SCIP ENGINEERING GROUP

JOHANNESBURG
EMALAHLENI
TSHWANE
EAST LONDON
NORTH WEST
KWAZULU NATAL

Smokey Mountain
Office Block
N4 Business Park
eMalahleni, Mpumalanga

Private Bag X7297
Postnet 145
eMalahleni, 1035
Mpumalanga

Tel: 013 656 2660
Fax: 013 656 3325
witbank@scip.co.za
www.scip.co.za

REMAINDER OF FARM LEEUPOORT 283-JS, PROVINCE MPUMALANGA

THE SUPPLY OF CIVIL SERVICES FOR THE PLANNED PINE RIDGE EXT 5-25

TOWN PLANNER:

Korsman & Associates

REPORT COMPILED BY:

SCIP ENGINEERING GROUP

Revision - 000
Date – October 2014

BBBEE: Level 2, 46% black female owned & 156% recognition level
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A member of CESA

Associates: M Marijnen
MP Barbosa; FF Deysel;
AS Le Roux;

Directors: JD Booyens;
NM Mjodi; P Booyens;
NM Ndaba
Reg. No. 1996/15526/07
Vat No. 4010168278

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1 EXECUTIVE SUMMARY

This proposed development will form part of Township development of the greater Pine Ridge area. The proposed Township is located North of the existing Pine Ridge Development.

Access to this development will be provided through the existing road network of roads namely the R544 (D1126) and Pineridge Road to Verena.

Access Roads will be constructed in co-operation with other developers and design of these will accommodate existing township as well as future developments.

Internal Streets will be designed according to existing Design Standards and pavement designs will utilize in-situ materials as well as imported material from commercial sources.

Stormwater can be safely routed within the development on roads and within sub-surface systems. No formal retention dams are foreseen. Existing stormwater infrastructure from higher lying areas will be accommodated through this development.

The provision of water will have to be implemented through the upgrading of bulk lines from Pap & Vleis (Railway Crossing) to the larger Klarinet Development. Also the capacity of Point A's storage and the capacity of the current Water Treatment Works (WTW) in town will have to be investigated. The upgrading of all these bulk infrastructure should be implemented through the *Bulk Services Fund*.

It is questionable whether sufficient bulk water is available for this development. Certain upgrading work to pipelines and reservoirs will be required to provide the necessary water pressure and flow rate during peak periods. The master plan of ELM should be implemented for the region.

Sewage will have to be drained through a new outfall sewer line to the Klipspruit WWTW. As far as we understand, the spare capacity on the existing outfall line as well as the pumpline from Pineridge to Klipspruit has been absorbed by the *Klarinet Integrated Housing Development* currently being done by ABSA Development Company. The line will have to be installed by ELM and funded from their *Bulk Services Fund* when approved.

The normal activities of people living in this future township will not lead to soil, surface water or ground water pollution.

Special measures will be taken in accommodating eco sensitive areas.

Strict Health and Safety Regulations will be enforced as per the Health and Safety Act and associated regulations during construction. All fauna and flora outside the perimeter of this development shall be protected and will not be damaged.

2 GENERAL INFORMATION

2.1. Location

The township is located to the north west of Emalahleni/Witbank.

Figure 1 indicates the border parameters of the property under discussion.

Figure 1

To the south of the property is the Pineridge Township and to the East is situated the recently serviced Klarinet Ext 6 township.

The 1:100 year floodlines for the river on the southern boundary as well as the section of river through the western part and north western part of the development were calculated and provided in a separate floodline report dated 17 November 2011. They are indicated on the attached plan (Appendix A) as yellow lines.

2.2. Applicant

The Managing Director
Sarovic Investments

WITBANK
1035
Tel: 013-656-6789
Fax: 013-656-5512
Email: wtbrentals@vodamail.co.za
Contact Person: Mr. Momir Sarovic

2.3. Consulting Engineer

SCIP Engineering Group (Pty) Ltd.
Private Bag X7297
Suite 145
eMalahleni
1035
Tel: 013 656 2660
Fax: 013 656 3325
Email: witbank@scip.co.za
Contact Person: Mr. W.R. van As

2.4. Layout plan

The layout plan that was used for the preparation of the Civil Services Report (this report) is shown in *Appendix A*.

2.5. Land-use rights

Application is made for the following land-use rights (Phase 1). A table with details is available from Townscape Planning Solutions.

1. Total area of township						459.698 4 Ha
2. Total number of erven						4255
Land Uses:	TOTAL ERVEN	AREA ha	MIN area	MAX area	AVE. area	% OF TOWN
"RESIDENTIAL 1"	4 161	185,7478 Ha	300 m^2	872 m^2	327.03 m^2	40.41
"RESIDENTIAL 2"	2	0,7806 Ha	12 952 m^2	4 854 m^2	2 056.75 m^2	0.17
"RESIDENTIAL 3"	5	1,3949 Ha	927 m^2	5 282 m^2	2 790 m^2	0.3
"RESIDENTIAL 4"	30	7,5283 Ha	1 430 m^2	18 043 m^2	2 509 m^2	1.64
"COMMUNITY FACILITY"	9	6,3298 Ha	460 m^2	53 989 m^2	7 033 m^2	1.38
"INSTITUTIONAL"	12	15,1090 Ha	1 512 m^2	1 756 m^2	1 627.56 m^2	3.29
"BUSINESS 2"	8	2,5642 Ha	2 054 m^2	4 412 m^2	3 205 m^2	0.56
"BUSINESS 3"	7	3,1008 Ha	1 453 m^2	9 962 m^2	4 430 m^2	0.67
INDUSTRIAL 1"	9	4,1997 Ha	2 081 m^2	18 948 m^2	4 666 m^2	0.91
"GOVERNMENT"	2	2,1436 Ha	2 601 m^2	18 835 m^2	10 718 m^2	0.47

"PARK"	9	149,1692 Ha	155 m^2	54 989 m^2	165 744 m^2	32.45
"PRIVATE PARK"	1	3,8393 Ha	38 393 m^2	38 393 m^2	38 393 m^2	0.84
"PRIVATE ROAD"		77,7912 Ha	77,7912 Ha	77,7912 Ha	77,7912 Ha	19.91
TOTAL:	4 255	459,6984 Ha				100%

The total area of phase for this development according to the details provided by Korsman & Associates is 459,6984 hectares.

2.6. Services Agreement Proposed

It is the intention of the developer to hand the Civil Services of the township over to the eMalahleni Local Municipality.

The ownership of all services will therefore revert to ELM after construction and the maintenance and insurance of the services will be the responsibility of ELM.

3 ASPECTS OF THE PROPOSED DEVELOPMENT REQUIRING SPECIAL ATTENTION

3.1. Development of residential stands in areas with high water tables

The geotechnical report identified certain areas with high water tables. Vegetation in these areas resembled those types commonly found in wetlands type environments.

This situation is actually caused by the Ferricrete underlying the particular area, therefore causing an impervious layer basically preventing surface water drainage into the sub-strata.

When construction of pipelines like sewage, water and stormwater starts, this Ferricrete layer will be penetrated and the water table will go down slightly. No substantial effect or bad result will develop for either the sub-strata or the vegetation.

3.2. Water storage on site

As can be seen in the detail section, the need for integrated planning and thus development of the greater Pine Ridge region is necessary. This will probably necessitate a reservoir for the area. A reservoir for this particular development is not envisaged.

3.3. The Sewage treatment

The proposed township is too big to rely on a sewage package plant. The volumes are given in the "Sewer" section. The sewage treatment can only succeed if the flow goes to an upgraded Pine Ridge pumpstation and then pumped to the Municipal treatment works at Klipspruit.

4 ROADS

4.1 Access to the proposed Township and Traffic Impact Study

The proposed development will primarily have direct access from the Saaihoek Road (D1126) as planned by WSP Consulting Engineers. The adjacent proposed township (Portion 79 of Blesboklaagte) will make use of the same existing road entrances, i.e. from Saaihoek Road.

Secondary access from the Verena road and Pineridge Township will possibly be provided during later phases (phase 2) of the development depending on the growth of the area.

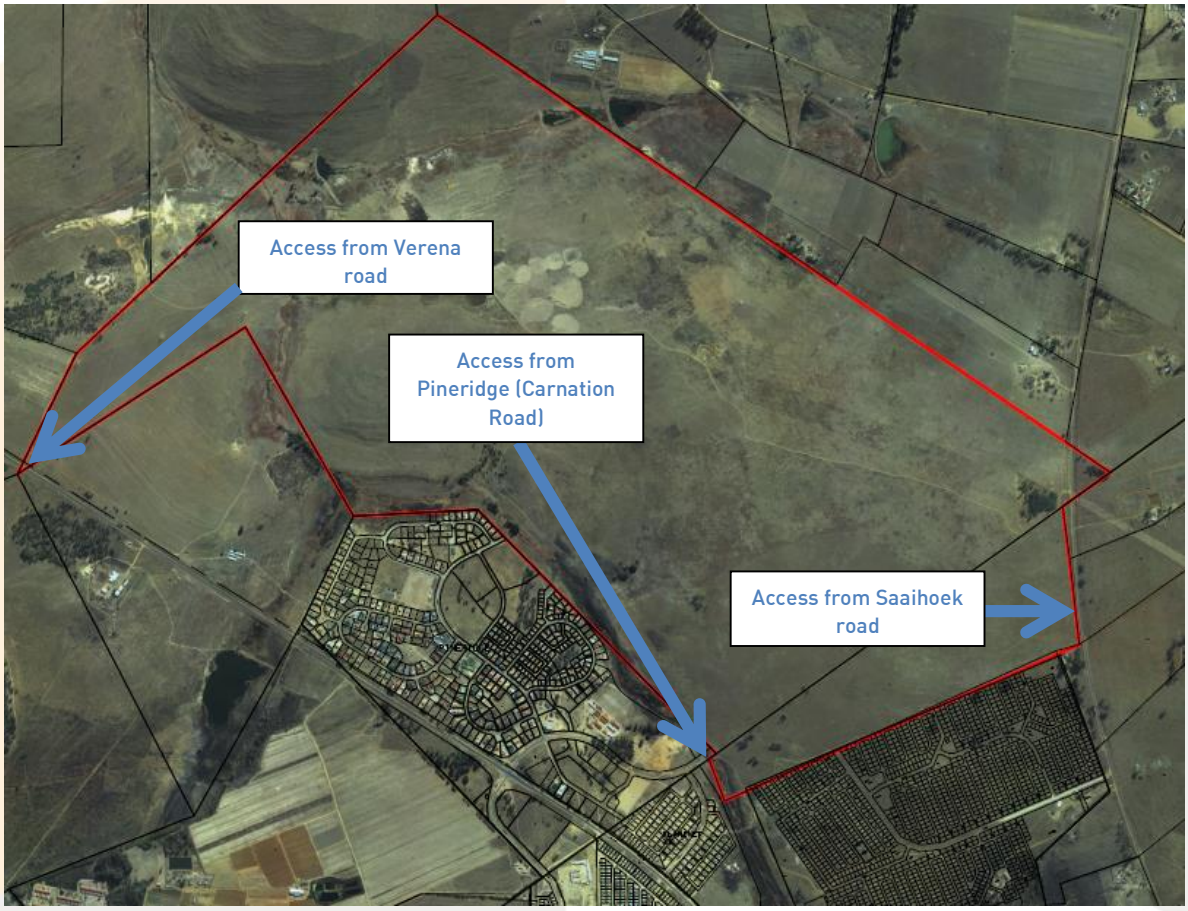


Figure 2

It is believed that sufficient capacity will be available from the (D1126) for phase 1 of the development.

The Traffic Impact study by WSP should be studied for further details on the roads and road accesses.

4.2. Street classification

The following street classes were provided for and incorporated in the current layout by Townscape Planning Solutions.

Street Reserve Width	Class of road	Roadway width (m)	Road Description
13 m	Class 5	5m	Local Access Roads
20 m	Class 4	6m	Local Collector Roads
25 m	Class 3	7m	Distributors/Secondary Roads

Table 1

It is the opinion of *SCIP Engineering Group (Pty) Ltd*. that the various street widths provided are sufficient.

Services like stormwater, sewerage and water as well as Telecommunication and Electricity will also be accommodated in the road servitudes. These services will be accommodated according to the protocol set by ELM in terms of positioning in the servitudes.

4.3. Road Materials

The geotechnical report revealed that the in situ material is basically that of the Karroo system and manifests as a sandy topsoil underlaid by a ferricrete layer over a large proportion of the property.

This means that the in situ material can be utilized for the construction of the streets.

The area also includes a registered borrowpit which could be initially used to obtain material but the vision is to rehabilitate the area according to the set Environmental Management Plan (EMP).

5 STORMWATER

5.1 Surface Drainage

The road layout of the township leans itself to an adequate drainage system. Sufficient material slopes exists.

Stormwater, as surface runoff during rainfall events, can drain freely from erven via streets to kerb inlets that will be provided on all internal roads and spaced according to topography and therefore catchment size.

Releasing stormwater from this township to the nearby stream can be easily managed through minor outlet and energy dissipating structures located high within the 1:100 floodline area. It might be necessary to place rubbish retaining structures at the stormwater outlet points.

Stormwater lines are accommodated mostly in road reserves and these lines will be designed to also accommodate water run-off from higher lying adjacent townships.

It is not foreseen that any problems will be encountered to accommodate the 1:2 (residential) and 1:5 year (business) return period storms on the roads and in the sub-surface conduits.

Street levels will be designed in such a way that streets act as stormwater collectors. Stormwater inlets will be placed in such a way that access to stands are not compromised.

No erosion will take place since all streets will be paved.

5.2 Stormwater routing

The safe routing of stormwater within the Township will receive special attention.

Retention ponds may be considered at bulk stands depending on the density of housing that will eventually be provided here. The requirement for retention ponds shall be in accordance with the bylaws of the Local Authority and shall be provided at detail design phase. At this stage no retention ponds is envisaged.

Existing excavated areas to the North and North West could be utilized as retention ponds as it is our opinion that these areas will be uneconomical to rehabilitate for the development of houses. These areas should be considered for parks and recreation areas. These areas will be adequately drained and rehabilitated according to DMR Standards and the EMP.

6 WATER SERVICES

6.1 Bulk water availability

This report does not aim to provide detail water demand modeling results or the exact impact of this development on the bulk water system, but rather aims to convey an engineering opinion on the ways and means to serve the development with water.

The impact of this development on the existing bulk water infrastructure will be quantified once the Design Engineer has been appointed for the detail design phase of both bulk and network water services.

Design drawings will be submitted with a design report by the Design Engineer to the Local Authority for their approval. It is the Local Authority's right to scrutinize the report and request changes to the design where needed.

We are of the opinion that the scale of this development will drastically impact on the provision and distribution of bulk water, i.e. affecting the current Water Treatment Works as well as storage reservoirs at Point A (in Witbank) as well as the bulk water lines feeding from Point A to the north-western suburbs. A secondary water reservoir at least, would be required in the new area.

The proposed land use covered in the township layout of *Figure 1* will require an estimated water demand as follows:

Technical parameter	Estimated value
Estimated Total Daily Demand =	3,0 Ml/day
Estimated Peak Flow Rate based on a peak factor of 5 =	180 l/s

The main water supply internally will be designed for fire water requirements and pipe sizes will likely vary from 110mm diameter to 315mm diameter.

The area is located relatively low compared to low level reservoirs at Point A and theoretically it is expected that *sufficient pressure will be available for this development.* It should be noted that it is our knowledge that the water purification plant of eMalahleni is under great pressure at the time of compiling this report. With the probable placing of secondary reservoirs in the area, the need for elevated water storage systems might arise. Designs will be done according to a master plan for the development of the greater Pine Ridge Area.

The upgrading of bulk lines to this development will have to be provided and should be done in accordance with the Klarinet Integrated Housing Project currently implemented by Bigen Africa and ABSA's Development Company. A master plan for the development of this area is obviously of paramount importance.

According to Mr. Dieter Storbech from Bigen Africa, the waterline from Pap & Vleis at the railway crossing feeding from Point A in town will be upgraded to serve a portion of phase 1C and phase 2 of Pine Ridge extension 6.

It is likely that the upgraded water line from Pap & Vleis will not be sufficient for the Sarovic Development and that further upgrading by the Local Authority, through the bulk services contribution strategy, will have to be implemented.

It is our opinion that the Local Authority will have to plan carefully in terms of the necessary upgrading work required for bulk water services.

6.2. Internal water layout

The township layout by Townscape Planning Solutions provides sufficient servitudes for an internal water network. The network will be designed and constructed according to municipal and national standards. All stands will be equipped with separate connections which will allow for internal fire systems as well.

Fire water will also be accommodated according to national and municipal standards.

7 SEWAGE SERVICES

7.1 Bulk Sewage Conveying availability

This report does not aim to provide detail sewage flow modeling results or the exact impact of this development on the existing bulk sewer system. The report merely aims to convey an engineering opinion regarding the ways and means of draining the development with a bulk and internal sewer systems.

Most of the development is situated topographically higher than the outfall sewer draining to the Pineridge Sewage Pumpstation.

According to Mr. Dieter Storbeck from Bigen Africa, the outfall sewer line and pumping line from the Pineridge Sewage Pumpstation is sufficient for most of the phase 1 Klarinet Integrated Housing Development. However a services agreement was apparently signed by ELM in which it is implied that no spare capacity is available on the pumpline to Klipspruit for the Sarovic Development which means that the bulk line will have to be upgraded.

The further phases of the Klarinet Integrated Housing Development will require a new outfall sewer line that will serve the Sarovic Development.

The necessity for an upgraded pumpstation at Pine Ridge proper outfall gravity sewer to the Klipspruit Works is inevitable. Such an upgrade should be done in accordance with the Klarinet Integrated Housing Development and Bulk Services Contribution Policy of ELM. The greater area of Pine Ridge is in dire need of a sewage master plan.

Technical parameter	Estimated value
Estimated Average Daily Dry Weather Flow =	2,5 Ml/d
Estimated Peak Wet Weather Flow rate =	3,0 Ml/d

Internal sewer lines will likely vary from 160mm to 250mm diameter.

The bulk studies that were available at the time of writing this report was limited and the report is based on basic information and opinions of other consultants dealing with the *Integrated Housing Development of Klarinet*.

8 NETWORK SERVICES / DEVELOPMENT COST

8.1 Services

The costing of network services was based on the layout provided by *Townscape Planning Solutions* September 2014.

The cost of network and bulk services is calculated separately. Please refer to *Section 7.1* for the bulk services costing.

PHASE 1 – INTERNAL SERVICES

Civil Service Discipline	Phase 1	Comments
Internal Services		
Water	R 22 812 000	
Sewer	R 22 690 000	
Roads	R 157 264 000	
Stormwater	R 29 689 000	
SUB-TOTAL	R 232 455 000	
Plus 14% VAT	R 32 543 700	
TOTAL	R 264 998 700	
Calculation based on stands		
Res 1	*4,161 stands*	
Res 2, 3, 4	*37 stands*	
Government, Institutional, Community Facility	*23 stands*	
Business, Industrial	*24 stands*	
Park	*10 stands*	
Total stands	*4,255 stands*	
Internal services cost per stand	**R 62,280 / stand**	

9 BULK SERVICES CONTRIBUTION

9.1 Services

ELM is currently considering the implementation of a bulk services contribution strategy.

Hereby, developers will have to pay a bulk services contribution and in turn receive bulk services to the development's boundary provided by ELM. This process is still to be finalized.

10 RECOMMENDATION

It is recommended that the Civil Services Report for this development be approved by the Local Authority.

Once the Township establishment process is underway, detail designs will follow and eventually an agreement for the delivery of services could be entered into by the developer and ELM.

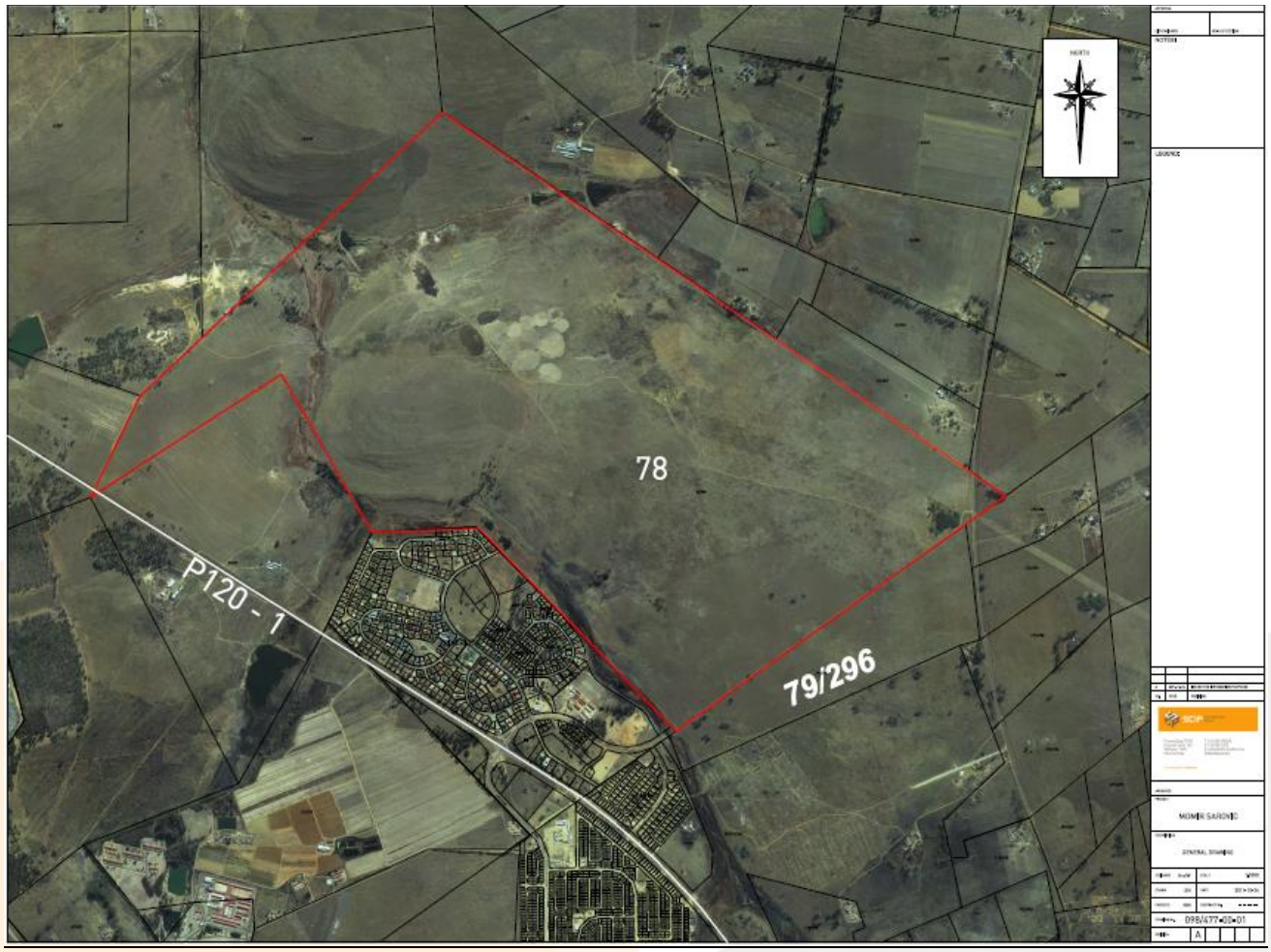
Trust you find this in order.

Yours faithfully,
SCIP Engineering Group (Pty) Ltd

W.R. van As Pr. Eng

APPENDIX A

FIGURE A.1



APPENDIX B

SITE PHOTOS

Low cost housing to the south-east of this development

View from the south, unidentified measuring station on river bordering the south

Pineridge pumpstation, currently accepting sewage from low cost housing

View from the North-west, west of western bordering river

View from the north, close to highest point on property

View from the north east, close to highest point on property