government in respect of the said land as at the date hereof".*

  This condition has lapsed through repeal by virtue of the Pre-Union Statute Law Revision Act, 1967 (Act 36 of 1967).

- *"This GRANT is made on the condition that all roads already made over the land by lawful authority shall remain free and unobstructed, that the land shall be subject to an outspan and to the grazing for the cattle of travellers; that the said land shall further be subject to such stipulations as have been established or may hereafter be established by the legislature; and finally, that the owners shall be liable to the prompt payment of an annual fee of one shilling and six pence (1/6) sterling per one hundred morgen".*

  This condition has lapsed through repeal by virtue of Section 53 of the Road Ordinance, 1957 (Ordinance 22 of 1957).

- *The owner of the hereinmentioned property has obtained the right of using a certain water furrow (dorpsvoor) over a Ptn called Vastrap of Ptn Alexandra of the farm Roodepoort no. 22 Ventersdorp meas 468,4537 mg as will more fully appear from Notarial Deed No. 901/1940S".*

  This right which vests in the property shall not be transferred to the erven in the proposed township area.

- *By Notarial Deed K5018/1991S as amended by K4082/1992S, the right has been granted to Eskom to convey electricity over the property hereby conveyed together with ancillary rights, and subject to conditions, as will more fully appear on reference to said Notarial Deed and diagram, grosses whereof is hereunto annexed".*

  This servitude affects the southern portion of the proposed township area of Tshing Extension 8 and was accommodated in the layout plan of the proposed township area within the road reserve of Mphatlatatsane Street and two (2) proposed public open space erven (Erven 556 and 557). The width of this servitude is 22 metres.

- *Kragtens Notariële Akte van serwituut K5258/1999S gedateer 19/8/1999, is die binnegemelde eiendom onderhewig aan'n reg van weg serwituut, 17,7543 hektaar groot, ten gunste van die Algemen Publiek, aangedui deur die figuur ABCDEFGHJKLMNPQRSTUVWXYZA1,B1,C1,D1,E1,F1,G1,H1,J1,K1,L1,M1,N1, P1,Q1,R1 op kaart Nr 14337/98, soos meer volledig sal blyk uit die gemelde notariële akte".*

  This servitude affects the proposed township are of Tshing Extension 8 and comprises the extension of Dock Street which is located along the northern boundary of the proposed township area.

According to Crown Grant No. G203/1906, the Remaining Extent of Portion 25 (a portion of Portion 8) of the farm Roodepoort No. 191-IP is subject to the following title conditions, which will be dealt with in respect of each township area as indicated:

- *"This GRANT shall be subject to all conditions and stipulations contained in the Town Lands Ordinance, 1904, and in any amendment thereof, and shall also be subject to all rights and servitudes which now affect or at any time hereafter may be found to affect the title to the land hereby transferred or to be binding on the Government in respect of the said land as at the date hereof".*

  This condition has lapsed through repeal by virtue of the Pre-Union Statute Law Revision Act, 1967 (Act 36 of 1967).

- *"This GRANT is made on the condition that all roads already made over the land by lawful authority shall remain free and unobstructed, that the land shall be subject to an outspan and to the grazing for the cattle of travellers; that the said land shall be further subject to such stipulations as have been established or may hereafter be established by the legislature; and finally, that the owners shall be liable to the prompt payment of an annual tax of one shilling and six pence (1/6) sterling per one hundred morgen".*

  This condition has lapsed through repeal by virtue of Section 53 of the Road Ordinance, 1957 (Ordinance 22 of 1957).

- *"Die eienaar van die binnegemelde eiendom het die reg gekry tot sekere dorpsvoor oor Gedeelte Vastrap van Gedeelte Alexandra van Roodepoort no 22 Dist. Ventersdorp groot 468,4539 mg. soos meer ten volle sal blyk uit Notariële Akte no 901/1940S".*

  This right which vests in the property shall not be transferred to the erven in the proposed township area.

- *"By Notarial Deed No 627/51S the right has been granted to the Electricity Supply Commission to convey electricity over the property hereby conveyed together with*

ancillary rights, and subject to conditions as will more fully appear on reference to said Notarial Deed and diagram, grosse whereof is hereunto annexed".

This servitude affects the proposed township area of Ventersdorp Extension 11 and traverses the western portion of the proposed township area and was accommodated in the layout plan within three (3) public open space erven (Erven 291, 292 and 293).

- *"By virtue of Not. Deed of agreement No. 62/51 S dd 28/11/60 a ptn of the withinmentioned property meas. 151,9280mg wide diagram no SG A3394/59 together with the property is subject to the laying of a shooting or rifle range to the Govt of the Union of SA as will more fully appear from the said not. Deed".*

  This condition does not affect either of the proposed township areas of Ventersdorp extensions 11 or 12 due to the location thereof.

- *By Notarial Deed K5018/91S as amended by K4082/1992S, the right has been granted to Eskom to convey electricity over the property hereby conveyed together with ancillary rights, and subject to conditions, as will more fully appear on reference to said Notarial Deed and diagram, grosses whereof is hereunto annexed".*

  This servitude does not affect the proposed township areas of Ventersdorp extension 11 or Ventersdorp extension 12.

- *Kragtens Notariële Akte van serwituut K5257/1999S gedateer 19 Augustus 1999, is die binnegemelde eiendom onderhewig aan 'n reg van weg 2,5348 hektaar serwituut ten gunste van die algemene publiek, aangedui deur die figuur ABCDEFGH op kaart LG. Nr 14332/98 soos meer volledig sal blyk uit die gesegde notariële akte".*

  This servitude comprises the extension of Doc Street traversing the existing township area of Tshing Extension 5 and does not affect the proposed township areas of Ventersdorp Extensions 11 or 12 due to the location thereof.

- *Kragtens notariële akte van serwituut K582/11S gedateer 10.01.2011, is die binnegemelde eiendom onderhewig aan 'n serwituut van reg van weg t.g.v. algemene publiek soos aangedui word deur die figuur EFGCB op Kaart LG No. 14336/1992 soos meer volledig sal blyk uit die genoemde notariële akte.*

  This servitude does not affect the proposed township areas of Ventersdorp Extensions 11 or 12 due to the location thereof.

CHAPTER 3: PHYSICAL ASPECTS

3.1 TOPOGRAPHY

- The proposed township area of Tshing Extension 8 is located on a shallow slope towards the drainage feature in the west and is located at between 1474masl at the drainage feature and 1487masl at its eastern boundary bordering onto the existing township area of Tshing Extension 5. The western boundary of the proposed township area borders onto the floodline area of a drainage channel.

- The proposed township area of Ventersdorp Extension 11 is located on gentle gradients sloping from 1501,5 metres above mean sea level at the highest point in town at the reservoir to 1477,0m at the Tshing soccer sports field. The design of the proposed township area of Ventersdorp Extension 11 was designed to accommodate an existing quarry. No drainage channel intersects the proposed township area.

Plate 11: View of quarry area located west of the central portion of the proposed township area of Ventersdorp extension 11

- A moderate slope of 4,5° is encountered in Ventersdorp Extension 12 towards the Schoonspruit and it ranges from 1411,0masl and 1462,0masl. The area drains predominantly in an easterly direction. The south-eastern boundary of the proposed township area comprises the floodline area adjacent to the Schoonspruit.

3.2 CLIMATE

The region is characterized by summer rainfall with thunderstorms, with annual low rainfall figures of 602mm (Lichtenburg), 670mm Carletonville and 625mm (Potchefstroom), recorded at the closest weather stations to the site. Winters are dry with frost common. The warmest months are normally December and January and the coldest months are June and July.

An analysis of the data confirms a Weinert's N-Value in the order of 5 for Ventersdorp. The mechanical disintegration of rocks will therefore not be dominant over chemical decomposition, and shallow soil horizons will be expected in areas of poor drainage, underlain by igneous rocks.

Storm water drainage and road pavement design must incorporate the climatic extremes above as well as the relative flatness of the area.

3.3 FRESHWATER SYSTEM

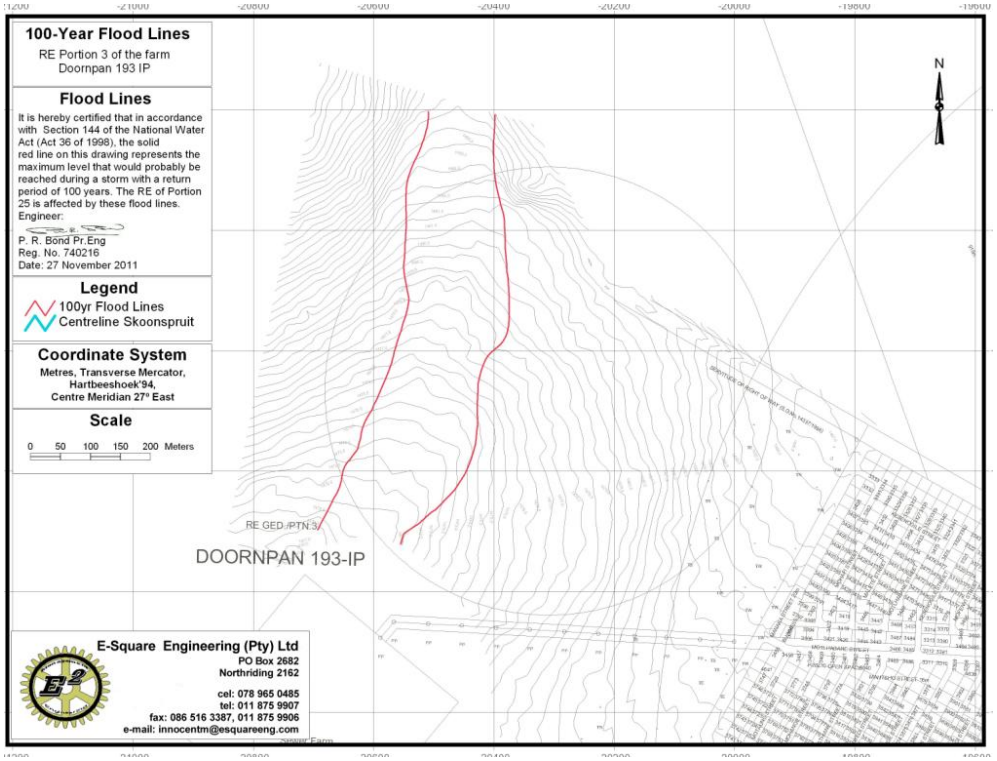
- The proposed development areas are located within the Vaal River System Drainage Basin.
- The proposed township area of Tshing Extension 8 drains in a westerly direction towards a non-perennial stream approximately 750 m to the east of the site that drains in a southerly direction towards the Elandskuil dam south of the site. This stream joins the Schoonspruit, 5 km south of Ventersdorp, which drains into the Vaal River downstream of Orkney.
- No prominent drainage channel intersects the proposed township area of Ventersdorp Extension 11.
- The proposed township area of Ventersdorp Extension 12 is located to the west of the Schoonspruit and the drainage of the township is towards the Schoonspruit. The south-eastern boundary of the proposed township area incorporates a portion of the floodplain of the Schoonspruit.

3.4 WETLANDS AND PANS

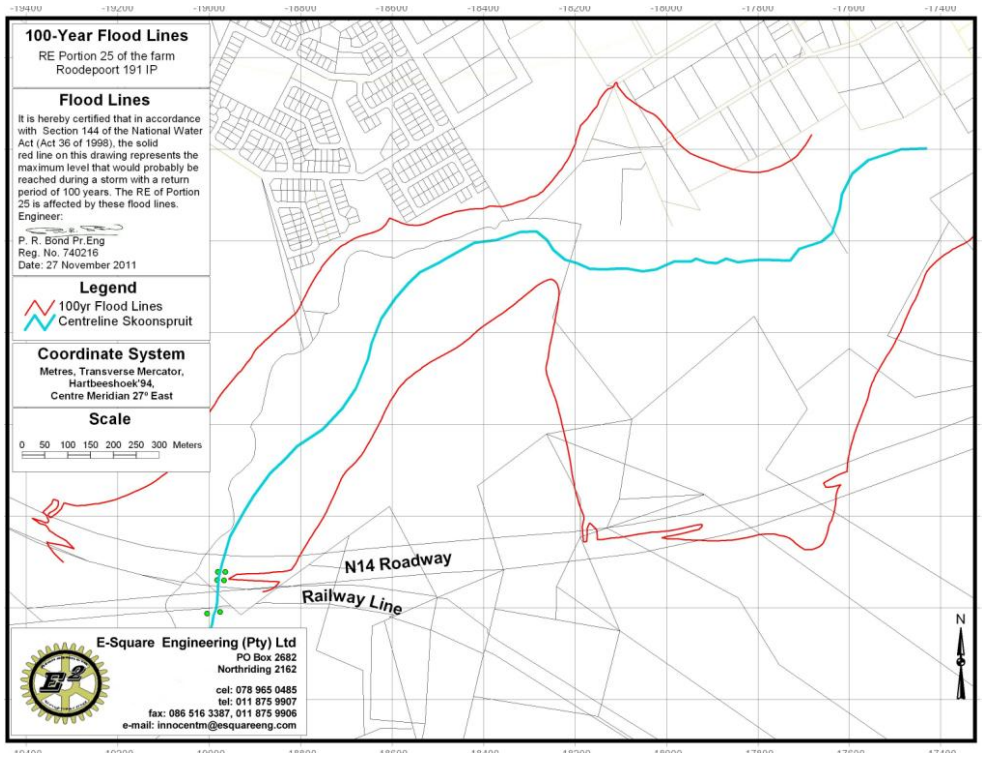
The township areas of Tshing Extension 8 and Ventersdorp Extension12 are both located adjacent to existing drainage features and it was subsequently necessary to determine the 1:10 year floodline applicable to the concerned drainage features in accordance with the provisions of Section 144 of the Water Act, 1998 (Act 36 of 1998).

In view of the fore-mentioned, the Dr. Kenneth Kaunda District Municipality appointed E-Square Engineering (Pty) Ltd for the determination of the 1:100 year floodlines. The comprehensive floodline determination report compiled by E-Square Engineering (Pty)

Ltd is attached to the application for township establishment as **Annexure H** and the results of the floodline determination are reflected on the following illustrations:



Tshing Extension 8: 1:100 Year floodline applicable to the non-perennial stream



Ventersdorp Extension 12: 1:100 Year floodline applicable to the Schoonspruit

The floodplain area (1:100 year floodline area) of the non-perennial stream located west of the proposed township area of Tshing Extension 8 was excluded from the township area.

The layout plan of the proposed township area of Ventersdorp Extension 11 incorporates a portion of the floodplain area (1:100 year floodline area) of the Schoonspruit into the open space system of the proposed township area as this incorporates and accommodates the cadastral boundary of the concerned farm portion.

3.5 VEGETATION

The area is typically characterized by Dry Cymbopogon Themeda Veld of the Pure Grasveld veld type (Acocks, 1988).

The sites are covered by sparse grasslands of which some was used as agriculture land, and no indigenous trees are present on site.

3.6 GROUNDWATER

No groundwater will be used due to the fact that the proposed development will be serviced by the infrastructure of the Ventersdorp Local Municipality. The permanent water table on site is deeper than 1,5m below natural ground surface as it was not encountered in any test pits. A perched water table may exist on shallow bedrock with low permeability characteristics of the rock mass, during long periods of consistent rain.

3.7 GEOLOGY (Extract from Geotechnical Report compiled by GeoTheron attached as **Annexure I** to the application for township establishment)

- Tshing Extension 8 is underlain by basaltic amygdaloidal lava, agglomerate and tuff of the Rietgat Formation and Venterdorp Extension 11 by quartz-veldspar porphyry of the Makwassie Formation, all from the Platberg Group, Ventersdorp Supergroup.
- In VentersdorpExtension 12, the Witwatersrand Supergroup is represented by ferruginous shale, quartzite, banded ironstone and hornfels of the Hospital Hill Formation of the West Rand Group.
- The bedrock is covered by transported material which is termed as “colluvium” in the test pit profiles.
- No dolomite occurs in the area and no dolomite stability investigation is required.

3.7.1 SITE EVALUATION

- No seepage or the presence of perennial fluctuations of ground water was encountered on site, but a seasonal perched water table may exist on top of the shallow bedrock.

- Special care must be taken to ensure adequate surface drainage to prevent the accumulation of water next to structures.
- The site contains low and low to medium expansive soil, and most foundations will not need special precautionary measures to minimize swell associated with a variation in moisture content of the soil, but the areas towards the western portion of Tshing Extension 8 will require modified normal foundations.
- Some problems regarding excavatability can be expected on the sites except on the western portions of Tshing Extension 8.
- Retaining walls as well as slope stabilization measures are recommended on all constructed embankments exceeding 1,5m.
- Storm water control measures such as ponding pools are recommended to control peak flows during thunderstorms. All embankments must be adequately compacted and vegetated with grass to limit any excessive erosion and scouring of the landscape.
- No mining activities on site or history of mining or contaminated land in the area were found. The site is located far from any mining activities and in an inactive area regarding seismic activity.
- Due to the level of development surrounding the area, the likelihood for the development of borrow pits on site are low.
- All road building and construction materials will be sourced from established commercial activities in and around Ventersdorp.
- Residential developments are possible on all the sites with the recommended precautionary measures. Difficult excavation of service and foundation construction is anticipated. Furthermore, Geotechnical Zone PD comprises drainage features within the 1:100 year flood line and Zone PQ requires rehabilitation of historical borrow pits or quarries.

3.7.2 SITE ZONATION

In terms of the results of the geotechnical investigation, the development area was divided into the following geotechnical zones:

Modified Normal Development:
Site Class H1/2C:
Dark reddish brown to kaki brown silty sandy clay represents a medium expansive and compressible soil, with a thickness in excess of 0,5m up to 0,8m, and an expected range of up to 15mm of total soil movement measured at surface, form this zone. Foundations will therefore require modified normal foundation techniques such as lightly reinforced strip footings or reinforced boxed steel in slightly widened strip foundations, the use of split construction techniques or articulation joints at all internal and external doors and openings with light reinforcement (brickforce) in masonry, or soil replacement by an engineered fill soil

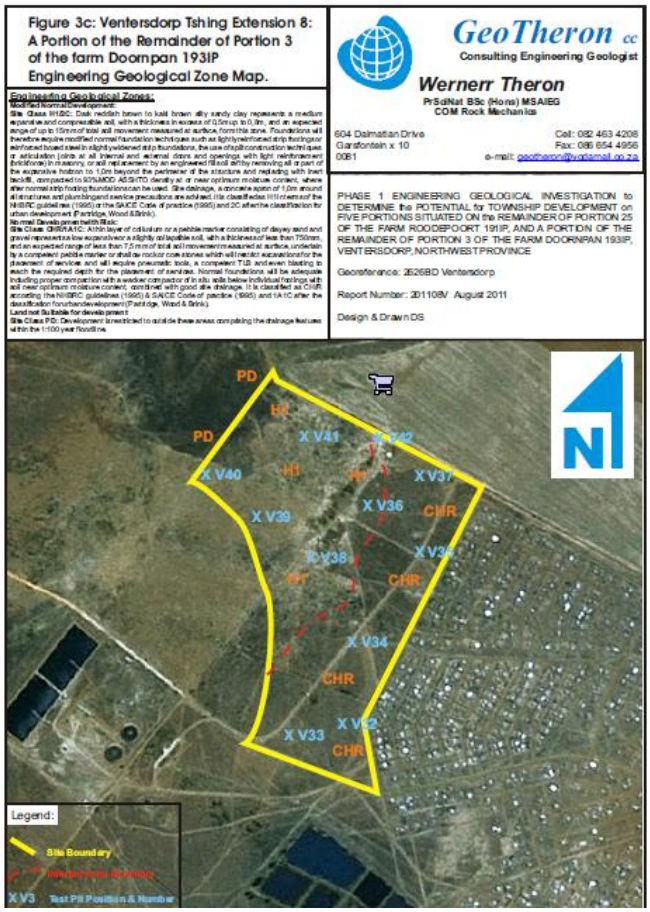
raft by removing all or part of the expansive horizon to 1,0m beyond the perimeter of the structure and replacing with inert backfill, compacted to 93%MOD ASSHTO density at or near optimum moisture content, where after normal strip footing foundations can be used. Site drainage, a concrete apron of 1,0m around all structures and plumbing and service precautions are advised. It is classified as H1 in terms of the NHBRC guidelines (1995) or the SAICE Code of practice (1995) and 2C after the classification for urban development (Partridge, Wood & Brink).

Normal Development with Risk:
Site Class CHR/1A1C:
A thin layer of colluvium or a pebble marker consisting of clayey sand and gravel represents a low expansive or a slightly collapsible soil, with a thickness of less than 750mm, and an expected range of less than 7,5 mm of total soil movement measured at surface, underlain by a competent pebble marker or shallow rock or core stones which will restrict excavations for the placement of services and will require pneumatic tools, a competent TLB and even blasting to reach the required depth for the placement of services. Normal foundations will be adequate including proper compaction with a wacker compactor of in situ soils below individual footings with soil near optimum moisture content, combined with good site drainage. It is classified as CH/R according the NHBRC guidelines (1995) & SAICE Code of practice (1995) and 1A1C after the classification for urban development (Partridge, Wood & Brink).

Land not Suitable for development
Site Class PD:
Development is restricted to outside these areas comprising the drainage features within the 1:100 year flood line that still needs to be determined.
Site Class PR:
Rock outcrop and sub-outcrop will restrict excavatability required during service installation as well as foundation excavations. Blasting or difficult excavation operations will dramatically increase the development cost in this zone.
Site Class PQ:
Previously mined areas includes old borrow pits and quarries and these areas need to be rehabilitated by backfilling them with an engineered fill compacted in layers.

The geotechnical problems encountered will require modified normal to special foundation techniques and construction, and proper standard compaction techniques and drainage is required.

The comprehensive Geotechnical Report is attached as **Annexure I** to the application for township establishment and the geotechnical zones are reflected on the following diagrams as it applies to the various proposed township areas:



Tshing Extension 8: Site Zonation **Ventersdorp Extension 11: Site Zonation**

Ventersdorp Extension 12: Site Zonation

3.7.3 FOUNDATION SOLUTIONS

Consolidation or collapse settlement

Site Class C (Estimated total Settlement of less than 5mm):

Normal Construction:

Minor collapse settlement requires normal construction (strip footing and slab on the ground) with proper compaction in foundation trenches and good site drainage.

Expansive soil

Site Class H (Estimated total heave of less than 7.5mm):

Soil tested as medium expansive with a clay layer thickness of up to 0,3m from surface

Normal construction:

Minor heave requires normal construction (strip footing and slab on the ground) with site

drainage and service/plumbing precautions recommended.

Site Class H1 (Estimated total heave of between 7.5 and 15mm):

Tested as medium expansive with a clay layer thickness of between 0,45 to 0,85m from surface, or a highly expansive clay layer of between 0,3 and 0,4m in thickness from surface or a clay layer with a very high expansive potential of up to 0.3m.

Modified normal:

Lightly reinforced strip footings.

Articulation joints at all internal/external doors and openings

Light reinforcement in masonry.

Site drainage and plumbing/service precautions.

Or soil raft:

Remove all or part of expansive horizon to 1,0m beyond the perimeter of the construction and replace with inert backfill compacted to 93% MOD AASHTO density at -1% to 2% of optimum moisture content.

Normal construction with lightly reinforced strip footings and masonry.

Site drainage and plumbing/service precautions.

Ground water in the form of seepage was not intersected in any test pits during the investigation, but some problems are foreseen and normal water tightening techniques such as damp course on foundation levels are required.

The expected moderate permeability of the silty clayey sand may lead to leach from sanitation systems to reach the ground water, and with the relative shallow residual rock, a closed water borne sewage system is recommended.

Special care must be taken to ensure adequate surface drainage to prevent the accumulation of water next to structures. Storm water diversion measures such as ponding pools are recommended to control peak flows during thunderstorms. All

embankments must be adequately compacted and planted with grass to stop any excessive erosion and scouring of the landscape.
The 1:100 year flood line must be determined and all development should be restricted to outside this area.

3.7.4 CONCLUSION

- Tshing Extension 8 is underlain by basaltic amygdaloidal lava, agglomerate and tuff of the Rietgat Formation and Venterdorp Extension 11 by quartz-veldspar porphyry of the Makwassie Formation, all from the Platberg Group, Ventersdorp Supergroup. In Extension 12, the Witwatersrand Supergroup is represented by ferruginous shale, quartzite, banded ironstone and hornfels of the Hospital Hill Formation of the West Rand Group.site is underlain by formations of the Platberg Group of the Ventersdorp Supergroup, and the West Rand Group of the Witwatersrand Supergroup.
- Some problems regarding excavatability to 1,5m in depth can be expected on the sites except on the western portions of Tshing Extension 8.
- Zoning of the site revealed zones with constraints regarding the **expansive potential or heave and compressibility** of the soil, as well as areas with restricted excavation and unrehabilitated borrow pits.
- Foundations will require normal to modified normal foundation techniques described within each defined zone. Proper compaction techniques and lightly reinforced strip footings with articulation joints at some internal and all external doors and openings with light reinforcement (brickforce) in masonry may be required. Site drainage and plumbing and service precautions must be used.
- There are no unacceptable geotechnical constraints on development of the site, except for the Geotechnical Zone PD comprising the drainage features within the 1:100 year flood line, and Zone PQ where an uncontrolled backfilled quarry needs to be properly rehabilitated.
- These proposed mitigation and precautionary measures need to be adhered to for successful development of the proposed residential townships.
- This investigation was done to reveal the geotechnical properties on site with the techniques as described. Although every possible factor during the investigation was dealt with, it is possible to encounter variable local conditions. This will require the inspection of foundations by a competent person to verify expected problems

3.8 ENVIRONMENTAL IMPACT ASSESSMENT

The NWU EIA Pro Bono Unit Group 1 was appointed to conduct Environmental Impact Assessments in terms of sections 24 and 24(D) of the National Environmental

Management Act, 1998 (Act 107 of 1998). This activity is listed as Listing Notice 2, Activity number 15 (Government Notice No. R545) and came into effect on 18 June 2010. The fore-mentioned activity is described as follows:

"(15) Physical alteration of undeveloped, vacant or derelict land for residential, retail, commercial, recreational, industrial or institutional use where the total area to be transformed is 20 hectares or more;"

The project was registered with the Department of Economic Development, Environment, Conservation and Tourism and the Environmental Impact Assessment Report is currently in process of finalisation following the finalisation of the engineering services investigation and will in due course be submitted to the Department of Economic Development, Environment, Conservation and Tourism for consideration.

The process set out above applies to the proposed township areas of Tshing Extension 8 and Ventersdorp Extension 11 which comprises development areas in excess of 20 hectares.

The NWU EIA Pro Bono Unit was similarly appointed to attend to the Environmental Impact Assessment process in respect of the proposed township area of Ventersdorp Extension 12 in terms of the new Regulations (in force since 2 August 2010) in terms of Section 24(M) and 44 made under section 24(5) of the Act and published in Government Notice No. R543 of 2010 of the National Environmental Management Act, 1998 (Act 107 of 1998). The fore-mentioned activity is set out in Government Notice No. R544, Listing Notice 1, Activity No. 23, namely:

(23) The transformation of undeveloped, vacant or derelict land to-

(i) residential, retail, commercial, recreational, industrial or institutional use, inside an urban area, and where the total area to be transformed is 5 hectares or more, but less than 20 hectares; or"

The proposed township area has similarly been registered with the Department of Economic Development, Environment, Conservation and Tourism and the Basic Assessment Report is currently pending finalisation for submission othe fore-mentioned Department for authorisation of the proposed activity.

The general impacts identified in terms of the Environmental Impact Assessment process in respect of the bio-physical and socio-economic aspects of the proposed developments can be summarised as follows (extracted from the Environmental Impact Assessment Report compiled by the NWU EIA Pro Bono Unit:

3.8.1 BIO-PHYSICAL ASPECTS

- **GEOLOGY**

The geological structure and the associated seismic stability will have a local long-term positive influence on the entire project. The intensity is judged to be low, and the significance will be medium and the probability "probable", while the project can have no influence on this variable. No dolomite occurs in the area and no dolomite stability investigation is required.

- **TOPOGRAPHY**

The Engineering report and the layout plan addresses the issues regarding storm water and the design of the services. Old quarries are present on site. This had a negative impact on the development due to the fact that it has decreased the availability of developable land.

The topography will have an impact on the project due to the gradients involved. The overall influence of the remaining area is positive, local, long term and will occur during all the project phases. The intensity and significance is medium. The project's influence on the topography will be long term, local and of low intensity and significance and definite.

Topography will influence the project. Due to the nature of the area, the impacts will be positive. The impact is judged to be medium in intensity (and favourable), probable and of medium significance.

The impact of the project on the topography (micro-relief) will be minimal as no large-scale excavations, levelling or embankment construction will be needed. During the construction phase the impact could be regarded as negative, whilst during the operational phase it will change to positive if the necessary maintenance as described in the Management Plan is adhered to. The intensity of the impact will be low, probable and low in significance. If the necessary precautions, described in the management plan are carefully adhered to, the impact is judged local and low in intensity and significance.

- **CLIMATE**

Extreme climatic events may have an influence on the project during the construction and post construction phases and will have to be taken into consideration.

- **Rainfall**

  The impact of rainfall on the project will usually be short (during single events), the impact may be negative with a probability of "probable", and a medium significance, and the intensity is low overall. In the long term, the annual average as well as distribution of rainfall will have significant impacts on the project.

  Prolonged wet spells may affect the dumping cycles as excess water may accumulate on site. An alternative wet cell dumping area will have to be planned for the rainy seasons. During extremely dry spells, dust will be generated, which will have to be mitigated. This will also negatively impact on re-vegetation.

  The cumulative impact of rainfall should be positive during the closure phase, if the rehabilitation programme makes provision for the re-establishment of indigenous vegetation adapted to the area.

  The scale of the project will ensure that it will not influence the climate and is therefore "not applicable".

- **Temperature**

  The general impact of this variable on the project is positive due to the effects of the temperature regime.

  The influence of this variable on the project is low and of little significance, while the project cannot influence this variable. This variable will only play a minor role during the operational and closure phases of the project. Extremely high temperatures may occur (mostly during dry spells) which will have adverse effects. The general nature of the average conditions will be positive. The impacts should therefore be considered as "variable".

  The project itself cannot influence this variable and it must be considered as "not applicable".

- **Wind**

  High wind speeds, such as those associated with thunderstorm activity or wind normally occurring in the beginning of spring, can have negative, medium significance, medium intensity impacts of a high probability on the project during the operational phase. Planning in

relation to the location of the site can mitigate impacts in relation to windblown waste and dust. The influence of the project on the wind can be considered negligible and therefore "not applicable".

- **SOIL**

The impact of the project on the soil will have to be considered during the construction phase as well as during the operational phase and soil protection measures will have to be devised. This aspect will be addressed in the eventual EMP.

The results obtained from the Geotechnical report will be used in planning the project, as well as in the management plan for the project. It is envisaged that soil will influence the project and that the impacts will be local, long term, negative in the development phase (but becoming positive in the operational phase – if proper management steps are implemented). The impact of the project on the soil will be local, long term, negative in the development phase (but becoming positive in the operational phase – if proper management steps are implemented).

- **SURFACE DRAINAGE**

Storm water drainage will have to be considered during the planning phase of the development and will have to be incorporated into the final layout plan.

Surface drainage will have an influence on the project on a local scale and long in duration. The influence is positive in the sense that the project would not be negatively impacted upon during any of the project phases. The project will have a negative influence on the environment during the operational phase as no natural overland flow will be possible during this phase. If the prescribed management plan for the closure phase is adhered to, no undue stress will be placed on the environment - a positive impact can be expected. The likelihood of these impacts is probable, but the impacts and significance is low.

- **GROUND WATER**

As stated in the Engineering Services Investigation, the project will not utilise groundwater as services will be provided by the Ventersdorp Local Municipality. Groundwater was similarly not encountered during the geotechnical investigation and recommendations in respect of a perched water table are contained in the geotechnical report.

- **FLORA**

  From preliminary work, the impact of the flora on the project is considered local, medium term and probable. The intensity and significance is judged low.

  The influence of the project on the flora can be negative if proper mitigation steps are not followed. If proper mitigation steps are defined in the management plan, a positive impact will result after the construction phase. The probability of such an impact occurring is probable and of medium significance and intensity.

- **FAUNA**

  Fauna will not influence the project and can be considered to be “Not Applicable”, while the project itself can have a local, short term impact on this variable. The impacts are probable but medium in significance and intensity.

- **AIR QUALITY**

  Air quality will have no influence on the project.

  The project will however create a certain amount of dust during the construction phase. If proper dust suppression measures are implemented this variable will have very little impact (low in intensity and significance during the construction phase).

- **NOISE**

  It is a fact that a certain amount of noise will be generated during the construction phase of the project. Noise levels should however rarely exceed the allowable limits. It is unlikely that the project will create any unacceptable noise during the operational phase.

  The impact of this variable on the site is “not applicable”.

- **ARCHAEOLOGY**

  No archaeological sites were found in the areas where the proposed development will take place. No evidence of previous settlements on other parts of the property has been observed. This aspect is addressed in section 3.9 in further detail.

3.8.2 SOCIO ECONOMIC FACTORS

- **CULTURAL SITES**

  No cultural sites were observed in the areas where the proposed development will take place.

- **AESTHETICS**

  Aesthetics as such have an impact on the project. This variable can be considered as having a definite impact of low significance and intensity on the project.

  The project itself will impact on the aesthetics. If proper mitigation measures are followed for the project as a whole, the impact could be described as "definite" with a local influence, long in duration and medium in intensity and significance. It must however be stressed that measures to curb any possible waste pollution must be strictly enforced.

- **SOCIOLOGICAL AND ECONOMIC ISSUES**

  The socio-economic status of the area will have an impact on the project and will be addressed as part of the Public Participation Process. The project on the other hand will have a positive long-term impact on these variables. It is judged highly probable and the significance and intensity should be medium. This is due to the positive influence that it will have on the local population due to the new job opportunities and the new injection of capital into the local community.

3.9 CULTURAL HERITAGE AREAS

African Heritage Consultants CC was commissioned to conduct a Cultural Heritage Resources Impact Assessment in respect of the proposed development areas. The fore-mentioned assessment contained the following results:

- ***Ventersdorp Extension 11 (section west of Dock Street)***:
  This area consists of a large vacant area located in close proximity to Tshing and Tshing Extension 5. The whole area is littered because of illegal dumping.

  No important heritage resources or graves are present – Refer Plate 12

Plate 12

- ***Ventersdorp Extension 11 (north-eastern section north-east of Dock Street)*:** This site is mainly flat Highveld grassland with some illegal dumping.

  No important cultural heritage resources or graves were found on the property.

- ***Ventersdorp Extension 11 (southern section bordered by the Public Works site):*** This site is also flat with some Highveld grass as well as illegal dump sites.

  No important cultural heritage resources or graves were found on the site – Refer Plate 13

Plate 13

- ***Ventersdorp Extension 12*:**
  This site lies on the southern section of the town near the Schoonspruit. The site is Highveld grassland with some patches Acacia karoo trees. The site has been used for a long period for illegal dumping. During the site investigation conducted by Dr. Udo Küsel of African Heritage Consultants CC, the remains of a large swimming pool was discovered. According to Mr. Gert Botes who lives next to the site the swimming pool was built in the late 1940`s as the municipal swimming pool at S26° 19' 27.8" & E26° 48' 59.9" – Refer Plate 14.

Plate 14

Due to the fact that Erven 199 and 200 in the existing township area of Ventersdorp are currently still vacant (also unfenced), the perception exists that the area comprising the fore-mentioned erven forms part of the proposed development area of the proposed township area of Ventersdorp Extension 12. On receipt of the report compiled by African Heritage Consultants CC, the location of the swimming pool referred to in the report was plotted via the co-ordinates given for this facility. This confirmed that the swimming pool referred to in the report of African Heritage Consultants CC is indeed located on Erf 199 within the existing township area of Ventersdorp and does not affect the proposed development area. This was also verified on 08 June 2012 during an in loco inspection conducted by two senior town planners of Maxim Planning Solutions (Pty) Ltd on 11 May 2012. The old swimming pool was physically identified by an inhabitant of Ventersdorp and the statement in respect of the location of this facility was therefore re-affirmed. This facility therefore does not affect the proposed township area of Ventersdorp Extension 12 and this fact was similarly communicated to the South African Heritage Resources Agency.

- **Tshing Extension 8:**
  This site lies west of the township area of Tshing Extension 5. The eastern section near the township has been occupied by squatters. The rest of the site is Highveld grassland with scrubs. The site has also been used for illegal dumping.

  No important cultural heritage resources or graves were found on the site.

Bearing in mind the issue of the old swimming pool expanded to in detail in the section addressing the proposed township area of Ventersdorp Extension 12, the heritage impact assessment reached the following conclusion:

- "There are no important cultural heritage resources or graves present on the proposed development site".

- "If during construction any cultural heritage resources or graves are unearthed all work has to be stopped until the site has been inspected and mitigated by a cultural heritage practitioner"

The comprehensive Cultural Heritage Resources Impact Assessment conducted by African Heritage Consultants is attached as **Annexure J** to the application for township establishment.

CHAPTER 4: PROPOSED DEVELOPMENT

4.1 LAND USES

The intention of the applicant i.e the Ventersdorp Local Municipality is to utilize the concerned properties for the establishment of the proposed township area of Tshing Extension 8, Ventersdorp Extension 11 and Ventersdorp Extension 12. Even though the most crucial need experienced by the Ventersdorp Local Municipality involves the creation of additional residential erven to accommodate the short term need for low cost housing in an attempt to eradicate the current informal settlements already evident in the areas directly west and east of the existing township area of Tshing Extension 5 as well as informal settlement on an existing school site in Tshing Extension 5, the layout plans compiled in respect of the various proposed township areas aim at addressing the Breaking New Ground (BNG) principles. These principles are addressed as follows:

- The extent and location of the proposed township area of Tshing Extension 8 was restricted to integrate with the township area of Tshing Extension 5 and to avoid the phenomenon of low-income housing projects being located on the periphery of urban areas.
- Through the use of the vacant municipal land located centrally within the urban complex of Ventersdorp / Tshing contributes to combating urban sprawl and directly aims at addressing the legacies of apartheid.
- The proposed township areas of Tshing Extension 8 and Ventersdorp Extension 12 can be classified as Greenfields development but the township area of Ventersdorp Extension 11 constitutes urban renewal and infill planning,
- The proposed township area of Ventersdorp Extension 11 not only provides for low cost housing development, but also provides erven that are appropriately sized to accommodate the need for bonded housing and middle income housing. These erven are proposed for development by the private sector and should be reserved and made available for such purposes by the Ventersdorp Local Municipality
- It is believed that the proposed township areas as a whole will ensure the delivery of housing at scale, by ensuring that housing delivery results in the creation of sustainable human settlements.

The layout plans of the respective township areas make provision for the following land uses:

Tshing Extension 8

Use Zone	Proposed Land Use	Number of erven	Area in hectares	% of area
Residential 1	Dwelling house (average stand size 393m²)	548	21,5415	66.44%
Business 2	Shops	1	0,0825	0.25%
Institutional	Crèche	1	0,0558	0.18%
Institutional	Church	2	0.1471	0.46%
Institutional	Community facility	1	0,6325	1.95%
Public Open Space	Park	4	0,7139	2.20%
Existing public roads	Streets		9,2482	28.52%
Total		**557**	**32,4215**	**100%**

Ventersdorp Extension 11

Use Zone	Proposed Land Use	Number of erven	Area in hectares	% of area
Residential 1	Dwelling house • Average stand size of 375m²: **193 erven** • Average stand size of 680m²: **36 erven** • Average stand size of 1000m²: **56 erven**	285	16,4607	67.94%
Institutional	Crèche	1	0,1369	0.56%
Institutional	Church	1	0.0876	0.36%
Municipal	Weather station	1	0,1112	0.46%
Special	Telecommunication purposes	1	0,0850	0.35%
Public Open Space	Park	10	1,5830	6.53%
Existing public roads	Streets		5,3664	22.15%
Total		**300**	**24,2310**	**100%**

Ventersdorp Extension 12

Use Zone	Proposed Land Use	Number of erven	Area in hectares	% of area
Residential 1	Dwelling house (average stand size 384m²)	110	4,2261	51.63%
Institutional	Crèche	1	0,0354	0.43%
Public Open Space	Park	3	2,0593	25.16%
Existing public roads	Streets		1,8653	22.78%
Total		**114**	**8,1861**	**100%**

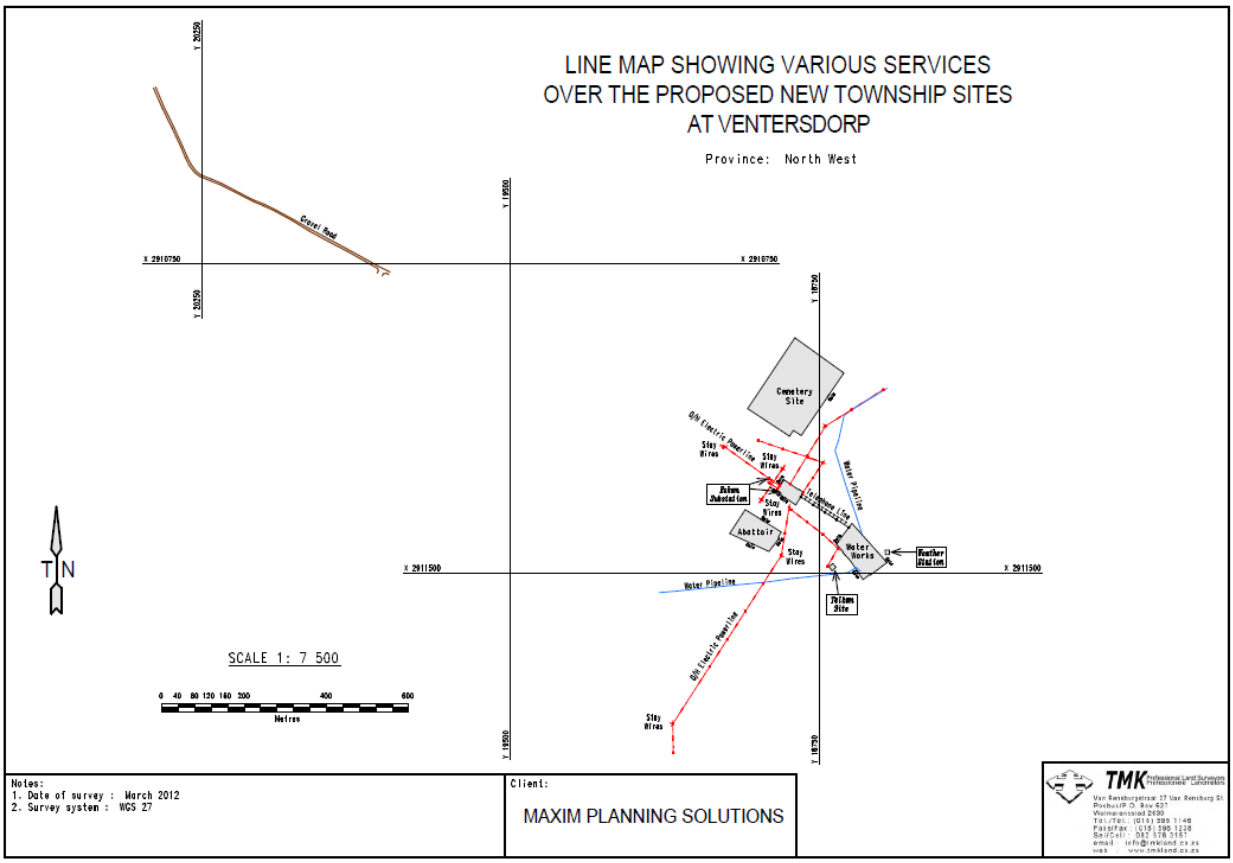
4.2 FACTORS INFLUENCING THE LAYOUT PLANS

The layout plans of the proposed township areas of Tshing Extension 8, Ventersdorp Extension 11 and Ventersdorp Extension 12 were influenced by the following factors:

* **Tshing Extension 8:**
  - Providing access to the proposed township area from the adjacent exisitn township area of Tshing Extension 5;
  - Accommodating the existing powerline servitude vide diagram SG No. A10504/1991 and traversing the southern portion of the proposed township area within the layout plan as two (2) open space erven. The remainder of the servitude width (22 metres in total) will be accommodated within the road reserve of Mphatlatatsane Street;
  - An existing community hall has been erected on the proposed development area and following a detail survey of the locality of the facility same was accommodated on an erf in the proposed township area. This facility is can also serve the proposed township area of Tshing Extension 8;
  - The central portion of the proposed township area is traversed by a powerline also traversing the adjacent township area of Tshing Extension 5 from east to west and running towards the sewer treatment works. The layout plan accommodates this powerline within two (2) public open space erven;
  - A buffer area of 500m from the centre of the sewer treatment works was reserved. This was also done during the establishment of the township area of Tshing Extension 5;
  - The 1:100 year floodline of the non-perennial stream located to the west of the proposed development area was determined and the layout plan accommodates the 1:100 year floodline and restricts development to the area outside the 1:100 year floodline;
  - The northern boundary of the proposed township area is affected by a servitude of right of way in favour of the general public vide diagram SG No. 14337/1998. This servitude was accommodated into the street network of the proposed township area; and
  - The layout plan makes provision for residential erven of minimum 375m² and an average of 393m².

* **Ventersdorp Extension 11:**
  - During site investigations and based on the results of the engineering services report, it was evident that the proposed development area is traversed by a network of services (waterlines, powerlines, sewerlines and electricity infrastructure). Following an intensive investigation to establish the exact position of the fore-mentioned services (which predominantly comprises of underground services), we were unable to obtain information on the location of

the services infrastructure and TMK Professional Land Surveyors was instructed to exhume the services and to accurately survey same. The results of this process are indicated on the following diagram:



- The northern portion of the proposed township area is located adjacent to the Ventersdorp Reservoir site. This area was excluded form the township area;
- Existing weather station infrastructure was identified adjacent to the Ventersdorp reservoir site and same was accommodated on a municipal erf in the proposed township area;
- The existing main feeder line from the Ventersdorp water purification works to the Ventersdorp reservoirs traverses the northern portion of the proposed township area and was accommodated within proposed servitudes that will be registered against the various erven affected by this line to allow for the protection thereof and for future maintenance purposes;
- Various powerlines are also located in close proximity to the northern portion of proposed township area that link to the Eskom sub-station. The layout plan was compiled to exclude these powerlines as well as the Eskom sub-station from the township area;
- The central portion of the proposed township area located directly west of Dock Street is affected by a newly erected telecommunication mast. This structure was accommodated within the layout plan as a “Special” erf;

- The central portion is also traversed by an existing waterline emanating from the Ventersdorp reservoir site and running in a southerly direction towards the township area of Tshing. This waterline was accommodated within proposed 3m servitudes that will be registered against the title of the erven affected by such waterline to allow for the protection thereof and to allow for future maintenance;
- The two powerlines emanating from the Eskom substation and running in a southerly direction were accommodated in the layout plan within three (3) public open space erven and were, where possible excluded from the township area. Where the fore-mentioned powerlines affect the proposed township area, provision was made for minimum clearance of 3 metres from the electrical conductor in accordance with the Occupational Health and Safety Act, 1993;
- The far western portion of the proposed township area is similarly affected by an existing powerline emanating from the Eskom substation site and running in a south-westerly direction towards the township area of Tshing. This powerline was also accommodated within three public open space erven 6m wide to alow for a 3m clearance on both sides of the electrical conductor;
- The far western portion is also affected by an existing Eskom servitude vide diagram SG No. A4177/1948 and registered by virtue of Notarial Deed of Servitude K627/1951S. This servitude comprises a width of 15,5m from the centre line thereof and was accommodated within three (3) public open space erven;
- A main waterline emanating from the Ventersdorp reservoir site and servicing the township area of Tshing Extension 5 was accommodated within the road reserve of a proposed street in the township area and the two (2) residential even affected by this line will be subject to a proposed servitude with a width of three (3) metres to protect the infrastructure and to allow for future maintenance;
- An existing sewerline from the abattoir site to the sewer treatment works will affect the proposed business erf in the proposed township area located adjacent to the eastern boundary of the existing township area of Tshing Extension 5 and also traversing the fore-mentioned township area. This sewerline will be protected through the registration of a 4m servitude against the title of the erf affected by sewerline. The area of the erf where the sewerline traverses can be utilised for parking purposes;
- The layout plan of the township area of Ventersdorp Extension 11 was to a large extent affected by the location of the area previously mined which includes old borrow pits and quarries. These areas were identified during the Geotechnical investigation and were excluded from the township area;
- The existing Ventersdorp abattoir site is located south of Dock Street and a buffer area was retained around this facility and the proposed township area.

existing quarry as well as a the existing school site already present on the proposed development area; and

- The far southern portion of the township area accommodated the location of the existing Public Works site as well as providing for the extension of Aenmey Street in a westerly direction as well as linking with the proposed extension of De Beer Street in a north-westerly direction.

⋆ **Ventersdorp Extension 12:**

- The proposed street network of the proposed township area was designed to allow for the extension of both Locatie- and De Beer Streets; and
- The proposed township area is affected by the 1:100 year floodline of the Schoonspruit and the floodline area was accommodated within the open space system of the proposed township. The south-eastern boundary of the proposed township area comprises the cadastral boundary of the concerned farm portion.

4.3 ACCESS

Access to the proposed township Tshing Extension 8 will be through the extension of Dock Street through the township area of Tshing Extension 5 as well as from the existing street network of the adjacent township area of Tshing Extension 5 through Manaka Street.

Plate 15: View of the extension of Dock Street (direction west)

Plate 16: View of Manaka Street Tshing Extension 5

Access to the township area of Ventersdorp Extension 11 will be obtained from extension of Eland Street in the township area of Ventersdorp Extension 3 that will link onto Dock Street. The street network of the proposed township area will predominantly link onto Dock Street whereas access will also be available from Sekgaphane Street in the existing township area of Tshing Extension 5.

Plate 17: View of Sekgaphane Street (direction north)

Plate 18: View of Sekgaphane Sreet (direction south)

Access to the far southern portion of the proposed township area will be obtained through the extension of Aenmey Street in a south-westerly direction as well as from the proposed extension of De Beer Street through the township area of Ventersdorp Extension 10 (this road will form part of the current application in respect of the re-layout of the existing township area of Ventersdorp Extension 10).

Plate 19: View of Aenmey Street (direction east)

Plate 20: View of Bult Street (direction west)

Access to the proposed township area of Ventersdorp Extension 12 will be obtained from De Beer Street and Locatie Street. The street network of the proposed township area will also link onto Vlei Street (to be constructed).

Plate 21: View of De Beer Street (direction north)

The street networks of the various township areas were designed to ensure proper surface stormwater drainage.

CHAPTER 5: PROVISION OF ENGINEERING SERVICES

5.1 INTRODUCTION

Aurecon was appointed by the Dr. Kenneth Kaunda District Municipality to compile a services report for the proposed development of approximately 1 000 stands on the following properties in Ventersdorp.

Table 1: Proposed properties for township development

Area Number	Property Description		Area (Ha)	Number Residential Stands
1 2 3	Re of Ptn 25 of the Farm Roodepoort 191-IP Re of Ptn 25 of the Farm Roodepoort 191-IP Re of Ptn 25 of the Farm Roodepoort 191-IP	Proposed Town Ventersdorp Ext. 11	24.2	285
4	Ventersdorp Ext 10 (Erf 893 – 904)	Re-layout Erven 893 – 904 Ventersdorp Ext.10	4.151	47
5	Re of Ptn 25 of the Farm Roodepoort 191-IP	Proposed Town Ventersdorp Ext. 12	8.189	110
8	Re of Ptn 3 of the Farm Doornpan 193-IP	Proposed TownTshing Ext. 8	19.607	548
	Total			990

The Area Number refers to the numbers that were allocated to the different land portions on the Ventersdorp Local Municipality Spatial Development Framework Map 11 – Options for Residential Development, as indicated below:

The provision of services to the proposed development areas will be addressed as follows:

- Section 5.2: Roads and Access
- Section 5.3: Storm water Drainage
- Section 5.4: Water Supply and Reticulation
- Section 5.5: Sewer Reticulation and Sewage Treatment
- Section 5.6: Solid Waste
- Section 5.7:Cleaning and renovation of pit latrines
- Section 5.8: Summary and conclusion

The following reports were consulted in the drafting of the report and should be read in conjunction with this Service Report:

- Ventersdorp Water Services Development Plan 2007/8
- Ventersdorp Spatial Development Framework

Cognisance should be taken of the fact that the investigation in respect of the provision of services to the proposed township areas was initially conducted during June 2011.

Due to the identification and initiation of new infrastructure projects, the initial engineering services investigation was re-assessed during June 2012 and the comprehensive report is attached to the application for township establishment as **Annexure K**. This memorandum will however include the contents of the fore-mentioned Engineering Services Report.

5.2 ROADS AND ACCESS

5.2.1 GENERAL INFORMATION

All roads will be designed to comply with the "Guidelines for Human Settlement Planning and Design", published by the CSIR Building and Construction Technology.

5.2.2 ACCESS

Access to the different land portions is from existing municipal owned roads and acts as distributor routes for the bordering residential areas. For traffic safety and control, the layout of the proposed township development areas will be planned that the road network will integrate with the existing road network in the bordering residential areas to reduce the number of intersections on the main distributor/collector routes.

5.2.3 CLASSIFICATION OF INTERNAL ROADS

The road classifications will be in accordance with the "Guidelines for Human Settlement Planning and Design", published by the CSIR Building and Construction Technology. Classifications of roads with roadway widths are as follows:

Table 2: Road Classifications

Description	Class No.	Function	Roadway Width
Roads in 20 m road reserve	4	Distributors	6 m
Roads in 16 m road reserve	4	Distributors	5,5 m
Roads in 13 m road reserve	5a 5b	Access collector Access loop	5 m 5 m
Roads in 10 m road reserve	5c	Access cul de sac	4,5 m

5.2.4 GEOMETRIC DESIGN STANDARDS

- **Class 4 – Distributors**

Design speed		60 km/h
Minimum center line radii		80 m
Minimum gradient		0.67%
Maximum grade /grade length		10% over 100 m
Minimum K-value:	Crest	10
	Sag	10

- **Class 5a – Access Collector**

Design speed		40 km/h
Minimum center line radii - deflection 0° to 60°		30 m
-	Deflection > 60°	15 m
Minimum gradient		0.67%
Maximum grade /grade length		12.5% over 70 m
Minimum K-value:	Crest	6
	Sag	6

- **Class 5b – Residential Access Loop**

Design speed		30 km/h
Minimum center line radii - deflection 0° to 60°		30 m
-	Deflection > 60°	10 m
Minimum gradient		0.67%
Maximum grade /grade length		16% over 50 m
Minimum K-value:	Crest	4
	Sag	4

- **Class 5c – Residential Access Cul-de-sac**

Design speed		20 km/h
Minimum center line radii - deflection 0° to 60°		15 m
-	Deflection > 60°	10 m
Minimum gradient		0.67%
Maximum grade /grade length		12.5% over 50 m
Minimum K-value:	Crest	2
	Sag	2
Minimum turning circle radii		8.0 m

5.2.5 PAVEMENT DESIGN

The design life of the pavement shall be 20 years. Further recommendations in respect of the layer work will be done in future following scrutiny of the geotechnical report.

5.3 STORM WATER DRAINAGE

5.3.1 STORM WATER SYSTEMS

- **Initial phase**
  In the initial phase, the roads will be constructed with a gravel surfacing wearing course. This layer can be reworked in the future as a sub base layer, followed by the upper layers. The road level as constructed for the initial phase will be lower than the adjacent areas, and the road, with a cross fall to one side; will serve as the major storm water drainage systems for the initial phase.

- **Final phase**
  With surfaced roads, it is proposed that a piped storm water system will be installed. The topography of the areas and the lack of piped storm water systems in in some of the residential areas bordering the proposed areas, long pipe-runs will be required.

5.3.2 HYDROLOGY

The following hydrological data will be used in the design of storm water drainage systems:

Design flood frequencies for major systems:	1:50 Years
Design flood frequencies for minor systems:	1:5 Years

Average rainfall : 600 mm (MAP).

5.3.3 DESIGN STANDARDS

The following standards are to be used to assist and reduce maintenance costs on the storm water system;

Minimum pipe size:	375 mm Ø
Minimum velocity in pipe:	0.9 m/sec

5.3.4 FLOODLINE ASSESSMENT

E-Square Consulting (Pty) Ltd was appointed to do the flood line determination. geotechnical report.

5.4 WATER SUPPLY AND RETICULATION

5.4.1 GENERAL INFORMATION

The design of the water reticulation network and bulk water infrastructure will be done in accordance to the "Guidelines for Human Settlement Planning and Design" issued by the CSIR Building and Construction Technology.

5.4.2 DESIGN CRITERIA

The municipal's service level policy states that water-borne sanitation facilities will be installed for all new development in the urban areas. The design criteria will be for in house level of water service with water-borne sanitation.

Water supply systems will be designed to comply with the "Guidelines for Human Settlement Planning and Design", published by the CSIR Building and Construction Technology.

Table 3: Water Reticulation Design Criteria

Average Annual Daily Demand (AADD), domestic water consumption, moderate to high	:	130 ℓ/capita/day
Gross Average Annual Daily Demand (GAADD)	:	Allow 10% losses
Summer Peak Factor (SPF)	:	1.5
Daily Peak Factor (DPF)	:	2.4
Design Peak Flow Rate (DPFR) for domestic flows	:	GAADD x SPF x DPF
Instantaneous peak factor	:	4
Maximum static head	:	90 m
Minimum residual head under conditions of domestic peak flow (DPFR)	:	24 m
Maximum linear flow under conditions of DPFR	:	1,5 m/sec
Fire flow at any one hydrant under condition of DPFR (one hydrant at a time)	:	15 ℓ/sec
Minimum pipe diameters	:	75 mm
Minimum residual head (fire plus DPFR)	:	15 m
Maximum linear flow under conditions of firefighting	:	2 m/sec
Pipe material	:	uPVC
Minimum pipe diameters	:	75 mm

Table 4: Design Criteria for Bulk water Supply and Storage

Storage capacity	:	48 Hours of AADD
Capacity of supply main to reservoir	:	1.5 x AADD
Elevated storage capacity (One electrical driven duty and one standby pump)	:	4 hours of instantaneous peak demand
Capacity of duty pump	:	The greater of: Sum of instantaneous peak demand and fire demand And Instantaneous peak demand plus 20%

5.4.3 BULK WATER SUPPLY: STATUS QUO

The water service authority, in terms of the Water Services Act, is the Ventersdorp Local Municipality.

Water is abstracted from a concrete channel close to the water care works under a permit from the Department of Water Affairs. The channel starts at the origin of the Schoonspruit on the farm Springwater about 3 kilometers from Ventersdorp on the Rustenburg road. The canal is the property of the Department of Water Affairs and is used by the Department to convey water to Ventersdorp for domestic and agriculture use.

The water treatment process consists out of filtration and disinfectant. The treated water is pumped to storage reservoirs in Ventersdorp approximately 2,5 kilometers from the water treatment works..

5.4.4 WATER DEMAND

Due to lack of reliable information, the water demand will be based on the population and the "Guidelines for Human Settlement Planning and Design" issued by the CSIR Building and Construction Technology.

The Table 6 below depicts the number of dwellings in 2008 in the different suburbs of Ventersdorp as contained in the Water Services Development Plan, 2008

Table 6: Number of dwelling units (2008)

	Ventersdorp	Moosapark	Toevlug	Tshing	Total
Houses on formal stands	590	39	44	3814	4487
Houses on informal stands				2167	2167
Total	590	39	44	5981	6654

Table 7 below is the estimated population in Ventersdorp, based on;

- The estimated population in 2008 from the WSDP,2008, and
- A population growth between 1 % and 2,5 % per annum for the period 2008 to 2011

Table 7: Estimate Population

	Ventersdorp	Moosapark	Toevlug	Tshing	Total
Persons per stand	3	3.3	3.8	4.3	
Population 2008	1770	129	167	25718	27784
Population 2011	1824	133	175	27696	29827

The estimated average annual daily demand (AADD) is based on the water demand figures contained in Table 9.11 of the Guidelines for Human Settlement Planning and Design.

Table 8: Domestic Water Consumption

Type of Water Supply		Typical Consumption (ℓ/c/d)
Standpipes in streets		25
House connection		
Development level	Moderate to high	130
	High	250
	Very High	450

Table 9 depicts the estimated current AADD based on the demographic information contained in tables 6, 7 & 8. This exclude the development of 415 stands in Toevlug and the proposed 1002 stands as indicated in Section 1 of this report.

Table 9: Estimated Current Average Annual Daily Demand (AADD)

Water Consumption ℓ/capita/day	% Of Households				AADD kℓ/day
	Ventersdorp	Moosapark	Toevlug	Tshing	
25			15%	40%	511
130			83%	53%	1,775
250	80%	95%	2%	5%	704
450	20%	5%		2%	392
AADD (kℓ/day) domestic	513	33	20	2,816	3,382
Add: AADD (kℓ/day) Non-residential (WSDP,2008)					525
					3,907
Water loses - 25% (WSDP,2008)					976
Total AADD (kℓ/day)					4,883

In Table 10 below, the current development of 415 stands in Toevlug and the proposed development of 990 stands are included in the estimation of number of dwellings.

Dwellings to cater for the population growth for the period 2008 to 2011 has been included in houses on informal stands, which include back yard dwellers, as no new stands were made available during this period.

Table 10: Number of Dwellings including the Proposed Development

	Ventersdorp	Moosapark	Toevlug	Tshing	Total
Houses on formal stands	590	39	44	3,814	4,487
Houses on informal stands				1,000*	1,000
Current development			415		415
Proposed Development	442			548	990
Total	1032	39	459	5,362	6,892

- *Estimated houses remaining on informal stands after the current development of 415 stands in Toevlug and the proposed 990.*

In Table 11 below the AADD is calculated based on:

- The number of households as depicted in table 10,
- Number of people per household as depicted in Table 7 above (Venterdorp WSDP, 2008), and
- Domestic water consumption as depicted in Table 8 above (Guidelines for Human Settlement Planning and Design).

Table 11: Estimated Future Average Annual Daily Demand (AADD)

Water Consumption ℓ/capita/day	% Of Households				AADD kℓ/day
	Ventersdorp	Moosapark	Toevlug	Tshing	
50			15%	30%	215
130	43%		83%	63%	2,440
250	45%	95%	2%	5%	809
450	12%	5%		2%	1,025
AADD (kℓ/day) residential	782	33	209	2,729	3,753
AADD (kℓ/day) Non-residential (WSDP,2008)					525
					4,278
Water loses - 25% (WSDP,2008)					1,070
Total AADD (kℓ/day)					5,348

The estimated AADD will increase by approximately 463 kl/day, or 9 %, from 4,884 to 5,348kl/day.

5.4.5 BULK WATER INFRASTRUCTURE

- **Water Treatment Works**

The original design capacity of the water treatment works is 8,400 kℓ/day (WSDP, 2008: 110). The Ventersdorp Local Municipality has approved a project to increase the capacity of the works to 14,000 kℓ/day. Funding for the new works was secured from the Department of Water Affairs under their Regional Bulk Infrastructure Grant initiative with counter funding from the Venterdorp Local Municipality. The Engineers on the project responsible for the design and construction monitoring is Worley Parsons RSA. The expected commencement date for the project is June 2012 with completion in May 2013.

In Table 12 the designed capacity is compared with the summer peak demand using a summer peak factor (SPF) of 1.5, for the upgraded water treatment works.

Table 12: Water Demand vs Design Capacity of the upgraded Water Treatment Works

Water treatment works capacity (after upgrading) - kℓ/day	14,000
Average Annual Daily Demand (AADD)- kℓ/day	5,348
Summer Daily peak demand (DSPD)- kℓ/day	10,696
DSPD as % of the design capacity	76%

The upgraded treatment capacity is adequate to meet the current and future demand for the existing and proposed developments in Ventersdorp, Tshing, Moosapark and Toevlug.

- **Bulk Water Supply System**

The existing clear water pumps will be replaced with the upgrading of the water treatment works. The pump configuration will be one duty and one standby. The specified capacity of the new pumps is 380 kℓ/hour(106.9l/s) against a total head of 45.4 m.

The capacity of the supply main to the reservoirs should provide an inflow rate to the reservoir of not less than 1.5 x AADD (DSPD) which is equal to 334 kℓ/hour. The upgraded pump supply system from the water treatment works to the reservoirs will be adequate for the current and future demand for the existing and proposed developments in Ventersdorp, Tshing, Moosapark and Toevlug

- **Reservoir Storage Capacity**

An average storage capacity of 48 hours of annual average daily demand (AADD) is suggested in the Guidelines for Human Settlement Planning and Design.

Currently water pumped from the water treatment works is stored in two ground level reservoirs with a combined capacity of 4,700 kℓ (WSDP, 2008).

The upgrading of the bulk water supply system also includes the construction of an additional storage reservoir of 5,500 kℓ. The anticipated completion date for the additional reservoir is May 2013.

Table 13: Reservoirs Storage Capacity

Current storage capacity (kℓ): Reservoir 1	2,700
Reservoir 2	2,000
	4,700
Additional storage capacity (kℓ)	5,500
Total future storage capacity (kℓ)	10,200
AADD (kℓ/day)	5,348
Storage capacity required for 48 hours at AADD (kℓ)	10,696
Hours storage capacity at AADD	45,8

If the capacity of the tower reservoirs is added, the future storage capacity will be 11, 400kℓ or 51 hours at AADD.

- **Elevated Reservoirs**

The nominal capacity of the elevated storage capacity required is based on the typical period involved in power failures and is given as follows in the Guidelines for Human Settlement Planning and Design.

- One electrical driven pump, plus one standby pump, plus standby power generator independent of the electricity supply.
  Storage capacity: Two (2) hours of instantaneous peak demand.
- One electrical driven pump, plus one standby pump
  Storage capacity: Four (4) hours of instantaneous peak demand

Currently water is pumped into two elevated reservoirs with a combined storage capacity of 1,200 kℓ. Water is pumped from the storage reservoirs into the elevated reservoirs by means of electrically driven pumps (WSDP, 2008)

No provisions have been made in the current project for the upgrading of the bulk water supply system for additional elevated storage capacity.

Table 14: Elevated Reservoirs Storage Capacity

Current storage capacity (kℓ): Reservoir 1	500
Reservoir 2	700
Total	1,200
AADD (kℓ/day)	5,348
AADD (kℓ/hour)	223
Instantaneous peak factor	3,6
Instantaneous peak demand (IPD) (kℓ/hour)	803
Average hours storage capacity at IPD	1,49

The available elevated storage capacity is insufficient. A possible solution for the interim is to install a standby generator or to replace the standby pump with a diesel motor driven pump to reduce the required storage capacity from four to two hours.

The unaccounted for water of 25% is above the acceptable norm and can be reduced by implementing a water demand and loss control strategy.

5.4.6 SUMMARY

Table 15: Bulk Water Supply Systems.

Bulk Water Supply Component		Capacity	Required Capacity	Remarks
Water Treatment Works (When upgrading work is completed in May 2013)		14,000 kℓ/day	8,364 kℓ/day	Adequate capacity for the current and proposed development
Bulk Supply Systems to Storage Reservoirs. (When upgrading work is completed in May 2013)		380 kℓ/hour	350 kℓ/hour	Adequate capacity for the current and proposed development
Reservoirs Storage Capacity (With additional 5,500 kℓ reservoir)	Hours	49at AADD	48 at AADD	Adequate capacity for the current and proposed development
	kℓ	11,400	11,152	
Elevated Reservoirs: Storage Capacity:	Hours	1,44at IPD	4 at IPD	For the short term the situation can be alleviated by installing a standby power plant or a diesel motor driven pump to reduce the required storage capacity to 2 hours at IPD (1,670 kℓ).
	kℓ	1,200	3,340	

The bulk water supply systems are indicated on drawing number 103429-WAT-001, WATER RETICULATION, (refer following page).

5.5 SEWER RETICULATION AND SEWAGE TREATMENT

5.5.1 GENERAL INFORMATION

A full waterborne sanitation system, connected to a wastewater treatment works, is in place in Ventersdorp, Toevlug and Tshing, the exception being Moosapark where each consumer unit is provided with a septic tank and soak away drain for disposal of sewage.

Water borne sewer gravitates from Ventersdorp and Tshing to two sewer pump stations from where it is pumped to the Waste Water Treatment Works.

The treated effluent at the wastewater treatment works is pumped to the old oxidation ponds from where it flows into one of the tributaries of the Schoonspruit through a 450mm pipeline

The municipal's service level policy states that water-borne sanitation facilities will be installed for all new development in the urban areas.

Pit latrines were provided for the people that squat on the Remainder of Portion 3 of the Farm Doornpan, 193-IP, indicated as area 8 on the MAP 11, Options for Residential Development, of the Ventersdorp Spatial Development.

For the purpose of this report only the existing stands plus the newly develop 415 stands in Toevlug and the proposed 1002 stands will be consider to contributing to the sewage inflow to the waste water treatment works.

5.5.2 DESIGN CRITERIA

The sewer reticulation will be done according to the: Guidelines for Human Settlement Planning and Design" (Red Book) issued by the CSIR Building and Construction Technology

Table 16: Sewer Design Criteria

Average daily flow : Low Income	450ℓ/single family dwelling/day
: Middle Income	650 ℓ/single family dwelling/day
: High Income	1,000 ℓ/single family dwelling/day
Peak factor	2,5
Capacity of sewer	To flow full at peak design flow plus 15 % for storm water infiltration and other contingencies
Minimum pipe diameter	110 mm Ø
Minimum velocity	0.7 m/s
Minimum gradient	150 mm Ø –1:200
	200 mm Ø – 1:300
	225 mm Ø – 1:350
	250 mm Ø – 1:400
	300 mm Ø – 1:500
Minimum depth of cover:	1,4 m in street reserves
	0,6 m in midblock

5.5.3 BULK OUTFALL SEWERS AND PUMP STATIONS

- **Bulk Outfall Sewers**
  The area numbers refer to the areas indicated on MAP 11 – Options for Residential Development, Ventersdorp Local Municipality.

  Areas 3, 4 and part of area 1 can drain through Tshing Extensions 1 and 4 towards the sewer pump station situated next to Road P32-1. A new bulk outfall sewer will have to be installed to connect the sewer network in these areas to the pump station. The balance of area 1 can drain towards the existing main outfall sewer in Tshing Extension 5.

  Area 2 can be connected to the existing main outfall sewer from the abattoir through Tshing extension 5.

  Area 5 will have to be connected with a new outfall sewer to the Ventersdorp sewage pump station situated next to the golf course.

  A new outfall sewer will have to be constructed from area 8 to the inlet works of the waste water treatment works.

  The existing bulk sewer networks as well as the proposed outfall sewers are indicated on drawing number 103429-SEW-001, SEWER RETICULATION (refer following page).

- **Sewer Pump stations**

  - **Venterdorp Sewage Pump station**
    The sewage from the Ventersdorp and Toevlug gravitates to the pump station next to the Ventersdorp golf course, from where it is pumped to the treatment works. Currently only 60 % of the capacity of the pump station is utilized, leaving 40 % available for further development (WSDP 2007/08: 116).

    The estimated sewage inflow to this pump station, based on the number of dwellings in Ventersdorp contributing towards the sewage flow to this pump station is 550 kℓ/day. The spare capacity at this pump station is thus 300 kℓ/day. The estimated increase in sewage flow towards this pump station due to the proposed development at Area 5 is estimated at 300 kℓ/day.

    The pump station was built in 1997 (WSDP 2007/08: 116) and due to wear and tear the efficiency of the pumps will be lower than the design capacity and might have to be replaced to cope with the increased inflow.

- **Tshing Sewage Pump station**

  The bulk of the sewage from Tshing gravitates towards the pump station next to the P32-1 road, from where it is pumped to the treatment works. Currently only 80 % of the capacity of the pump station is utilized, leaving 20 % available for further development (WSDP 2007/08: 116).

  The estimated sewage inflow to this pump station, based on the number of dwellings contributing towards the sewage flow to this pump station is 1,200kℓ/day. The spare capacity at this pump station is thus 400 kℓ/day. The estimated increase in sewage flow towards this pump station due to the proposed development at Areas1, 2, 3 and 4 is estimated at 350kℓ/day.

  The pump station was built in 1997 (WSDP 2007/08: 116) and due to wear and tear the efficiency of the pumps will be lower than the design capacity and might have to be replaced to cope with the increased inflow.

5.5.4 WASTE WATER TREATMENT WORKS

The design capacity of the waste water treatment plant is 3 Mℓ (3,000 kℓ) per day (WSDP, 2008).The works was originally constructed in 1998 and recently being refurbish. The refurbishment work includes the replacement of the stolen fence, repairs to equipment and buildings that were vandalised, improvement to security measures to prevent future vandalism, etc. It could not be confirmed if the capacity of the Waste Water Treatment Works was increased with the refurbishment project.

For the purpose of this report only the existing stands plus the newly develop 415 stands in Toevlug and the proposed 1002 stands will be consider to contributing to the sewage inflow to the waste water treatment works.

No records are available for the current inflow into the works. To determine the current and future hydraulic loading on the works, the demographic scenarios as depicted in Tables 6 and 10 above will be used.

Table 17: Estimated Current Sewage Flow

Average Daily Flow ℓ/dwelling/day	% Of Households			Average daily flow (kℓ/day)
	Ventersdorp	Toevlug	Tshing	
Low income: 500 ℓ/d/d		85%	85%	1,340
Middle income: 750 ℓ/d/d	25%	15%	15%	545
High Income: 1,000 ℓ/d/d	75%			443
Total waste water (kℓ/day)				2,328
Average dry weather flow (ℓ/sec)				27
Peak flow (Peak factor = 2.5) (ℓ/sec)				68

Table 18: Estimated Sewage Flow

Average Daily Flow ℓ/dwelling/day	% Of Households			Average daily flow (kℓ/day)
	Ventersdorp	Toevlug	Tshing	
Low income: 500 ℓ/d/d	17%	85%	85%	1,952
Middle income: 750 ℓ/d/d	21%	15%	15%	692
High Income: 1,000 ℓ/d/d	62%			443
Total waste water (kℓ/day)				3,087
Average dry weather flow (ℓ/sec)				36
Peak flow (Peak factor = 2.5) (ℓ/sec)				90

The Waste Water Treatment Plant does have adequate capacity to treat the expected sewage flow from the current and proposed development.

5.5.5 SUMMARY: SEWAGE

- **Outfall sewers**
  New sewer lines will be installed to convey sewage from;
  - Areas 1, 2, 3 & 4 to the Tshing sewage pump station,
  - Area 5 to the Ventersdorp sewage pump station, and
  - Area 8 to the wastewater treatment works.

- **Sewage Pump stations**
  Both pump stations do have sufficient spare design capacity to accommodate the increase in sewage flow, but the pump stations has been constructed in 1997 and due to wear and tear the mechanical components (pumps) might have to be replaced to cope with the increase in sewage flow.

- **Wastewater Treatment Works**
  The works has been constructed and completed in 1999. Recently some refurbishment work on the plant was done, however it could not be confirmed if the if the treatment capacity of the works was increased.

  The existing plant should have sufficient capacity to accommodate and treat the increased sewage flow due to the proposed development.

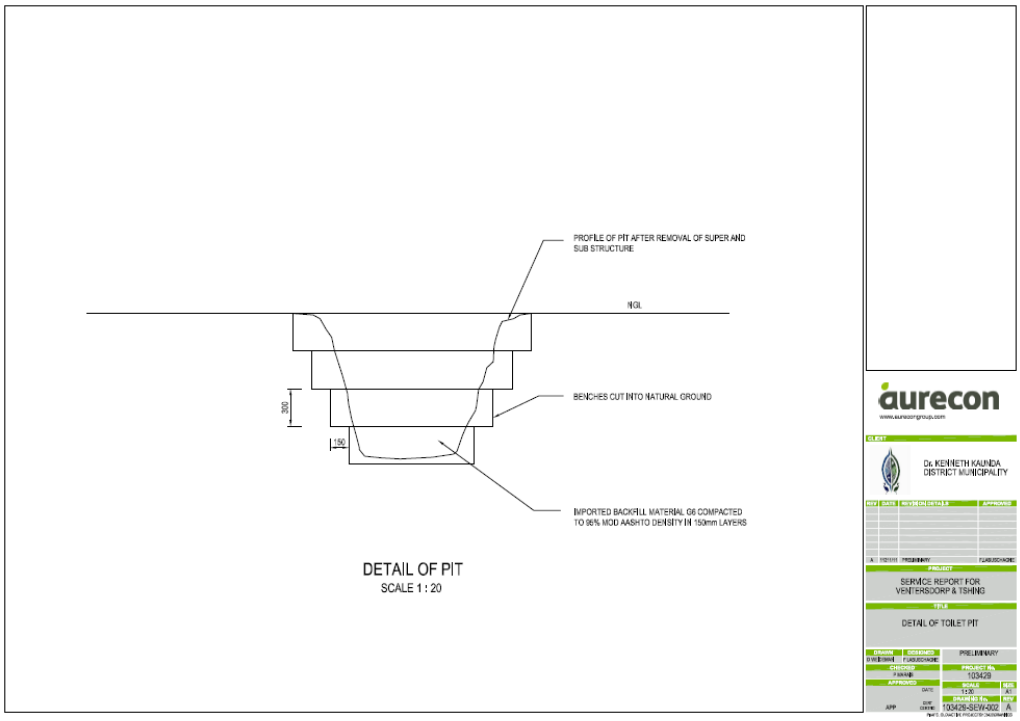
5.6 RENOVATION OF EXISTING PIT LATRINES IN AREA 8

As an interim measure Ventersdorp Local Municipality settle landless people on informal stands on Area 8. The level of sanitation service provided was VIP's shared by more than one family.

The VIP's shall have to be renovated not to impose unnecessary constrains on the town layout and services and to create a healthy environment for the future occupants of the stands.

The top structures of the VIP will be demolished; the slab on the pit removed and the pit empty of its contents. The contents of the pits shall be taken to the wastewater treatment works for further treatment. Special precautions and personal protective equipment shall be used to protect the workers.

After the pit contents were removed, the pit lining shall be properly cleaned and disinfected. The pit lining will then be demolished and removed to the solid waste site where it will be disposed of and covered to prevent the re-use of the building rubble. The hole shall be backfilled as detailed in Drawing 103429-SEW-002, as indicated below



5.7 SOLID WASTE

The Ventersdorp Local Municipality provides waste removal service to all households in Ventersdorp, Tshing, Toevlug and Moosapark. Households are provided with a 65 liter refuse container that is emptied on a weekly basis.

The municipality disposes of the solid waste at a waste disposal landfill site north of the Tshing.

5.8 SUMMARY AND CONCLUSION

The proposed development will cater for people residing on informal stands. The development will result into an improved level of services (water and sanitation) to the residents, which will increase the demand for water and the sewage treatment capacity.

The Ventersdorp Local Municipality has embarked on a project to upgrade the bulk water supply. The project entails:

- Increasing the capacity of the water purification works to 14,000 kℓ/day
- The construction of a 5,500 kℓ storage reservoir.

The work on the upgrading project is scheduled to commence in June 2012 and to be completed by May 2013. The upgraded water purification works and storage reservoirs will have sufficient capacity to accommodate the increased water demand that will result from the proposed development.

The elevated storage capacity, based on the requirements of the "Guidelines for Human Settlement Planning and Design" issued by the CSIR Building and Construction Technology, is inadequate. The Venterdorp Local Municipality, as an interim measure, can consider the option to install a standby power generator or a diesel motor driven pump to reduce the required elevated storage capacity from 4 hours at instantaneous peak demand to 2 hours until additional elevated storage capacity can be provided.

The estimated sewage generated with the proposed development will marginally exceed the design treatment capacity of the wastewater treatment works. It could not confirm if the treatment capacity has been increased with the latest refurbishment of the works, however the Waste Water Treatment Works will be able to cope with the increased sewage flow from the proposed development.

Both the raw sewage pump stations do have sufficient spare capacity (Ventersdorp Water Services Development Plan 2007/8) to cope with the increased sewage flow.

The existing VIP's on area 8 (Re of Ptn 3 of the Farm Doornpan 193-IP) shall be demolished and rehabilitated as describe in paragraph 6 of the report not to impose unnecessary constrains on the town layout and services and to create a healthy environment for the future occupants of the stands.

The proposed development of approximately 1,000 stands is earmarked to reduce the number of people living in informal areas. The formalization and township establishment will result in better an improved service delivery, which will result in an increase in demand for bulk water and sanitation services. Except for the elevated storage reservoir capacity, the planned upgraded bulk water supply infrastructure and the existing bulk sewage infrastructure shall have sufficient capacity to cope with the increased demand that will result from the proposed development. The issue of the elevated storage capacity can be alleviated by installing a standby power generator and/or a diesel motor driven pump to reduce the required storage capacity from 4 to 2 hours at IPD.

CHAPTER 6: CONCLUSION

From a land use and town planning point of view the proposed development areas are ideally suited for residential purposes due to the following:

- The proposed development areas are located in areas earmarked for future residential development in terms of the Spatial Development Framework of the Ventersdorp Local Municipality.

- The purpose of the applications for township establishment is to provide sufficient erven within the Ventersdorp/Tshing urban complex to address the short term need for residential erven in order to address existing informal settlement of land and avoid further informal settlement from taking place whilst similarly providing vacant erven to allow for orderly future settlement.

- The proposed development areas are located directly adjacent to existing township areas and constitute the logic extension of the existing built-up urban area of Tshing and Ventersdorp. In this regard the proposed development constitutes infill development.

- The location of the proposed development areas in relation to the existing township area of Tshing and Ventersdorp further allows for easy connection to existing services networks in order to service the erven within the proposed township areas.

- The proposed development areas are all further easily accessible due to their location adjacent to existing main access roads servicing the Tshing and Ventersdorp residential areas.

- In addition to the proposed township areas complying with the recommendations as encompassed in the Spatial Development Framework of the Ventersdorp Local Municipality, the proposed developments also comply with the General Principles as set out in the Development Facilitation Act, namely:
    - Policy, administrative practice and laws should provide for urban and rural development and should facilitate the development of formal and informal, existing and new settlements (Principle 3(1)(a);
    - Discouraging the illegal occupation of land (Principle 3(1)(b);
    - Promoting efficient and integrated land development in rural and urban areas in support of each other (Principle 3(1)(c);
    - Promoting the availability of residential and employment opportunities in close proximity to or integrated with each other. This is specifically attained through the process of infilling whilst similarly curbing urban sprawl (Principle 3(1)(c)
    - Discouraging the phenomenon of urban sprawl (Principle 3(1)(c)

- Contributing to the correction of historically distorted spatial patterns of settlement in the Republic and tot he optimum use of existing infrastructure in excess of current demands (Principle 3(1)(c);
- Affording members of communities affected by land development to actively participate in the process. The township establishment process as well as the Environmental Impact Assessment processes provide these opportunities (Principle 3(1)(d);
- Principle 3(1)(h) calls for policy, administrative practice and laws to promote sustainable land development at the required scale in that they promote land development which is within the fiscal, institutional and administrative means of the Republic, promote the establishment of viable communities, promote sustainable protection of the environment, meeting the basic needs of all citizens in an affordable way and ensuring the safe utilisation of land by taking into consideration factors such as geological formations and hazardous undermined areas.
- This process of township establishment also aims at promoting the speedy development of land (Principle 3(1)(i); and
- The applications for township establishment similarly aim at ensuring security of tenure specifically for the landless community of Ventersdorp but also for future investors through the creation of erven for bonded and middle income housing (Principle 3(1)(k).

In view of the fore-mentioned, we trust that this application will be considered favourably.

K. RAUBENHEIMER
Pr. Pln A/924/1996