**Assignment**

Mr. J. Moller and F. Viljoen of Bateleur Environmental Services (BES) were appointed by Polygon Environmental Planners (PEP) for specialist input in the form of an Ecological Assessment.

This ecological report will form part of an Environmental Impact Assessment (EIA) process being conducted by PEP for the proposed establishment of a shopping centre and associated infrastructure on a part of Portion 1, farm Schoongelegen 432-LT, Ga-Kgapane, a property of approximately 5.8 ha in extent.

BES has no vested interest in the Schoongelegen property or the proposed development.

**The following services were to be rendered by BES:**

a) Literature study.

b) Red Data species assessment.

c) Terrain and soil survey.

d) Fauna and Flora assessment.

e) Ecological sensitivity and health survey.

f) Identification of potential impacts on the applicable environment.

g) Measures for the mitigation of impacts on the applicable environment.

**Environmental Management per Definition**

Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated, and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option while promoting sustainability.

## Introduction

### THE ENVIRONMENT

**Section 24 of the Constitution of RSA enshrines the right to – the Environment**

Everyone has the right —

1. to an environment that is not harmful to their health or well-being; and
2. to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that —

    1. prevent pollution and ecological degradation;
    2. promote conservation; and
    3. secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

    4. Sustainable development requires the consideration of all relevant factors including the following:

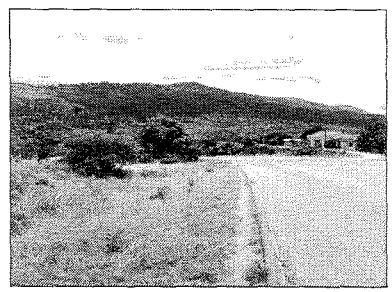
        1. That the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimized and remedied;
        2. that pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimized and remedied;
        3. that the disturbance of landscapes and sites that constitute the nation's cultural heritage is avoided, or where it cannot be altogether avoided, is minimized and remedied;
        4. that waste is avoided, or where it cannot be altogether avoided, minimized and reused or recycled where possible and otherwise disposed of in a responsible manner;
        5. that the use and exploitation of non-renewable natural resources is responsible and equitable, and takes into account the consequences of the depletion of the resource;
        6. that the development, use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardized;
        7. that a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions; and
        8. that negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimized and remedied.



## Study Area

- **Location**

The study area is situated within the Tzaneen area on a portion of the farm Schoongelegen 432 LT, which is situated south-east of Ga-Kgapane and north of Tzaneen along the Ga-Kgapane tarred road. It is located approximately 10 km northeast of the town of Modjadjiskloof, with its eastern boundary formed by the Ga-Kgapane road. The site can be accessed from a direct turnoff from the main tar road. The GPS coordinates for the site entrance is at S23°40'05.1" and E30°14'41.8" respectively with an altitude of approximately 830m – 850m above sea level.



- **Description of ecology**

### SVI 8 TZANEEN SOUR BUSHVELD

**Distribution:**

Limpopo Province: A band extending along the foot-slopes and hills of the north-eastern escarpment, from the Soutpansberg Mountains in the north via Tzaneen and narrowing to the Abel Erasmus Pass area in the south. Altitude 600-1000 m and higher in places. (Please see appendix for map)

**Vegetation & Landscape Features:**

Deciduous, tall open bushveld (parkland) with a well developed, tall grass layer, occurring on the low to high mountains with undulating plains mainly at the base of, and on the lower to middle slopes of the north-eastern escarpment.

**Lithology, Geology & Soil:**

The potassium-poor gneisses of the Goudplaats gneiss (Swazian Erathem) and an Archaean granite dyke underlie most of this area. Shales and quartzite of the Wolkberg Group are present, but not common. Soils are Mispah, Glenrosa or Hutton forms, shallow to deep, sandy or gravelly and well drained. Land types Fa, Ab, Ae and La.

Erosion and the erosion potential of the area is varies from site to site depending on factors such as slope, rainfall, habitat disturbance, land-use etc.

**Climate:**

Summer rainfall with dry winters. M.A.P. from about 550 mm on the foot slopes of the escarpment in the east to about 1000 mm, where it borders grassland at higher altitudes. Mean monthly maximum and minimum temperatures for Tzaneen 36.4°C and 3.9°C for January and June, respectively. Corresponding values for Levubu-Agr 36.4°C and 5.7°C for October and July, respectively. (Please see appendix for rainfall tables)

**Important Taxonomy**

**Tall Trees:** Pterocarpus angolensis, Sclerocarya birrea subsp. Caffra.

**Small Trees:** Acacia polyacantha, Albizia versicolor, Ficus sansibarica, Parinari curatellifolia, Piliostigma thonningii, Pterocarpus rotundifolius, Trichillia emetica, Acasia davyi, Acasia sieberiana var. woodii, Antidesma venosum, Catha edulis, Faurea richetiana, Faurea saligna, Ficus burkei, Ficus petersii, Heteropyxis natalensis, Peltrophorum africanum, Terminalia sericea, Vernonia colorata.

**Tall Shrubs:** Olea europaea subsp. africana, Pseudarthria hookeri var. hookeri, Rhus pentheri, Triumfetta pilosa var. tomentosa.

**Low Shrubs:** Agathisanthemum bojeri, Barleria elegans, Dicliptera clinopodia, Flemingia grahamiana, Indigofera filipes, Polygala producta.

**Woody Climbers:** Bauhinia galpinii, Pterolobium stellatum.

**Graminoids:** Cybopogon caesius, Cybopogon nardus, Hyparrhenia cymbaria, Hyparrhenia poecilotricha, Hyperthelia dissolute, Alloteropsis semialata subsp. semialata, Andropogon schirensis, Bothrocloa bladhii, Monocymbium ceresiiforme, Paspalum scrobiculatum, Schizachyrium sanguineum, Themeda triandra.

**Herbs:** Waltheria indica.



**Conservation Status:**

Endangered. Targeted conservation percentage 19%. Only a little over 1% statutorily conserved, almost all in the Lekgalameetse Nature Reserve, and about 2% conserved in private Nature Reserves such as the Selati Game Reserve and the Wolkberg (Serala) Wilderness Area. About 41% transformed mainly because of cultivation (29%) and plantations (9%). The higher-lying parts of this unit have been heavily afforested with tree plantations while the lower-lying areas are under agricultural and horticultural crops. (Please see appendix)

Scattered alien plants include *Solanum mauritianum, Melea azedarach* and *Caesalpinia decapetala.* The subtropical climate is conducive to the spread of *Cromolaena odorata, Lantana camara* and *Psidium guajava.*

**Remarks:**

This unit has several subtropical elements such as *Acacia polyacantha* and *Trichillia emetica.* It is very similar to SVI 9 Legogote Sour Bushveld, but the latter has a cooler climate and different floristic elements. At places on the footslopes, this vegetation becomes very dense and is transitional to forest in kloofs on the eastern slopes of the Drakensberg. *Acacia ataxacantha* and *Trema orientalis* are prominent pioneer species here. This unit is also rich in fig species.

More specifically, this particular habitat could be classified as part of the rivers and wetlands area of the Limpopo Lowveld bordering Escarpment foothills and Tree Savanna. Common birds include the Longcrested Eagle, Purplecrested Lourie, Bluegrey Flycatcher, Wood Owl and African Goshawk. Typical trees are the Paperbark Thorn and Kiaat.

**References:**

Scheepers (1977), Acocks (1988), Stalmans (1990), Mucina *et al* (2006), Brandl (1987).

## Method

### General.

After an initial assessment was done, relevant books, maps and species lists had to be obtained or compiled for the specific environment. The practical survey then followed after careful planning thereof. Data was collected and incorporated with the literature study in order to create a holistic picture of the specific environment. From thereon specific impacts could be identified and mitigating strategies set in place in order to reach a conclusion on the proposed development.

### GPS points, points of interest and Photo points.

With the initial assessment GPS points were taken at main points of interest such as the entrances, typical vegetation units, borders of the property and soil survey sites. Photos were taken to form visual evidence for later referral. (Please see appendix for GPS and Photo points)

### Transects: Trees, Grasses and Forbs.

Set transects were walked in order to identify grass, tree and forb species respectively. Species were recorded and data analysed afterwards. Alien invasive species were also identified.

### Soil samples.

A soil ogre was used to drill into the soil up to the depth of roughly 0.5 to 1.2 meters. The samples were laid out in order, analysis was made and soil type recorded. Certain aspects such as where to drill in order to attain a representative sample, soil erodability and clay percentage were taken into account.

### Fauna.

A search for tracks and signs of fauna was conducted. The tracks and signs that were found supported relevant literature. A real-time assessment was made for mammals, amphibians, arachnids, insects, birds and reptile species.

### Desktop survey

A desktop survey was conducted on the specific area. Information regarding Red Data Species, geology and soils, climate, vegetation, fauna and flora were obtained using relevant literature as referred to in the reference section.



## Results:

### Soil survey

All soils sites that were analysed were found to be that of a Hutton soil form, this soil is red in colour, rich in iron and very erodible if mismanaged. Little erosion was found on the site though. Soil samples were taken to be representative of the whole site. The soils correspond well with the vegetation unit that was found, soils are further discussed in the mitigation and appendix sections of this report.

### Vegetation Survey

- **Literature survey**

This part of the survey is thoroughly covered in the introduction of this document. The results that were found in the site surveys are on par with that which were found in the literature survey. Relevant tree, forb and grass lists including alien invasive plants are discussed below and included in the appendix section of this document.

- **Site survey**

Only one plant community was identified on site, this community exist mainly because of uniform soils, relevant climate and the dominant human impact on the applicable environment.

Prominent **grass** species for the site included:

- *Cynodon dactylon and Melinis repens.* These grass species are good indicators of disturbed areas such as old lands.

Prominent **tree** species for the site included:

- *Eucalyptus spp., Grewia bicolour and Diospyros lycioides*

Prominent **forbs / flowering plants** for the site included:

- *Asparagus africanua, Biddens pilosa and Lantana camara*

The above mentioned trees and forbs are mostly exotic and need to be eradicated. This issue is further discussed in the mitigation strategies section of this report.

- **Assessment of current condition of vegetation on site**

The current vegetation on sites ranges from degraded to semi-natural. The degraded areas display an array of exotic invasive species and sub-climax grass species. The most probable cause would be the previous forestry and agricultural practises, overgrazing and disturbance of the habitat.

- **Vegetation Map and plant communities**

**Vegetation unit 1**

This unit was set out as the only vegetation unit on site. It is displayed on the google / gps overlay map. Relevant grass, forb, tree and soil types are represented in the appendix section.

**Fauna Survey**

- **Literature survey**

The literature survey was found to be on par with the site survey in terms of species, tracks and signs that were found. Species lists were drawn up for mammals, birds, snakes, other reptiles and amphibians.

- **Site survey and evaluation of habitat and potential presence of fauna**

By studying the habitat of the site, one could with fair accuracy determine the species which would occur on site. Because of the degraded ecosystem biodiversity was found to be relatively low and as such very few species would actually occur on site.



**Survey of Red Data species**

**Red Data lists Schoongelegen:**

**Plants:**

No red data plant species were found on the site. Marula trees however are not to be removed without a relevant permit from DWAF.

**Frogs:**

No red data frog species occur in the particular area, according to the book Frogs and Frogging, V. Carruthers (2001) No proper drainage lines or wetlands occur on site, thus prime habitat for amphibians is lacking.

**Mammals:**

List of Red Data mammals that could possibly occur in the area.

| Scientific Name | English Name | Probability of occurrence | Status |
|---|---|---|---|
| Cercopithecus mitis | Samango Monkey | Low | Vulnerable |
| Raphicerus sharpie | Sharp's Grysbok | Low | Near Threatened |

These species were not present on site at the time of the survey.

**Reptiles:**

The only reptile that is listed as an IUCN Red Data species that could possibly occur in the study area is the African Rock Python.

| Scientific Name | English Name | Probability of occurrence |
|---|---|---|
| *Python sebae* | Rock Python | Medium |

**Birds:**

| Scientific Name | English Name | Conservation Status | Probability of Occurrence |
|---|---|---|---|
| *Leptoptilos crumeniferus* | Marabou Stork | Near Threatened | Low |
| *Sagittarius serpentarius* | Secretary bird | Near Threatened | Very Low |
| *Gyps coprotheres* | Cape Griffon Vulture | Vulnerable | Low |
| *Gyps africanus* | White-backed Vulture | Vulnerable | Low |
| *Macheiramphus alcinus* | Bat Hawk | Near Threatened | High |
| *Aquila rapax* | Tawny Eagle | Vulnerable | Low |
| *Hieraaetus ayresii* | Ayre's Eagle | Near Threatened | Medium |
| *Polemaetus bellicosus* | Martial Eagle | Vulnerable | Low |
| *Falco biarmicus* | Lanner Falcon | Near Threatened | Medium |
| *Eupodotis melanogaster* | Black-bellied Korhaan | Near Threatened | Low |
| *Poicephalus robustus* | Cape Parrot | Endangered | Very low |
| *Tyto capensis* | Grass Owl | Vulnerable | Very low |
| *Bucorvus leadbeateri* | Ground Hornbill | Vulnerable | Very low |
| *Certhilauda chuana* | Short Claw Lark | Near Threatened | Very Low |
| *Hirundo atrocaerulea* | Blue Swallow | Critically Endangered | Very Low |

Fifteen of the seventeen IUCN Red Data bird species could possibly occur in the study area, but because of the degraded state of this specific site the probability of the occurrence of most of these bird species is low.

**Total number of Red Data species that could possibly be found on the sites include:**

| TYPE | NUMBER |
|---|---|
| Frogs | 0 |
| Plants | 0 |
| Snakes & Other reptiles | 1 |
| Birds | 15 |
| Mammals | 2 |
| **Total Number:** | **18 Species** |



**Ecological Sensitivity Map**

The ecological sensitivity for the area, considering all sites, was classified as **Medium – Low.**

| Sensitivity Categories | Description and Recommendation: |
|---|---|
| **High** | Pristine areas, Ecologically very sensitive, High Biodiversity.<br><br>Applied Conservation, No development. |
| **Medium – High** | Areas with special status such as heritage sites, wetlands and conservancies / tourism orientated or areas with medium - high biodiversity / fragile ecosystems.<br><br>Very considerate development and environmentally friendly structures, very low impact. |
| **Medium** | Areas with natural vegetation and considerable biodiversity.<br><br>Selective and Considerate development only. Low impact. |
| **Medium – Low** | Areas with neglected to degraded natural vegetation, usually in or close to urban areas.<br><br>Cultivated areas.<br><br>Considerate development. |
| Low | Ecologically degraded areas, Low Biodiversity, Little value to Conservation, usually cut off from other ecological resources.<br><br>Development to be considered. |

**Identification of potential impacts**

**Aspects**

The following aspects will have an impact on the applicable environment:

*Construction work*

*Day to day operation of the proposed development*

*Waste and Sewage generation*

**Impacts**

*Construction phase*

Soil erosion
Soil pollution
Water pollution
Decrease in biodiversity
Increase in alien plants
Minimal air pollution

*Sewage effluent*

Surface and groundwater pollution

*Day to day operation of the proposed development*

Cooking oil, greases and other oils
Potential fire hazards

**Extent of Impacts**

The impact of the establishment will have a localised impact limited to the area of the proposed development.

**Duration of Impacts**

The duration of the impact will be long-term, 25 years plus.

**Severity of Impacts**

The severity of the impact can be rated as medium.



**Probability of Impacts**

The probability of the impact can be reduced from a high probability to a very low probability should mitigation strategies be adhered to for the proposed establishment.

**Significance of impacts**

The significance of the impact on the environment is rated as medium – low, as the environment is already in a degraded state.

**Recommendations, mitigation strategies, descriptions of feasible alternatives and practical solutions for the best practicable environmental option.**

**The establishment**

*The following mitigation strategies should be adhered to during and after construction*

- All alien invasive species should be eradicated on site
- No indigenous species may be hunted or harvested without relevant permits.
- No poisons may be used without the permission of an ecologist.
- Runoff water from roads must be managed due to the erosion potential of the site and possible pollutants from vehicles. (Please see recommendation on a stormwater pond)
- Re-establish indigenous vegetation as soon as possible after construction.
- Appropriate signs should be put up to stop littering and illegal dumping.
- Construction of the establishment should take place in a considerate manner as to minimize the impact on the environment during construction.
- Indigenous plants should be planted in the gardens.
- The proposed sewage system should be well maintained and an artificial wetland should be added in order to enhance the bio-degration and filtering processes for the effluent.

- An oil/water separator should be fitted for any shops using cooking oil, oils or greases. This separator should be inspected and serviced regularly.

- Topsoil should be removed and stored for later use in rehabilitation of the establishment.

- Terraforce bricks or geotextiles should be used to secure soil on steep slopes in order to actively prevent erosion.

- Oil spills should be cleaned up and disposed of in a responsible manner.

There exists a possible option to be considered concerning water runoff by creating a stormwater pond which will gradually release water into the environment via the drainage line on the eastern boundary of the property.

Effluent water is to be tested four times per year for faecal *coli*-forms and *E. coli*. Electric conductivity, total dissolved solids, pH, Nitrates, Cl and Ammonia should also be tested for. Results should comply with Governmental Standards.

- Runoff water from the site could be led into a storm-water pond together with the treated sewage effluent and water from the water/oil separators. Sediment will then settle and higher quality water will then enter the surrounding environment. This water could also be used for irrigation.

- The environmental impact of sanitation

Sanitation systems should protect the environment and not harm it. Water is a scarce resource in South Africa, and it should be protected and used carefully. There are many threats of pollution where there are no sanitation systems or where they do not work properly. The worst risks are to water supplies in rivers, dams and underground. This in turn can cause serious health problems.

The proper operation of sanitation systems is essential to protect the environment, and must be paid for. A complicated, expensive system which is poorly maintained can be just as harmful to the environment as having no system at all.



***Alien invasive species control***

All alien invasive species should be cleared and follow up eradication should be done.

**Category 1** species are prohibited on any land or water surface in South Africa and must be eradicated.

- *Pisidia guajava* *Lantana spp.* *Solanum mauritianum* *Ipomoea purpurea*

**Category 2** species must be eradicated outside controlled demarcated areas and are prohibited within 30m of the 1:50 year floodline)

- *Ricinus communis* *Agave sisalana* *Eucalyptus spp.* *Litchi chinensis*

  *Persea Americana* *Oxalis latifolia* *Tradescantia fluminensis*

**Methods of control**

(1) Where category 1, 2 or 3 plants occur contrary to the provisions of these regulations (CONSERVATION OF AGRICULTURAL RESOURCES ACT 43/1983), a land user shall control such plants by means of one or more of the following methods of control as is appropriate for the species concerned and the ecosystem in which it occurs:

(a) Uprooting, felling, cutting or burning;

(b) Treatment with a weed killer that is registered for use in connection with such plants in accordance with the directions for the use of such a weed killer;

(c) Biological control carried out in accordance with the stipulations of the Agricultural Pests Act, 1983 (Act No. 36 of 1983), the Environment Conservation Act, 1989 (Act No. 73 of 1989) and any other applicable legislation;

(d) Any other method of treatment recognised by the executive officer that has as its object the control of the plants concerned, subject to the provisions of sub-regulation (4);

(e) A combination of one or more of the methods prescribed in paragraphs (a), (b), (c), and (d), save that biological control reserves and areas where biological control agents are effective shall not be disturbed by other control methods to the extent that the agents are destroyed or become ineffective.

(2) The methods contemplated in sub-regulation (1) shall also be applied with regard to the propagating material and the re-growth of category 1, 2 and 3 plants in order to prevent such plants from forming seed or re-establishing in any manner.

(3) The performance of an act of control is not in itself proof that the objects of the control methods have been achieved and follow-up operations are mandatory to achieve the appropriate level of combating.

(4) Where uncertainty exists about the presence or efficacy of any biological control agent, a biological control expert shall be consulted.

(5) Any action taken to control category 1, 2 and 3 plants shall be executed with caution and in a manner that will cause the least possible damage to the environment.

**Specific specialist studies should reveal the following limitations observed on site:**

- A geotechnical survey should indicate whether the moderately steep slopes should be considered suitable to develop on.
- A hydrological engineer should determine the exact flood line of the non-perennial drainage channels originating in the mountainous region.



**Conclusion**

This specific site is already disturbed by means of recent agricultural activities, therefore biodiversity is low and alien invasive plant species are dominating scarred areas while this area is acting as a seed-bank for alien invasive species. The establishment can be promoted as it will ensure the eradication of the above mentioned alien species and boost the local economy. Careful attention need to be given to water runoff and associated soil erosion.

An ecological frame of mind should be kept during the development. The use of eco-friendly building and remediation methods should be implemented. Gardens, water and soil conservation should enjoy priority. The development should be done in the most environmentally friendly manner so that people and the environment will benefit.

Ecologically, there is no reason for the establishment not to continue as long as recommendations and mitigation strategies are adhered to and sustained.

**Document limitations**

This document has been prepared for the particular purpose as described in the assignment section. No responsibility will be accepted by BES for any use outside of context. BES did not perform a complete assessment of all possible conditions or circumstances that may exist at the site referenced in this document. Conditions may exist which were undetectable given the limited nature of the enquiry with respect to the site. In addition it is recognised that the passage of time affects the information and assessment provided in this document. BES opinions are based upon information that existed at the time of production of this document. Where data supplied by the client or any other external sources have been used, it has been assumed that the information is correct unless otherwise stated. Any assessments made in this document are based on the conditions indicated from published sources and the investigation described. Although BES has gone through reasonable lengths to ensure the accuracy, integrity and reliability of information in this document, no warranty is included, either expressed or implied, that the actual conditions will conform exactly to the assessments contained in this document.

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**References**


- Africa Geo-Environmental Services; Ecological Report dated February 2007; Compiled by Dr. B. Henning.
- Branch B. (1998) Field Guide to Snakes and other Reptiles of Southern Africa. Struik Publishers. Capetown.
- Brandl, G. (1987). The geology of the Tzaneen area. Dept. of Mineral and Energy Affairs. Government Printer
- Butchart D. (2001) Wildlife of the Lowveld. Struik Publishers. Cape Town.
- Carruthers,V (2001). Frogs and Frogging in South Africa. Struik Publishers.
- Cillié B. (1997). Die Soogdier Gids tot Suider-Afrika. Briza Publikasies. Pretoria.
- CONSERVATION OF AGRICULTURAL RESOURCES ACT 43/1983
- Dept. Of Agriculture 2007; A guide to the use of herbicides of bush encroachment, noxious plants and aquatic weeds. First edition.
- Knoll, C. (May/June2006) Environmental Management Magazine; Design courtesy of Lindros Whole Earth Consultants, p21, Primedia Publishing; Randburg.
- Google earth; www.google.com
- Grondklassifikasiewerkgroep. (1991). Grondklassifikasie 'n Taksonomiese Sisteem vir Suid-Afrika. Die Departement van Landbou-Ontwikkeling.
- Henderson L. (2001). Alien Weeds and Invasive Plants. Paarl Print. Cape Town.
- Manning J. (2003). Photographic Guide to the Wildflowers of South-Africa. Briza Publications. Pretoria.
- Marais, J. (2004). A complete Guide to the Snakes of Southern Africa. Struik Publishers.
- Mucina, L & Rutherford, M.C, (2006). The Vegetation of South Africa, Lesotho and Swaziland. South African Biodiversity Institute, Pretoria.





- Newman, K. (2000). Birds of Southern Africa 7th edition. Struik Publishers
- Pelgrave, K.C. (2002). Trees of Southern Africa. Struik Publishers.
- Sinclair I., Hockey P., Tarboton W. (2002). SASOL Voëls van Suider-Afrika. Struik Uitgewers. Kaapstad.
- Stuart C. Stuart T. (2000). A Field Guide to Tracks and Signs of Southern and East African Wildlife. Struik Publishers. Capetown.
- Stuart, C & Stuart, T. (2001). Field Guide to the Mammals of Southern Africa 3rd edition. Struik Publishers.
- Van Oudtshoorn F. (2002). Gids tot Grasse van Suider-Afrika. Briza Publikasies. Pretoria.
- Van Wyk B., van Wyk P. (1997). Field Guide to Trees of Southern Africa. Struik Publishers. Capetown.
- Van Wyk, B & Malan, S, (1998) Wild Flowers. Struik Publishers.
- Wikipedia free encyclopaedia; www.wikipedia.org

**Appendixes**

Maps and diagrams:

A. Locality Map

B. GPS Map

C. Terrain

D. Climatic Information

E. Vegetation Map

F. Ecosystem Status

G. Conservation Status

H. Ecological sensitivity map

I. Photographs

Flora:

J. Grasses

K. Sedges

L. Woody plants

M. Flowering plants

N. Soils

Fauna:

O. Mammals

P. Birds

Q. Snakes

R. Other reptiles

S. Amphibians

T. Designs

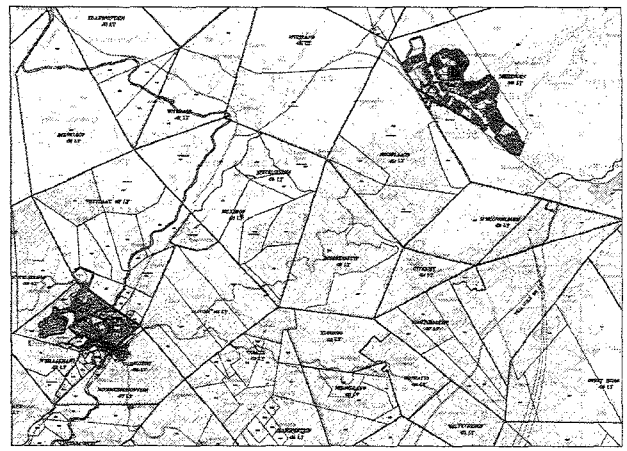
Other information:

U. Contact details



## *Maps and diagrams:*

### Location



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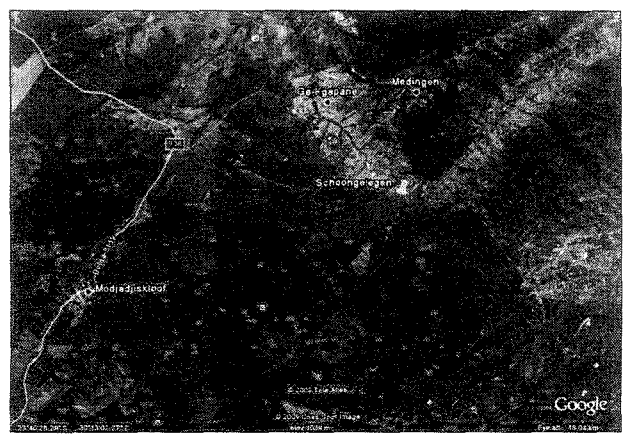
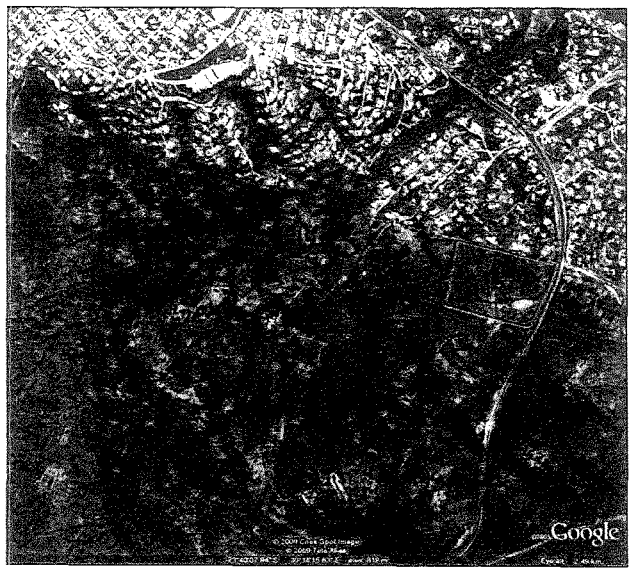
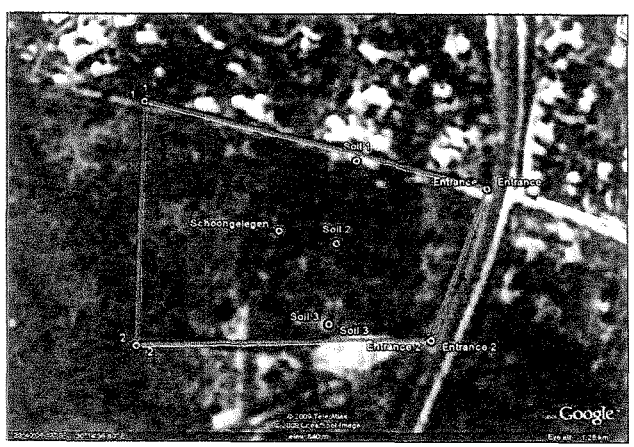
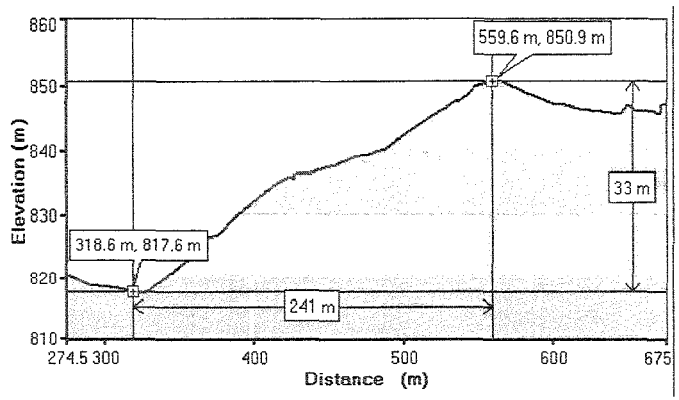




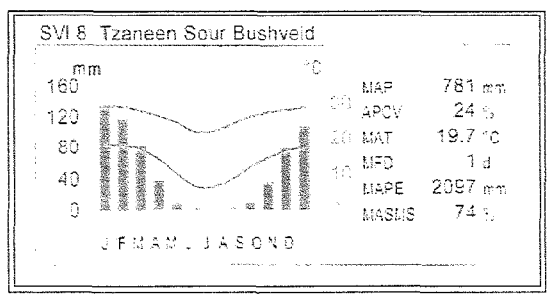





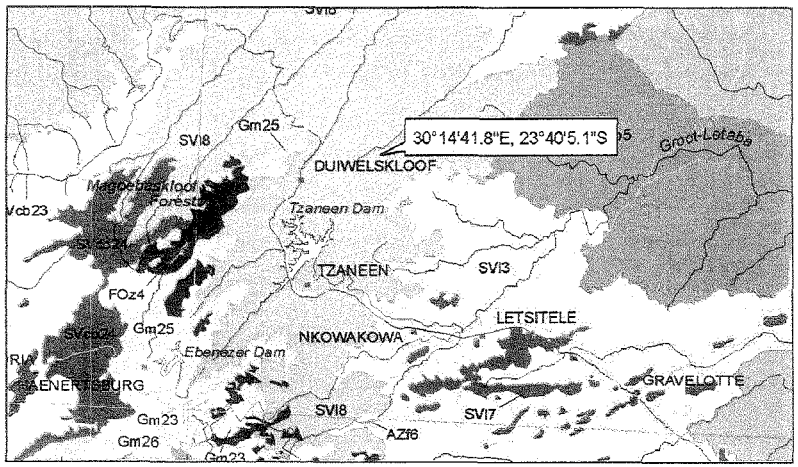

## Terrain Map




## Climatic Information



## Vegetation map

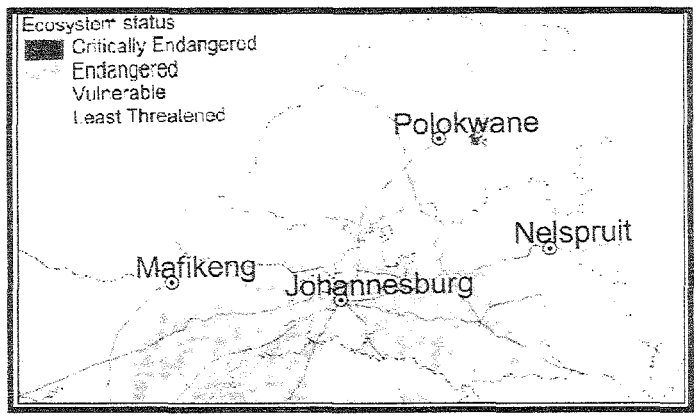



**Lowveld Bioregion**

| | | |
|---|---|---|
| | SVI 1 | Makuleke Sandy Bushveld |
| | SVI 2 | Nwambyia-Pumbe Sandy Bushveld |
| | SVI 3 | Granite Lowveld |
| | SVI 4 | Delagoa Lowveld |
| | SVI 5 | Tshokwane-Hlane Basalt Lowveld |
| | SVI 6 | Gabbro Grassy Bushveld |
| | SVI 7 | Gravelotte Rocky Bushveld |
| | SVI 8 | Tzaneen Sour Bushveld |
| | SVI 9 | Legogote Sour Bushveld |



## Ecosystem Status



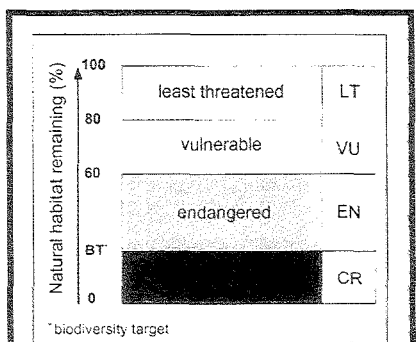
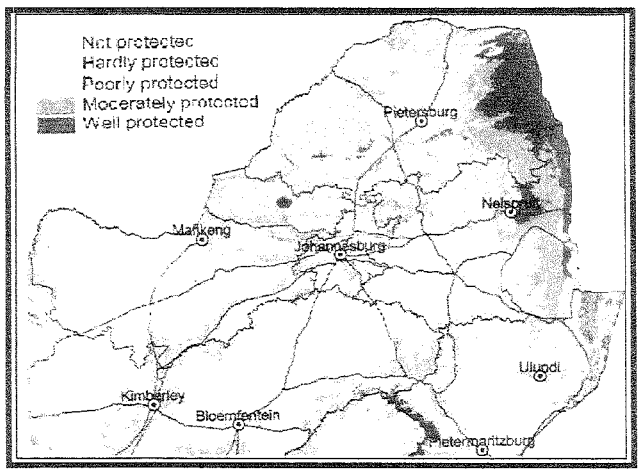
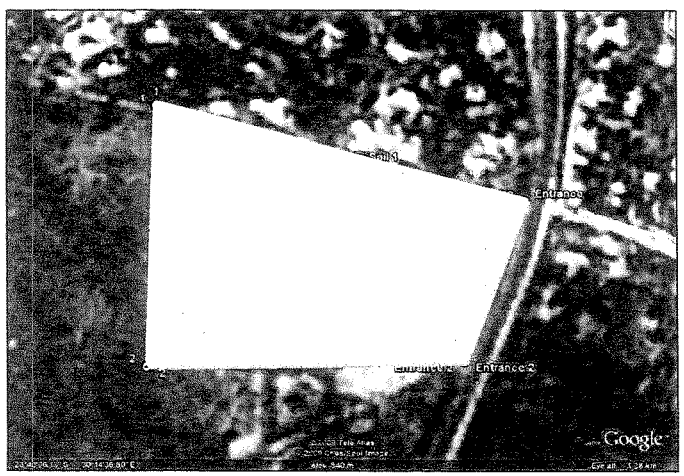




**Figure 16.4** Classification of vegetation types into four levels of ecosystem status based on % of remaining untransformed area and the biodiversity target.

## Conservation Status and vulnerability

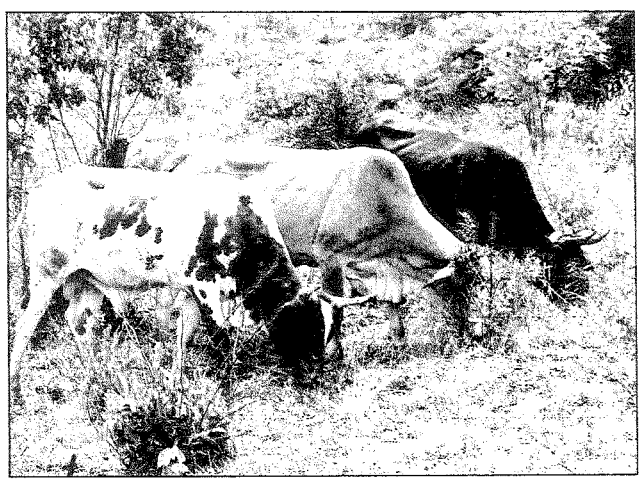


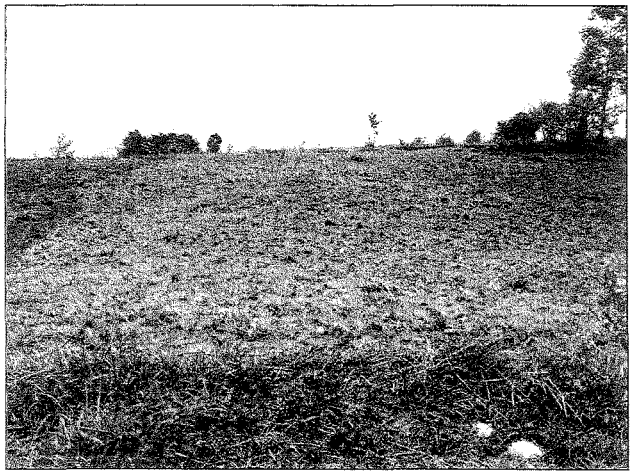

## Ecological sensitivity map

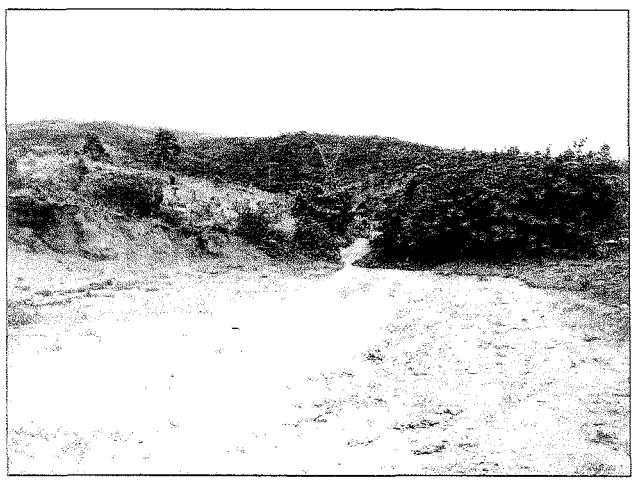





## Photographs









*Flora:*

## GRASS SPECIES:

| No. | SPECIES NAME | ENGLISH NAME |
|---|---|---|
| 1 | *Cynodon dactylon* | Couch Grass |
| 2 | *Digitaria eriantha* C | Common Finger Grass |
| 3 | *Eragrostis curvula* | Weeping Love Grass |
| 4 | *Eragrostis plana* | Tough Love Grass |
| 5 | *Eragrostis pseudosclerantha* | Footpath Love Grass |
| 6 | *Hyparrhenia cymbaria* | Boat Thatching Grass |
| 7 | *Imperata cylindrica* | Cotton Wool Grass |
| 8 | *Melinis nerviglumis* | Bristle-leaved Red Top |
| 9 | *Melinis repens* | Natal Red Top |
| 10 | *Microchloa caffra* | Pincushion Grass |
| 11 | *Panicum coloratum* | Small Buffalo Grass |
| 12 | *Panicum maximum* | Guinea Grass |
| 13 | *Setaria sphacelata* | Golden Bristle Grass |
| 14 | *Sorghum bicolor* | Common Wild Sorghum |
| 15 | *Sporobolus africanus* | Ratstail Dropseed |
| 16 | *Sporobolus fimbriatus* | Dropseed Grass |
| 17 | *Tragus berteronianus* | Carrot-seed Grass |
| 18 | *Urochloa mosambicensis* | Bushveld Signal Grass |

## WOODY SPECIES:

| No. | SPECIES NAME | ENGLISH NAME |
|---|---|---|
| 1 | *Acacia karroo* | Sweet Thorn |
| 2 | **Agave sisalana* | Sisal |
| 3 | *Bauhinia galpinii* | Pride-of-De Kaap |
| 4 | *Canthium gilfillanii* | Velvet Rock Alder |
| 5 | *Combretum collinum* | Variable Bushwillow |
| 6 | *Dichrostachys cinerea* | Sickle Bush |
| 7 | *Diospyros lycioides* | Bluebush |
| 8 | *Dodonaea augustifolia* | Sand Olive |
| 9 | **Eucalyptus* spp. | Gum |
| 10 | *Euclea crispa* | Blue Guarri |
| 11 | *Euclea natalensis* | Natal Guarri |
| 12 | *Faurea saligna* | Transvaal Beech |
| 13 | *Ficus thonningii* | Common Wild Fig |
| 14 | *Grewia bicolor* | White Raisin |
| 15 | *Gymnosporia buxifolia* | Common Spike-thorn |
| 16 | *Heteropyxis natalensis* | Lavender Tree |
| 17 | *Kirkia acuminata* | White Seringa |
| 18 | **Litchi chinensis* | Litchi |
| 19 | *Peltophorum africanum* | Weeping Wattle |
| 20 | **Persea americana* | Laurel |
| 21 | **Psiadia guajava* | Guava |
| 22 | *Pterocarpus rotundifolius* | Round-leaved Teak |
| 23 | *Rhamnus prinoides* | Dogwood |
| 24 | *Rhoicissus tridentata* | Bushman's Grape |
| 25 | *Rhus pendulina* | White Karree |
| 26 | *Sclerocarya birrea* | Marula |
| 27 | *Solanum mauritianum* | Bugweed |
| 28 | *Terminalai sericea* | Silver Cluster-leaf |
| 29 | *Vangueria infausta* | Wild Medlar |
| 30 | *Ziziphus mucronata* | Buffalo-thorn |

* Exotic species

## FLOWERING PLANT SPECIES:

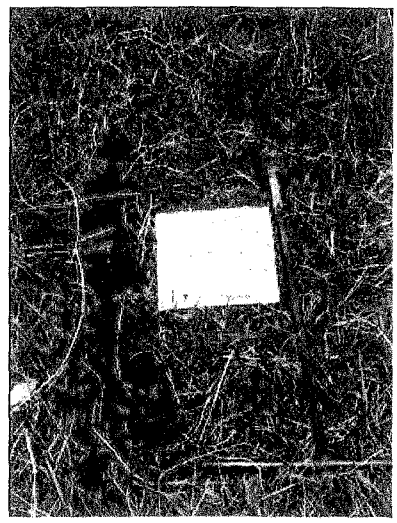
| Nr. | Species Name | English / Common Name |
|---|---|---|
| 1 | *Asparagus africanua* | Bush Asparagus |
| 2 | *Berkheya setifera* | No English Name |
| 3 | *Biddens pilose* | Blackjack |
| 4 | Commelina benghalensis | Bengal Wandering jew |
| 5 | *Conyza bonariensis* | Flax-leave Fleabane |
| 6 | *Cyphostemma lanigerum* | Wild Grape |
| 7 | **Ipomoea purpurea* | Common Morning Glory |
| 8 | **Lantana camara* | Lantana |
| 9 | **Lantana rugosa* | Bird's Brandy |
| 10 | *Lippia javanica* | No English Name |
| 11 | *Oxalis corniculata* | Creeping Sorrel |
| 12 | **Oxalis latifolia* | Red Sorrel |
| 14 | *Pavonia burchelli* | No English Name |
| 15 | *Rhynchosia minima* | No English Name |
| 16 | *Richardia brasiliensis* | Tropical richardia |
| 17 | **Ricinus communis* | Caster Oil Plant |
| 18 | *Schizocarphus nerrosus* | No English Name |
| 19 | *Senna didgmobotrya* | No English Name |
| 20 | **Solanum mauritianum* | Bugweed |
| 21 | *Thunbergia dregeana* | No English Name |
| 22 | *Thunbergia pondoensis* | No English Name |
| 23 | **Tradescantia fluminensis* | Wandering Jew |
| 24 | *Tribulus terrestris* | No English Name |
| 25 | *Truimfetta welwitschii* | No English Name |
| 26 | *Verbena bonariensis* | Wild Verbena |
| 27 | *Waltheria indica* | No English Name |
| 28 | *Xanthium strumarium* | Large Cocklebur |

* Exotic species

## SOIL DATA:

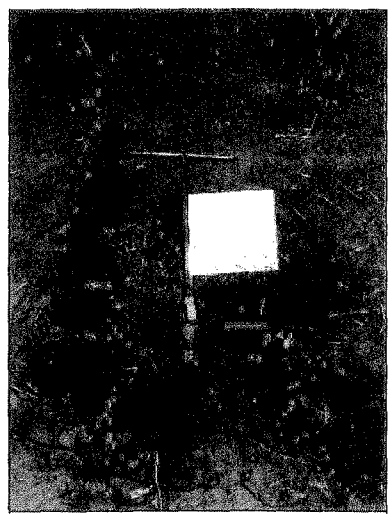
**Survey site No. 1**

| | |
|---|---|
| *GPS Point* | S23 40 04.3 E30 14 38.0 |
| *Soil Type* | Hutton |
| *Clay %* | 45% |
| *Drainage potential* | Medium-High |
| *Land Terrain Unit* | 3 |
| *Soil Dept A- Horizon* | 15 cm |
| *Soil Dept B- Horizon* | 100 + cm |
| *Underlying Mother Material* | Leucocratic Biotite Granite |



**Survey site No. 2**

| | |
|---|---|
| *GPS Point* | S23 40 06.5 E30 14 37.4 |
| *Soil Type* | Hutton |
| *Clay %* | 40% |
| *Drainage potential* | Medium |
| *Land Terrain Unit* | 3 |
| *Soil Dept A- Horizon* | 5 cm |
| *Soil Dept B- Horizon* | 110 + cm |
| *Underlying Mother Material* | Leucocratic Biotite Granite |



**Survey site No. 3**

| | |
|---|---|
| *GPS Point* | S23 40 08.6 E30 14 37.1 |
| *Soil Type* | Hutton |
| *Clay %* | 45% |
| *Drainage potential* | High |
| *Land Terrain Unit* | 3 |
| *Soil Dept A- Horizon* | 5 cm |
| *Soil Dept B- Horizon* | 110 + cm |
| *Underlying Mother Material* | Leucocratic Biotite Granite |

***Mammal List:***

| *SCIENTIFIC NAME* | *ENGLISH NAME* | *PROBABILITY OF OCCURRENCE* |
|---|---|---|
| *Ambysomus hottentotus* | Hottentot Golden Mole | Medium |
| *Elephantulus myurus* | Rock Elephant Shrew | Low |
| *Myosorex varius* | Forest Elephant Shrew | Medium |
| *Myosorex tenuis* | Zuurbron Forest Shrew | Medium |
| *Crocidura mariquensis* | Maquassie Mush Shrew | Low |
| *Crocidura luna* | Grey-Brown musk Shrew | Medium |
| *Crocidura fuscomurina* | Tiny Musk Shrew | Low |
| *Crocidura cyanea* | Reddish Grey Musk Shrew | Low |
| *Crocidura silacea* | Lesser grey-brown Musk Shrew | Medium |
| *Crocidura hirta* | Lesser Red Musk Shrew | Low |
| *Suncus lixus* | Greater Dwarf Shrew | Low |
| *Epomophorus wahlbergi* | Wahlberg's Epauletted Fruit Bat | Medium |
| *Epomophorus crypturus* | Peters's Epauletted Fruit Bat | Medium |
| *Taphozous mauritianus* | Mauritian Tomb Bat | Low |
| *Hipposideros caffer* | Sundevall's Leaf-nose Bat | Medium |
| *Nycteris thebaica* | Egyptian Slit-faced Bat | Medium |
| *Rhinolophus clivosus* | Geoffrey's Horseshoe Bat | Medium |
| *Rhinolophus darling* | Darling's Horseshoe Bat. | Medium |
| *Rhinolophus simulator* | Bushveld Horseshoe Bat | Medium |
| *Miniopterus schreibersii* | Schreibers's Long Fingered Bat | Medium |
| *Eptesicus capensis* | Cape Serottine Bat | Low |
| *Myotis tricolor* | Temminch's hairy Bat | Medium |
| *Pipistrellus kuhlii* | Kuhl's Pipstrelle | Low |
| *Pipistrellus rusica* | Rusty Bat | Medium |
| *Pipistrellus nanus* | Banana Bat | Medium |
| *Nycticeius schlieffenii* | Schlieffens Bat | Low |
| *Scotophilus dinganii* | Yellow House Bat | Medium |
| *Scotophilus viridis* | Lesser Yellow House Bat | Medium |
| *Tadarida agyptiaca* | Egyptian Free-tailed Bat | Low-Medium |
| *Papio cynocephalus ursinus* | Savanna Baboon | Medium |
| *Chlorocebus aethiops* | Vervet Monkey | Medium |
| *Cercopithecus mitis* | Samango Monkey | Low |
| *Galago crassicaudatus* | Thick-tailed Bushbaby | Low-Very Low |
| *Galago Moholi* | Southern Lesser Bushbaby | Very low |
| *Lepus saxatilis* | Scrub Hare | Medium |
| *Paraxerus cepapi* | Tree Squirrel | Medium |
| *Graphiurus platyops* | Rock Dormouse | Low |
| *Graphiurus marinus* | Woodland Dormouse | Medium |
| *Graphiurus parvus* | Lesser Savanna Dormouse | Low |
| *Cryptomys hottentotus* | Common Molerat | Medium |
| *Cryptomys damarensis* | Dammara Molerat | Medium |
| *Hystrix africaeaustralis* | Porcupine | Medium |
| *Thryonomys swinderianus* | Greater Cane Rat | Medium |
| *Steatomys pratensis* | Fat Mouse | Medium |
| *Dendromus melanotis* | Grey Climbing Mouse | Low |
| *Dendromus mesomelas* | Brant's Climbing Mouse | Low |
| *Dendromus mystacalis* | Chestnut Climbing Mouse | Low |
| *Tatera leucogaster* | Bushveld Gerbil | Low |
| *Tetera brantsii* | Highveld Gerbil | Low |
| *Acomys spinosissimus* | Spiny Mouse | Medium |
| *Aethomys namaquensis* | Namaqua Rock Mouse | Low |
| *Aethomys chrysophilus* | Red Veld Rat | Medium |
| *Dasymys incomtus* | Water Rat | Medium |
| *Rhabdomys pumilio* | Striped Mouse | Medium |
| *Lemniscomys rosalia* | Single striped mouse | Medium |
| *Mus sorella* | Thomas's Pygmy Mouse | Medium |
| *Mus minutoides* | Pygmy Mouse | Medium |
| *Mus musculus* | House Mouse | Medium |
| *Thallomys paedulcus* | Tree Mouse | Low |
| *Thallomys nigricaudatus* | Black Tailed Tree Mouse | Low |
| *Grammomys dolichurus* | Woodland Mouse | Medium |
| *Mastomys Natalensis* | Natal Multimammate Mouse | Medium |
| *Mastomys coucha* | Multimammate Mouse | Medium |
| *Rattus rattus* | House Rat | High |
| *Otomys angoniensis* | Angoni Vlei Rat | Medium |
| *Otomys irroratus* | Vlei rat | Low |
| *Mungos mungo* | Banded Mongoose | Medium |
| *Galerella sanguinea* | Slender Mongoose | Medium |
| *Atilax paludinosus* | Water Mongoose | Medium |
| *Helogale parvula* | Dwarf Mongoose | Medium |
| *Cynictis penicillata* | Yellow mongoose | Low |
| *Potamochoerus larvatus* | Bushpig | Medium |
| *Tragelaphus scriptus* | Bushbuck | Medium |
| *Raphicerus campestris* | Steenbok | Low |
| *Raphicerus sharpei* | Sharp's Grysbok | Very Low |
| *Sylvicarpa grimmia* | Common Duiker | Medium |

**Bird List**

* Endemic or near endemic

| |
|---|
| Whitebreasted Cormorant |
| Reed Cormorant |
| Darter |
| Grey Heron |
| Blackheaded Heron |
| Goliath Heron |
| Purple Heron |
| Great White Heron |
| Yellow Billed Egret |
| Little Egret |
| Cattle Egret |
| Squacco Heron |
| Blackcrowned Night Heron |
| Little Bittern |
| Hamerkop |
| White Stork |
| Black Stork |
| Yellowbilled Stork |
| Sacred Ibis |
| Hadeda Ibis |
| African Spoonbill * |
| Whitefaced Duck |
| Whitebacked Duck |
| Egyptian Goose |
| Yellowbilled Duck |
| African Black Duck |
| Cape Teal |
| Hottentot Teal |
| Redbilled Teal |
| Spurwinged Goose |
| Secretary Bird |
| Cape Vulture * |
| Yellowbilled Kite |
| Blackshouldered Kite |
| Cuckoo Hawk |
| Booted Eagle |
| Longcrested Eagle |
| Martial Eagle |
| Crowned Eagle |
| Blackbreasted Snake Eagle |
| Bateleur |
| Verreux's Eagle |
| African Fish Eagle |
| Steppe Buzzard |
| Forest Buzzard * |

| |
|---|
| Jackal Buzzard * |
| Redbreasted Sparrowhawk |
| Little Sparrowhawk |
| Black Sparrowhawk |
| African Goshawk |
| Gabar Goshawk |
| African Marsh Harrier |
| Gymnogene |
| Osprey |
| Lanner Falcon |
| Peregrine Falcon |
| European Hobby |
| Eastern Redfooted Kestrel |
| Rock Kestrel |
| Greater Kestrel |
| Lesser Kestrel * |
| Common Quail |
| Helmeted Guinea Fowl |
| African Rail * |
| Black Crake |
| Baillon's Crake |
| Redchested Flufftail |
| Buffspotted Flufftail |
| Moorhen |
| Redknobbed Coot |
| Red Crested Korhaan |
| African Finfoot |
| African Jacana * |
| Ringed Plover * |
| Threebanded Plover |
| Crowned Plover |
| Kittlitz's Plover |
| Blacksmith Plover * |
| Common Sandpiper |
| Wood Sandpiper |
| Marsh Sandpiper |
| Greenshank |
| Curlew Sandpiper |
| Little Stint |
| Ruff |
| Ethiopian Snipe |
| Avocet |
| Blackwinged Stilt |
| Spotted Dikkop |
| Water Dikkop |
| Greyheaded Gull |
| Whiskered tern |
| Feral Pigeon |
| Rock (Spotted) Pigeon |

| |
|---|
| Rameron Pigeon * |
| Redeyed Dove |
| Cape Turtle Dove |
| Laughing Dove |
| Namaqua Dove |
| Greenspotted Dove |
| Tambourine Dove |
| Purple Crested Lourie |
| Grey Lourie |
| Knysna Lourie * |
| Redchested Cuckoo |
| African Cuckoo |
| Black Cuckoo |
| Great Spotted Cuckoo |
| Jacobin Cuckoo |
| Emerald Cuckoo |
| Copper Tailed Cuckoo |
| Klaas's Cuckoo |
| Diederik Cuckoo |
| Barn Owl |
| African Scops Owl |
| Pearl Spotted Owl |
| White Faced Owl |
| Marsh Owl |
| Wood Owl |
| Spotted Eagle Owl |
| Giant Eagle Owl |
| Rufous cheeked Nightjar |
| European Nightjar |
| Mozambique Nightjar |
| Freckled Nightjar |
| Fierynecked Nightjar |
| Palm swift |
| Black Swift |
| Whiterumped Swift |
| Horus Swift |
| Little Swift |
| Alpine Swift |
| Speckled Mousebird |
| Redfaced Mousebird |
| Narina Trogon * |
| Pied Kingfisher |
| Great Kingfisher |
| Halfcollared Kingfisher |
| Malachite Kingfisher |
| Striped Kingfisher |
| Brownhooded Kingfisher |
| Little Bee-eater |
| White Fronted Bee-eater |

| |
|---|
| Carmine Bee-eater |
| European Bee-eater |
| Hoopoe |
| Scimitar Wood Hoopoe |
| Redbilled Wood Hoopoe * |
| Southern Yellow-billed Hornbill |
| Red-billed Hornbill |
| Crowned Hornbill |
| Blackcollared Barbet |
| Crested Barbet |
| Pied Barbet * |
| Yellow-fronted Tinker Barbet |
| Greater Honeyguide * |
| Scalythroated Honeyguide * |
| Sharp Billed Honey Guide |
| Lesser Honeyguide |
| Ground Woodpecker * |
| Bearded Woodpekker |
| Bennett's Woodpekker |
| Golden tailed Woodpekker |
| Red Throated Wrynek |
| Cardinal Woodpecker * |
| Olive Woodpecker * |
| Melodious Lark |
| Rufousnaped Lark |
| Flappet Lark |
| Sabota Lark * |
| Longbilled Lark * |
| Chestnut-Backed Finch Lark |
| Redcapped Lark |
| European Swallow |
| Whitethroated Swallow * |
| Pearlbreasted Swallow |
| Greater Striped Swallow |
| Grey Rumped Swallow |
| White Tailed Swallow |
| Lesser Striped Swallow |
| Rock Martin |
| House Martin |
| Brownthroated Martin |
| Long Tailed Bush Shrike |
| Red Backed Shrike |
| Lesser Grey Shrike |
| Southern Boubou |
| Fiscal Shrike |
| Crimson-Breasted Shrike |
| Tree-streaked Tchagra |
| Red-billed Helmet Shrike |
| Helmet Shrike |

| |
|---|
| *Olive bush Shrike* |
| *Gorgeous Bush Shrike* |
| *White Breasted Cuckoo Shrike* |
| *Grey Cuckoo Shrike* |
| *Black Cuckoo Shrike* |
| *Grey Headed Bush Shrike* |
| *Black-crowned Tchagra* |
| *Puff Back* |
| *Brubru* |
| *White Crowned Shrike* |
| *Black Flycatsher* |
| *Black Cuckooshrike* |
| *Square Tailed Drongo* |
| *Forktailed Drongo* |
| *European Golden Oriole* |
| *Blackheaded Oriole* |
| *Black Crow* |
| *Pied Crow* |
| *Whitenecked Raven* |
| *Southern Black Tit* |
| *Redeyed Bulbul ** |
| *Blackeyed Bulbul* |
| *Yellow Belied Bulbul* |
| *Terrestrial Bulbul* |
| *Sombre Bulbul* |
| *Olive Thrush* |
| *Groundscraper Thrush* |
| *Kurrichane Thrush* |
| *Olive Thrush* |
| *Orange Thrush* |
| *Cape Rock Thrush ** |
| *Arrow Marked Babbler* |
| *Capped Wheatear* |
| *Mountain Chat *** |
| *Sicklewinged Chat ** |
| *Anteating Chat ** |
| *Stone Robin* |
| *Chorister Robin ** |
| *Cape Robin ** |
| *White Throated Robin* |
| *Starred Robin ** |
| *Cape Rock Jumper ** |
| *Chorister Robin* |
| *Whitebrowed Scrub Robin* |
| *Long-billed Crombec* |
| *Layard's Titbabbler ** |
| *African Marsh Warbler* |
| *Titbabler* |
| *Grey Pendule Tit* |

| |
|---|
| *Burnt-nek Eremomela* |
| *Yellow Belied Eremomela* |
| *Green-capped Eremomela* |
| *Green-Backed Bleating Warbler* |
| *Yellowthroated Warbler* |
| *Barthroated Apalis* |
| *Longbilled Crombec* |
| *Yellowbellied Eremomela* |
| *Karoo Eremomela ** |
| *Bleating Warbler* |
| *Grassbird ** |
| *Fantailed Cisticola* |
| *Desert Cisticola* |
| *Cloud Cisticola ** |
| *Wailing Cisticola* |
| *Lazy Cristicola* |
| *Red Faced Cristicola* |
| *Rattling Cristicola* |
| *Neddicky* |
| *Blackchested Prinia ** |
| *Tawney Flanked Prinia* |
| *Spotted Flycatcher* |
| *Dusky Flycatcher* |
| *Blue-grey Flycatcher* |
| *Fan-Tailed Flycatcher* |
| *Pallid Flycatcher* |
| *Marico Flycatcher* |
| *Fiscal Flycatcher ** |
| *Cape Batis* |
| *Chin-spot Batis* |
| *Fairy Flycatcher ** |
| *Bluemantled Flycatcher* |
| *Paradise Flycatcher* |
| *Yellow Wagtail* |
| *Long Tailed Wagtail* |
| *African Pied Wagtail* |
| *Cape Wagtail* |
| *Grassveld Pipit* |
| *Longbilled Pipit* |
| *Plainbacked Pipit* |
| *Buffy Pipit* |
| *Bushveld Pipit* |
| *Striped Pipit* |
| *Orange throated Longclaw ** |
| *European Starling* |
| *Wattled Starling* |
| *Cape Glossy Starling* |
| *Red Wing Starling* |
| *Red-Billed Oxpecker* |

| |
|---|
| *Lesser Doublecollared Sunbird** |
| *Greater Doublecollared Sunbird** |
| *White Bellied Sunbird* |
| *Scarlet Chested Sunbird* |
| *Black sunbird* |
| *Marico Sunbird* |
| *Cape White-eye ** |
| *House Sparrow* |
| *Cape Sparrow ** |
| *Southern Greyheaded Sparrow* |
| *Yellowthroated Sparrow* |
| *Thickbilled Weaver* |
| *Golden weaver* |
| *Spectacled Weaver* |
| *Cape Weaver ** |
| *Spotted Backed Weaver* |
| *Lesser Masked Weaver* |
| *Red Headed Weaver* |
| *Golden Bishop* |
| *Masked Weaver* |
| *Redbilled Quelea* |
| *Red Bishop* |
| *Yellowrumped Widow* |
| *Longtailed Widow* |
| *Melba Finch* |
| *Jamesons Fire Finch* |
| *Bluebilled Firefinch* |
| *Quil Finch* |
| *Green Twinspot* |
| *Redbilled Firefinch* |
| *Orange Breasted Waxbill* |
| *Black Cheeked Waxbill* |
| *Violet-Eared Waxbill* |
| *Common Waxbill* |
| *Swee Waxbill ** |
| *Cut Throat Finch* |
| *Redheaded Finch ** |
| *Cuckoo Finch* |
| *Bronze Manikin* |
| *Pin-Tailed Whydah* |
| *Paradise Whydah* |
| *Shaft-Tailed Whydah* |
| *Black Widow Finch* |
| *Purple Widow Finch* |
| *Steel-Blue Widow Finch* |
| *Yelloweyed Canary* |
| *Cape Canary* |
| *Forest Canary ** |
| *Bully Canary* |

| |
|---|
| *Black-Throated Canary* |
| *Streakyheaded Canary* |
| *Goldenbreasted Bunting* |
| *Cape Bunting ** |
| *Rock Bunting* |
| *Larklike Bunting ** |

***Snakes***

| ENGLISH NAME | SCIENTIFIC NAME | Probability of occurrence |
|---|---|---|
| | | |
| PUFADDER | *BITIS ARIETANS* | Medium |
| COMMON NIGHT ADDER | *CAUSUS RHOMBEATUS* | Medium |
| SNOUTED NIGHT ADDER | *CAUSUS DEFILIPPI* | Medium |
| BLACK MAMBA | *DENDROASPIS POLYLEPIS* | Medium |
| MOZAMBIQUE SPITTING COBRA | *NAJA MOSSAMBICA* | Medium |
| SHIELD NOSE SNAKE | *ASPIDELAPS SCUTATUS* | Low |
| ZAMBEZI GARTER SNAKE | *ELAPSOIDEA BOULENGERT* | Low |
| SPOTTED HARLEQUIN SNAKE | *HOMOROSELAPS LACTENS* | Medium |
| BOOMSLANG | *DISPHOLIDUS TYPUS* | Medium |
| BIRD SNAKE | *THELOTORNIS CAPENSIS* | Medium |
| SOUTHERN STILETTO SNAKE | *ATRACTASPIS BIBRONII* | Medium |
| OLIVE WHIP SNAKE | *PSAMMOPITIS MOSSAMBICUS* | Medium |
| SHORT-SNOUTED WHIP SNAKE | *PSAMMOPITIS BREUIROSTIS* | Low |
| KALAHARI SAND SNAKE | *PSAMMOPITIS TRINASALIS* | Low |
| WESTERN STRIPED BELLIED SAND SNAKE | *PSAMMOPITIS SUBTAENIATUS* | Low |
| CROSS MARRED SAND SNAKE | *PSAMMOPITIS CRUCIFGR* | Low |
| DWARF WHIP SNAKE | *PSAMMOPITIS ANGOLENSIS* | Low |
| SPOTTED SKAAPSTEKER | *PSAMMOPITIS RITOMBEATUS* | Low |
| STRIPED SKAAPSTEKER | *PSAMMOPITYLAX TRITAENIATUS* | Low |
| EASTERN BARK SNAKE | *HEMIRHAGERRHIS NOTOTAENIA* | Medium |
| MANY SPOTTED SNAKE | *AMPLORHINUS MULTIMACULATUS* | Low |
| COMMON TIGER SNAKE | *TELESCOPUS SEMIANNULATUS* | Medium |
| MARBLE TREE SNAKE | *DIPSAPOBOA AULICA* | Low |
| HERALD SNAKE | *CROTAPITOPELEIS HOTAMBOEIA* | Medium |
| BLACK HEADED CENTIPEDE EATER | *APARALLACUTUS CAPENSIS* | Medium |
| NATAL PURPLE GLOSSED SNAKE | *AMBLYODIPSAS CONCOLOR* | Low |
| COMMON PURPLE CLOSSED SNAKE | *AMBLYODIPSAS POLYLEPIS* | Low |
| SOUTHERN AFRICAN PYTHON | *PYTHON NATALENSIS* | Medium |
| BROWN HOUSE SNAKE | *LAMPROPHIS CAPENSIS* | High |
| OLIVE HOUSE SNAKE | *LAMPROITIS INORNATUS* | Low |
| AURORA HOUSE SNAKE | *LAMPROPHIS AURORA* | Medium |
| SPOTTED ROCK SNAKE | *LAMPROPITIS GUTTATUS* | Low |
| SWAZI ROCK SNAKE | *LAMPROPITIS SWAZICUS* | Low |
| COMMON BROWN WATER SNAKE | *LYCODONOMORPITUS RUFULY* | Medium |
| MOLE SNAKE | *PSEUDASPIS CANA* | Medium |
| TWO STRIPED SHOVEL SNOUT | *PROSYMNA BIVITTATA* | Low |
| EAST AFRICAN SHOVEL SNOUT | *PROSYMNA STUHLMANNII* | Low |
| SPOTTED BUSH SNAKE | *PHILOTHAMNUS SEMIVARIEGATUS* | Medium |
| GREEN WATER SNAKE | *PHILOTHAMUS HOPLPGASTER* | Medium |
| COMMON SLUG EATER | *DUBERRIA LUTRIX* | Medium |
| COMMON WOLF SNAKE | *LYCOPHIDION CAPENSE* | Medium |
| VARIEGAROD WOLF SNAKE | *LYCOPITIDION VARIEGATUM* | Medium |
| CAPE FILE SNAKE | *MEHELYA CAPINSIS* | Low |
| BLACK FILE SNAKE | *MEITEYA NYASSAE* | Low |



| | | |
|---|---|---|
| COMMON EGG EATER | *DASYPELTIS SCABRA* | Medium |
| | | |
| DELALANDE'S BEAKED BLIND SNAKE | *RHINOTYPHLOPS LALANDEI* | Medium |
| SCITLEGEL'S BEAKED BLIND SNAKE | *RITINOTYPHLOPS SCHLEGELII* | Medium |
| BIBRON'S BLIND SNAKE | *TYPHLOPS BIBRONII* | Medium |
| LONG TAILED WORM SNAKE | *LEPTOTYPHLOPS LONGICAUDUS* | Medium |
| PETER'S WORM SNAKE | *LEPTOTYPITLOPS SCUTIFRONS* | Medium |
| INCOGNITO WORM SNAKE | *LEPTOTYPHLOPS INCOGNITUS* | Medium |
| DISTANT'S WORM SNAKE | *LEPTOTYPHLOPS DISTANTI* | Medium |

***Other Reptiles:***

| ***SCIENTIFIC NAME*** | ***ENGLISH NAME*** | ***PROBABILITY OF OCCURRENCE*** |
|---|---|---|
| *Manopeltis infuscate* | Dusky Spade-snouted Worm Lizard | Low |
| *Acontias plumbeus* | Giant Legless Skink | Low |
| *Thyphlosaurus cregoi* | Cregoi's Blind Legless Skink | Low |
| *Scelotes mirus* | Montane Dwarf Burrowing Skink | Medium |
| *Lygosoma sundevallii* | Sundevall's Writhing Skink | Low |
| *Mabuya capensis* | Cape Skink | Medium |
| *Mabuya quinquetaeniata* | Five-line or Rainbow Skink | Medium |
| *Mabuya striata punctaissima* | Striped Skink | High |
| *Mabuya varia* | Variable Skink | Medium |
| *Panaspis wahlbergii* | Walberg's Snake Eyed Skink | Medium |
| *Ichnotropis capensis* | Cape Rough-scaled Lizard | Medium |
| *Ichnotropis squamulosa* | Common Rough-scale Lizard | Medium |
| *Nucras intertexta* | Spotted Sandveld Lizard | Medium |
| *Nucras lalandii* | Delalande's Sandveld Lizard | Low |
| *Nucras holubi* | Holub's Sandveld Lizard | Medium |
| *Nurcras ornata* | Ornate Sandveld Lizard | Low |
| *Pedioplanis lineocellata lineocellata* | Spotted Sand Lizard | Medium |
| *Gerrhosaurus flavigularis* | Yellow –throated Plated Lizard | Medium |
| *Gerrhosaurus major* | Rough-scaled Plated Lizard | Low |
| *Gerrhosaurus nigrolineatus* | Black-lined Plated Lizard | Medium |
| *Gerrhosaurus validus* | Giant Plated Lizard | Low |
| *Chamaesaura aenea* | Transvaal Grass Lizard | Low |
| *Cordylus tropidosternum jonesi* | Tropical Girdled Lizard | Low |
| *Cordylus vittifer* | Transvaal Girdled Lizard | Medium |
| *Pseudocordylus transvaalensis* | Northern Crag Lizard | Low |
| *Varanus albigularis* | Rock Monitor | Medium |



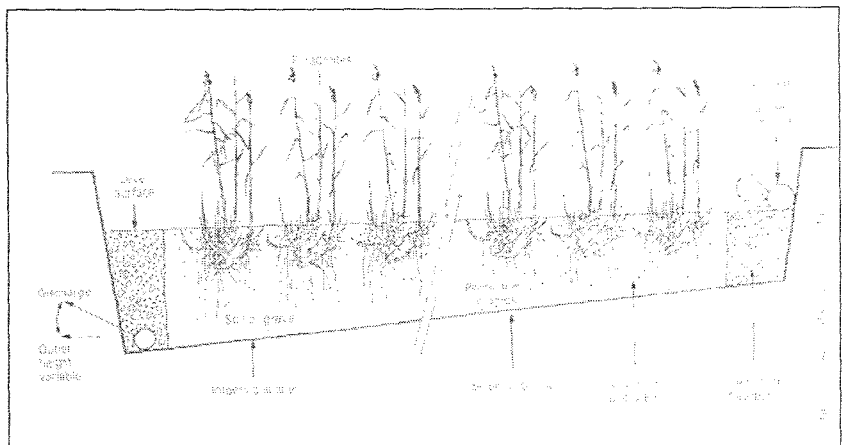
| | | |
|---|---|---|
| *Varanus niloticus* | Nile Monitor | Medium |
| *Agama aculeata* | Ground Agama | Medium |
| *Agama atra* | Southern Rock Agama | Low |
| *Acanthocerus atricollis* | Southern Tree Agama | Medium |
| *Chamaeleo dilepis* | Flap-neck Chameleon | Medium |
| *Hemidactylus mabouia* | Moreau's Tropical House Gecko | Medium |
| *Homopholis wahlbergii* | Walberg's Velvet Gecko | Medium |
| *Lygodactylus capensis* | Cape Dwarf Gecko | Medium |
| *Pachydactylus turneri* | Turner's Thick-toed Gecko | Medium |
| *Pachydactylus vansoni* | Van Son's Thick-toed Gecko | Medium |
| *Geochelone pardalis* | Leopard Tortoise | Medium |
| *Kinixys spekii* | Speke's Hinged Tortoise | Low |
| *Pelomedusa subrufa* | Marsh or Helmeted Terrapin | Low |
| *Pelusios sinuatus* | Serrated Hinged Terrapin | Medium |

***Amphibians***

| ENGLISH NAME | SCIENTIFIC NAME | PROPABILITY OF OCCURANCE |
|---|---|---|
| COMMON PLATANNA | *XENOPUS LAEVIS* | Medium |
| BANDED RUBBER FROG | *PHRYNOMANTIS BIFASCIATUS* | Medium |
| NATAL GHOST FROG | *HELEOPHRYNE NATALENSIS* | Low |
| BROWN BACK TREE FROG | *LEPTOPELIS MOSSAMBICUS* | Medium |
| BUBBLING KASSINA | *KASSINA SENEQALENSIS* | Medium |
| PAINTED REED FROG | *HYPOROLIUS MARMORATUS* | Medium |
| FOAM NEST FROG | *BREVICEPS ADSPERSUS* | Medium |
| AFRICAN BULL FROG | *PYXICEPHALUS EDULUS* | Low |
| TREMOLO SAND FROG | *TOMOPTERNA CRYPTOTUS* | Low |
| KNOCKING SAND FROG | *TOMOPTERNA TUBERCUVOSA* | Low |
| NATAL SAND FROG | *TOMOPTERNA NATALENSIS* | Medium |
| RAUCOUS TOAD | *BUFO RANGERI* | Medium |
| FLAT BACKED TOAD | *BUFO MACULATUS* | Medium |
| GUTTURAL TOAD | *BUFO GUTTURALIS* | Medium |
| EASTERN OLIVE TOAD | *BUFO FENOULITETI* | Medium |
| RED TOAD | *SCHISMADERMA CARENS* | Medium |
| STRIPED STREAM FROG | *STRONGYLOPUS FASCIATUS* | Medium |
| COMMON RIVER FROG | *AFRANA ANGOLENSIS* | Medium |
| STRIPED GRASS FROG | *PTYCHADENA POROSISSIMA* | Medium |
| BROAD BANDED GRASS FROG | *PTYCHADENA MOSSAMBICA* | Medium |
| BRONZE CACO | *CACOSTERNUM NANUM* | Medium |
| COMMON CACO | *CACOSTERNUM BOETTGERI* | Medium |
| SNORING PUDDLE FROG | *PHRYNOBATRACHUS NAKEWSIS* | Medium |



**Designs**



Typical arrangement for a Reed Bed Treatment System

## *Other information:*

### Contact details:

- ***Louise Agenbag*** (Polygon Environmental Planners)

  Cell: 083 339 2731

  e-mail: louise@polygon.co.za

- ***Jacques Moller*** (Bateleur Environmental Services)

  Cell: 079 501 3270

  e-mail: jj.moller@hotmail.com

- ***Francois Viljoen*** (Bateleur Environmental Services)

  Cell: 072 240 6511

  e-mail: fviljoen@yahoo.com

# Heritage Impact Assessment

- Mr Frans Roodt, R&R Cultural Resource Consultants

The HIA was conducted on the whole of Portion 1 of Schoongelegen 432-LT, based on Activity Alternative 1 (proposed township establishment on Portion 1). It was subsequently found that township establishment is fatally flawed due to geo-technical constraints on a large portion of the property; Activity Alternative 2 (proposed shopping centre) is therefore now proposed to be undertaken on part of Portion 1.

The heritage site (remains of a mud hut) found by R&R Cultural Resource Consultants on Portion 1 of Schoongelegen is situated on a part of the property which will **not** be affected by the proposed shopping centre development. Attached in this section, along with the HIA Report, is a letter from R&R confirming that the heritage site does not form part of the area proposed to be developed.

**Tel:** (015) 2257075
083 770 2131
**Fax:** 086 670 9130
**E-Mail:** hr19@mweb.co.za

CULTURAL RESOURCE CONSULTANTS

P.O. Box 1600
**POLOKWANE**
0 7 0 0

18 September 2009

To whom it may concern,

With reference to the Phase 1 scoping undertaken on the farm Skoongelegen 432 LT portion 1, Ga-Kgapane, Limpopo (2330 CA), in February 2007.

Geotech investigations on the site have revealed that mixed land-use is no longer viable due to steep slopes and floodlines. Thus the area to be utilised for development has been reduced to only 5 Ha and will only be used as a shopping complex. The area to be utilised now **excludes** the hut floor remnants and other archaeological remains noted during survey.

Thus, we **no longer** deem that it is necessary that a phase 2 assessment of the area occurs.

*From a heritage resources management point of view we have no objection with regard to the development. Should any archaeological and/or heritage material be unearthed during development, it must be reported to the archaeologist and/or Limpopo Heritage Authority immediately.*

FRANS ROODT (*BA Hons, MA Archaeology, Post Grad Dip. Museology; UP*)
For: R & R Cultural Resource Consultants

# HERITAGE IMPACT ASSESSMENT REPORT

## SKOONGELEGEN RESIDENTIAL DEVELOPMENT
## TZANEEN: Ga-Kgapane
## LIMPOPO

**FOR:** Polygon Architects
P O Box 1935
Tzaneen, 0850

**Frans Roodt**
February 2007

**Tel:** (015) 2257075
083 770 2131
**Fax:** 086 670 9130
**E-Mail:** hr19@mweb.co.za

CULTURAL RESOURCE CONSULTANTS

PO Box 1600
**POLOKWANE**
0 7 0 0

**CONTENTS**

## 1. INTRODUCTION AND TERMS OF REFERENCE

The application constitutes an activity, which may potentially be harmful to heritage resources that may occur in the demarcated area. The National Heritage Resources Act (NHRA - Act No. 25 of 1999) protects all structures and features older than 60 years (section 34), archaeological sites and material (section 35) and graves and burial sites (section 36). In order to comply with the legislation, the Applicant requires information on the heritage resources, and their significance that may occur in the demarcated area. This will enable the Applicant to take pro-active measures to limit the adverse effects that the development could have on such heritage resources.

In terms of the National Heritage Resources Act (1999) the following is of relevance:

**Historical remains**

**Section 34(1)** No person may alter or demolish any structure or part of a structure, which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.

**Archaeological remains**

**Section 35(4)** No person may, without a permit issued by the responsible heritage resources authority-

(a) destroy, damage, excavate, alter, deface, or otherwise disturb any archaeological or palaeontological site or any meteorite

**Burial grounds and graves**

**Section 36 (3)(a)** No person may, without a permit issued by SAHRA or a provincial heritage resources authority-

(c) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or

(b) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation equipment, or any equipment which assists in detection or recovery of metals.

**Culture resource management**

Section 38(1) Subject to the provisions of subsection (7), (8) and (9), any person who intends to undertake a development* ...

must at the very earliest stages of initiating such development notify the responsible heritage resources authority and furnish it with details regarding the location, nature, and extent of the proposed development.

*'**development**' means any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of the heritage authority in any way result in a change to the nature, appearance or physical nature of a place, or influence its stability and future well-being, including-

(a) construction, alteration, demolition, removal or change of use of a place or a structure at a place;



(b) carry out any works on or over or under a place*;
(e) any change to the natural or existing condition or topography of land, and
(f) any removal or destruction of trees, or removal of vegetation or topsoil;

*"'**place** means a site, area or region, a building or other structure* ..."

*"'**structure** means any building, works, device or other facility made by people and which is fixed to the ground, ..."

The author was contracted to undertake a heritage scoping survey of the farm Skoongelegen 432 LT (Refer to map, South Africa 1:50 000 2330 CA). The aim was to determine the presence or not of heritage resources such as archaeological and historical sites and features, graves and places of religious and cultural significance, and to submit appropriate recommendations with regard to the cultural resources management measures that may be required at affected sites / features.

The report thus provides an overview of the heritage resources, which may occur in the demarcated area where development is intended. The significance of the heritage resources was assessed in terms of criteria defined in the methodology section. The impact of the proposed development on these resources is indicated and the report recommends mitigation measures that should be implemented to minimize the adverse impact of the proposed development on these heritage resources.

## 2. METHOD

### 2.1 Sources of information

The major source of information was the field survey of the area, done on foot, using standard methods of archaeological observation.

### 2.2 Limitations

There were no major limitations; visibility was relatively good with most areas having only moderate vegetation cover in the form of maize and other crops. However due to the nature of the archaeological deposit, there is always a small possibility that something could have been missed.

### 2.3 Categories of significance

The significance of archaeological sites is ranked into the following categories.

No significance: sites that do not require mitigation.
Low significance: sites that *may require mitigation.*
Medium significance: sites that require mitigation.
High significance: sites that must not be disturbed at all.

The significance of an archaeological site is based on the amount of deposit, the integrity of the context, the kind of deposit and the potential to help answer present research questions. Historical structures are defined by Section 34 of the National Heritage Resources Act, 1999, while other historical and cultural significant sites, places and features, are generally determined by community preferences.

*A crucial aspect in determining the significance and protection status of a heritage resource is often whether or not the sustainable social and economic benefits of a proposed development outweigh the conservation issues at stake. There are many aspects that must be taken into consideration when determining significance, such as rarity, national significance, scientific importance, cultural and religious significance, and not least, community preferences. When, for whatever reason the protection of a heritage site is not deemed necessary or practical, its research potential must be assessed and mitigated in order to gain data / information which would otherwise be lost. Such sites must be adequately recorded and sampled before being destroyed. These are generally sites graded as of low or medium significance.*

### 2.4 Terminology

| | |
|---|---|
| Early Stone Age: | Predominantly the Acheulean hand axe industry complex dating to ± 1 Myr – 250 000 yrs. before present. |
| Middle Stone Age: | Various lithic industries in SA dating from ± 250 000 yrs. - 30 000 yrs. before present. |
| Late Stone Age: | The period from ± 30 000 yrs. to contact period with either Iron Age farmers or European colonists. |
| Early Iron Age: | Most of the first millennium AD. |
| Middle Iron Age: | 10th to 13th centuries AD. |
| Late Iron Age: | 14th century to colonial period. *The entire Iron Age represents the spread of Bantu speaking peoples.* |
| Historical: | Mainly cultural remains of western influence and settlement from AD 1652 onwards – mostly structures older than 60 years in terms of Section 34 of the NHRA. |
| Phase 1 assessments: | Scoping surveys to establish the presence of and to evaluate heritage resources in a given area. |
| Phase 2 assessments: | In depth culture resources management studies which could include major archaeological excavations, detailed site surveys and mapping / plans of sites, including historical / architectural structures and features. Alternatively, the sampling of sites by collecting material, small test pit excavations or auger sampling. |
| Sensitive: | Often refers to graves and burial sites although not necessarily a heritage place, as well as ideologically significant sites such as ritual / religious places. *Sensitive* may also refer to an entire landscape / area known for its significant heritage remains. |



## 3. BACKGROUND INFORMATION

The escarpment and Lowveld areas of the Limpopo Province are rich in archaeological sites. Notably here are the sites at Silver Leaves about 12 km south of Tzaneen, the Eiland Resort in the Hans Merensky Nature Reserve and the mineral rich Murchison mountain range at Gravelotte. Silver Leaves is of particular interest as it falls in a similar environment in the foothills of the Transvaal Drakensberg. The Type-site, Silver Leaves represents the earliest cultural expression of the first black farmers that moved into South Africa. The belonged to the Uruwe Tradition from East Africa and migrated southwards as part of the Kwale Branch, i.e., the eastern stream of migration and settled in the Tzaneen area in the 3rd century AD. From the 5th century onwards, the westerns stream of migration, namely the Kalundu Tradition from the Congo/Angola regions reached the area. The Happy Rest Branch represents this stream and has been found at Mooketsi not far to the northwest of the demarcated area. A Later facies that developed out of the western stream named Eiland (Type site – Eiland Resort) dated to the 10th century AD also occurs in the general area – including at the Silver Leaves site.

In the 13th century AD a second eastern stream migrated into this area of South Africa, namely the Kalambo Branch of Uruwe in East Africa. They are represented by the Moloko pottery phase that is the ancestors of today's Sotho-Tswana population. Lastly, the area had been influenced by the Venda that are descendants of the Mapungubwe/Zimbabwe culture that merged with the Icon facies of the Moloko Sotho-Tswana phase. This pottery facies is known Letaba style.

## 4. ARCHAEOLOGICAL AND HISTORICAL REMAINS

### 4.1 Stone Age Remains

No Stone Age remains of significance were noted on the site.

### 4.2 Iron Age Remains

A low concentration of pottery fragments was noted on the site. These were found in small clusters scattered around the area, mostly in maize fields, and other disturbed areas. An archaeological Iron Age period floor was also noted in a road track next to one of the maize fields.

1. *S23° 40' 07.2" E30° 14' 35.3"*

   Cluster of undecorated pottery fragments.

2. *S23° 40' 28.5" E30° 14' 11.6"*

   Cluster of undecorated pottery fragments.

**Discussion**

An unidentified archaeological site was detected in the demarcated area. It consists of an exposed Iron Age Hut floor and scatterings of non-diagnostic pottery fragments. Due to the absence of identifiable material it is not at this stage possible to determine the origin of the floor or of the pottery fragments.

### 4.3 Recent Historical Remains

No recent historical remains were noted.

### 4.4 Graves

No formal graves were observed. However, the possibility of subsurface unmarked graves at the archaeological site cannot be ruled out.

## 5. MANAGEMENT AND MITIGATION MEASURES

Archaeological site

The terrain has already been severely impacted on by recent human activities. The proposed development will finally destroy all the archaeological evidence and will thus have a further negative impact on the heritage remains. With reference to the above-mentioned background information and the lack of diagnostic material, a phase 2 assessment of the archaeological site is required. The site is already damaged and is thus not worth protecting, but is regarded as scientifically significant. The data will shed light on the cultural sequence of the immediate area, migratory patterns and demographics of the past.

A destruction permit must be applied for from SAHRA before development may commence.

## 6. RECOMMENDATIONS

In view of the above it is recommended that a phase 2 assessment be conducted on the unidentified archaeological site. It will consist of trench excavations and the recording and mapping of all archaeological finds. This will be a prerequisite for the application of a destruction permit.

*From a heritage resources management point of view we have no objection with regard to the development on condition that the management measures mentioned above are implemented.*



## 7. REFERENCES

**Deacon, J.** 1996. *Archaeology for Planners, Developers and Local Authorities.* National Monuments Council. Publication no. P021E.

**Deacon, J.** 1997. *Report: Workshop on Standards for the Assessment of Significance and Research Priorities for Contract Archaeology.* In: Newsletter No 49, Sept 1998. Southern African Association of Archaeologists.

**Evers, T.M. 1988.** *The recognition of Groups in the Iron Age of Southern Africa.* PhD thesis. Johannesburg: University of the Witwatersrand.

**Huffman, T.N. 1980.** *Ceramics, classification and Iron Age entities.* African Studies 39:123-174

**Huffman NT.** 2002. *Regionality in the Iron Age: the case of the Sotho-Tswana.* Southern African Humanities, Vol 14. Pietermaritzburg. Johannesburg

**Huffman, NT.** In prep. *The Last 500 years in the Transvaal.* School of Geography, Archaeology & Environmental Studies University of the Witwatersrand

**FRANS ROODT** *(BA Hons, MA Archaeology, Post Grad Dip. in Museology; UP)*
Principal Investigator for R & R Cultural Resource Consultants.

Fig 1. Maize field and general view of the area.

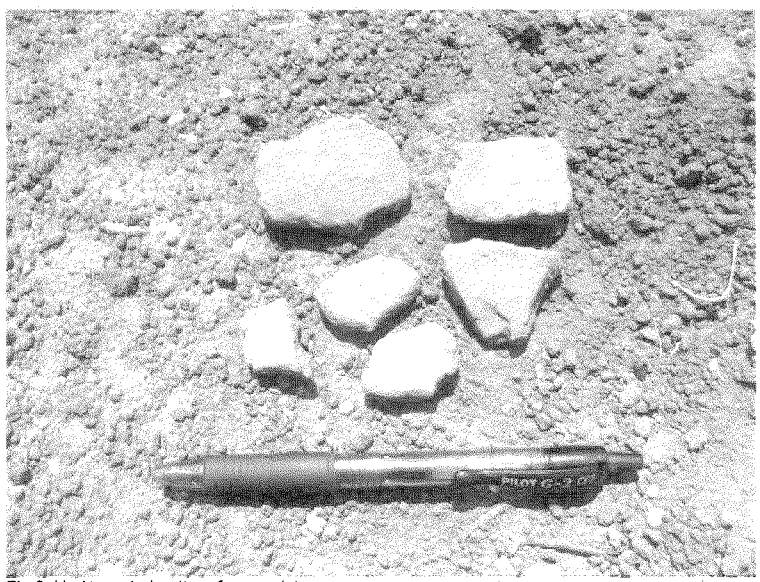


Fig 2. Undecorated pottery fragments.



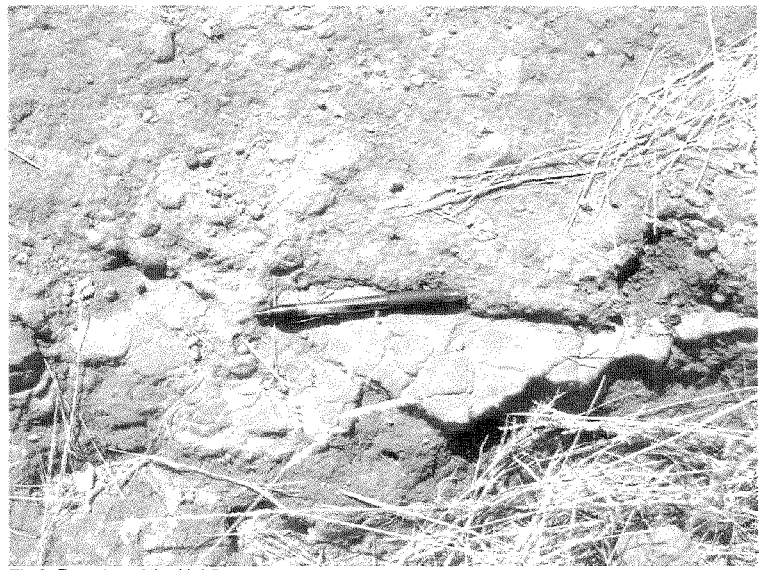


Fig 3. Remains of the Hut floor

Fig 4. Road track where hut floor was recorded.

# Market Research Study

- DEMACON Market Studies

# Ga-Kgapane Retail Development

May 2007

Demacon is a member of

SOUTH AFRICAN COUNCIL OF SHOPPING CENTRES (SACSC)


SOUTH AFRICAN PROPERTY OWNERS ASSOCIATION (SAPOA)


**The information contained in this report has been compiled with the utmost care and accuracy within the parameters specified in this document. Any decision based on the contents of this report is, however, the sole responsibility of the decision maker.**

**Enquiries:**

Hein du Toit

+27 12 460 7009 (t)

+27 12 346 5883 (f)

+27 82 8988 667

hein@demacon.co.za





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# EXECUTIVE SUMMARY

## ➢ DEMOGRAPHIC OVERVIEW:

**Table 1: Key socio-economic indicators of the primary market area (10km radius)**

| Variable | Market Characteristics |
|---|---|
| **Population size** | 72,719 people<br>16,505 households |
| **Household Size** | 4.4 people/ household |
| **Age profile** | 25.5% - between 10 and 19 years<br>29.4% - between 20 and 40 years<br>13.9% - between 40 and 60 years<br>7.3% - 60 years and older |
| **Highest level of education** | 26.3% - Some secondary education<br>15.0% - Some primary education<br>12.4% - Grade 12 / St 10<br>5.4% - Complete primary<br>6.0% - Higher<br>34.9% - No schooling |
| **Level of employment** | 49.7% Economically active of which 42.3% is unemployed and 57.7% is employed |
| **Occupation profile** | 18.4% - Clerks<br>14.3% - Elementary occupations<br>12.4% - Technicians and associate professionals<br>12.2% - Professionals<br>10.1% - Undetermined |
| **Average household income** | Market area (all LSM groups): R26,547.31 per annum - 2007<br>R2,212.28 per month – 2007<br>Market area (LSM 6 - 10): R15,593.51 per annum - 2007<br>R1,299.46 per month – 2007 |
| **LSM Profile** | 80.5% LSM 6 to 10+<br>19.5% LSM 10+ |

## ➢ LOCATION ANALYSIS:

**Table 2: Summary of site evaluation results**

| Category | Percentage |
|---|---|
| Retail development site | 70.2% |

* ***Note:*** *80%+ indicates an exceptional site rating; a site rating of 70 – 80% is high and indicates that most important fundamentals for successful shopping centre development are in place; a rating of 60 – 70% indicates some critical factors may be lacking but could possibly be addressed; projects with a sub 60% rating are not recommended for consideration.*

## ➢ RETAIL MARKET:

**Table 3: Summary of the retail market**

| Variables | Rand per annum / m² GLA |
|---|---|
| Market size (2007) – annual consumer retail spend | R434,230,957 |
| Optimum point of market entry | Q4:2010 / Q2:2011 |
| **Optimum centre size (m² GLA) – including banking & services** | **8,767.70m²** |
| Annual business sales potential | R168,874,749.67 |

| Variables | Rand per annum / m² GLA |
|---|---|
| Employment opportunities (on site) | 293 |
| Capital investment | R59,620,388.23 |





# CHAPTER 1: INTRODUCTION

## 1.1 BACKGROUND

Chapter one provides an introduction and concise roadmap of the ***Ga-Kgapane Retail Development.*** The chapter also provides concise background to the project, a site description as well as a report outline.

## 1.2 PROJECT BRIEF

**Demacon Property Market Specialists** were commissioned by **Ghiordes** to perform a comprehensive, specialist market potential assessment to establish the capacity of the local market to sustain a retail facility on a land portion situated south of *Ga-Kgapane, Limpopo Province.*

It is understood that Ghiordes requires an objective and informed analysis of local market dynamics and growth prospects – in particular the capacity of the market to potentially sustain a new retail facility. In terms of the project brief, the study should assess *inter alia* the following aspects:

- ✓ Local market and economic growth dynamics
- ✓ Current and future retail demand and supply within the market that would effectively compete with the proposed centre
- ✓ Market potential and centre expansion possibilities, including consumer market preferences, perceptions and tenanting options.
- ✓ A ten year growth forecast is also required to assess future potential of the market as a whole
- ✓ Current and future market potential for retail floor space in the town
- ✓ Recommendations, including ideal size, composition and inclusion of additional tenants
- ✓ Economic impact of the proposed capital investment on the local economy.

A specialist market study will be compiled, outlining current market potential (2007 as base year) as well as a five and ten year growth forecast, utilizing selected econometric models – informed by macro and micro market dynamics and critical factors underpinning local economic growth in the area.

## 1.3 LOCATION OF THE SITE

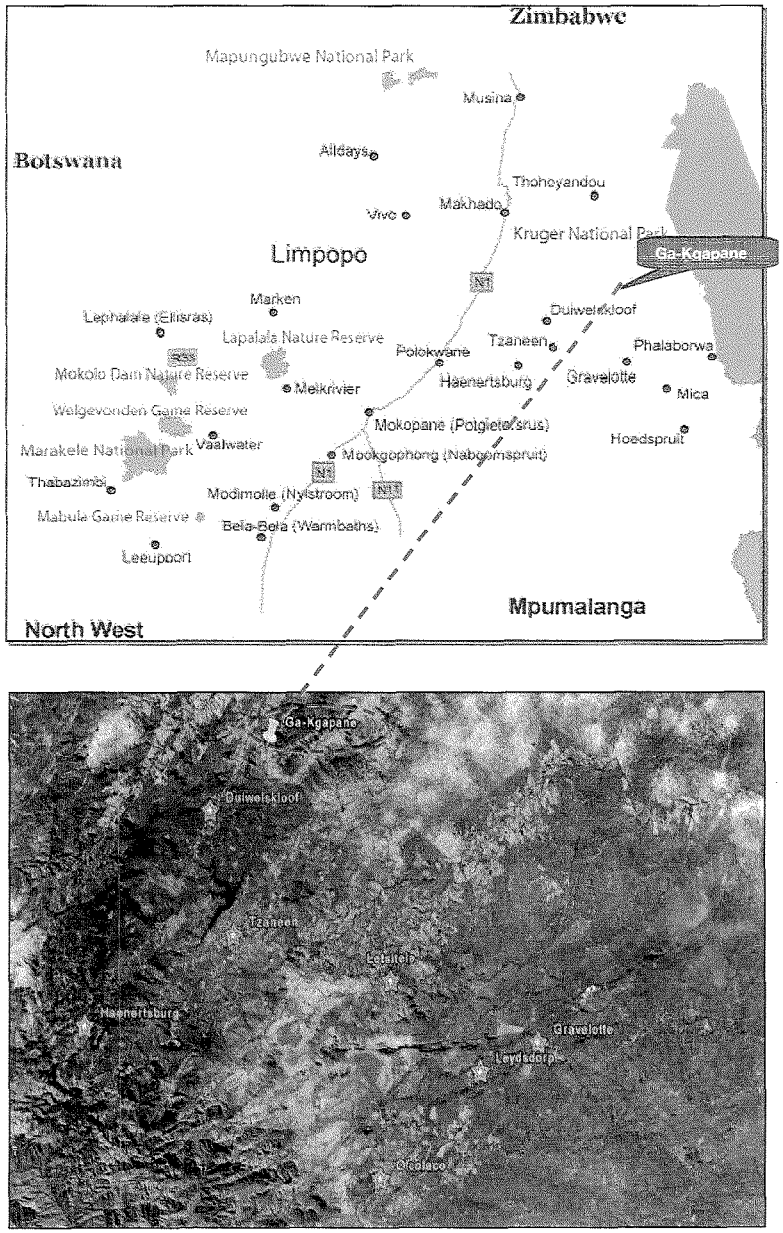
The retail development site is situated south of Ga-Kgapane, Limpopo Province on the farm Schoongelegen 432 LT. Refer to map 1.1 for location map.

## 1.4 REPORT OUTLINE

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

Chapter 2: Location Analysis
Chapter 3: Economic Market Overview
Chapter 4: Demographic Market Overview
Chapter 5: Retail Market Analysis
Chapter 6: Considerations for Retail Development in Previously Disenfranchised Areas
Chapter 7: Development Recommendations

**Map 1.1: Location of Ga-Kgapane within the Mopani District Municipal Area**







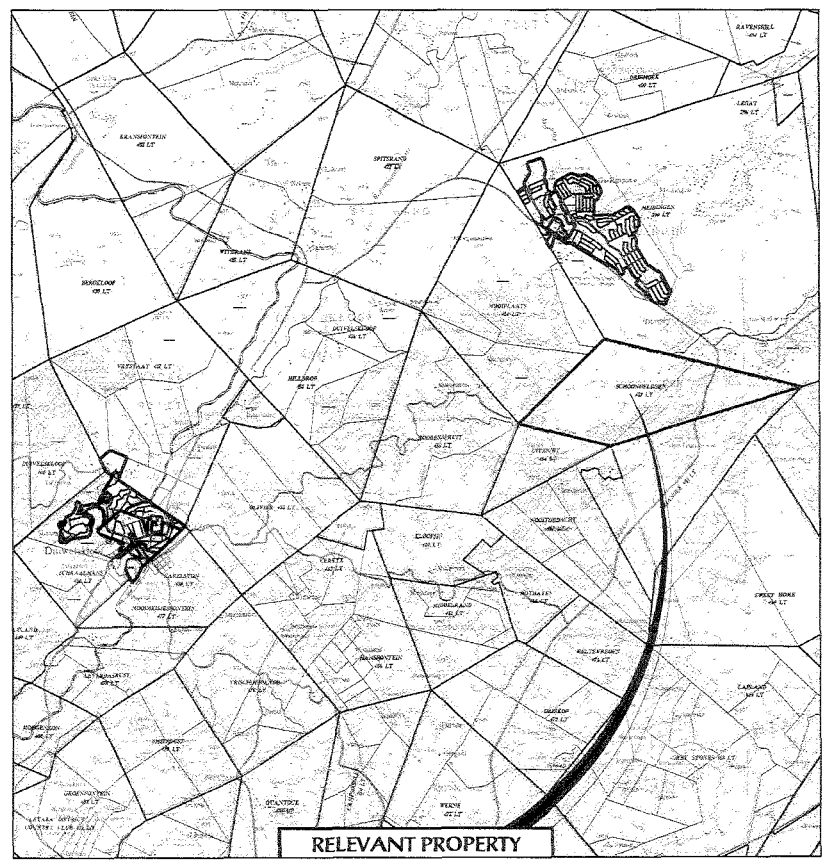

# CHAPTER 2: LOCATION ANALYSIS

## 2.1 INTRODUCTION

Market potential is influenced by; *inter alia*, the characteristics of the various sites to be developed. Certain types of developments each have specific location requirements and should subsequently be assessed in terms of selected location criteria. To this effect, the site evaluation model is utilized.

The following section provides the site assessment to determine it potential for a new retail facility. (Refer to map 2.1 for the development site)

**Map 2.1: Delineation of the mixed use development site**



## 2.2 DEVELOPMENT SITE ASSESSMENT

The Demacon model is pragmatic and is based on the assignment of values to various location factors. Firstly, the site is evaluated on a ten-point scale, with ten being the highest. Secondly, weights are attached to these factors, in order of importance (1 to 5, with 5 being the most important).

In the context of preceding citywide and local analyses, Demacon was requested to rate a number of potential sites for future investment purposes. The preceding economic analysis, coupled to knowledge of local *Greater Letaba Metropolitan Municipality* and *surrounding urban markets* will enable an in-depth analysis.

The following table indicates the assessment of the retail development.

- **Assessment of the retail development**

**Table 2.1: Assessment of the retail development**

| Location Factors | Grade 1-10 | Weight 1-5 | Points |
|---|---|---|---|
| Consumer volumes | 8 | 5 | 40 |
| Accessibility and visibility | 8 | 4 | 32 |
| Income level and income growth | 6 | 5 | 30 |
| Population growth | 6 | 5 | 30 |
| Age factor | 7 | 3 | 21 |
| Proximity to competition | 7 | 3 | 21 |
| Condition of premises | 8 | 2 | 16 |
| Directional Growth of the area | 7 | 4 | 28 |
| Functionality and complimentary uses | 7 | 4 | 28 |
| Area improving or deteriorating | 7 | 4 | 28 |
| Proximity to labour | 7 | 3 | 21 |
| Proximity to suppliers | 7 | 2 | 14 |
| Public transport accessibility | 7 | 3 | 21 |
| Address value | 7 | 4 | 28 |
| Future expansion potential | 7 | 4 | 28 |
| | | **Total points** | **386** |
| | | **Score** | **70.2%** |

* ***Note:*** *80%+ indicates an exceptional site rating; a site rating of 70 – 80% is high and indicates that most important fundamentals for successful shopping centre development are in place; a rating of 60 – 70% indicates some critical factors may be lacking but could possibly be addressed; projects with a sub 60% rating are not recommended for consideration.*

## 2.3 KEY DEVELOPMENT DETERMINANTS IMPACTING ON THE MOPANI DISTRICT:

According to the municipality a number of important development determinants have been identified which would most probably influence the future development of the district and individual local municipality areas. It may also impact negatively on the implementation of a more functional spatial/settlement development pattern for the Mopani District.

➢ **Agriculture:**

- Access to sufficient water (it can be assumed that progressively less water will be available in future for irrigation, even on the subsistence level).





- In view of the above possibility, it may become imperative in future to restructure the agricultural basket to include crops that are more drought resistant such as Prickly Pear.
- The successful establishment of emergent farmers.
- A number of projects have been identified including:
- Middle Letaba Irrigation Scheme (3000 ha near Giyani); and
- Lower Letaba Irrigation Scheme (near places such as Prieska, Waterbok, Masalal, Nondweni and Belasting).
- A number of major projects have already been commissioned and/or are being investigated, including (in no particular order):
  - Expansion of rock phosphates (by Foskor);
  - Phlogopite processing facility;
  - Koalin clay project (depending on the findings of the pilot Phlogopite project);
  - Underground copper mining at Phalaborwa;
  - Surface strip mining of Ilmenite bearing sands (Gravelotte);
  - Exploitation of heavy minerals (Tzaneen and Lenyenye);

➢ **Tourism:**

- The area has significant tourism potential and it is well known for the Kruger National Park (included in Bohlabela District and other tourism destinations. A number of large scale projects have been identified and are in various stages of implementation, the most important of which include (in no particular order):
  - Sekororo-Lekgalametsi Mountain Resort;
  - Modjadji Tourist Facility;
  - Mariyeta Nature Reserve;
  - Golden Horseshoe;
  - "Lowveld" Biosphere.
- The registration of the Central "Lowveld" Biosphere with UNESCO to give it international recognition which in turn could promote tourism to the area. The Biosphere will comprise national and provincial reserves such as the KNP, private reserves such as Selati, Klaserie, Sabi and Kapama game reserves, and protected community trust and state land (existing and proposed) including Lekgalametsi nature reserve and the Hlulani Community Project.
- Phalaborwa-Massingiri-Mozambique tourism corridor to provide access to the proposed Gaza Piece Park.
- In addition to these larger scale proposals, there are also a number of smaller scale project proposals such as:
  - Commercialization of Manyeleti Nature Reserve;
  - Commercialization of Letaba Ranch;
  - Lake Tzaneen Resort;
  - Haenertsburg Nature Reserve and day visitor centre; etc.

➢ **Services:**

- Any initiative that may reduce the absolute number of Government officials working and residing in Giyani;

➢ **Manufacturing:**

- The two towns of Tzaneen and Phalaborwa have been selected to qualify for the Tax Holiday Schemes (THS) in terms of the new Industrial Policy.
- This incentive may render project proposals mentioned here and in the Economic Development Strategy more feasible:
  - Fruit processing plant;
  - Timber processing plant; and

- Meat processing.

## 2.4 SYNTHESIS

Preceding paragraphs analyzed the potential site in terms of retail potential. Findings of the location assessments can be summarized as follows:

**Table 2.2: Summary of Site Evaluation Results:**

| Residential developing site | Percentage |
|---|---|
| Retail development | 70.2% |

* ***Note:*** *80%+ indicates an exceptional site rating; a site rating of 70 – 80% is high and indicates that most important fundamentals for successful shopping centre development are in place; a rating of 60 – 70% indicates some critical factors may be lacking but could possibly be addressed; projects with a sub 60% rating are not recommended for consideration.*

The above assessment, contextualized by the regional economic overview discussed in Chapter 3, should enable management to make informed decisions regarding future development prospects and investment options in high growth destinations in the market area.

The developed site should be evaluated in the context of the current expansionary phase in the domestic (and local) economy and the anticipated consolidation phase which macroeconomists and real estate analysts predict will follow in the post 2010 period (2010 – 2015), coupled to existing infrastructure in the market.





# CHAPTER 3: ECONOMIC PROFILE

## 3.1 REPORT OUTLINE

An intricate, though well defined relationship exists between the economy and urban real estate markets. The performance of specific economic sectors serves as proxy for the performance of these real estate markets. The purpose of this chapter is to outline the salient features of the market area economy (comprised of **Greater Letaba Local Municipality**) in terms of selected time series economic indicators; most notably the economic profile and growth trends within the local economy. As such, this chapter provides insight into the composition and stability of the local economies and hence, provides a more comprehensive assessment of medium- to long-term investment prospects than the conventional demographic analysis.

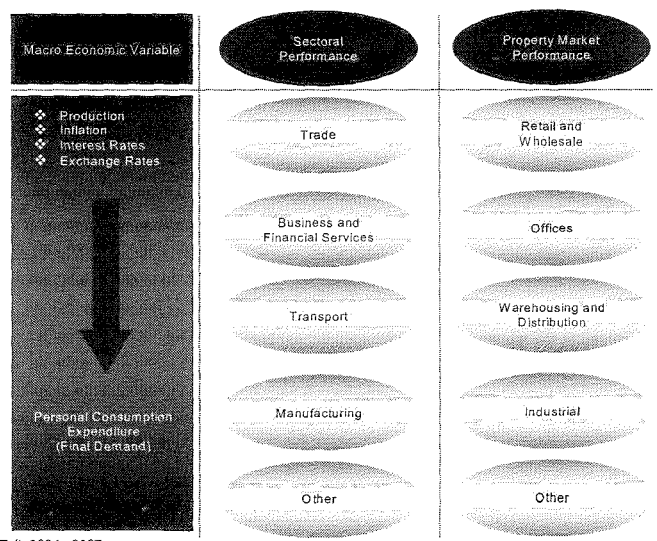
Subsequent sub-sections provide a concise overview of the local economy in terms of the following aspects:

- ✓ Reference Framework
- ✓ Macroeconomic Overview
- ✓ Local Economic Trends
- ✓ Trade Sector Performance
- ✓ Property Market Performance
- ✓ Synthesis

## 3.2 REFERENCE FRAMEWORK

The causal relationship between economic sector performance and property market performance is illustrated in Diagram 3.1

**Diagram 3.1: Causal Relationship between Economic Performance and Property Sectors**



Indicators such as production, inflation, interest rates and exchange rates influence Personal Consumption Expenditure (PCE). PCE is a major demand driver for a broad spectrum of economic goods and services, including retail and accommodation. Gross Geographic Product (GGP), in turn, serves as leading indicator for property market performance.

In the context of Diagram 3.1, the trade sector performance serves as proxy for the retail market and the business and financial services sector serves as proxy for the office market. This causal relationship serves to inform property development proposals on a macro scale and creates a platform for more fine-grained analyses.

## 3.3 MACROECONOMIC OVERVIEW

In terms of broad macroeconomic trends, the following are some of the dominant trends regarding the national economy and the impact of macroeconomic indicators on the property sector.

**Table 3.1: Macroeconomic Indicators**

| Trend | Short to medium term implications |
|---|---|
| Positive prevailing economic conditions:<br>✓ Stable economic growth, **4.6%** forecast for **2007** (exceeds population growth rate)<br>✓ Decreasing unemployment<br>✓ Rand weakening somewhat since May 2006: (R/$ R6.96, R/£ R13.77, R/€ R9.42) - as at 15/05/2007<br>✓ Low and stable inflation (lowest since 1960s, within the 3%-6% range)<br>✓ Stable interest rates (12.5%) | ✓ Strong performance in property sector<br>✓ Strong growth in house price index<br>✓ Strong demand from growing black middle class<br>✓ Increasing levels of disposable household income – may be curbed by increased interest rates over the medium term<br>✓ Foreign demand for South African property remain buoyant |
| ✓ High nominal growth in house prices (15.8% in October 2005 on October 2004; 23.4% for January to October 2005)<br>✓ Nominal growth in house prices from January to November 2006 of 14.6%, with 8% forecast for 2007 (Absa) | ✓ House price growth slowing down, but continues to exceed growth in remuneration, making residential property increasingly less affordable<br>✓ However, rise in prices reflect increase in residential demand, inducing increased fixed capital formation in residential property<br>✓ Due to interest rate changes, prices of commodities and interest on debt will rise slightly although the debt-to-income ratio should remain positive |
| ✓ Personal tax relief (R64.1 billion between 2000/01 and 2006/07) | ✓ Higher real disposable income<br>✓ Increase in household expenditure, with emphasis on middle and lower income groups<br>✓ Increase in consumer confidence |
| ✓ Annual reductions in transfer duties on property as from 1 March 2006 – no transfer duty payable on property valued at R500 000 and less<br>✓ Abolition of stamp duty on mortgage bonds from 1 March 2004<br>✓ Strong growth in disposable income of households since 2000 (3.2% per annum; currently exceeding 7%) | ✓ Initial market sentiment is that property affordability will not improve significantly under present conditions<br>✓ Although house price growth is tapering off, prices are set to remain at high levels<br>✓ Growth will remain strong in selected locations<br>✓ Higher levels of disposable income<br>✓ Improved capacity to afford better housing |





| Trend | Short to medium term implications |
|---|---|
| ✓ Low interest rate levels fueling household debt<br>✓ High levels of growth in retail sales<br>✓ Real retail sales growth – 6.5% (January to November 2005); 8.1% November 2005 compared with November 2004)<br>✓ South African retail sales growth accelerated to 12.3% year-on-year in November 2006 at constant prices | ✓ Strong demand for housing from rising black middle class market<br>✓ Retail sector still performing very well, with growth in terms of durables, non-durables and semi-durables reaching record highs. |

The buoyant spending on goods and services by households over the past few years was spurred by a number of factors, as stated in the table:

- ✓ A domestic economy expanding for the longest uninterrupted period since WWII, with a growth rate of 3.7% recorded for 2004, 5.5% for 2005, 4.6% for 2006 and 4.7 % on the cards for 2007
- ✓ Towards end 2004 – growth in retail sales of durable goods, non-durable goods and semi-durable goods reached record highs. Market crested in 2005, but 2006/07 outlook remains positive
- ✓ Preliminary retail sales growth rate for January to November 2005 was 8.1%; compared with 10.3% for 2004 (January to December), and 12.3% in the year to November 2006
- ✓ The expanding domestic economy was supported by favourable global economic conditions
- ✓ During 2005 cash expenditure by South African households totaled some R837 billion
- ✓ Close to one fifth of the amount was spent on food
- ✓ Poor households spent 71% of their budget on food, compared with 24% by middle income earners and 28% by upper income groups, an independent survey has found
- ✓ The average monthly food and beverage income for the 12 months to August 2006 was R1.86 billion, says StatsSA, 49.3% was earned by restaurants and coffee shops, followed by take-aways at 28.4%, caterers earned 17.9% and other catering services 4.4%. Of the total, food sales amounted to R1.58 billion (84.6%)
- ✓ A living standard survey, undertaken by Unisa, shows there is a rapid growth of the middle class, mostly made up of previously disadvantaged blacks and a widening gap between the rich and the poor
- ✓ Initial figures reveal the economic outlook for 2007 looks positive in terms of consumer expenditure. This is encouraging in the light of the plethora of new shopping centre developments coming on steam in 2006
- ✓ Improving employment prospects in the formal economy, and hence more consumers
- ✓ Strong growth in assets – houses and equities, causing consumers to feel richer and spend more
- ✓ Positive real increases in remuneration for a number of sectors
- ✓ Lower levels of savings, higher levels of expenditure on debt
- ✓ Edcon, Truworths, Woolworths, Foschini, Pepkor and Mr Price have come out strongly against government's plan to restrict clothing and textile imports from China. It is expected that there will be an inflationary effect of 20% to 25% and more on prices of some categories of clothing
- ✓ Motor car sales for the second quarter of 2006 were 11.6% at R23.6 billion higher than for the comparable period last year. Motor trade sales for the first six months of 2006 increased by 15.2% compared with the same period last year, with a new record level of

sales for the month of October 2006. This brings the year-to-date market for 2006 to a level 15.5% up on the January to October period for 2005

- ✓ Prolific growth rates primarily driven by strong consumer expenditure, thriving amidst low and stable interest rates and inflation in recent times, may taper off over the short to medium term as the SARB deliberately increased the Repo Rate by 200 basis points between June and December 2006. Consequently, the average R500 000 home loan will cost approximately R690 per month per household more since June 2006. The impact is expected to be more pronounced in terms of household expenditure on luxury and durable consumer goods, e.g. homes, vehicles, furniture and appliances. DEMACON initially anticipated a total interest rate increase of between 2% and 4%. Similar sentiments were recently revealed in independent media reports (eg. Beeld, 3 December 2006)
- ✓ The growth stimulus created by a new black middle-class, particularly for luxury consumer goods (cell phones, cars etc.) is expected to continue.

These factors all bode well for consumer and business confidence, which is expected to continue for some time, as indicated by projected macroeconomic indicators.

**Table 3.2 Macroeconomic Indicator Forecasts (comparative annualized averages)**

| Macro-Economic Indicators | 2006 | 2007 |
|---|---|---|
| Real GDP (% change)* | 4.4 | 6.0 |
| CPI (average, % change) | 4.3 | 5.1 |
| Current GDE (% change) | 10.2 | 10.1 |
| Real GDE (% change) | 5.4 | 5.3 |
| Real PCE (% change) | 5.5 | 4.5 |
| 10-year bonds (average, %) | 7.8 | 8.3 |
| Nominal prime overdraft rate (average, %) | 10.9 | 11.3 |
| Real retail sales: durable goods (% change) | 10.0 | 5.3 |
| Real retail sales: non-durable goods (% change) | 4.5 | 4.0 |
| Real retail sales: semi-durable goods (% change) | 10.8 | 6.8 |

- ✓ Economists predict that consumer inflation will increase slightly to around the 5% mark, economic growth is expected to reach around 4.7%
- ✓ Government support for low income earners has seen a strong surge in retail sales at the lower end of the market while it is expected that the emerging middle class will continue spending in 2007
- ✓ Supporting factors to continued positive retail expectations for 2006 were ascribed to inter alia government fiscal discipline, a decline in consumer inflation, the strength of the rand and economic stability. Figures for 2007 are expected to be below the 2006 benchmark, although still positive, as the effects of marginally higher interest rates filter through to various levels of the economy
- ✓ South Africa's consumer landscape is constantly evolving. Between 1994 and 2004, over 547 new stores have opened within the organized trade grocery retail sector, equaling a growth of 46%
- ✓ These stores have been fairly evenly split between corporates like Shoprite and Pick 'n Pay (who recently acquired Fruit & Veg City for an estimated R400 million)
- ✓ Regionally, South Africa's retail spend continues to be heavily weighted towards Gauteng and the Western Cape





- ✓ Despite only containing 30% of the country's population, these two business hives contribute 54% of the country's spend (GDP)
- ✓ Another imbalance in local retail scene exists in store concentration – The organised/modern grocery trade comprises a mere 5% of stores, but account for 70% of the country's grocery turnover
- ✓ Smaller counter and self service or traditional stores, bring in considerably less, but of course there are huge numbers of these outlets
- ✓ Examples of buoyant retailer performance include the following: Ellerines achieved 79.2% growth in turnover for the year ended 30 August 2006. The Ellerines group attributes its strong growth to the emergence of the middle class black community
- ✓ Woolworths increased sales by 20.2% year-on-year for the six months to December 2006, with Woolworths' store card, credit card and personal loan books growing by 25.9%.
- ✓ According to the South African Council of Shopping Centres, the Mr Price Group is on a major expansion drive. This group grew headline earnings by 49% to 161.7c a share in the 52 weeks to 31 March 2006 on a revenue increase of 14% to R5.28 billion. Mr Price has stated that it plans to spend around R1 billion on new store development over the next five years. Expansion is to include bigger Mr Price stores, in particular the new Mr Price Home stores, occupying from 1 500m² to 2 500m².
- ✓ Interesting in the statement is that these stores would be opened near fast-growing high density residential areas to become final-destination destinations rather than part-of-a-shopping-mall-destination, where the rentals are much higher. The group is also moving into credit sales, having determined a strong demand for it. Cash sales, however, still make up 89% of total sales. Sales breakdowns indicate that the home products division reported a 72% increase in profit while apparel showed a 41% increase in operational profit
- ✓ Spur grew its attributable income by 40%; the group opened 20 new stores in South Africa during this financial year as well as three internationally
- ✓ A survey conducted by BMR predicted a bumper year for retailers in 2006, set to continue into 2007
- ✓ Retailers expect sales to grow by an average of 6.4% this year. Sales of durable goods including cars and non-durable goods are expected to be biggest with an expected rise of 6.4% in semi-durables such as clothes
- ✓ Foschini reported third quarter sales increase of 19.4% compared to the corresponding period a year earlier, while Edcon reported a 21% jump
- ✓ The Shoprite Group (SA's second biggest supermarket chain) reported a 15.1% increase in turnover for the 52 weeks ending 30 June 2006.
- ✓ Government support for low income earners has seen a strong surge in retail sales at the lower end of the market while it is expected that the emerging middle class will continue spending in 2007
- ✓ Market sentiment towards the increased Repo Rate was clearly negative, as exhibited by the Stock Market's immediate behaviour the day after the announcement, but the effects on household spend are still to be measured. Suffice to say the first increased rate increase in the domestic economy for 4 years may caution consumers to spend less and save more – the effect is expected to be more pronounced on certain commodity types. Although the initial impact on the retail market was negligible, the effect is expected to become gradually more pronounced during 2007.

The bottom line is that the South African consumer market is characterized by an increasingly large segment of **socially upward mobile consumers** – the rising black middle class with a set of very strong aspirational values. This trend holds direct beneficial implications for the domestic retail industry. A combination of government expenditure, local economic development and social upliftment interventions are gradually creating a feeder system for the

LSM 4, 5 & 6 categories due to steady growth in disposable income and household asset ownership levels in the LSM 1 to 3 categories since 1994 (refer to Table 3.3 below).

In the context of the above it is needless to say that, barring a major exogenous shock, the trade sector is set to continue along a positive growth trajectory over the short to medium term. Development in rural areas is set to benefit from this trend, as statistics indicate that the average South African consumer, in particular the LSM 1-3 segments, have increased his level of wealth over the past decade.

**In summary:** The macroeconomic conditions outlined above create a favourable climate for real estate investment – in particular those sectors that benefit from low and stable interest rates and inflation, including residential and retail markets. There is general consensus among real estate practitioners that the economy is in a **window period**. During this window period, retailers are likely to build for current as well as future demand. Indications are that this window period is expected to last until at least **2010** and that shopping centre development is likely to taper of after 2010.

The recent interest rate hike is not expected to alter the state of the consumer market landscape significantly, although consumers may gradually reveal more cautious expenditure behaviour compared with the preceding 4 years.

**Table 3.3: SA population in terms of Living Standard Measurement criteria, 2004**

| | Penetration | | | Average Monthly Household Income | | |
|---|---|---|---|---|---|---|
| | 2003A (%) | 2003B (%) | 2004 (%) | 2003A (R) | 2003B (R) | 2004 (R) |
| LSM 1 | 10.3 | 9.5 | 9.1 | 862 | 886 | 879 |
| LSM 2 | 13.2 | 13.1 | 12.7 | 1 112 | 1 130 | 1 068 |
| LSM 3 | 14.3 | 14.4 | 14.0 | 1 342 | 1 348 | 1 408 |
| LSM 4 | 14.0 | 14.0 | 14.7 | 1 751 | 1 717 | 1 774 |
| LSM 5 | 12.5 | 12.8 | 13.1 | 2 429 | 2 347 | 2 427 |
| LSM 6 | 12.9 | 13.2 | 14.0 | 3 999 | 3 960 | 4 075 |
| LSM 7 | 6.3 | 6.5 | 6.2 | 6 020 | 6 189 | 6 455 |
| LSM 8 | 5.9 | 5.9 | 4.8 | 8 442 | 8 522 | 8 471 |
| LSM 9 | 5.7 | 5.5 | 5.9 | 11 596 | 12 195 | 11 566 |
| LSM 10 | 4.9 | 5.1 | 5.3 | 17 195 | 18 216 | 18 649 |

## Development Implications

These macro-economic factors have the following implications for local economies that planners and developers should acknowledge:

- ✓ Due to increasing demand for space in primary markets i.e. new developments, existing nodes may experience an increase in vacancy rates over the short term, with a recovery over the medium term.

- ✓ The existence of highly differentiated micro markets imply that only certain nodes will benefit from prevailing macro market conditions, while others will continue to deteriorate rapidly.
- ✓ Local authorities should mobilize available resources to align themselves and draw maximum benefit from government initiatives.
- ✓ Local authorities characterized by low growth and limited investment should adopt a facilitative approach to encourage new investment.

Appropriately designed retail centres can serve as catalyst for growth in smaller local economies.

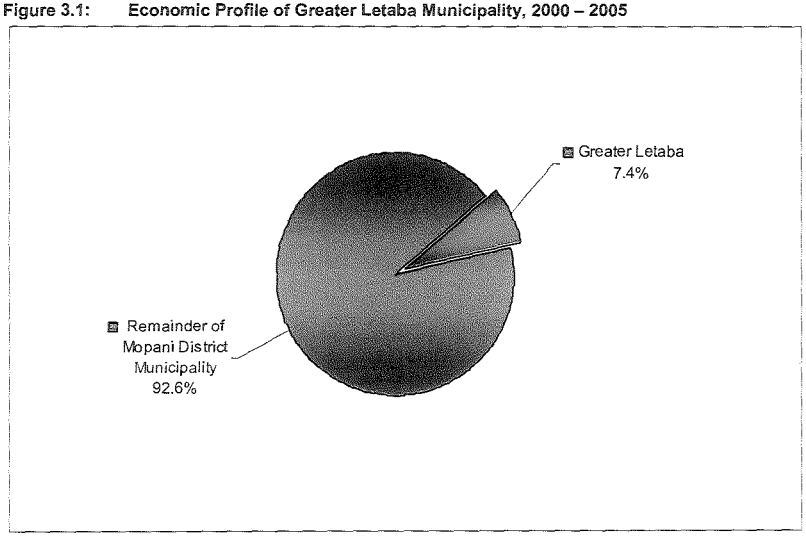
## 3.4 LOCAL ECONOMIC TRENDS

Subsequent economic indicators provide insight to the performance of the **Greater Letaba Local Municipality**. The data indicate the dominant economic sectors, growth sectors as well as the comparative advantages of all the local economies.

### 3.4.1 ECONOMIC PROFILE

The assessment serves to highlight sub-regional **growth trends** in the market. Future investment opportunities will be informed by this sub-regional assessment. Figure 3.1 indicates the contribution of Greater Letaba Local Municipal economy in relation to the Mopani District Municipal economy.

**Figure 3.1: Economic Profile of Greater Letaba Municipality, 2000 – 2005**




In context of the above, Figure 3.2 indicates the contribution of the nine major economic sectors to the total economic production of the Greater Letaba economy for the time period 2000 to 2005.

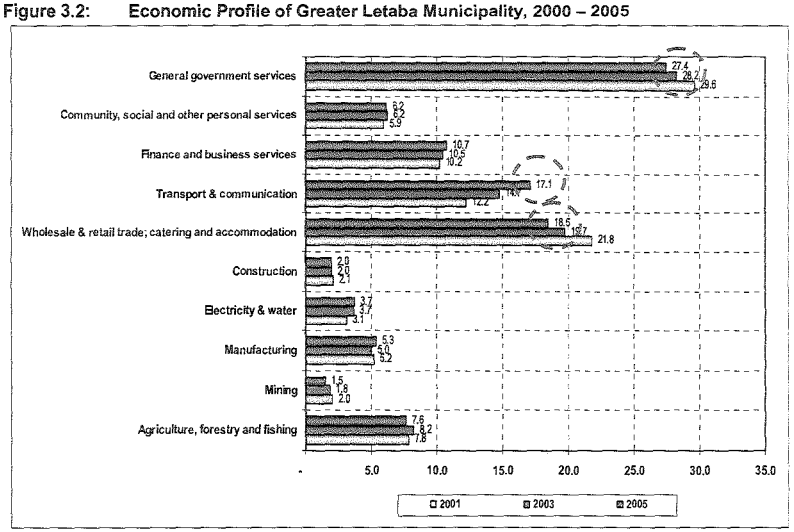




These nine sectors are:

- ✓ General government services
- ✓ Community, social and other personal services
- ✓ Finance and business services
- ✓ Transport and communication
- ✓ Trade sector (Wholesale and retail; catering and accommodation)
- ✓ Construction
- ✓ Electricity and water
- ✓ Manufacturing
- ✓ Mining
- ✓ Agriculture, forestry and fishing

**Figure 3.2: Economic Profile of Greater Letaba Municipality, 2000 – 2005**




*Source: Demacon, 2007*

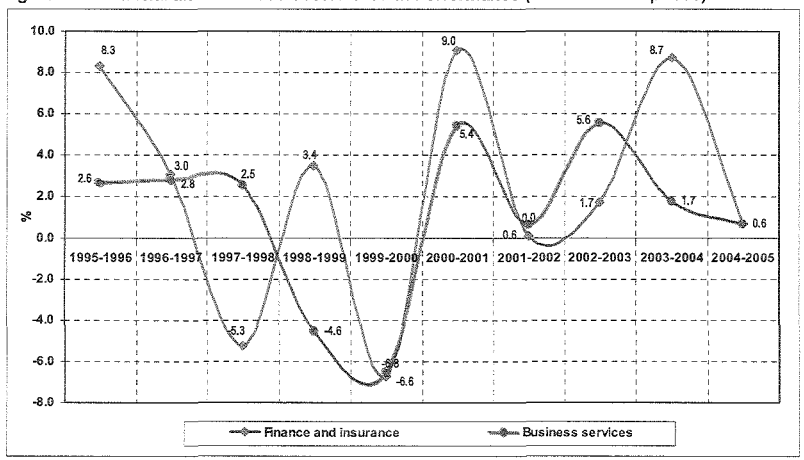
**Findings:** (Figure 3.2)

- ✓ The regional economy and specific local economies have become increasingly diversified over the past two decades, the implication being that consumer demand and favourable local market conditions have created numerous investment opportunities for services sector based activities.
- ✓ Regional investment activities (discussed under subsequent paragraphs) affirm the notion that investors have a keen interest in the above economies.
- ✓ The four dominant contributor to the local economy in 2005 are the following:
  - General government services – ***27.4%***
  - Trade sector– ***17.1%***
  - Transport & communication – ***18.5%***

Once again, the emphasis for the investor should be on identifying those economies that have been performing consistently ***above the regional average***, i.e. the 4.0% annual economic growth in recent years.

- *Business services sector* of Greater Letaba local municipality peaked during 1996 – 1997 (***3.0%***), in 2000 – 2001 (***5.4%***) and again in 2002 – 2003 (***5.6%***).
- The *business services sector* and the *finance and insurance sector* of the Greater Letaba local municipality both ended with a contribution of ***0.6%***.

**Figure 3.4: Financial and Business Sector Growth Performance (constant 2000 prices)**




*Source: Demacon, 2007*

### 3.4.4 GROWTH IN FINAL CONSUMPTION EXPENDITURE AND DISPOSABLE INCOME

Figures in subsequent paragraphs illustrate the rate of ***growth of final consumptions expenditure*** (on all goods and services) in relation to ***growth in disposable household income***. The graph reveals a high degree of positive correlation between the two variables, which in turn reveals similar up- and downturns to the business cycle as a whole.

Figure 3.5 illustrates the rate of growth in final consumption expenditure in relation to annual growth in disposable household income in Greater Letaba Local Municipality.

**Findings:** (Figure 3.5)

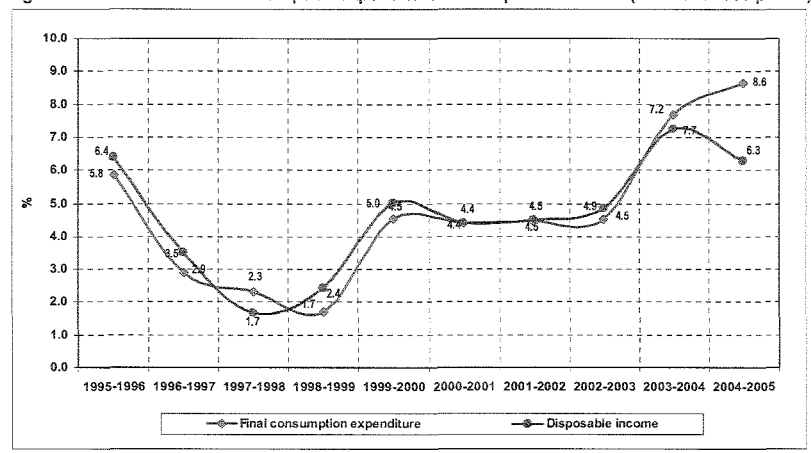
- ✓ The cyclical trend observed in the above figure correlates with the business cycle trend, i.e. a follow through on the 2000 / 2001 weakening of the Rand and subsequent growth to record high levels in 2004 (continuing into 2005 and the first quarter of 2006.
- ✓ *Final consumption expenditure* for the Greater Letaba Local Municipality achieved an economic contribution of ***8.6%*** and *disposable income* achieved an economic contribution of ***6.3%*** over the entire time period.
- ✓ A general South African trend is the decrease in expenditure on non-durable goods which is declining year-on-year with a rise in consumption expenditure on semi-durables and durables. These trends can be ascribed to, *inter alia*, the high rate of inflation on non-durables (especially meat) and unabated clothing and footwear deflation (mainly fuelled by imports from China).
- ✓ Bear in mind that the above reflects ***relative*** values. Under present market conditions, which include low interest rates and inflation, households are prone to spend ***relatively*** more on durables and semi-durables.





- ✓ There is a positive correlation between the economic growth and the disposable income of the trade sector. The fact that both economic growth and growth in disposable income exceed the retail sector growth, suggests that households experience real income growth in the local retail infrastructure.

**Figure 3.5: Growth in final consumption expenditure and disposable incom (constant 2000 prices)**




*Source: Demacon, 2007*

The above was, over the preceding 4 years, accompanied by gradually rising levels of household debt - which the recent interest rate hike by 50 basis points will set out to curb. The benefit from the analysis once again stems from a comparison of the various sub-economies to the regional average - above average performers are highlighted and reveal areas in which high growth is expected to continue in future *(these are indicative of **high potential locations for consumer driven services**).*

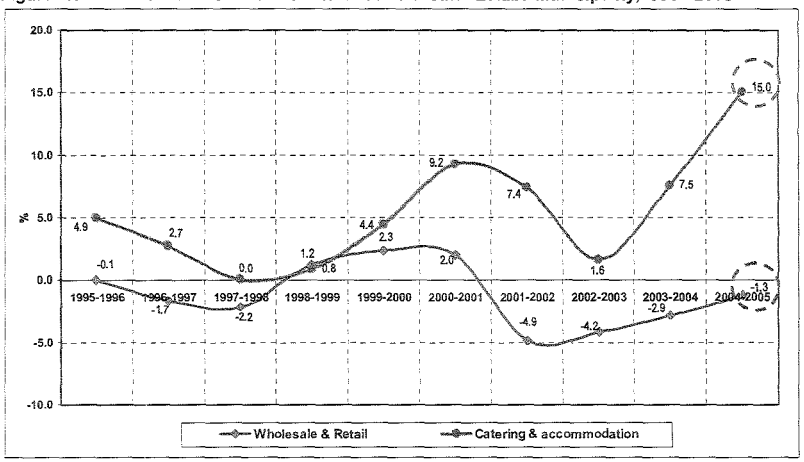
### 3.4.5 TRADE SECTOR PERFORMANCE

The trade sector comprises establishments engaged in retailing merchandise, generally without transformation, and rendering of services incidental to the sale of merchandise. Trade thus involves the selling or arranging the purchase or sale of goods from resale, and selling durable, semi-durable and non-durable consumer goods. The trade sector is sensitive to business cycle fluctuations, which in turn are extremely sensitive to global economic fluctuations.

The state of this sector is therefore an ultimate and direct reflection of consumer demand. The impact of macro and micro economic forces on the trade sector therefore extends to both supply and demand side dynamics of the product value chain. The trade sector is the all-important interface between producer, wholesaler and consumer.

Figure 3.6 illustrates trade sector growth in the market area since 1995.

**Figure 3.6: Economic Growth Performance of Greater Letaba Municipality,1995 - 2005**




*Source: Demacon, 2007*

Findings: (Figure 3.6)

- ✓ Growth in *wholesale and retail* trade peaked in 2000 – 2001 (***9.2%***) and *catering and accommodation* peaked in 1999 - 2000 (***2.3%***).
- ✓ *Wholesale and retail trade sector* ended with a contribution of ***-1.3%*** and *catering and accommodation sector* ended with a contribution of ***15.0%***.

Expenditure

The trade sector is accounted for by a spectrum of consumer types, including private households, other businesses, government and exports. The household sector is by far the largest of these consumer markets, especially in the retail sub-sector.

Retail sales refer to the amount of money spent on a variety of consumer goods. This includes for example non-perishable products, footwear, jewellery and hardware. Retail sales serve as an indication of the expenditure in certain categories.

Retail sales figures provide an indication of current demand for specific categories of consumer goods, which can be divided into three broad groupings, namely:

| | |
|---|---|
| 1. Durable goods | Durable goods include goods such as furniture, household appliances and personal transport equipment. |
| 2. Semi-durable goods | Semi-durable goods include products such as footwear, clothing and household textiles. |
| 3. Non-durable goods | Non-durable goods include food, beverages, and tobacco, and household consumer goods, medical and pharmaceutical products. |

Subsequent paragraphs indicate the household expenditure per retail category.

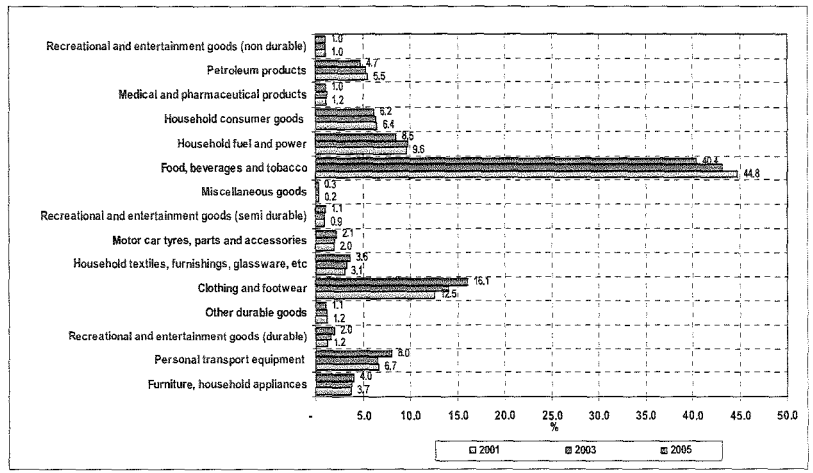




### 3.4.6 HOUSEHOLD EXPENDITURE PER RETAIL CATEGORY

Sub-economies that recorded above average growth in household expenditure as highlighted in Figure 3.7.

**Figure 3.7: Household expenditure per retail category – Greater Letaba Municipality (constant 2000 prices)**




*Source: Demacon, 2007*

Findings: (Figure 3.7)

- ✓ A general urban South African trend indicates that the decrease in expenditure directed towards non-durable groceries is declining year-on-year with a rise in consumption expenditure on semi durables including clothes and foot ware. These trends can be ascribed to the high rate of inflation on non-durables (especially meat) and unabated clothing and footwear deflation.
- ✓ Figure 3.8 discloses that *food, beverages and tobacco* is the largest sector of the retail sections, with a contribution of ***40.4%*** in 2005.
- ✓ The second largest sector is *clothing & footwear* sector, with a contribution of ***16.1%*** in 2005, followed by *household fuel and power* of ***8.5%***.
- ✓ The smallest sector per retail category in Figure 3.8 is *miscellaneous goods* and *other durable goods* with a contribution of ***0.3%***.

Development implications:

Since 1994, local property markets - including retail - have experienced significant change. Due to economic and social openness, disposable income now comes from a much wider base. In short, consider the following:

- ✓ South Africa has a diverse population and broad geographic spread
- ✓ Although KwaZulu Natal is the most populous province, the spending power of South African consumers is located largely in Gauteng and the Western Cape

- ✓ 53% of the population is younger than 24 years old - for retailers, this means that the bulk of the population, although not responsible for shopping, has a major influence on consumer spending
- ✓ With regard to the product category to which consumers direct the bulk of their spending, food is and always will be one of the greatest avenues for spending
- ✓ In terms of discretionary disposable income, an interesting shift took place in this spending dynamics around 2000, with the arrival of legalized casino's - at this point, there is a noticeable decrease in the percentage of income spent on food and a noticeable increase in spending in the entertainment industry
- ✓ Allied to this, the burgeoning cellular telephone market has seen an increase in consumer spending from 2001 (8,3-million customers) to 2004 (18,2-million customers). This trend is indicative of the progress of and accessibility to technology, as well as the increased importance of such technology in our daily lives
- ✓ The advent of the National Lottery created another avenue for consumers to channel their money into, thus further increasing the market share of the entertainment industry. However, disillusionment has led to a recent drop in Lotto sales
- ✓ Increased levels of consumer confidence among all racial and income groups since 2003, coupled to stable inflation and interest rates have translated into higher spending on durables, in particular new cars - where the number of new cars purchased is at its highest level in four years.

## 3.5 SYNTHESIS

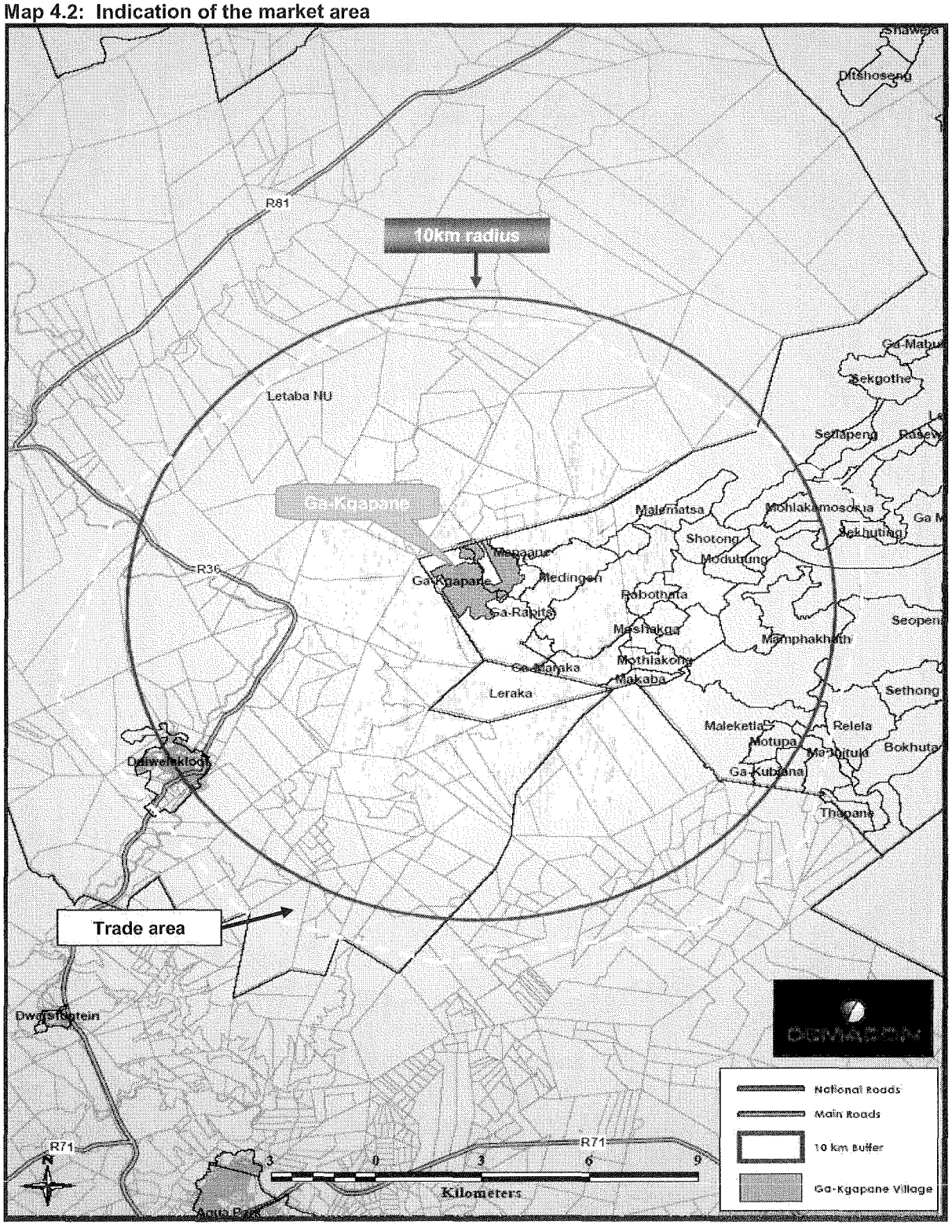
This Chapter provided an overview of the macro-economic trends underlining the local economy, supported by an overview on the performance of the trade sector, the business and finance sector and a brief overview of the residential market trends within the local economy.

- ✓ The demand for real estate is essentially a derived demand and positive market performance can be traced to favourable and stable market indicators pertaining to economic growth, inflation, interest rates and exchange rates
- ✓ Macro economic indicators indicate that the South African economy is at positive levels, as were last seen during the Post-1945 World War period. This positive economic climate is expected to prevail over the short to medium term, up to at least 2010
- ✓ Both of these aspects bode well for the retail sector. It is therefore anticipated that the trade sector will experience higher levels of growth over the next five years, especially with the anticipation of the Soccer World Cup in 2010
- ✓ In the context of these favourable market conditions, the retail sector can continue to expect **demand led** growth, and property developments are anticipated to flourish
- ✓ The SARB deliberately increased the Repo Rate by 200 basis points between June and December 2006. Consequently, the average R500 000 home loan will cost approximately R690 per month per household more since June 2006
- ✓ Market sentiment towards the recently increased Repo Rate was clearly negative, as exhibited by the Stock Market's immediate behaviour the day after the announcement, but the effects on household spend are still to be measured. Suffice to say, the first interest rate increases in the domestic economy for 4 years may caution consumers to spend less and save more – the effect is expected to be more pronounced on certain commodity types
- ✓ Demacon initially anticipated a total interest rate increase of between 2% and 4%. Similar sentiments were recently revealed in independent media reports (eg. Beeld, 3 December 2006)
- ✓ Although the initial impact on the retail market was negligible, the effect is expected to become gradually more pronounced during 2007

| Subplaces | Number of people in sub-place | Number of household in sub-place | Household size | Population density (people/km²) | Household density (HH/km²) |
|---|---|---|---|---|---|
| Motupa | 5,111 | 1,100 | 4.6 | 477 | 102 |
| **2007** | **72,719** | **16,505** | **4.4** | **30,049** | **6,574** |

*Source: Demacon, 2007*

**Map 4.2: Indication of the market area**



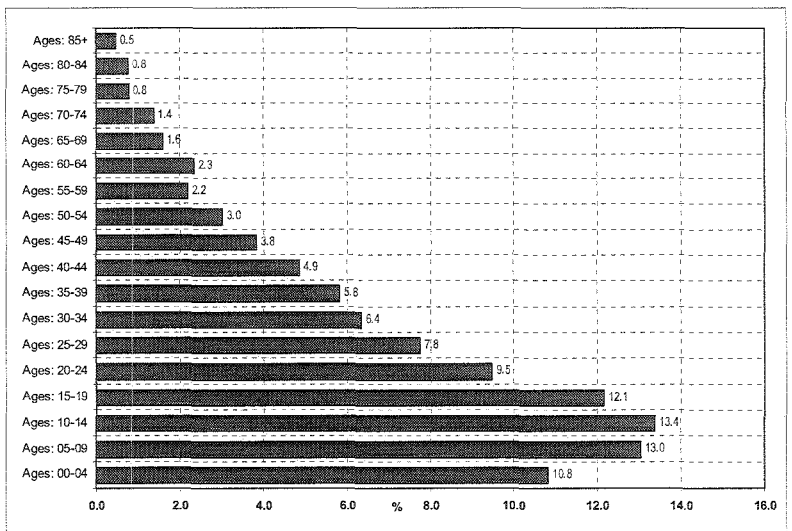
**Findings: (Table 4.1)**

- ✓ A total of ***72,719*** people and ***16,505*** households reside in this market area. The average household size in this market is ***4.4*** persons per household.
- ✓ The above population figures and subsequent demographic indicators reflect market characteristics of the market area population as a whole.
- ✓ The population growth rate in the market is ***1.3%*** per annum.

## 4.3 AGE PROFILE

The age distribution of a specific area also serves as an important indicator, with reference to consumer demand behaviour and preferences - in particular the dominant age groups. Figure 4.1 illustrates the consumer market age profile.

**Figure 4.1: Age Profile**




*Source: Demacon, 2007*

**Findings:** (Figure 4.1)

- ✓ The market area is characterized by a large segment of younger consumers.
- ✓ The majority of consumers falls within the age group *10 to 14 years* (***13.4%***), followed by the age groups *5 - 9 years* (***13.0%***) and *15 to 19 years* (***12.1%***).
- ✓ ***13.9%*** of the population is between the ages 40 and 60 years, with an older component of ***7.3%***.

In terms of the age category, 15 to 65, approximately ***57.8%*** of the people forms part of the *economically active population.*



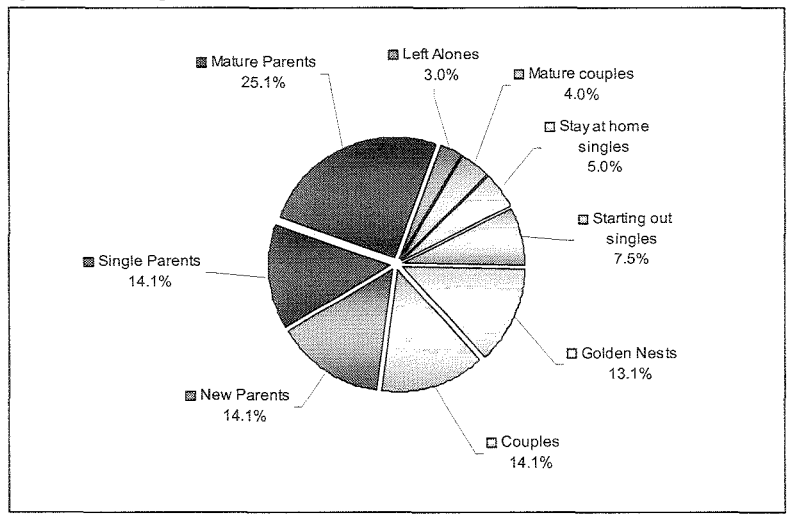


## 4.4 LIFE STAGES OF HOUSEHOLDS

The life stage of a household will ordinarily determine the quality of a product type purchased by a household and ultimately determine the type of retail facility favoured by households.

Figure 4.2 indicates the life stage profile of the market as based on findings of the Demacon household survey, April 2007. Note the correlating product preference in Table 4.2.

**Figure 4.2: Life stages of households**




*Demacon: Household survey 2007*

**Findings:** (Figure 4.2)

- ✓ The majority of respondents within the market area are mature parents (2.5%).
- ✓ These dominant life stages are supported by smaller percentages of the following stages:
  - Single parents, new parents, couples (14.1%)
  - Golden nests (13.1%)
  - Starting out singles (7.5%)
  - Starting at home singles (5.0%)
  - Mature couples (4.0%)
  - Left alones (3.0%)

Typical lifestage preferences are summarized in Table 4.2.

**Table 4.2: Lifestages**

| Life stage | Products and entertainment preference |
|---|---|
| At-home singles | • Supermarket<br>• Restaurants and pubs<br>• Cinemas<br>• Clothing stores<br>• Sport stores<br>• Durable centre – TV, Hi-FI, music centre |
| Starting out singles | • Supermarket<br>• Restaurants |

| Life stage | Products and entertainment preference |
|---|---|
| Mature singles | • Bookshops<br>• Sport shop<br>• Clothing stores<br>• Cinemas<br>• Internet Café<br>• Supermarket<br>• Bottle store<br>• Clothing store<br>• Bookstore<br>• Butchery<br>• Supermarket/Hypermarket<br>• Restaurants and pubs |
| Couples | • Clothing stores<br>• Sport stores<br>• Bookshops<br>• Household appliance stores<br>• Music centres<br>• Shoe stores<br>• Cinemas |
| New parents | • Supermarket<br>• Baby stores<br>• Clothing stores<br>• Sport stores<br>• Durable stores – household appliances<br>• Computer stores<br>• Electronics – Hi-Fi, TV etc<br>• Pet store<br>• Internet Café |
| Mature parents | • Supermarket<br>• Clothing stores<br>• Household appliance stores<br>• Shoe stores |
| Single parents | • Supermarket<br>• Clothing and shoe stores<br>• Baby stores |
| Golden nests | • Supermarket<br>• Household appliance stores<br>• Computer store<br>• Pet store<br>• Bookstore |
| Left alones | • Pharmacy<br>• Supermarket<br>• Pharmacy |

**Development implications**

The market population is characterized by a young and upcoming market segment, supported by the mature population. The mature population has specific mindsets in terms of retail behaviour, demand for products and services.

The younger up-coming market, on the other hand, has well defined aspirational values and brand consciousness. This reflects overall stability within the community. These two market segments will drive demand for local goods and services.

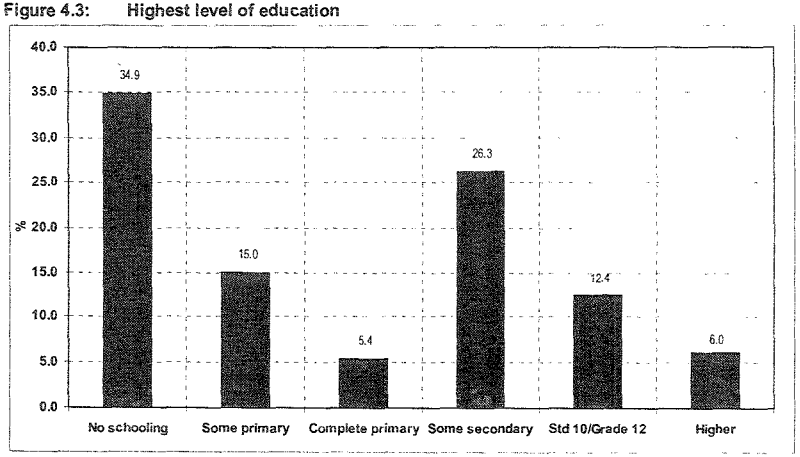




## 4.5 HIGHEST LEVEL OF EDUCATION

The highest level of education serves as proxy for human development within the consumer market. The level of employment is also an important indicator, impacting on the level of human development as well as on the level of disposable community income. Figure 4.3 indicates the highest level of education of the population in the market.

**Figure 4.3: Highest level of education**




*Source: Demacon, 2007*

**Findings:** (Figure 4.3)

- ✓ Figure 4.3 indicates that ***65.1%*** of the market area population is educated.
- ✓ ***6.0%*** of the market has obtained *higher educational* qualifications.
- ✓ A relatively large segment (***26.3%***) of the market area population has *some secondary education*, followed by ***15.0%*** of the population has *some primary education.*
- ✓ ***12.4%*** of the population has obtained *std 10 / Grade 12*
- ✓ ***5.4%*** of the population has complete their *primary education*
- ✓ The largest segment of the market population (***34.9%***) has no form of education.

**Development Implications**

A number of factors contribute to the general property development climate in a specific geographical area. Of the socio-economic factors that provide an initial indication of market potential are levels of education and standards of living.

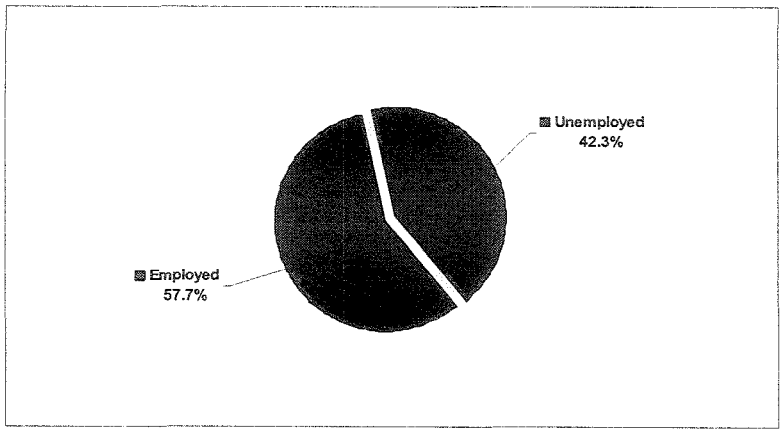
The majority of households are literate and educated - it can be expected that these trends will be portrayed in the area LSM profile. It can furthermore be expected, based on the prevalence of higher educational qualifications in the market (6.0%) that the market population will predominantly be lower to middle income earners.

## 4.6 EMPLOYMENT STATUS

The level of employment reflects employment and unemployment levels in the consumer market, which impacts on disposable income patterns.

Level of employment, coupled to household size is also indicative of dependency ratios (refer to Figure 4.4).

**Figure 4.4 Employment of the market area**




*Source: Demacon, 2007*

**Findings:** (Figure 4.4)

- ✓ ***49.7%*** of the population in the market area is *not economically active* due to the fact that they are either younger than 15 years of age; older than 65 years; or has physical disabilities.
- ✓ Of the ***50.3%*** of the population that are *economically active* – ***57.7%*** are employed and ***42.3%*** are unemployed.

**Development Implications**

The majority of the market area is employed, reflecting low dependency ratios. These employment figures are furthermore indicative of the prevalence of double income earner households in the primary market area.

## 4.7 OCCUPATION PROFILE

The occupation profile is an important indicator of anticipated community income, serving as proxy for the level of community wealth and stability. The presence of white and blue collar occupations serves as indication of a higher income profile or lower income profile consumer market. Figure 4.5 indicates the occupation profile of the consumer market.

**Findings:** (Figure 4.5)

- ✓ The largest proportion of the population is employed as *clerks* (***18.4%***)

*The dominant occupation group is supported by:*

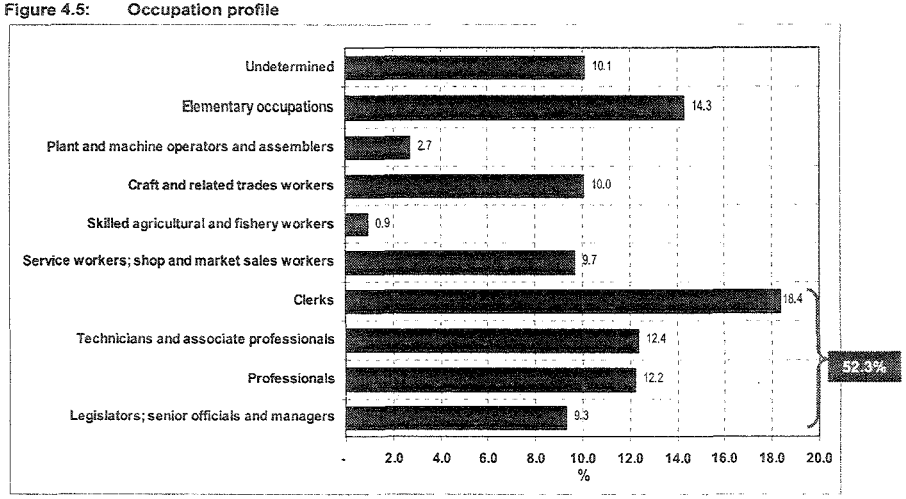
- ✓ Elementary occupations (***14.3%***)
- ✓ Technicians and associate professionals (***12.4%***)
- ✓ Professionals (***12.2%***)





- ✓ ***10.1%*** of the market population is undetermined to work.
- ✓ In total, ***52.3%*** of the local labour force is involved in professional and related occupations.

**Figure 4.5: Occupation profile**




*Source: Demacon, 2007*

**Development implications**

The occupation profile reflects two dominant market segments – one segment representing white collar occupations, serving as proxy for higher incomes and overall wealth, with the other representing blue collar occupations serving as proxy for middle income earners. These findings correlate with the findings of preceding paragraphs pertaining to aspects such as level of education and employment.

## 4.8 AVERAGE ANNUAL HOUSEHOLD INCOME

Average household income is a direct indicator of consumer demand for a broad spectrum of economic goods and services and the quantity of additional floor space that could be sustained by a given consumer market. Average household income, to an extent, also reflects the living standard of a household, and influences aspects such as asset ownership.

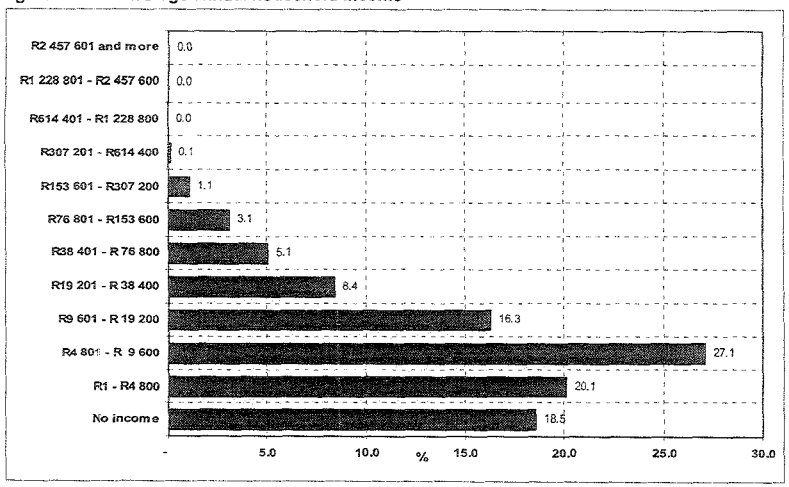
Figure 4.6 illustrates the annual household income profile of the primary market.

**Findings:** (Figure 4.6)

- ✓ The dominant segment (***27.1%***) of households in the market area earns an income of between R4 801 – R9 600.
- ✓ ***9.4%*** of the household earns an annual income of between *R38 401 and R614 400.*
- ✓ ***47.2%*** of households in the market area earns incomes between *R1 and R9 600*
- ✓ ***24.7%*** of households in the market area earns incomes between *R9 601 and R38 400*
- ✓ ***0.1%*** of households in the market area earn annual incomes exceeding *R307 200*
- ✓ The **weighted average annual household income** for the market (all LSM groups) amounts to **R26 547.31 per annum**, which translate into **R2 212.28 per month.**

✓ The **weighted average annual household income** for the market area (LSM 6 – 10+ groups) amounts to **R15 593.51 per annum**, which translate into **R1 299.46 per month**.

**Figure 4.6: Average annual household income**




*Source: Demacon, 2007*

This indicates that the market area is located in predominately *lower to middle income earning* community, representing pockets of wealth and poverty. Subsequent paragraphs indicate the living standard measurement of the market.

## 4.9 LIVING STANDARD MEASUREMENT

The LSM index is an internationally recognized instrument designed to profile a market in terms of a continuum of progressively more developed and sophisticated market segments. The LSM system is based on a set of marketing differentiators, which group consumers according to their standard of living, using criteria such as degree of urbanization and ownership of assets (predominantly luxury goods).

Essentially, the LSM system is a wealth measure based on standard of living, rather than income alone. The market segmentation continuum is divided into ten LSM segments, where LSM 1 signifies the lowest living standard and LSM 10+ signifies the highest living standard.

The LSM categories are defined and weighted in terms of the following 29 variables (refer to Table 4.3). It is important to note that the LSM system is widely applied internationally for marketing and branding purposes, and that it is therefore not an instrument developed locally to label or stereotype certain market segments.

**Table 4.3: Living Standard Measurement (LSM) Variables**

| | | | |
|---|---|---|---|
| 1 | Hot running water | 16 | Less than 2 radio sets/household |
| 2 | Fridge/freezer | 17 | Hi-Fi/music centre |
| 3 | Microwave oven | 18 | Rural outside |
| 4 | Flush toilet in/outside house | 19 | Built-in kitchen sink |
| 5 | No domestic in household | 20 | Home security service |





| | | | |
|---|---|---|---|
| 6 | VCR | 21 | Deep freezer |
| 7 | Vacuum cleaner/floor polisher | 22 | Water in home/plot |
| 8 | No cell phone in household | 23 | M-net/DSTV subscription |
| 9 | Traditional hut | 24 | Dishwasher |
| 10 | Washing machine | 25 | Electricity |
| 11 | PC in home | 26 | Sewing machine |
| 12 | Electric stove | 27 | DVD player |
| 13 | TV set | 28 | 1 cell phone per household |
| 14 | Tumble dryer | 29 | Motor vehicle in household |
| 15 | Home telephone | | |

Table 4.3 summarizes the current status of the consumer market in terms of the LSM index. Essentially, the LSM index summarizes the net result of market indicators discussed in preceding paragraphs.

The target market segments utilized for net effective demand modeling are LSM 6 to 10+. This does not preclude LSM 1-5 market segments from supporting the mixed use development.

The objective is to assess whether *minimum demand thresholds* can be met by households within the market area sustaining the market potential, taking due cognizance of demand potential and effective competitive supply of commercial and residential activities. Demand modeling therefore only focuses on LSM 6 - 10+ segments of the market.

**Table 4.4: Living Standard Measurement Indicator**

| Income category (R/month) | LSM Status | Market Area (% of households) |
|---|---|---|
| Super A income (>R 30 000) | LSM 10+ | 0.3% |
| A income (R16000 to R30000) | LSM 10 | 1.1% |
| B income (R11000 to R16000) | LSM 9 | 3.1% |
| C income (R4500 to R11000) | LSM 7 and 8 | 5.1% |
| D income (R2500 to R4500) | LSM 6 | 8.4% |
| D low (<R2500) | LSM 1 - 5 | 82.1% |

*Source: Demacon calculations*

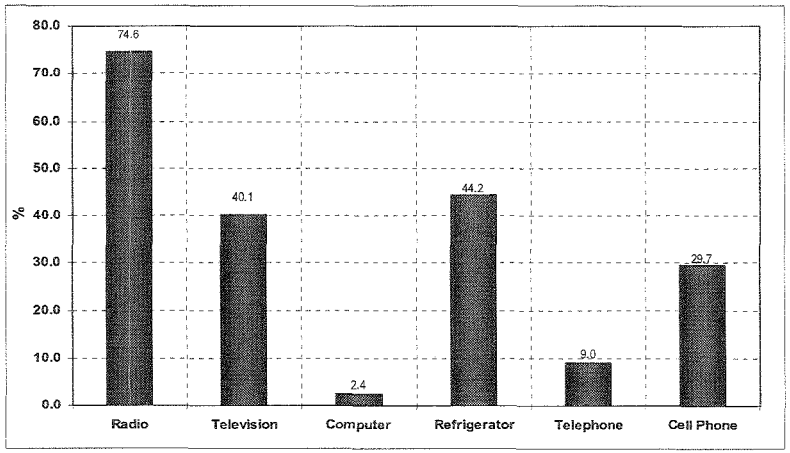
**Findings:** (Table 4.4)

- ✓ As seen in Table 4.6 ***4.5%*** of the market population of the market area are within the **LSM 10 and higher** category, with a monthly incomes in excess of R16 000 per household per month and higher.
- ✓ The household **LSM grouping 7 and 8** in the market accounts for ***5.1%*** of the market area population and earn monthly incomes of R4 500 to R11 000
- ✓ Approximately ***3.1%*** of the households in the market area are within the **LSM 9** category, typically earn between R12 000 and R20 000 per month.
- ✓ **17.9%** of households in the market area fall within the **LSM 6 and higher** category.
- ✓ ***82.1%*** of the households fall within the **LSM 1 -5** category.

## 4.10 HOUSEHOLD GOODS

Ownership of household goods also serves as proxy for wealth and living standards, arguably also of quality of life. The assets considered include television sets, radios, refrigerators, home telephones and cellular phones. The ownership of household goods is consistent with rural environments and LSM 1 – 5 segments. Ownership of luxury items is evidently *limited* and the focus is largely on necessity goods.

**Figure 4.7: Ownership of household goods**




*Source: Demacon, 2007*

**Findings:** (Figure 4.7)

- ✓ The majority (***74.6%***) of the market population in the market area owns a radio, followed by ***44.2%*** of the households that own a refrigerator.
- ✓ ***40.1%*** of the households in the market area own a television, ***29.7%*** of the household earn a cell phone and ***9.0%*** of the households earn a telephone.
- ✓ Only ***2.4%*** of the households in the market area own a computer.

**Development implications:**

Consistent with the profile of previous consumer market indicators, asset ownership levels are notably higher in the secondary market compared with the primary market. The household goods profile is consistent with the consumer income profile. Relatively low ownership levels of, for instance cell phones (***27.4%***), telephones (***25.9%***) and computers (***7.8%***), will impact on shopping behaviour - in this example it will suggests a typical pattern of *higher-frequency-smaller-parcel* type of purchases. This phenomenon holds important merchandising implications, in particular for the grocery anchor.

## 4.11 CONSUMER MARKET & EXPENDITURE

Subsequent paragraphs present findings of **Demacon Consumer Market Surveys** performed in **April 2007.** These were conducted as follows:

***Consumer shopper profile survey***
***Household profile survey***

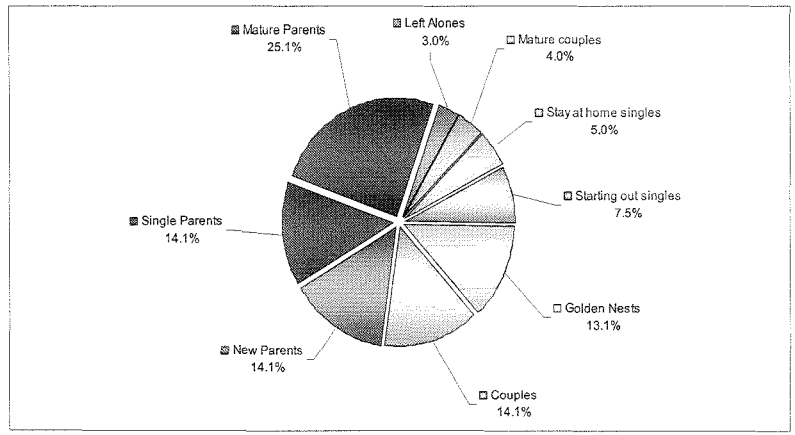
Focus on assessing consumer preferences and expenditure, within the market area; as well as testing preferences and opinions regarding a new retail centre.





### 4.11.1 Lifestage indication

**Figure 4.8: Lifestage indication**



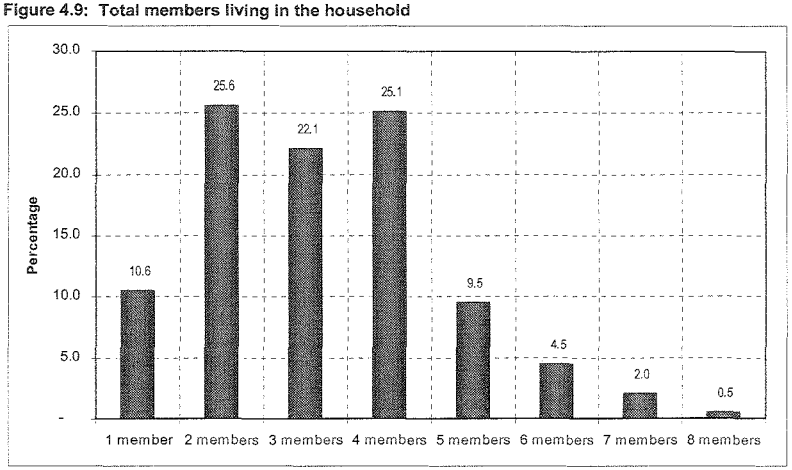

*Source: Demacon household survey, 2007*

**Findings:** (Figure 4.8)

- ✓ The majority of respondents within the market area is mature parents (25.1%), followed by Single parents, new parents, couples all 14.1%.

### 4.11.2 Total members living in the household

**Figure 4.9: Total members living in the household**



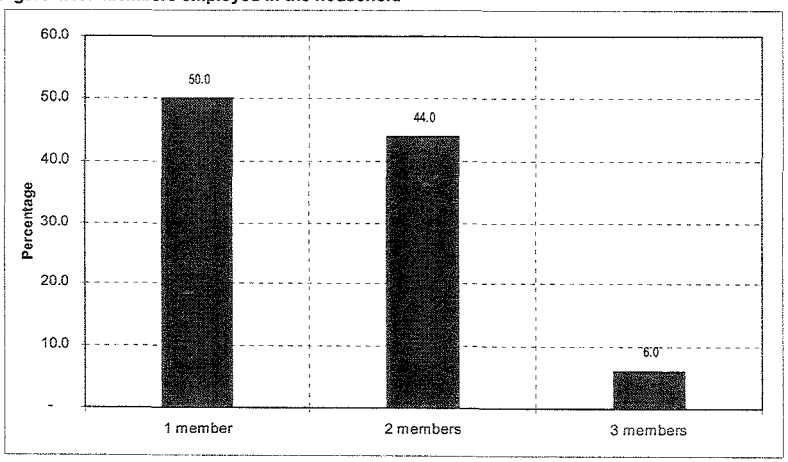

*Source: Demacon household survey, 2007*

**Findings:** (Figure 4.9)

- ✓ The majority of respondents indicated that they are 2 members living in their household (***25.6%***).
- ✓ ***25.1%*** of the members indicated that they are 4 members living in their household.

### 4.11.3 Total members employed in the household?

**Figure 4.10: Members employed in the household**




*Source: Demacon household survey, 2007*

**Findings:** (Figure 4.10)

- ✓ The majority (***50.0%)*** of the respondents in the market area indicated that is only one member employed in the household.
- ✓ ***44.0%*** of the respondents in the market area indicated that there are 2 members employed in the household.

### 4.11.4 Age of the member responsible for retail purchases

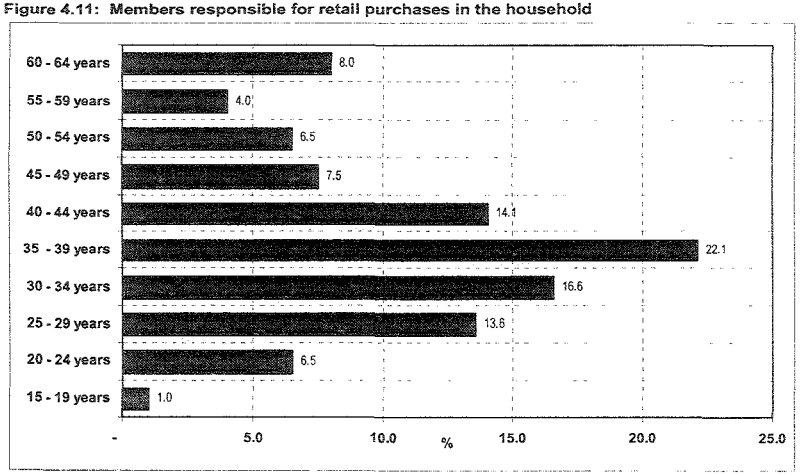
**Findings:** (Figure 4.11)

- ✓ The majority of respondents in the market (***22.1%***) indicated that the members responsible for retail purchases are between 35 – 39 years.
- ✓ ***16.6%*** of the respondents indicated that the members responsible for retail purchases are between 30 – 34.
- ✓ ***66.4%*** of the members responsible for retail purchases are between 25 – 44 years.





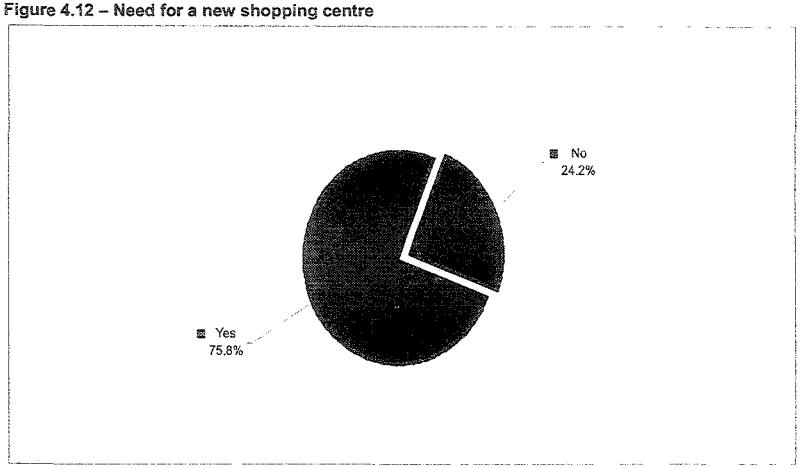
**Figure 4.11: Members responsible for retail purchases in the household**




*Source: Demacon household survey, 2007*

### 4.11.5 Is there a need for a new shopping centre?

**Figure 4.12 – Need for a new shopping centre**



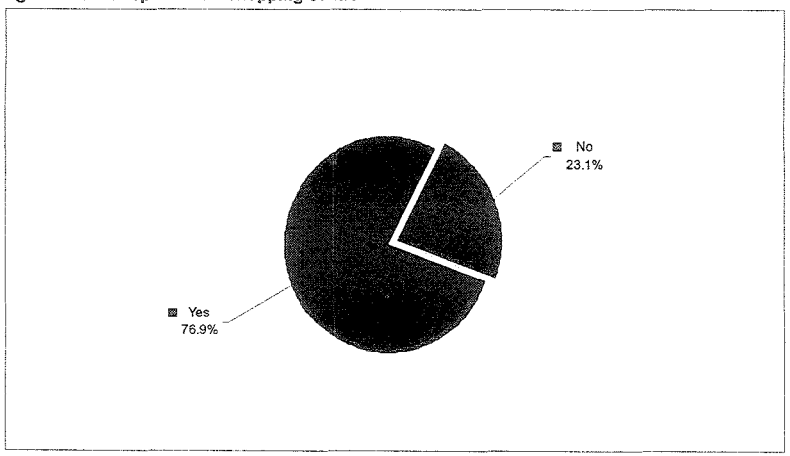

*Source: Demacon household survey, 2007*

**Findings:** (Figure 4.12)

- ✓ As illustrated in figure 4.12, the majority of respondents (***75.8%***) do feel that there is a need for a new shopping centre
- ✓ ***24.2%*** of the respondents do not feel that there is a need for a shopping centre.

### 4.11.6 Would you shop at a new shopping centre?

**Figure 4.13 – Shop at a new shopping centre**




*Source: Demacon household survey, 2007*

**Findings:** (Figure 4.13)

- ✓ As illustrated in Figure 4.13, the majority of respondents (***76.9%***) will shop at a new shopping centre.
- ✓ ***23.1%*** of the respondents will not shop at a shopping centre.

### 4.11.7 Type of shop and services would you like to see in the new shopping centre

**Table 4.5: Types of shops and services**

| Type of shop | Percentage | Type of service | Percentage |
|---|---|---|---|
| Supermarket | 75.9 | Doctors | 70.9 |
| Clothing store | 74.9 | Dentist | 53.3 |
| Accessory store | 53.8 | Optometrist | 47.2 |
| Home Décor | 36.2 | Estate Agent | 19.6 |
| Specialty stores | 38.7 | Video Store | 22.1 |
| Pharmacy | 70.9 | Banks | 74.4 |
| Pet store | 23.6 | Hairdressers | 41.7 |
| Liquor store | 44.7 | Dry-Cleaners | 33.2 |
| Butchery | 70.4 | Photo-lab | 31.2 |
| Shoe store | 60.8 | Legal services | 40.7 |
| Furniture store | 61.3 | | |
| Book / gift store | 40.2 | | |
| Hardware | 47.7 | | |
| Restaurant / TA | 61.8 | | |
| Hobby store | 18.6 | | |
| Florist | 21.1 | | |

*Source: Demacon household survey, 2007*



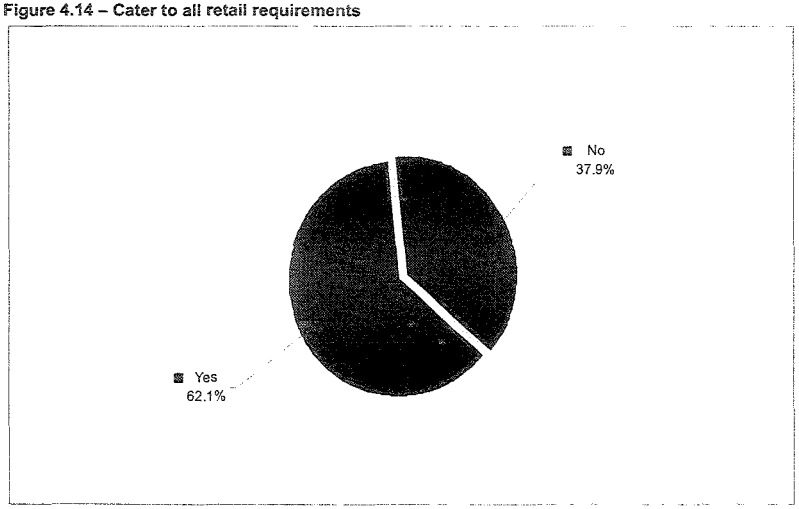


**Findings:** (Table 4.5)

- ✓ The **type of shops** that the households in the market area would like to see in the new shopping mall are the following:
  - Supermarket (***75.9%***)
  - Clothing store (***74.9%***)
  - Pharmacy (***70.9%***)
  - Butchery store (***70.4%***)
  - Restaurant / take away (***61.8%***)
  - Shoe store (***60.8%***)
- ✓ The **type of services** that the households in the market area would like to see in the new shopping mall are the following:
  - Banks (***74.4%***)
  - Doctors (***70.9%***)
  - Dentist (***53.3%***)
  - Optometrist (***47.2%***)

### 4.11.8 Do retail centres cater to all your retail requirements?

**Figure 4.14 – Cater to all retail requirements**



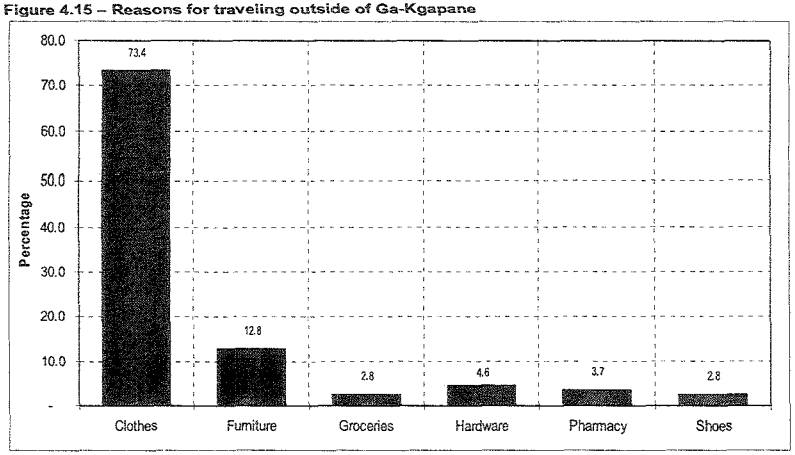

*Source: Demacon household survey, 2007*

**Findings:** (Figure 4.14)

- ✓ ***62.1%*** of the respondents indicated that the retail centres do cater to all their retail requirements, whereas ***38.9%*** do not cater to all their requirements.

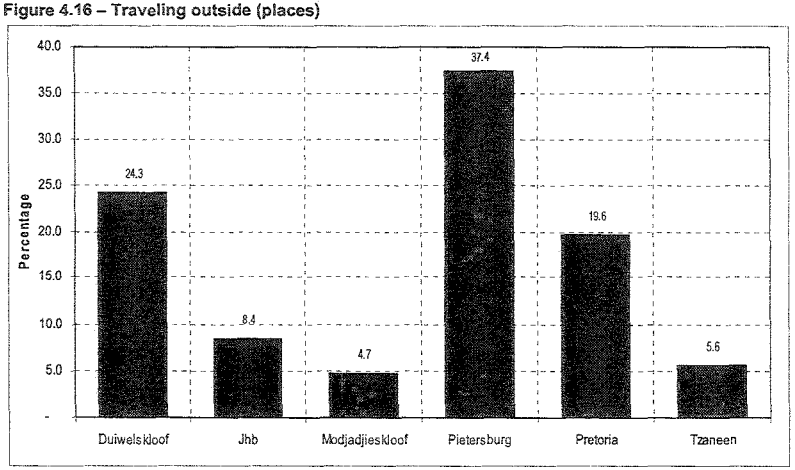
### 4.11.9 Must you travel outside of Ga-Kgapane for retail purposes and where?

**Figure 4.15 – Reasons for traveling outside of Ga-Kgapane**




*Source: Demacon household survey, 2007*

**Figure 4.16 – Traveling outside (places)**




*Source: Demacon household survey, 2007*

**Findings:** (Figure 4.15)

- ✓ ***73.4%*** of the respondents travel outside of Ga-Kgapane to buy clothes
- ✓ ***12.8%*** of the respondents travel outside of Ga-Kgapane to buy furniture.

**Findings:** (Figure 4.16)

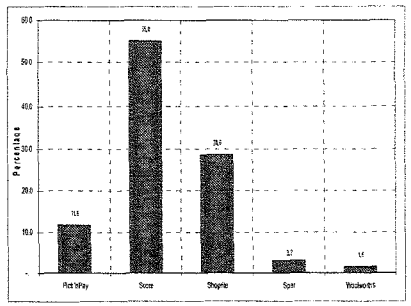
- ✓ Pietersburg is the most preferable place the respondents travel to do retail purchases (***37.4%***).
- ✓ Duiwelskloof is the second most preferable place to travel to for retail purchases.





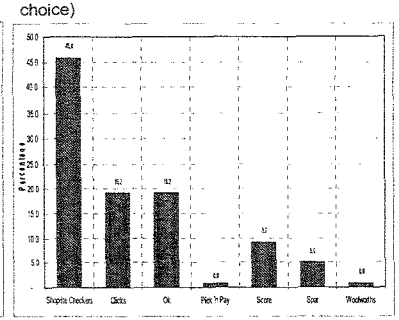
### 4.11.10 Favourite grocery anchor

**Figure 4.17: Favourite grocery anchor** (1st choice)



*Source: Demacon household survey, 2007*

**Figure 4.18: Favourite grocery anchor** (2nd choice)



*Source: Demacon household survey, 2007*

**Findings:** (Figure 4.17 and Figure 4.18)

- ✓ As seen in Figure 4.17, the majority (***55.0%***) of the respondents in the market prefer to a Score as their favourite grocery anchor, followed by Shoprite Checkers (***28.6%***)
- ✓ As seen in Figure 4.18, the majority of respondents (***45.8%***) prefer Shoprite Checkers as their favourite grocery anchor, followed by Clicks and OK (***19.2%***).

### 4.11.11 Shop you would like to see in the shopping centre

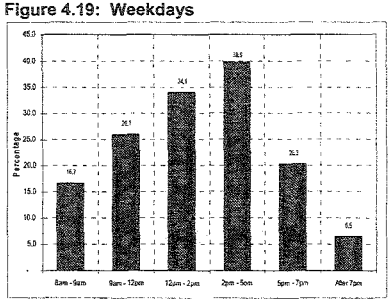
**Table 4.6: Type of shop and names**

| Type of shop | Name of shop |
|---|---|
| Banks | FNB (57.1%), ABSA (34.1%) |
| Clothing store | Foschini (11.2%), Edgars (9.8%), Mr Price (9.8%) |
| Grocery store | Pick 'n Pay (4.8%), Discom (4.8%) |
| Hardware | Mica (20%) |
| Furniture | Morkels (20%) |

*Source: Demacon household survey, 2007*

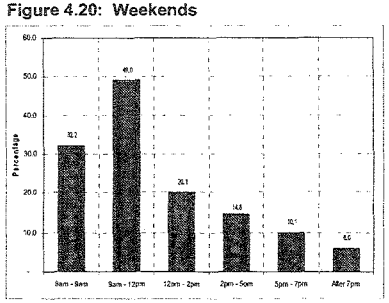
### 4.11.12 Preferred time of day to conduct retail purchases

**Figure 4.19: Weekdays**



*Source: Demacon household survey, 2007*

**Figure 4.20: Weekends**



*Source: Demacon household survey, 2007*

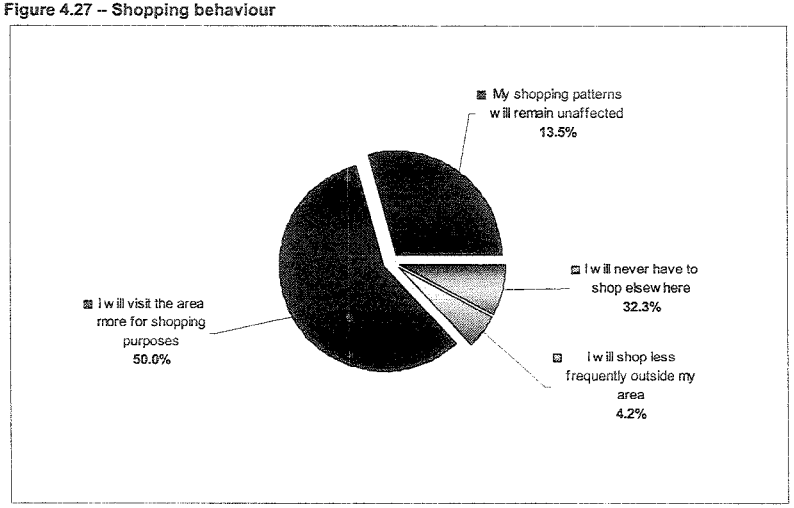
| Type of Restaurant | Name of Restaurant |
|---|---|
| Gourmet restaurant | ✓ Rhapsody's<br>✓ Italian<br>✓ Greek |
| Fast-food restaurant | ✓ Chicken Licken<br>✓ KFC |
| Cafeterias | - |
| Take-out restaurants | ✓ Debonaires<br>✓ Romans Pizza |
| Coffeehouses / Coffee bars | ✓ Burgandys<br>✓ House of coffees |
| Deli's (Laspiga) | ✓ Lespigo |
| Home industries | - |

**Findings:** (Table 4.7)

- ✓ Survey findings indicate that the respondents in the market area prefer *Dros* and *Ocean Baskets* as the family restaurants.
- ✓ Fast food restaurants that the respondents in the market area would prefer to see in the new mall are *Chicken Licken* and *KFC*.
- ✓ Take out restaurants the respondents in the market area would prefer to see in the new mall are *Debonaires* and *Romans Pizza*.

### 4.11.16 How would a new mall affect your current shopping behaviour?

**Figure 4.27 -- Shopping behaviour**




*Source: Demacon household survey, 2007*

**Findings:** (Figure 4.27)

- ✓ The majority (***50.0%)*** of the respondents in the market area indicated that they will visit the area more for shopping purposes.
- ✓ ***32.3%*** of the respondents in the market area will never have to shop elsewhere.
- ✓ ***13.5%*** of the respondents indicated that their shopping patterns will remain unaffected.





### 4.11.17 Which of the following trips would you combine?

**Table 4.8: Combined Shopping Trips**

| Category | Yes | No |
|---|---|---|
| Bulk monthly groceries only | 74.9% | 25.1% |
| Groceries with entertainment, restaurants | 64.0% | 36.0% |
| Clothing with entertainment (e.g. movies) | 60.4% | 39.6% |
| Groceries with banking | 65.0% | 35.0% |
| Personal care with home industries | 41.1% | 58.9% |
| Personal care with clothing | 58.9% | 41.1% |
| Restaurants, entertainment with personal care | 55.3% | 44.7% |
| Clothing with groceries | 71.7% | 28.3% |
| Clothing with banking | 71.4% | 28.6% |

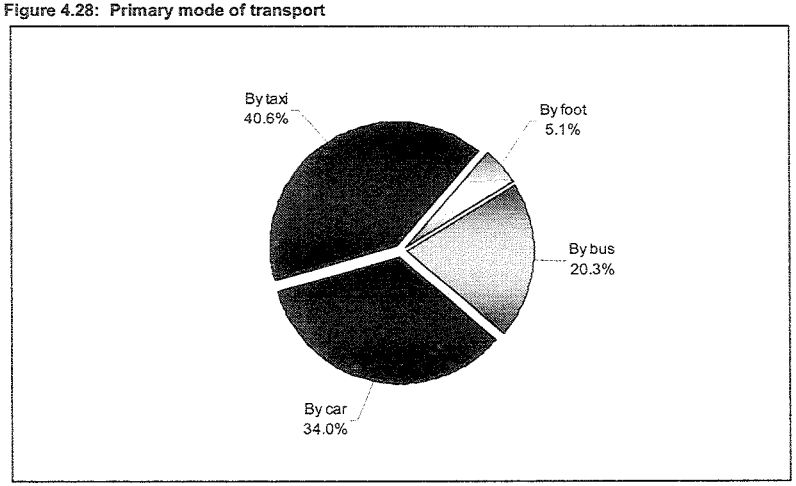
*Source: Demacon household survey, 2007*

**Findings:** (Table 4.8)

- ✓ As seen in Table 4.8, the majority (***74.9%***) of the respondents in the market are shopping for only bulk monthly groceries.
- ✓ ***71.7%*** of the respondents are combining clothing with groceries, whereas ***71.4%*** of the respondents combine clothing with banking.

### 4.11.18 Primary mode of transport

**Figure 4.28: Primary mode of transport**




*Source: Demacon household survey, 2007*

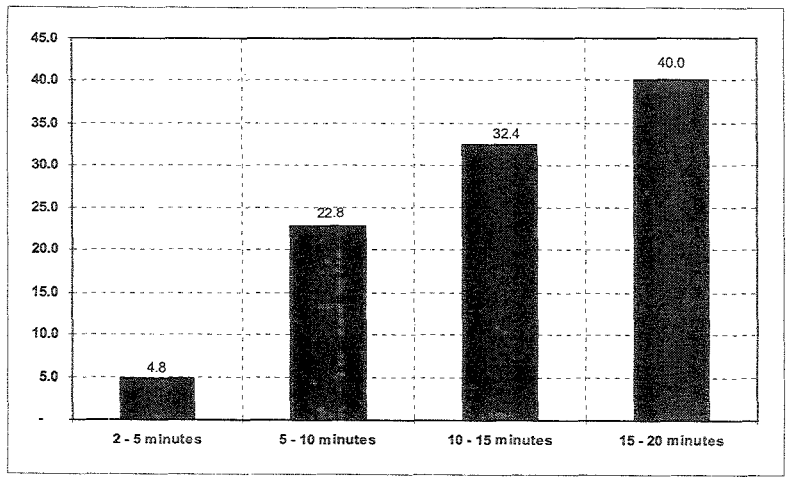
**Findings:** (Figure 4.28)

- ✓ The majority of respondents in the market area (***40.6%***) are using a taxi as primary mode of transport.

- ✓ ***34.0%*** of the respondents are driving by car as primary mode of transport.
- ✓ **20.3%** of the respondents are traveling by bus and ***5.1%*** are walking.

### 4.11.19 How far would you travel to shop at the new shopping centre?

**Figure 4.29: How far would you travel**




*Source: Demacon household survey, 2007*

**Findings:** (Figure 4.29)

- ✓ As seen in Figure 4.29, the majority (***40.0%***) of the respondents in the market are willing to travel 15 – 20 minutes to a shopping centre.
- ✓ ***32.4%*** of the respondents are willing to travel 10 – 15 minutes to a shopping centre
- ✓ ***22.8%*** are willing to travel 5 – 10 minutes and ***4.8%*** are willing to travel 2 – 5 minutes to a shopping centre.

### 4.11.20 Consumer market expenditure

Table 4.9 summarizes findings of the assessment pertaining to consumer expenditure per retail. Household income are relatively low and the average household subsequently spend on a high proportion – between 80% and 90% - of household income on the spectrum of retail goods and services indicated in Table 4.9.

**Table 4.9: Monthly expenditure per retail category**

| Retail category | Estimated monthly expenditure | % of expenditure | Preferred Town / Place |
|---|---|---|---|
| Bulk groceries | R874.21 | 24.16 | Modjadjiskloof (***38.4%***) |
| Top up groceries | R344.59 | 9.52 | Ga-Kgapane (***13.0%***) |
| Clothing / shoes / accessories | R633.11 | 17.50 | Modjadjiskloof (***35.9%***) |
| Furniture and homeware | R488.49 | 13.50 | Pietersburg (***61.6%***) |
| Hardware goods | R209.62 | 5.79 | Tzaneen (***61.8%***) |





| Retail category | Estimated monthly expenditure | % of expenditure | Preferred Town / Place |
|---|---|---|---|
| Gifts books confectionary | R221.71 | 6.13 | Pietersburg (***51.9%***) |
| Speciality goods | R219.29 | 6.06 | Pietersburg (***68.3%***) |
| Restaurants / entertainment | R288.35 | 7.97 | Pietersburg (**39.6%**) |
| Personal Care | R199.37 | 5.51 | Modjadjiskloof (***60.6%***) |
| Laundry & other | R140.00 | 3.87 | Ga-Kgapane (***100.0%***) |
| **TOTAL** | **R3,618.74** | **100.00** | |

*Source: Demacon household survey, 2007*

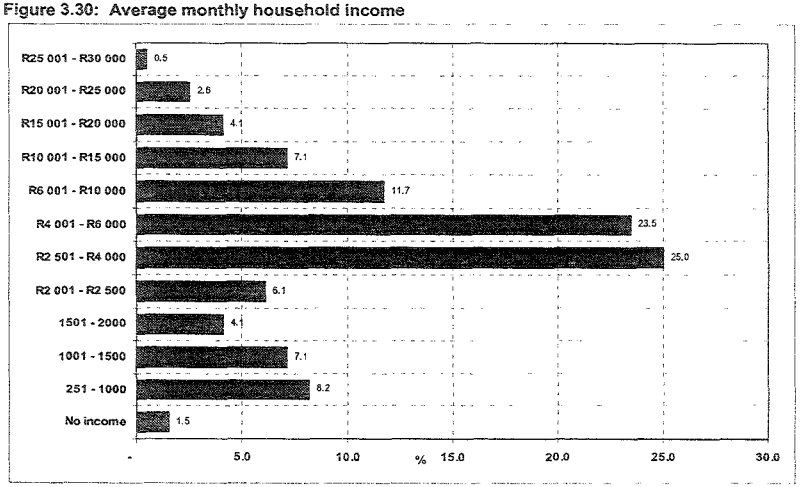
**Findings:** (Table 4.9)

- ✓ Survey findings indicate that approximately ***24.2%*** of total retail expenditure is directed to *groceries* where purchases are conducted at Modjadjiskloof (***38.4%***) and top up groceries in Ga-Kgapane (***13.0%***).
- ✓ Approximately **17.5%** of expenditure is allocated towards *clothing / shoes / accessories,* purchased at Modjadjiskloof (***35.9%***); followed by *furniture & homeware* (**13.5%**) purchased at Pietersburg and *hardware* (***5.8%***) purchased in Tzaneen.
- ✓ A weighted average of **R3,618.74** is spent per month on the various retail commodities.
- ✓ According to the results of the household survey, it is clear that the households spends **R3,618.74** on retail products and services, but earns a weighted household income of **R2,212.28** per month. It can be concluded that this is can be the result of social grants and remittances.

### 4.11.21 Estimated total monthly household income

The following figure indicates the estimated total monthly household income before any deductions are subtracted, as indicated by each household in the market.

**Figure 3.30: Average monthly household income**




*Source: Demacon household survey, 2007*

**Findings:** (Figure 3.30)

- ✓ Figure 3.20 indicates that the largest segment of households (***25.0%***) in the market area earn an income of *R2 501 – R4 000* monthly, followed by (***23.5%***) of the household in the market area earn an income of *R4 001 – R6 000* monthly.
- ✓ ***11.7%*** of the respondents in the market area that is earning a monthly household income of *R6 001 – R10 000.*
- ✓ ***8.2%*** of the respondents earn a monthly income which falls within the category *R251 – R1 000.*

## 4.12 SYNTHESIS

This section provides an overview of the socio-economic indicators of the market area. The following summarizes the main characteristics of the market area.

**Table 4.10: Key socio-economic indicators of the market area**

| Variable | Market Characteristics |
|---|---|
| **Population size** | 72,719 people<br>16,505 households |
| **Household Size** | 4.4 people/ household |
| **Age profile** | 25.5% - between 10 and 19 years<br>29.4% - between 20 and 40 years<br>13.9% - between 40 and 60 years<br>7.3% - 60 years and older |
| **Highest level of education** | 26.3% - Some secondary education<br>15.0% - Some primary education<br>12.4% - Grade 12 / St 10<br>5.4% - Complete primary<br>6.0% - Higher<br>34.9% - No schooling |
| **Level of employment** | 49.7% Economically active of which 42.3% is unemployed and 57.7% is employed |
| **Occupation profile** | 18.4% - Clerks<br>14.3% - Elementary occupations<br>12.4% - Technicians and associate professionals<br>12.2% - Professionals<br>10.1% - Undetermined |
| **Average household income** | Market area (all LSM groups): R26,547.31 per annum - 2007<br>R2,212.28 per month – 2007<br>Market area (LSM 6 - 10): R15,593.51 per annum - 2007<br>R1,299.46 per month – 2007 |
| **LSM Profile** | 80.5% LSM 6 to 10+<br>19.5% LSM 10+ |

It is estimated that approximately ***72,719*** *people* and ***16,505*** *households* reside in the market area, where as ***2,954*** households fall within LSM 6 – 10+ category. The area is furthermore characterized by an increasing number of *younger couples and families* as well as mature parents accommodated in new townhouse security developments in the area. Of the total labour force, ***57.7%*** are formally employed - largely within occupations varying from *clerks to professionals.*

Prior to an assessment of market potential, which requires demand and supply side data, the current status of the retail market is analyzed in the following chapters.





Chapter 5 provides an assessment of the existing retail facilities in the market, as well as the competitive nature of these facilities.

# CHAPTER 5: RETAIL MARKET ANALYSIS

## 5.1 INTRODUCTION

This section of the report focuses on the retail market, with the objective of estimating the development potential within the designated area. In order to reach this objective, the supply and demand for retail development within the market area should be identified and assessed in light of current trends.

Subsequent sub-sections provide a concise overview of the residential property market in terms of the following aspects:

- ✓ **Market Potential Assessment**
- ✓ **Synthesis**

## 5.2 MARKET POTENTIAL ASSESSMENT

The demand-side dynamics within the market have been concisely described in preceding chapters, supported by a retail market growth assessment. An assessment of the net effective demand for additional retail floor space will be made in this chapter. A growth forecast, respectively for a five and ten year horizon are provided based on economic, population and income growth prevalent in the market.

Retail demand modeling has become increasingly specialized over the past decade. One particular aspect that has changed is a notable shift away from broad based supply-demand estimations to multivariate, differentiated models. Contemporary models focus on specific expenditure patterns of selected LSM market segments.

The retail development potential estimations will be addressed under the following headings:

- ✓ Retail Supply
- ✓ Retail Demand Estimations

### ➢ RETAIL SUPPLY IN THE MARKET AREA

#### ✓ Existing supply within the market area

The retail supply in the market area is relatively small. As indicated in the household survey the respondents travel to Modjajiskloof for a lot of their retail purchases. In Modjajiskloof the retail supply is situated on either side of the main road and consists of local dealers and a small percentage of nationals and no retail centres situated in the town. The nationals in Modjajiskloof include a Spar, Score, Pep Stores, KFC, Toyota Garage and a First National Bank. In context of the above the existing retail supply of Modjajiskloof amounts to approximately ***5,000m² – 6,000m² GLA***. (Refer to Annexure A for demand density maps)

### ➢ RETAIL MARKET DEMAND ESTIMATIONS

Subsequent paragraphs indicate the market retail expenditure, the market demand and the tenant apportionment of the market.





#### ✓ Market Retail Expenditure

The following tables summarize the current and forecast market expenditure and the retail floor space for retail facilities within the retail node. Demand values are presented for 2007, 2012 and 2017 (all values: constant 2007 prices).

**Table 5.1: Market Area Retail Expenditure, 2007, 2012 and 2017**

| Retail Category | 2007 Rand/annum | 2012 Rand/annum | 2017 Rand/annum |
|---|---|---|---|
| Bulk groceries | 198,857,892 | 277,237,745 | 386,511,021 |
| Top-up groceries | 48,672,423 | 67,856,662 | 94,602,370 |
| Clothing, shoes, accessories | 47,847,467 | 66,706,549 | 92,998,940 |
| Furniture and homeware | 20,493,652 | 28,571,226 | 39,832,577 |
| Hardware goods | 13,546,651 | 18,886,065 | 26,330,008 |
| Gifts, books and confectionary | 18,409,552 | 25,665,678 | 35,781,806 |
| Specialty / value goods | 4,732,644 | 6,598,016 | 9,198,625 |
| Restaurants, entertainment | 47,239,604 | 65,859,097 | 91,817,465 |
| Personal care | 31,956,203 | 44,551,742 | 62,111,815 |
| Other personal goods & services | 2,474,869 | 3,450,339 | 4,810,290 |
| **TOTAL** | **434,230,957** | **605,383,119** | **843,994,918** |

*Source: Demacon Retail Demand Model, 2007*

#### ✓ Market Retail Floor Space

The above expenditure patterns translate into the demand for retail floor space as summarized in Table 5.2.

**Table 5.2: Retail Floor Space Demand, 2007, 2012 and 2017**

| Retail Category | 2007 m2 GLA | 2012 m2 GLA | 2017 m2 GLA |
|---|---|---|---|
| Bulk groceries | 8,286 | 9,964 | 11,983 |
| Top-up groceries | 2,028 | 2,439 | 2,933 |
| Clothing, shoes, accessories | 2,734 | 3,288 | 3,954 |
| Furniture and homeware | 1,171 | 1,408 | 1,694 |
| Hardware goods | 774 | 931 | 1,120 |
| Gifts, books and confectionary | 944 | 1,135 | 1,365 |
| Specialty / value goods | 243 | 292 | 351 |
| Restaurants, entertainment | 2,699 | 3,246 | 3,904 |
| Personal care | 1,826 | 2,196 | 2,641 |
| Other personal goods & services | 141 | 170 | 205 |
| **TOTAL** | **20,847** | **25,070** | **30,150** |

*Source: Demacon Retail Demand Model, 2007*

#### ✓ Tenant Composition & Apportionment

Given the above market potential estimation, based on the Residual Demand Technique, the Market Share Model could assist in refining the tenant composition of the proposed centre. PhD research conducted by the author indicates that the share technique should not be applied in isolation, but only once market potential has been established, to inform centre composition and tenant mix.

In the context of the market potential analysis, empirical data was utilized to estimate the apportionment of additional floor space. Table 5.3 indicates the tenant mix apportionment and findings provide guidelines for centre tenanting and merchandising.

**Table 5.3: Tenant mix apportionment**

| Retail Category | Min Demand ($m^2$) | Max Demand ($m^2$) | Midpoint ($m^2$) | Floor space apportionment (%) |
|---|---|---|---|---|
| Bulk groceries | 1,657 | 2,486 | 2,071 | 39.7% |
| Top-up groceries | 406 | 608 | 507 | 9.7% |
| Clothing, shoes, accessories | 547 | 820 | 684 | 13.1% |
| Furniture and homeware | 234 | 351 | 293 | 5.6% |
| Hardware goods | 155 | 232 | 194 | 3.7% |
| Gifts, books and confectionary | 189 | 283 | 236 | 4.5% |
| Specialty / value goods | 49 | 73 | 61 | 1.2% |
| Restaurants, entertainment | 540 | 810 | 675 | 12.9% |
| Personal care | 365 | 548 | 457 | 8.8% |
| Other personal goods & services | 28 | 42 | 35 | 0.7% |
| **TOTAL** | **4,169** | **6,254** | **5,212** | **100.0%** |

*Source: Demacon Retail Demand Model, 2007*

✓ **Total Retail Demand**

The total retail market potential is summarized in Table 5.4.

**Table 5.4: Summary of Total Market Demand, 2007, 2012 and 2017**

| | 2007 Rand/annum | 2012 Rand/annum | 2017 Rand/annum |
|---|---|---|---|
| **Retail Expenditure** | **434,230,957** | **605,383,119** | **843,994,918** |
| | **2007 $m^2$ GLA** | **2012 $m^2$ GLA** | **2017 $m^2$ GLA** |
| **Retail Demand** | **20,847** | **25,070** | **30,150** |

*Source: Demacon Retail Demand Model, 2007*

The following table indicates the recommended centre options for the portions.

## 5.3 SYNTHESIS

The findings of the preceding Chapter are integrated into an empirical assessment of retail market potential. Demacon's Retail Demand Modeling results illustrate that the consumer market can sustain a new retail facilities in the market area.

**Table 5.5: Recommended centre options for portions**

| Variables | Rand per annum / $m^2$ GLA |
|---|---|
| Market size (2007) – annual consumer retail spend | R434,230,957 |
| Optimum point of market entry | Q4:2010 / Q2:2011 |
| **Optimum centre size ($m^2$ GLA) – Including banking & services** | **8,767.70$m^2$** |
| Annual business sales potential | R168,874,749.67 |
| Employment opportunities (on site) | 293 |
| Capital investment | R59,620,388.23 |





Based on the figures summarized in Table 5.5, it is evident that the market can sustain a total of **7,267.70m² retail GLA** for which makes provision for an additional **1,500$m^2$ retail GLA** including banking and services, automotive, servicing and spares).

The total centre size amounts to **8,767.70$m^2$**. Demacon calculated the optimum *point of market entry* for the proposed retail centre to be in ***2010 / 2011***. The market potential indicted a gap in the market for a *neigbourhood centre,* which will strengthen functionality of the different nodes surrounding the development.

Based on prevalent consumer behaviour and research findings in similar markets, it can be expected that the new centre will predominantly cater to the **LSM 1 – 6 consumer market.** Performance will be dependent on, *inter alia,* appropriate tenant composition.

The challenge will be to find a **balance** between **market demand** (as revealed by consumer income and spending patterns) and **tenant demand** (i.e. the expressed desire by tenants to occupy space in the centre) and **investor demand** (i.e. the need for capital growth). Chapter 6 integrated the findings and assessment of the office market potential.

# CHAPTER 6: CONSIDERATIONS FOR RETAIL DEVELOPMENT IN PREVIOUSLY DISENFRANCHISED AREAS

The purpose of this chapter is *firstly* to provide an overview of trends pertaining to retail development in townships, and *secondly* to provide an overview of specific factors that have proven to influence retail development in previously disenfranchised (PDI) areas.

## 6.1 SHOPPING CENTRE DEVELOPMENT TRENDS IN TOWNSHIPS

The following trends were observed with regard to the development of shopping centres in PDI areas over the past decade:

- ✓ Shopping centres are currently opening in township areas at a reasonable pace
- ✓ This trend emerged due to changed perceptions regarding the black consumer market
- ✓ Since 1994 the stigma clinging to the township consumer market started to decline, and retailers acknowledged that consumer expenditure is related to the level of consumer income (LSM profile) and not race
- ✓ Changes in the general income profile of the black community has also led to the rise of the Black Middle Class, with aspirational values and a demand for luxury items
- ✓ Due to the high level of developments in the general middle income suburbs and the stagnation of these markets, developers started to shift their focus to under delivered township and rural areas.
- ✓ Companies have started investing millions in shopping centres, distributed over all the provinces except for the Northern Cape, due to low population and income concentrations. Shopping centres arose in Motherwell, Mdantsane, Mitchells Plein, Mkuhlu, Tembisa, Malemole, Puthaditjaba, Giyani, Mamelodi, Atteridgeville and many others.
- ✓ A number of these centres are constructed by partnerships between provincial government and the private sector, emphasising the importance of public sector commitment.

## 6.2 CONSIDERATIONS FOR RETAIL DEVELOPMENT IN PDI AREAS

The success of shopping centres in township areas relate to a number of factors, including correct configuration and design, size, tenant mix and centre management. The following identified aspects impact directly on the viability of township centres:

- ✓ The size and location of the centre is critical. In general, sizes predominantly vary between 10 000m² and 20 000m².
- ✓ Township centres should be open planned and not enclosed to cater for the mass of consumers moving through it (emphasis should be placed on pedestrian movement patterns).
- ✓ Developers should refrain from introducing low-key, second rate shopping centres to these areas - market research has proven that these communities have well defined aspirational values and wish to see national brands represented in their areas.
- ✓ Centres should not be focused on convenience only, but should also offer a shopping experience.
- ✓ Stores need to be created that work for the markets without downgrading the brand image.
- ✓ In general, tenant composition should be at a ratio of 70% national tenants and 30% local tenants (could be 5%-10%).
- ✓ Informal trading should be addressed in a positive way.





- ✓ Flexible trading hours are key to success, as well as security, cleanliness and effective management.
- ✓ Local-buy is crucial to the development process and success – the community should understand the benefits of the new centre.

## 6.3 GENERAL COMPOSITION OF TOWNSHIP CENTRES

The following is a concise list of tenants typically found in the new generation of township shopping centres.

**Table 6.1: Typical tenants found in New Generation township shopping centres**

**Supermarkets**
- Shoprite Checkers
- Score Supermarket
- Pick 'n Pay
- Spar

**Green Grocer**
- Fruit and Veg City

**Clothing Stores**
- Pep Stores
- Ackermans
- Jet
- Mr Price
- Sales House
- Dunns
- Boxer
- Express
- Fashion World
- Style
- Webers

**Shoes**
- Pick a Pair
- Shoe City
- Bata
- Cuthberts

**General Dealers**
- Discom

**Furniture Stores**
- Lewis
- Ellerines
- Furn City
- Price and Pride
- Lubners
- Morkels
- Bedzone
- Beares
- Town Talk
- Russels
- JD Group

**Appliances**
- Best Electric
- Electric Express
- OK Furniture

**Hardware/building material**
- Cashbuild
- Burnetts Build It
- Timber City

**Restaurants/take aways**
- Pie City
- KFC
- Nando's
- Chicken Licken
- Wimpy
- Captain De Rigos

**Cell phone stores**
- Vodacom
- Cell C
- MTN

**Liquor Store**
- Rank Liquor
- Solly Kramer

**Pharmacies**
- Link Pharmacy

**Financial institutions**
- FNB
- Standard Bank
- ABSA

**Savings and loans**
- Peoples Bank
- Cash Loans
- Peps Bank
- Credit Indemnity

**Legal Services**
- Legal Wise

- Charlie Parkers
- Cash 'n Carry
- Something Fishy
- Steers
- Chicken Place

## 6.4 SYNTHESIS

A combination of factors, most notably market conditions in urban areas, contemporary policy statements regarding development in PDI communities (e.g. the Financial Services Charter and Property Charter), and the obvious gap in the township centre retail structure have enticed developers to focus their attention on PDI areas.





# CHAPTER 7: DEVELOPMENT RECOMMENDATIONS

## 7.1 INTRODUCTION

This chapter provides development recommendations and guidelines for each respective land use proposed, as well as an overview of development drivers and probable development trends in the future node.

## 7.2 RETAIL MARKET RECOMMENDATIONS

### ➢ SUMMARY OF THE MAIN FINDINGS

- ✓ The proposed development is located in a market area characterized by predominantly lower income households, primarily in the LSM categories 1 to 6, reflecting the need of convenience goods and services and fast moving consumables.
- ✓ Taking into account the retail supply and consumer demand within the market, market data suggest potential for an **8,767.70m² GLA** (including banking and services, automotive, servicing and spares).
- ✓ The sustainability of the centre will hinge on, *inter alia*, matching retailers with the consumer market profile - specific consumer preferences were articulated.
- ✓ The development will also have a positive impact on the local economy as well as on municipal income.
- ✓ The following table provides a summary of the retail market assessments:

**Table 7.1: Recommended centre options for portions**

| Variables | Rand per annum / m² GLA |
|---|---|
| Market size (2007) – annual consumer retail spend | R434,230,957 |
| Optimum point of market entry | Q4:2010 / Q2:2011 |
| **Optimum centre size (m² GLA) – including banking & services** | **8,767.70m²** |
| Annual business sales potential | R168,874,749.67 |
| Employment opportunities (on site) | 293 |
| Capital investment | R59,620,388.23 |

### ➢ ADVANTAGES OF THE PROPOSED RETAIL DEVELOPMENT

The development of new retail centres will have numerous advantages for the local community and municipality. The nature of the development will have numerous advantages for the local community and municipality:

- ✓ It will address a gap in the retail nodes for convenience, daily necessities retail goods, thereby addressing the leakage of purchase power from the market.
- ✓ It will contribute to the creation of a well-balanced and attractive retail environment, catering to the demands of a growing LSM 1 to 6 component of the local market.
- ✓ The project will contribute to the expansion of the local municipal tax base
- ✓ The investment will increase the product line and service range within the market
- ✓ It will increase and expand the product and service range within the market and improve the overall quality of lives.

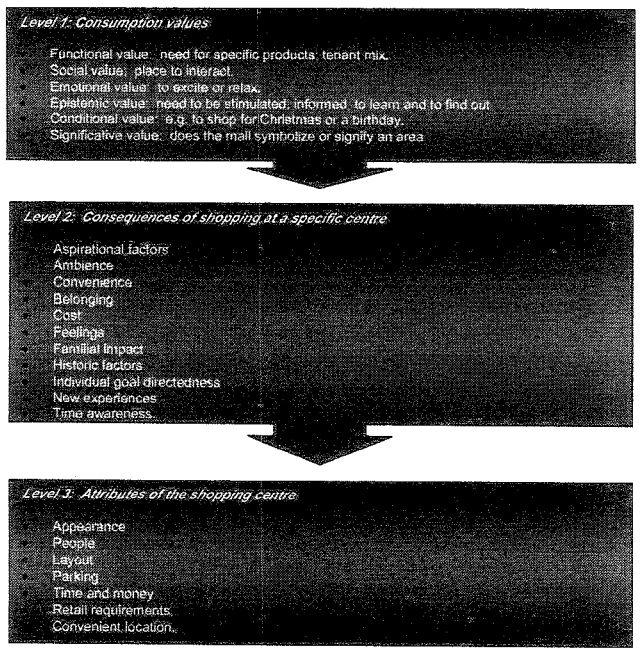
## ➢ FACTORS THAT INFLUENCE CONSUMER BEHAVIOUR

It has been established through empirical research that the factors listed below impact directly on a centre's power of attraction. In addition to proven market demand, centre design should accommodate these values *(Diagram 7.1)*.

These aspects affirm that physical factors are only one dimension of consumer behaviour patterns. Other factors such as cognitive, emotional and experiential factors are increasingly contributing to the viability of shopping centres.

The sustainability of a centre is dominated by level one, thus the importance of providing the correct tenant mix as part of the shopping centre. Tenant mix should adhere to the demands and preferences of the market population.

**Diagram 7.1: Factors that Influence Consumer Behaviour**




## ➢ SIZE AND CRITICAL MASS

### Size and Parking

- ✓ The ***neighbourhood centre*** should include between 15 – 40 shops.
- ✓ Ample parking should be provided at a ratio of 4 bays per 100m² retail GLA.
- ✓ The parking area should be accessible, convenient, paved and well lit in the evenings.
- ✓ Land should be reserved for future expansion.





### Layout and design

- ✓ The anchor tenant should be appropriately positioned to generate consumer traffic past line shops.
- ✓ Layout should be legible and should promote convenience.
- ✓ Pedestrian flow patterns should be accommodated.

### Finishes

- ✓ The centre should comply with modern design standards.
- ✓ The centre should reflect high quality finishes.
- ✓ Attention should be paid to quality design features.
- ✓ The centre should be branded to have a unique image and theme.

## ➢ TENANTING OPTIONS AND TRADE HOURS

It has been established through empirical research that the factors listed below impact directly on a centre's power of attraction. In addition to proven market demand, centre design should accommodate these values

These aspects affirm that physical factors are only one dimension of consumer behaviour patterns. Other factors such as cognitive, emotional and experiential factors are increasingly contributing to the viability of shopping centres.

The sustainability of a centre is dominated by level one, thus the importance of providing the correct tenant mix as part of the convenience centre. The tenant mix should adhere to the demands and revealed preferences of the market population.

Based on modern second economy shopping centre trends, the proposed centre should consist of a mixture of shops selling non-durables, durables and services. In terms of these broad categories, the following types of shops can be included:

### Non-durables: fast moving or perishable products

- ✓ Supermarket
- ✓ Florist
- ✓ Confectionary store
- ✓ Bakery
- ✓ Butchery

### Durables: Non-perishable products and specialty goods

- ✓ Home and houseware shops
- ✓ Hardware/DIY
- ✓ Computer and appliance stores
- ✓ Book stores
- ✓ Speciality stores – hobby stores, art and craft stores, gift stores etc.
- ✓ Pharmacy
- ✓ Cell phone stores
- ✓ Pet store
- ✓ Biltong store

### Wine and dine: Restaurants and Take Aways

- ✓ Restaurants
- ✓ Coffee Shops
- ✓ Take Away and fast food outlets

**Services: Financial, medical, personal care etc.**

- ✓ ATMs
- ✓ Optometrist
- ✓ Doctor
- ✓ Dentist
- ✓ Estate Agent
- ✓ Hairdresser
- ✓ Beauty Salon
- ✓ Photo Lab
- ✓ Dry Cleaners
- ✓ Video store.

In order to ensure overall feasibility of the *local convenience retail centre*, the *community centre* as well as the *small regional mall*, it is recommended that between 60% and 70% of the retail floor space should be durable goods. A supermarket / superstore could be included with 80% convenience goods.

Based on the consumer market profile and revealed preferences, coupled to the composition of existing centres in the market, *inter alia* the following national tenants can be considered in the tenanting / merchandising process.

**Table 7.2: Examples of tenants for consideration**

**Supermarkets**
- Shoprite Checkers
- Score
- Buy Rite

**Clothing Stores**
- Ackermans
- Jet
- Mr Price
- Sales House
- Dunns
- Express
- Fashion World
- Style

**Shoes**
- Pick a Pair
- Shoe City
- Bata
- Cuthberts

**General Dealers**
- Discom
- Charlie Parkers

**Appliances**
- Best Electric
- Electric Express
- OK Furniture

**Furniture Stores**
- Furn City
- Town Talk
- Russell's
- Morkels
- Lewis
- Beares
- Russell's

**Hardware/building material**
- Build It
- Cash Built

**Restaurants/take aways**
- Pie City
- KFC
- Nando's
- Chicken Licken
- Wimpy
- Captain De Rigos
- Steers
- Chicken Place

**Cell phone stores**
- Vodacom
- Cell C
- MTN

**Liquor Store**
- Rank Liquor
- Solly Kramer

**Pharmacies**
- Link Pharmacy

**Financial Institutions**
- FNB
- Standard Bank
- ABSA

**Savings and loans**
- Peoples Bank
- Cash Loans
- Peps Bank
- Credit Indemnity

**Legal Services**
- Legal Wise





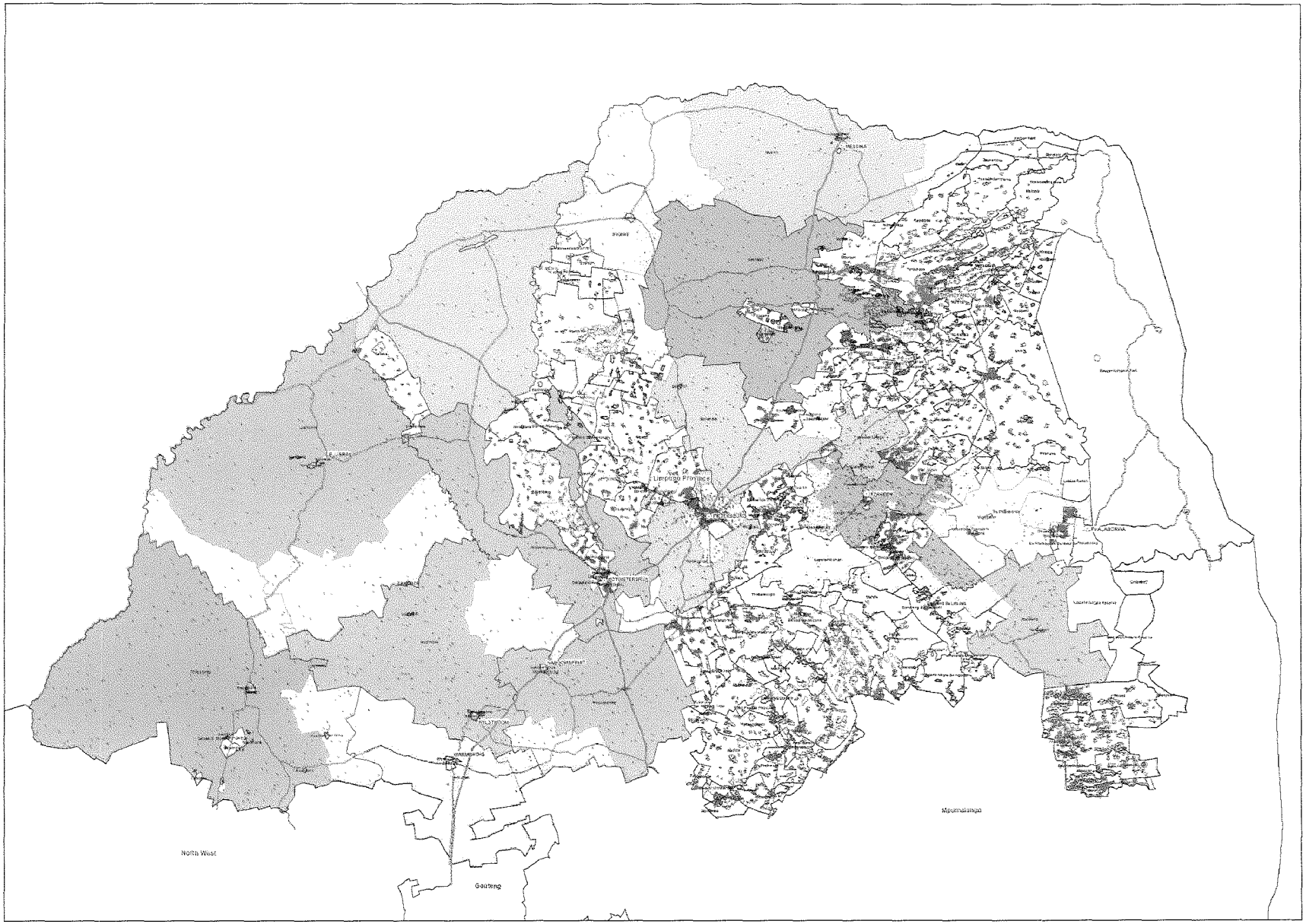
In the context of the above generic considerations, the refurbished centre should provide retail outlets and product lines that cater to the needs of a predominantly LSM 1 – 5 market, which implies:

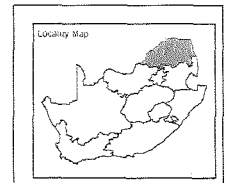
- ✓ Demand for middle and lower-end retail goods and services
- ✓ Higher frequency of daily necessity purchases
- ✓ Emphasis on convenience goods (including fast moving consumables - FMC's) and selected personal services.

**Trade hours**

The shopping centre should provide extended trade hours to cater for the after hours demand from both the surrounding household and commuter segments of the market. In particular the food hall and restaurant components should be sensitive to the operational practices of the **taxi rank**.

# ANNEXURE A: DEMAND DENSITY ANALYSIS




**Legend**

Limpopo Main Towns

**LSM Profile**

1 Dot = 100

Total Demand (100 sq. m)

**Roads**

**CLASS**

Arterial Road

Main Road

National Road

**Suburb Places**

**LSM Profile**

LSM 1 - 3

LSM 4 - 5

LSM 6 - 7

LSM 8 - 9

LSM 10+

Census Main Places

Projection: Transverse Mercator "JC3"

Datum: Clarke 1880

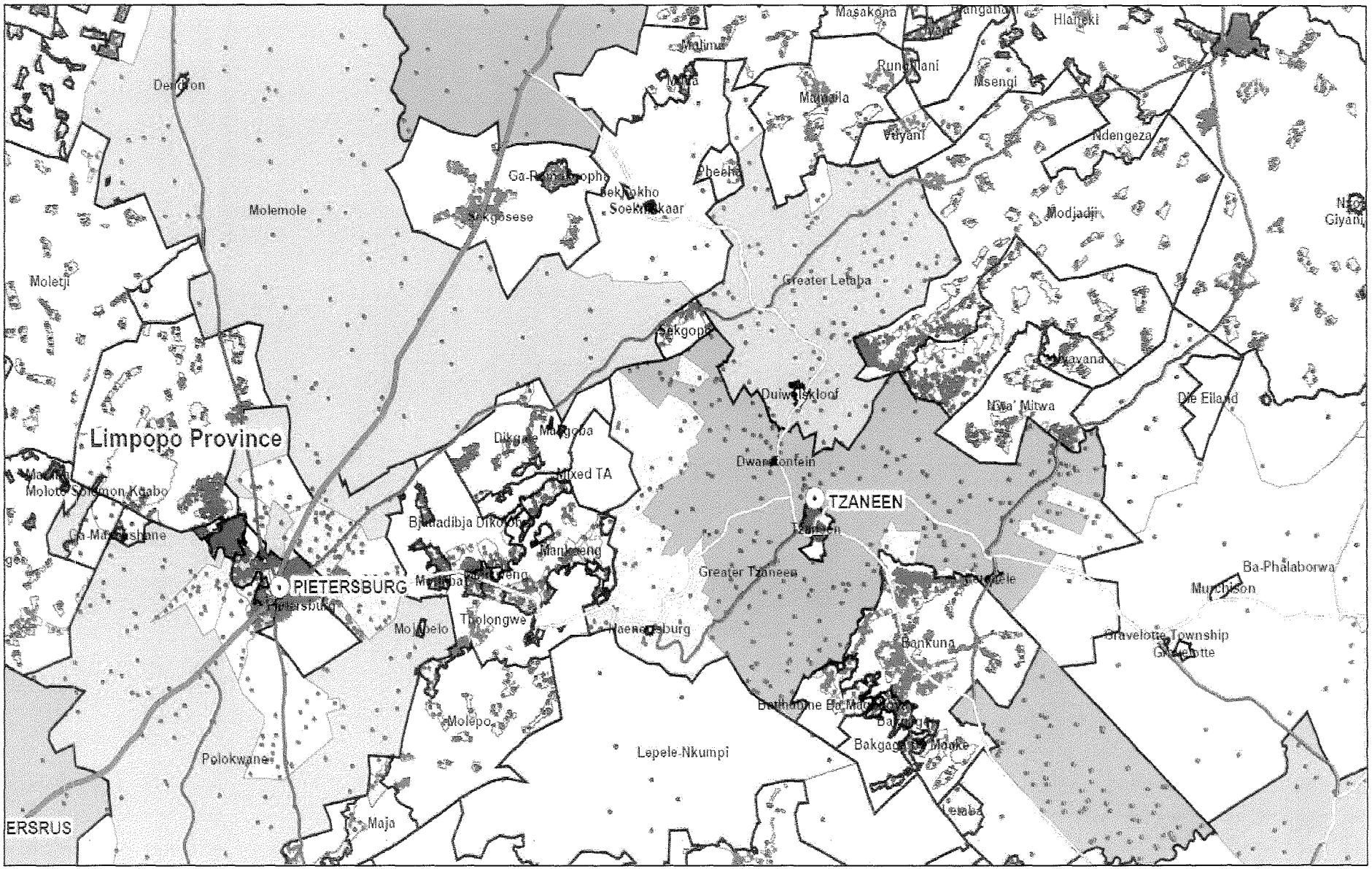
N

Scale 1 : 160 000

0 15 25 30 40 50 65 km

# LIMPOPO-DEMAND DENSITY & LSM PROFILE

DEMACON


Masakona
Hlaneki
Runoflani
Msengi
Mandala
Vuyani
Ndengeza
Modjadji
Giyani
Molemole
Moletji
Greater Letaba
Sekgopo
Mavana
Duiwelskloof
Nwa' Mitwa
Die Eiland
Limpopo Province
Mixed TA
Dwarsloopfein
TZANEEN
Tzaneen
Greater Tzaneen
Ba-Phalaborwa
Murchison
PIETERSBURG
Pietersburg
Molepo
Thabamoopo
Mankweng
Tholongwe
Haenertsburg
Gravelotte Township
Gravelotte
Bankuna
Molepo
Lepele-Nkumpi
Bakgaga
Polokwane
Maja
ERSRUS

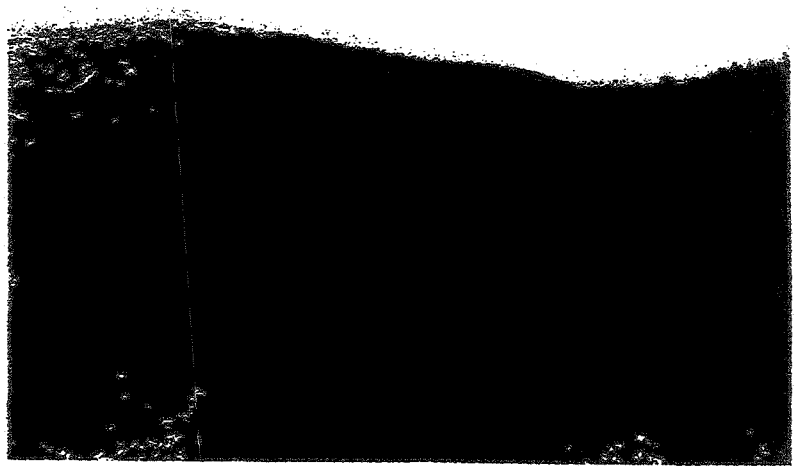
# Geo-technical Investigation
- WSM Leshika

The geo-technical investigation was conducted on the whole of Portion 1 of Schoongelegen 432-LT, based on Activity Alternative A1 and Site Alternative S1 (proposed township establishment on the whole of Portion 1). It was subsequently found that this alternative is fatally flawed due to geo-technical constraints on a large portion of the property. Activity Alternative A2 and Site Alternative S2 (proposed shopping centre on a small section of Portion 1) is therefore now proposed and is being investigated.

It is proposed that a geo-hydrological investigation be conducted during the impact assessment phase on the particular section of the property on which the shopping centre and associated infrastructure is proposed to be established, in order to assess the potential impacts that may be associated with the proposed sewerage treatment system and groundwater abstraction from the onsite borehole.

## GHIORDES cc

# PROPOSED NEW TOWNSHIP DEVELOPMENT ON PORTION 1 OF THE FARM SCHOONGELEGEN 432 LT, LIMPOPO PROVINCE



**Engineering Geological Phase 1 Investigation**
**WH07017 - SCHOONGELEGEN**

COMPILED BY


**WSM LESHIKA CONSULTING (PTY) LTD**

Postnet Suite #8
Private Bag X9676
**POLOKWANE**
0700
TEL : (015) 296-1560

2 Rhodesdrift Street
Hampton Court
**POLOKWANE**
0699
FAX : (015) 296-4158

CONTACT PERSON : **C J HAUPT, PrSciNat**


**PROPOSED NEW TOWNSHIP DEVELOPMENT ON PORTION 1 OF THE FARM SCHOONGELEGEN 432 LT, LIMPOPO PROVINCE**
**Engineering Geological Phase 1 Investigation**

## TABLE CONTENTS

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## LIST OF APPENDICES







## 1. INTRODUCTION AND TERMS OF REFERENCE

WSM Leshika Consulting (Pty) Ltd was appointed by Mr Johan Le Roux of Ghiordes to conduct an Engineering Geological Investigation for the proposed new township development on portion 1 of the farm Schoongelegen 432 LT, Limpopo Province.

The aim of the investigation is to address the geological constraints and material properties at the site, and to supply recommendations regarding founding at the site.

The field work was conducted from the 8th of March 2007. This report describes the methodology and outcomes of the investigation at the site and gives the geotechnical zonation.

## 2. INFORMATION USED IN THE STUDY

The following was available at the time of the investigation:

- 1:250 000-scale 2330 TZANEEN Geological Sheet;
- 1:50 000-scale 2330CA DUIWELSKLOOF Topographical Sheet.

## 3. OBJECTIVES OF THE INVESTIGATION

The objectives of the engineering geological investigation were to:

- Identify (where possible) the underlying geological formations and the near-surface weathered, residual and transported soil cover, and to describe the vertical and horizontal distribution over the site;
- Delineate the site into the prescribed geotechnical zones according to the different founding conditions;
- Obtain the basic data concerning the use of in-situ material for guideline purposes;
- Provide suitable foundation recommendations for the proposed development; and
- Comment on the excavation characteristics of the soils.

## 4. SITE DESCRIPTION

### 4.1 Location

The site is situated to approximately 13km east of Duiwelskloof, on the farm Schoongelegen 432 LT, Limpopo Province. The locality is depicted in Figure 1.

### 4.2 Topography, Drainage and Vegetation

There is an elevation difference of approximately 297.5m between the upper (SW) and lower (NE) parts of the site, which is located at approximately 900m above mean sea level.

The site comprises of a relatively uneven, steep surface gradient of between 8°-16°. The general slope angle is towards the NE, but because the area is mountaneous, the slope angle varies within the site. No prominent drainage channels are present on the investigated area, but the area can be described as a watershed, thus minor drainage channels occur across the site.

The site is vegetated with veldt, trees and bush and parts of the site are also cultivated.

No evidence of past mining activity has been encountered during the desk study or fieldwork conducted on this site.

## 5. NATURE OF INVESTIGATION

The investigation was conducted on the 8th of March 2007, comprising of a site walkover and the excavation of test pits by means of a CASE TLB. Test pits were placed in areas with suitable site access, and are judged to be representative of the whole site. Due to the steep gradient of the site, only a part of the site could be accessed with the TLB.





An Engineering Geologist placed and inspected all the test pits. Soil profiles were described according to the standard procedures as contained within the "Guidelines for Soil and Rock Logging" (SAIEG, AEG & SAICE, 1994). The profiles are attached in Appendix 1.

Soil samples were collected from representative soil horizons and submitted for Foundation Indicator testing at TPT Lab in Polokwane.

The available information, results of the laboratory analyses and the field observations were combined to produce a geotechnical zonation map of the site.

## 6. GEOLOGY

### 6.1 General Geology

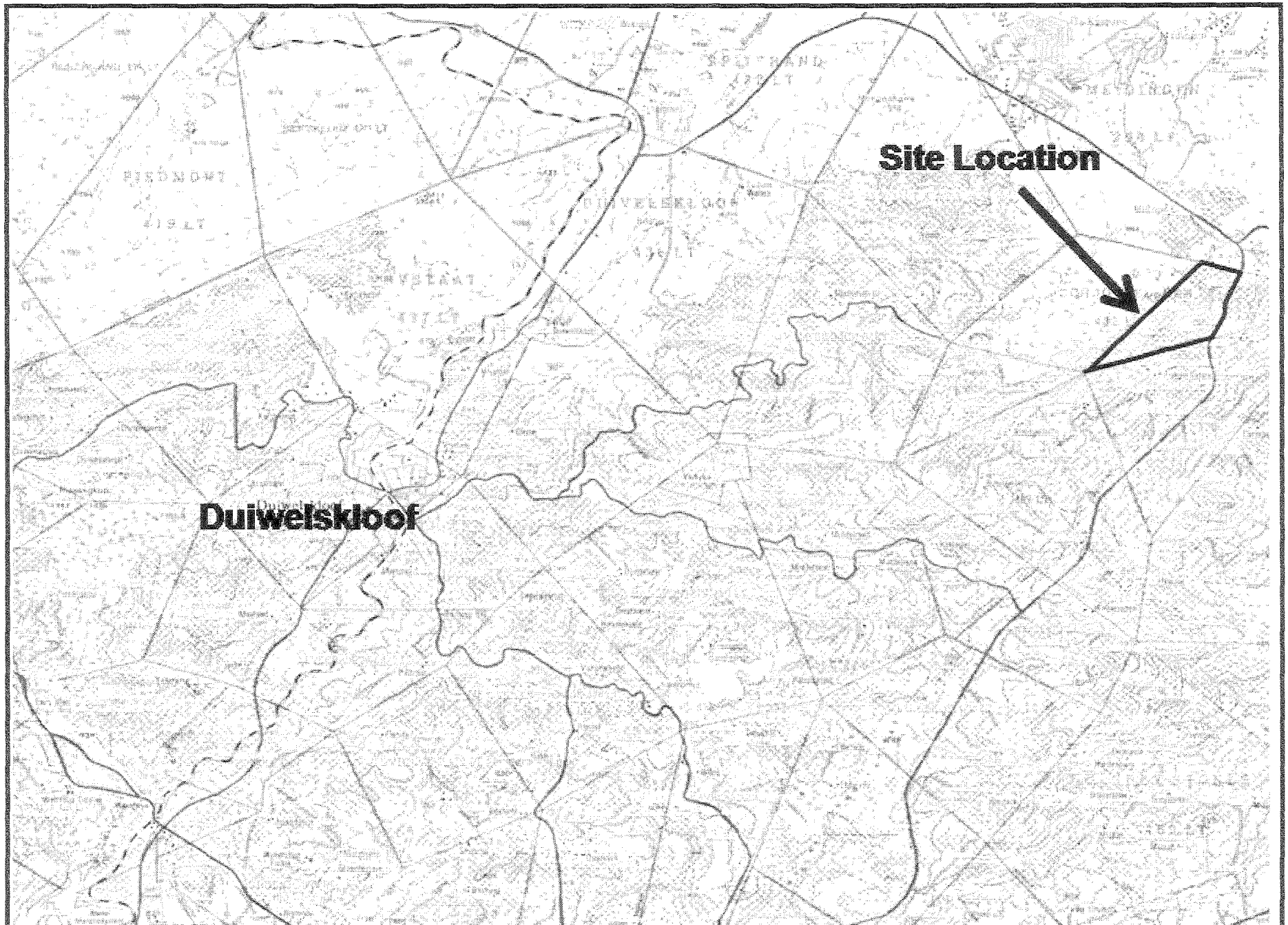
Based on the 1:250 000-scale geological sheet, the site is underlain by leucocratic biotite granite, of Vaalian age.

**This site is not underlain by dolomitic bedrock and a stability investigation is therefore not required.**

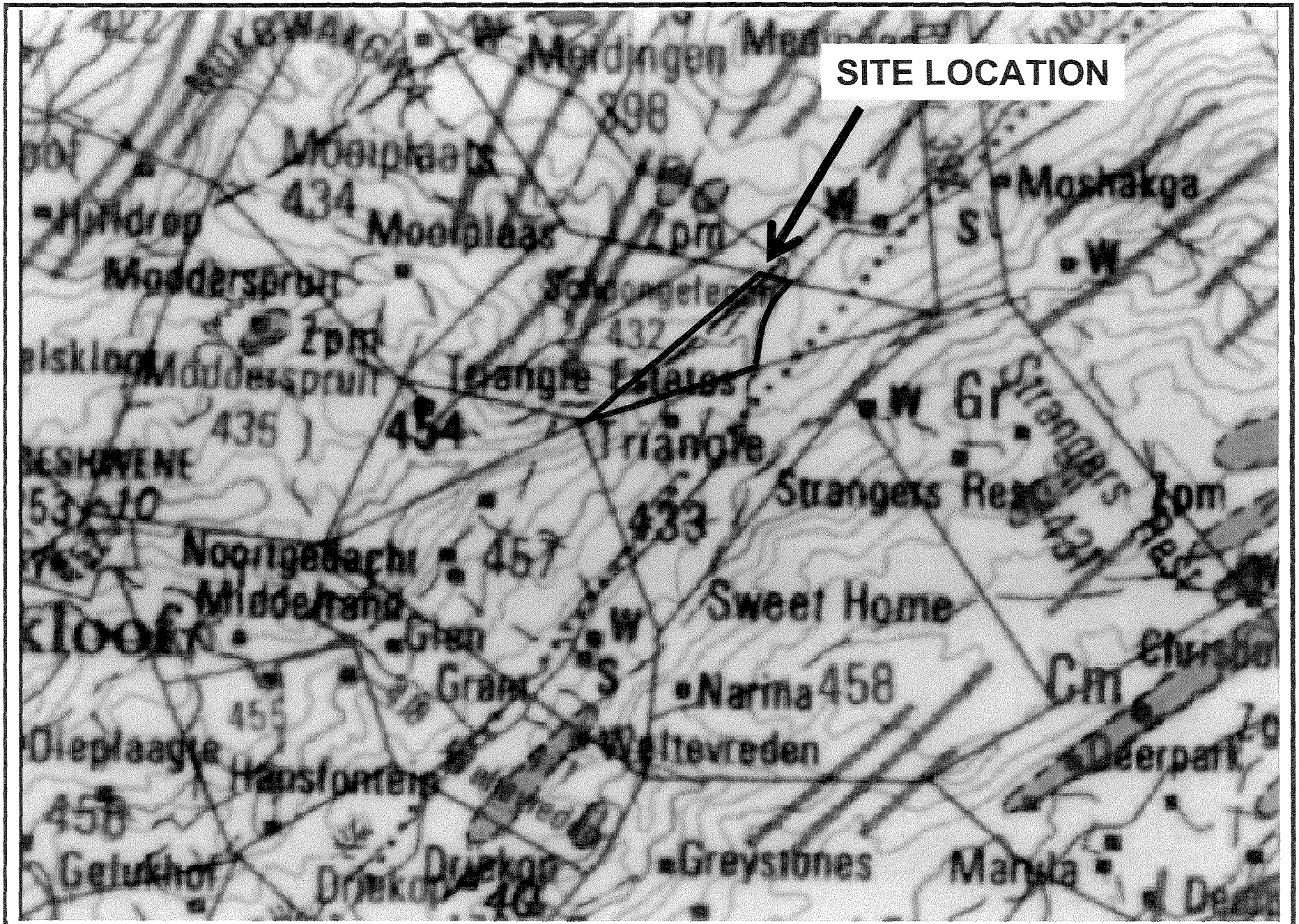
The stratigraphy and geology are depicted in Table 1 and Figure 2 respectively.

**TABLE 1 : STRATIGRAPHY FROM YOUNGEST TO OLDEST**

| No. | Lithology | Sedimentary & Volcanic | | | Intrusive | Age |
|---|---|---|---|---|---|---|
| | | Formation | Group | Supergroup | Suite | |
| Vlg | Biotite granite | — | — | — | — | Vaalian |
| **Structural Features** | | | | | | |
| ---------- | Fault, concealed or not accurately locates | | | | | Unknown |
| ———— | Diabase dyke | | | | | Vaalian |
| ..... | Lineament derived from aerial photographs and LANDSAT | | | | | Unknown |
| Qv | Quartz vein | | | | | Unknown |




| WSM LESHIKA (Pty) Ltd | Site Location | Figure 1 |
|---|---|---|




| WSM LESHIKA CONSULTING (Pty) Ltd | Site Geology | Figure 2 |
|---|---|---|

### 6.2 Soil Profile

All test holes were excavated by TLB to the respective depths of TLB refusal (DoR). The general soil profile is summarized in Table 2.

**TABLE 2 : THICKNESSES OF DIFFERENT SOIL HORIZONS (M)**

| Test Pit | Surficial Soils | Residuum | DoR | Geology at EoH |
|---|---|---|---|---|
| TP01 | -- | 2.4 | 2.4 | Residual granite |
| TP02 | -- | 3.4 | 3.4 | Residual granite |
| TP03 | -- | 3.0 | 3.0 | Residual granite |
| TP04 | 0.2 | 2.8 | 3.0 | Residual granite |
| TP05 | -- | 3.0 | 3.0 | Residual granite |
| TP06 | 0.2 | 2.3 | 2.5 | Residual granite |
| TP07 | 0.2 | 1.3 | 1.5 | Weathered Granite |
| TP08 | -- | 2.8 | 2.8 | Residual granite |

#### 6.2.1 *Surficial soils*

Material described on-site as *dry, brown, dense, voided, silty clay with abundant gravels* was encountered in test pits TP4, TP6 and TP7. It had a thickness of 0.2m

#### 6.2.2 *Residuum*

The residuum consisted of a few different layers of residual granite and was described on-site as *slightly moist, reddish brown speckled orange and white, very dense, slickensided, sandy clay,* or *dry, orange brown, medium dense to dense, intact silty sand with scattered gravels,* or *dry, olive green yellowish white, loose, intact, silty* clay *with scattered gravels* and was encountered in all test pits. Its thickness varies from 1.3m – 3.4m, with an average thickness of 2.5m.

### 6.3 Water Table

Groundwater seepage was not encountered in any of the test pits excavated. Due to the site gradient towards the NE, percolating groundwater will flow in this direction through the upper permeable horizons.



## 7. GEOTECHNICAL EVALUATION

The Geotechnical Evaluation is based on all visual observations, laboratory results and desk study information, collated in order to classify the site as required by the NHBRC.

### 7.1 Engineering and Material Characteristics

The laboratory testing results of three foundation indicator tests are shown in Table 3.1. Laboratory results are given in Appendix 3.

**TABLE 3 : FOUNDATION INDICATOR TEST RESULTS**

**Table 3.1**

| Sample | TP1 | TP5 | TP5 |
|---|---|---|---|
| Depth (m) | 0.2 – 1.0 | 1.0 – 1.5 | 1.5 – 2.0 |
| Soil horizon | Residual granite | Residual granite | Residual granite |
| % Clay | 47.7 | 9.5 | 12.4 |
| % Silt | 17.0 | 17.0 | 30.9 |
| % Sand | 29.8 | 43.3 | 48.9 |
| % Gravel | 5.5 | 30.2 | 7.8 |
| PI | 19 | 9 | 7 |
| LL | 50 | 34 | 37 |
| Pot. Exp. | Low | Low | Low |
| Unified | OH | SM | OL |
| P.R.A. | A-7-5(12) | A-2-4(0) | A-4(4) |

*PI – Plasticity Index; LL – Liquid Limit; Pot. Exp - Potential Expansiveness. Unified and P.R.A. refer to the Soil Classification Systems*

### 7.2 Slope Stability and Erosion

The site comprises of an uneven, steep gradient of between 8°-16°. The general slope angle is towards the NE, but because the area is mountainous, the slope direction varies. No natural slope instabilities occur on the investigated area. The erodability of the soil is classified has 'INTERMEDIATE', as there is evidence of erosion on site and the surface soil cover is clayey.

### 7.3 Excavatability

TLB refusal or difficult excavation conditions were encountered only in test pit TP7 at 1.50m. Excavation via TLB may not be possible over parts of the site, because of the presence of shallow bedrock. The site soils are subsequently classified as SOFT becoming INTERMEDIATE to HARD in depth where bedrock is encountered, according to SANS 1200D (1988). Accessibility difficulties to large parts of the site made it impossible to identify areas of difficult excavation.

### 7.4 Impact of the Geotechnical Character of the Site

The three main constrains in the investigated area are steep slopes, heave and excavation difficulty via TLB to 1.5m in some areas where bedrock is present at less than 1.5m, thus the costs for services installation etc. might increase.

## 8. SITE CLASSIFICATION

### 8.1 Geotechnical Zonation

The zonation is based on the following:

- The relatively homogenous soil profiles per land facet (*viz.* flood plains, slopes and crests).
- The similar grading throughout the profiles per land facet.
- The absence of soluble rock or undermined areas at the site.
- The potential heave of the soil under loading and/or wetting.

TABLE 5 summarizes the general geotechnical constraints pertaining to urban development as proposed by Partridge, Wood and Brink (1993). The "Class" column indicates the severity of the particular constraint.





**TABLE 5 : GEOTECHNICAL CLASSIFICATION FOR URBAN DEVELOPMENT (PARTRIDGE, WOOD & BRINK, 1993)**

| | *Constraint* | *Site Condition* | *Class* |
|---|---|---|---|
| A | Collapsible soil. | Potentially collapsible horizons more than 750mm in thickness. | 1 |
| B | Seepage. | Perched water table less than 1.5m in localized parts of site. | 1 |
| C | Active soil. | Moderate soil-heave potential predicted | 2 |
| D | High compressibility soil. | Low soil compressibility expected. | 1 |
| E | Erodibility of soil. | Moderate soil erodibility expected. | 2 |
| F | Difficulty of excavation to 1.5m depth. | Rock or hardpan pedocretes between 10 and 40% of total volume. | 2 |
| G | Undermined ground. | No undermined ground. | 1 |
| H | Instability in areas of soluble rock. | No soluble rock. | 1 |
| I | Steep slopes. | Steep slopes. | 3 |
| J | Areas of unstable natural slopes. | Low risk. | 1 |
| K | Areas subject to seismic activity. | Less than 10% probability of an event less than 100cm/s$^2$ within 50 years. | 1 |
| L | Areas subject to flooding. | No drainage feature on-site. | 1 |
| *Geotechnical classes:* | *Most favourable (1)* | *Intermediate (2)* | *Least favourable (3)* |

The geotechnical constraints on this site will be:

- Steep slopes
- Difficulty of excavation to 1.5m
- Potential heave

Based on the fieldwork and laboratory testing, the whole area is considered three geotechnical zones, see Figure 3.:

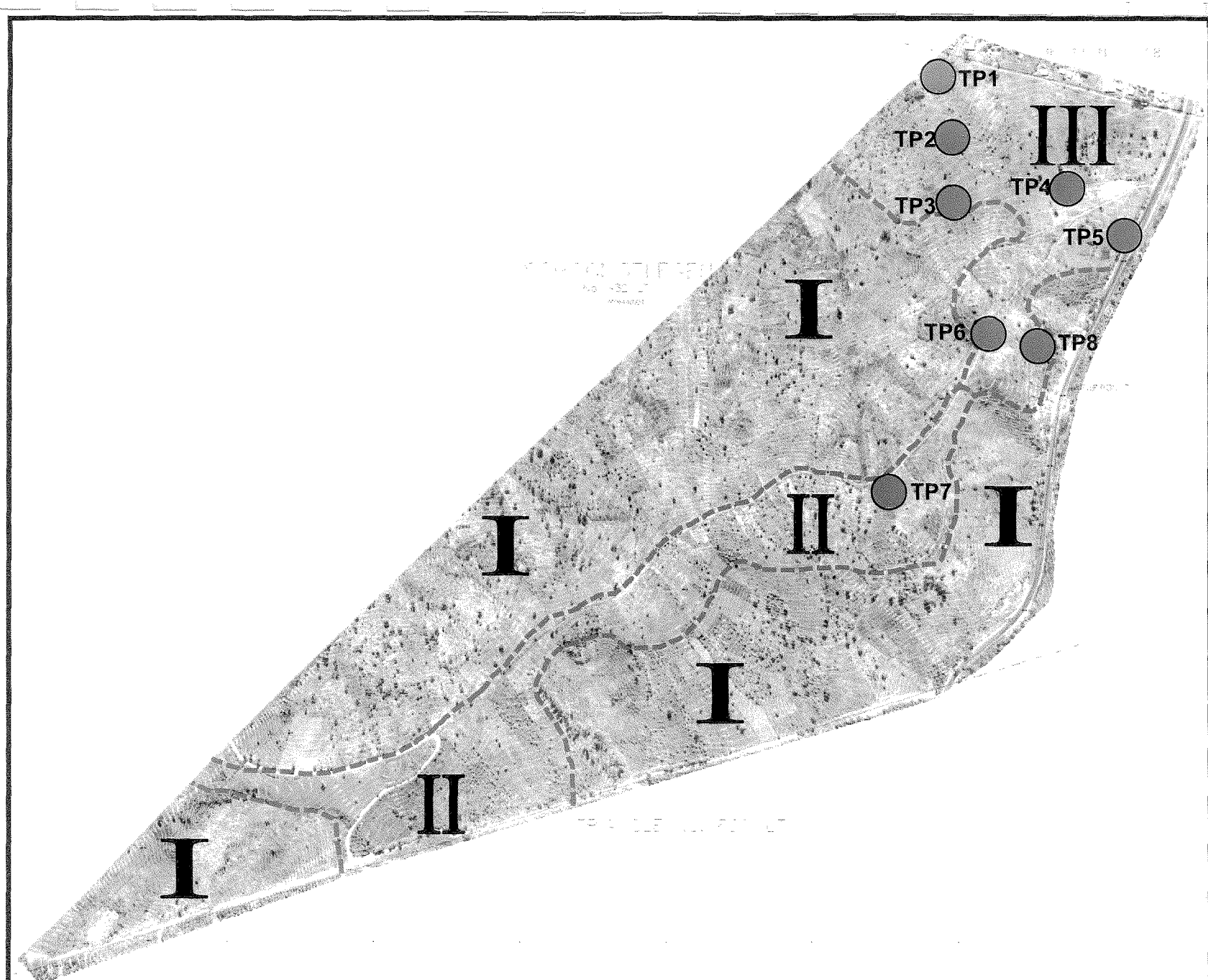
**Zone I:** **H/3I2E**

*Constraint*: Possible heave
Intermediate erodability of soil
Steep slopes (more than 12 degrees, not suitable for construction)

*Founding*: Cut and fill
Normal construction
Good site drainage

**Zone II:** **H1/2EFI**

*Constraint*: Potential heave




Test pits
TP1-TP8

Zone Boundaries

**Site class designation**

I H/3EI

II H1/2EFI

III H2/2ECI

WSM LESHIKA CONSULTING (Pty) Ltd

Site layout and zonation

Figure 3

Intermediate erodability of soil
Difficulty of excavation to 1.5m
Steep slopes (between 6 and 12 degrees)

*Founding*: Modified normal
Soil raft
Good site drainage

**Zone III:** **H2/2CEI**

*Constraint*: Potential heave
Intermediate erodability of soil
Steep slopes (between 6 and 12 degrees)

*Founding*: Stiffened or cellular raft
Piled construction
Split construction
Soil raft
Good site drainage

## 9. FOUNDATION RECOMMENDATIONS AND SOLUTIONS

The foundation recommendations are according to The Guidelines for urban engineering geological investigations and good site water and plumbing/service precautions should also be (see Appendix 2). An engineer should be responsible for the final foundation design.

## 10. CONSTRUCTION MATERIALS

Table 6 shows the site material properties according to the Unified Soil Classification System.





**TABLE 6 : UNIFIED SOIL CLASSIFICATION**

| Class | Stability as Embankment | Drainage | Compaction Characteristics |
|---|---|---|---|
| OL | -- | Poor | - |
| SM | Reasonably stable | Fair (impervious) | Good |
| **Class** | **Subgrade** | **Subbase** | **Base** |
| OL | Poor | Not suitable | Not suitable |
| SM | Fair to good | Poor to good | Poor to not suitable |
| *All descriptors noted in brackets indicate conditions when compacted.* | | | |

## 11. DRAINAGE

Proper precautionary measures have to be taken to ensure sufficient drainage of surface water on the site. Precautions also have to be taken to allow for proper drainage to prevent perched groundwater tables to form and sub surface drainage may be necessary in this regard.

## 12. CONCLUSIONS AND RECOMMENDATIONS

TLB refusal was encountered at depths varying between 1.50m and 3.40. Refusal was on residual granite and highly weathered granite, and the whole site is expected to be underlain by granite. No dolomites are present at the site. No dolomite stability investigation is therefore required.

The site is considered three geotechnical zones based on the inherent geotechnical constraints. The main constraints are steep slopes, heave, erosion and difficult excavation.

Large boulders should also be removed from the ground to prevent differential settlement of the foundations.
Modified normal construction with water precautionary measures will suffice for single storey masonry buildings. Larger structures will require site specific investigations.

## 13. REPORT PROVISIONS

While every effort is made during the fieldwork phase to identify the various soil horizons, areas subject to perched water table, areas of poor drainage, areas underlain by hard rock, and to estimate their distributions, it is impossible to guarantee that isolated zones of poorer foundation materials or harder rock have not been overlooked.

For this reason, this investigation has sought to highlight areas of potential foundation, groundwater and excavation problems, as well as to provide prior warning to the Town and Regional Planners and Consulting Engineers.

All information and deductions contained within this report are dependent not only on access to the site and previous information, but also on the accuracy of the results received from the accredited laboratories and the proposed site map supplied by the Client.

A competent person should inspect foundation and open service trenches to determine the variance from the above assessment of the site.

NHBRC enrolment of the site can only be completed once this Phase 2 geotechnical site investigation has been executed. The present site zoning is based on the NHBRC Manual with the guideline site class designation specifically for single-storey masonry residential units.

**ED VAN DER WALT**
ENG. & ENV. GEOLOGIST

**CJ HAUPT Pr.Sci.Nat.**
DIRECTOR

**JL VAN ROOY Pr.Sci.Nat.**
ENGINEERING GEOLOGIST
TECHNICAL EDITOR



## 14. REFERENCES


Das, B. M., 1990. Principles of Geotechnical Engineering. 2nd Ed. PWS-Kent. USA.

Jennings, J.E.B., Brink, A.B.A., Williams, A.A.B., 1973. Revised guide to Soil Profiling for Civil Engineering Purposes in Southern Africa. The Civil Engineer in SA. pp 3-12. January 1973.

Partridge, T.C., Wood, C.K., Brink, A.B.A., 1993. Priorities for Urban Expansion within the PWV Metropolitan Region: The primacy of geotechnical constraints. South African Geographical Journal, Vol 75, pp 9-13.

National Home Builders Registration Council, 1995. Standards and Guidelines. HBRC.

South African Bureau of Standards, 1988. Standardized Specification for Civil Engineering Construction. DA: Earthworks (Small Works). SABS 1200 DA-1988, (As amended 1990).

South African National Standards. 2001. Drinking Water. SANS 241:2001.

SAICE. 1995. Code of Practice: Foundations and Superstructures for Single Storey Residential Buildings of Masonry Construction. Joint Structural Division, Johannesburg. First Edition.

SAIEG, 1996. Guidelines for Soil and Rock Logging. SAICE/SAIEG.

Weinert, H.H., 1980. The Natural Road Construction Materials of Southern Africa. Academica. Cape Town.

# APPENDIX 1 : SOIL PROFILES

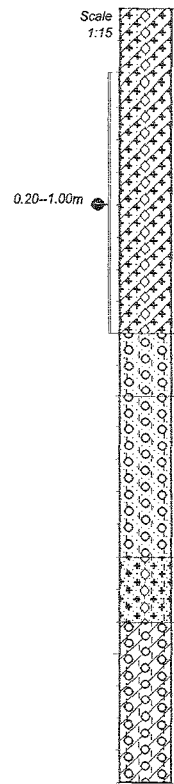


SCHOONGELEGEN

HOLE No: T1
Sheet 1 of 1

JOB NUMBER: WH07017

Scale 1:15




0.00 slightly moist, reddish brown speckled orange and white, very dense, slickensided, sandy CLAY, residual granite.

1.00 dry, orange brown, medium dense to dense, silty SAND with scattered gravels, residual granite.

1.20 dry, orange brown, medium dense to dense, intact, silty SAND with scattered highly weathered white and grey gravels, residual granite.

1.70 dry, yellowish reddish brown, loose to medium dense, intact, silty SAND, residual granite.

1.90 dry, olive green yellowish white, loose, intact, silty CLAY scattered gravels, residual granite.

2.40

NOTES

1) Depth of TLB refusal.

2) No seepage or water in the pit.

3) Soil sample retrieved at 0.20--1.00m

CONTRACTOR :
MACHINE : CASE TLB
DRILLED BY :
PROFILED BY : Eugene van der Walt
TYPE SET BY : MC Smit
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM :
DATE :
DATE : 08/03/2007
DATE : 15/11/07 10:27
TEXT : ..C:\DOTFILES\07017_DP.TXT

ELEVATION :
X-COORD : 23.66731S
Y-COORD : 30.24052E

HOLE No: T1

D03E

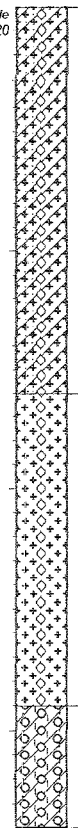
dot.PLOT 4013 J&W

SCHOONGELEGEN

HOLE No: T2
Sheet 1 of 1

JOB NUMBER: WH07017

Scale 1:20



0.00 slightly moist, reddish brown speckled orange and white, very dense, slickensided, sandy CLAY with scattered cobbles of granite, residual granite.

1.60 slightly moist, reddish brown mottled orange speckled black, dense, intact, residual GRANITE.

2.90 dry, olive green and orange speckled black, loose, intact, silty CLAY scattered gravels, residual granite.

3.40

NOTES

1) Depth of TLB refusal.

2) No seepage or water in the pit.

3) No sample retrieved.

CONTRACTOR :
MACHINE : CASE TLB
DRILLED BY :
PROFILED BY : Eugene van der Walt

INCLINATION :
DIAM :
DATE :
DATE : 08/03/2007

ELEVATION :
X-COORD : 23.66803S
Y-COORD : 30.24079E

HOLE No: T2

TYPE SET BY : MC Smit
SETUP FILE : STANDARD.SET

DATE : 15/11/07 10:27
TEXT : ..C:\DOTFILES\07017_DP.TXT

D03E

dot.PLOT 4013 J&W

SCHOONGELEGEN

HOLE No: T3
Sheet 1 of 1

JOB NUMBER: WH07017

Scale 1:15

0.00 slightly moist, reddish brown speckled orange and white, very dense, slickensided, sandy CLAY with abundant cobbles and boulders of granite, residual granite.

1.20 slightly moist, reddish brown mottled orange speckled black, dense, intact, residual GRANITE.

2.50 dry, olive green and orange speckled black, loose, intact, silty CLAY scattered gravels, residual granite.

3.00

NOTES

1) Depth of TLB refusal.

2) No seepage or water in the pit.

3) No samples retrieved.

CONTRACTOR :
MACHINE : CASE TLB
DRILLED BY :
PROFILED BY : Eugene van der Walt

INCLINATION :
DIAM :
DATE :
DATE : 08/03/2007

ELEVATION :
X-COORD : 23.66904S
Y-COORD : 30.24107E

HOLE No: T3

TYPE SET BY : MC Smit
SETUP FILE : STANDARD.SET

DATE : 15/11/07 10:27
TEXT : ..C:\DOTFILES\07017_DP.TXT

D03E

dot.PLOT 4013 J&W

SCHOONGELEGEN

HOLE No: T4
Sheet 1 of 1

JOB NUMBER: WH07017

Scale 1:15

0.00 dry, brown, dense, voided, silty CLAY with abundant gravels, colluvium.

0.20 slightly moist, reddish brown speckled orange and white, very dense, slickensided, sandy CLAY, residual granite.

3.00

NOTES

1) Depth of TLB refusal.

2) No seepage or water in the pit.

3) No samples retrieved.

CONTRACTOR :
MACHINE : CASE TLB
DRILLED BY :
PROFILED BY : Eugene van der Walt

TYPE SET BY : MC Smit
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM :
DATE :
DATE : 08/03/2007

DATE : 15/11/07 10:27
TEXT : ..C:\DOTFILES\07017_DP.TXT

ELEVATION :
X-COORD : 23.66868S
Y-COORD : 30.24297E

HOLE No: T4

D03E

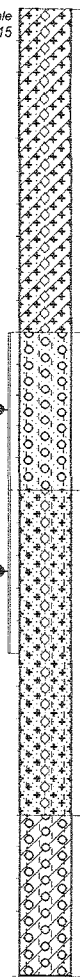
dot.PLOT 4013 J&W

SCHOONGELEGEN

HOLE No: T5
Sheet 1 of 1

JOB NUMBER: WH07017

Scale 1:15



1.00--1.50m

1.50--2.00m

0.00 slightly moist, reddish brown speckled orange and white, very dense, slickensided, sandy CLAY, residual granite.

1.00 dry, orange brown, medium dense to dense, silty SAND with scattered gravels, residual granite.

1.50 dry, yellowish reddish brown, loose to medium dense, intact, silty SAND, residual granite.

2.50 dry, olive green yellowish white, loose, intact, silty CLAY scattered gravels, residual granite.

3.00

NOTES

1) Depth of TLB refusal.

2) No seepage or water in the pit.

3) Soil samples retrieved at 1.00--1.50m.

4) Soil samples retrieved at 1.50--2.00m.

CONTRACTOR :
MACHINE : CASE TLB
DRILLED BY :
PROFILED BY : Eugene van der Walt

TYPE SET BY : MC Smit
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM :
DATE :
DATE : 08/03/2007

DATE : 15/11/07 10:27
TEXT : ..C:\DOTFILES\07017_DP.TXT

ELEVATION :
X-COORD : 23.66926S
Y-COORD : 30.24411E

HOLE No: T5

D03E

dot.PLOT 4013 J&W

SCHOONGELEGEN

HOLE No: T6
Sheet 1 of 1

JOB NUMBER: WH07017

Scale 1:15

0.00 dry, brown, dense, voided, silty CLAY with abundant gravels, colluvium.

0.20 slightly moist, reddish brown speckled orange and white, very dense, slickensided, sandy CLAY, residual granite.

2.00 dry, orange brown, medium dense to dense, silty SAND with scattered gravels, residual granite.

2.50

NOTES

1) Depth of TLB refusal.

2) No seepage or water in the pit.

3) No samples retrieved.

CONTRACTOR :
MACHINE : CASE TLB
DRILLED BY :
PROFILED BY : Eugene van der Walt
TYPE SET BY : MC Smit
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM :
DATE :
DATE : 08/03/2007
DATE : 15/11/07 10:27
TEXT : ..C:\DOTFILES\07017_DP.TXT

ELEVATION :
X-COORD : 23.67157S
Y-COORD : 30.24139E

HOLE No: T6

D03E

dot.PLOT 4013 J&W

SCHOONGELEGEN

HOLE No: T7
Sheet 1 of 1

JOB NUMBER: WH07017

Scale 1:10

0.00 dry, brown, dense, voided, silty CLAY with abundant gravels, colluvium.

0.20 dry, orange brown, medium dense to dense, silty SAND with scattered gravels, residual granite.

0.30 dry, orange brown, medium dense to dense, intact, silty SAND with scattered highly weathered white and grey gravels, residual granite.

0.40 dry, yellowish reddish brown, loose to medium dense, intact, silty SAND, residual granite.

1.50 DoR

NOTES

1) Depth of TLB refusal on granite.

2) No seepage or water in the pit.

3) No samples retrieved.

CONTRACTOR :
MACHINE : CASE TLB
DRILLED BY :
PROFILED BY : Eugene van der Walt
TYPE SET BY : MC Smit
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM :
DATE :
DATE : 08/03/2007
DATE : 15/11/07 10:27
TEXT : ..C:\DOTFILES\07017_DP.TXT

ELEVATION :
X-COORD : 23.67355S
Y-COORD : 30.24010E

HOLE No: T7

D03E

dot.PLOT 4013 J&W

SCHOONGELEGEN

HOLE No: T8
Sheet 1 of 1

JOB NUMBER: WH07017

Scale 1:15

0.00 slightly moist, reddish brown speckled orange and white, very dense, slickensided, sandy CLAY, residual granite.

1.90 dry, orange brown, medium dense to dense, silty SAND with scattered gravels, residual granite.

2.60 dry, yellowish reddish brown, loose to medium dense, intact, silty SAND, residual granite.

2.80

NOTES

1) Depth of TLB refusal.

2) No seepage or water in the pit.

3) No samples retrieved.

CONTRACTOR :
MACHINE : CASE TLB
DRILLED BY :
PROFILED BY : Eugene van der Walt
TYPE SET BY : MC Smit
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM :
DATE :
DATE : 08/03/2007
DATE : 15/11/07 10:27
TEXT : ..C:\DOTFILES\07017_DP.TXT

ELEVATION :
X-COORD : 23.67129S
Y-COORD : 30.24217E

HOLE No: T8

D03E

dot.PLOT 4013 J&W

SCHOONGELEGEN

LEGEND
Sheet 1 of 1

JOB NUMBER: WH07017

| | |
|---|---|
| GRAVELS | {SA02} |
| SAND | {SA04} |
| SANDY | {SA05} |
| SILTY | {SA07} |
| CLAY | {SA08} |
| GRANITE | {SA17}{SA44} |
| DISTURBED SAMPLE | {SA38} |

Name

CONTRACTOR :
MACHINE :
DRILLED BY :
PROFILED BY :
TYPE SET BY : MC Smit
SETUP FILE : STANDARD.SET

INCLINATION :
DIAM :
DATE :
DATE :
DATE : 15/11/07 10:27
TEXT : ..C:\DOTFILES\07017_DP.TXT

ELEVATION :
X-COORD :
Y-COORD :

LEGEND
SUMMARY OF SYMBOLS

D03E

dot.PLOT 4013 J&W

# APPENDIX 2 : GEOTECHNICAL CONSTRAINT

| RESIDENTIAL SITE CLASS DESIGNATIONS (SAICE, 1995) | | | | |
|---|---|---|---|---|
| **TYPICAL FOUNDATION MATERIAL** | **CHARACTER OF FOUNDING MATERIAL** | **EXPECTED RANGE OF TOTAL SOIL MOVEMENTS (mm)** | **ASSUMED DIFFERENTIAL MOVEMENT (% OF TOTAL)** | **SITE CLASS** |
| Rock (excluding mud rocks which exhibit swelling to some depth) | STABLE | NEGLIGIBLE | - | R |
| Fine-grained soils with moderate to very high plasticity (clays, silty clays, clayey silts and sandy clays) | EXPANSIVE SOILS | < 7,5<br>7,5 – 15<br>15 – 30<br>> 30 | 50%<br>50%<br>50%<br>50% | H<br>H1<br>H2<br>H3 |
| Silty sands, sands, sandy and gravelly soils | COMPRESSIBLE AND POTENTIALLY COLLAPSIBLE SOILS | < 5,0<br>5,0 – 10<br>> 10 | 75%<br>75%<br>75% | C<br>C1<br>C2 |
| Fine-grained soils (clayey silts and clayey sands of low plasticity), sands, sandy and gravelly soils | COMPRESSIBLE SOIL | < 10<br>10 – 20<br>> 20 | 50%<br>50%<br>50% | S<br>S1<br>S2 |
| Contaminated soils<br>Controlled fill<br>Dolomitic areas<br>Land fill<br>Marshy areas<br>Mine waste fill<br>Mining subsidence<br>Reclaimed areas<br>Very soft silt/silty clays<br>Uncontrolled fill | VARIABLE | VARIABLE | | P |

**NOTES:**

1. The classifications C, H, R and S are not intended for dolomitic area sites unless specific investigations are carried out to assess the stability (risk of sinkholes and doline formation) of the dolomites. Where this risk is found to be acceptable, the site shall be designated as Class P (dolomitic areas).
2. Site classes are based on the assumption that differential movements, experienced by single-storey residential buildings, expressed as a percentage of the total movements are equal to about 50% for soils that exhibit expansive or compressive characteristics and 75% for soils that exhibit both compressible and collapse characteristics. Where this assumption is incorrect or inappropriate, the total soil movements must be adjusted so that the resultant different movements implied by the table is equal to that which is expected in the field.
3. In some instances, it may be more appropriate to use a composite description to describe a site mote fully e.g. C1/H2 or S1 and/or H2. Composite Site Classes may lead to higher differential movements and result in design solutions appropriate to a higher range of differential movement e.g. a Class R/C1 site. Alternatively, a further site investigation may be necessary since the final design solution may depend on the location of the building on a particular site.
4. Where it is not possible to provide a single site designation and a composite description is inappropriate, sites may be given multiple descriptions to indicate the range of possible conditions e.g. H-H1-H2 or C1-C2.
5. Soft silts and clays usually exhibit high consolidation and low bearing characteristics. Structures founded on these horizons may experience high settlements and such sites should be designated as being Class S1 or S2 as relevant and appropriate.
6. Sites containing contaminated soils include those associated with reclaimed mine land, land down-slope of mine tailings and old landfills.
7. Where a site is designated as Class P, full particulars relating to the founding conditions on the site must be provided.
8. Where sites are designated as being Class P, the reason for such classification shall be placed in brackets immediately after the suffix – i.e. P (contaminated soils). Under certain circumstances, composite description may be more appropriate – e.g. P (dolomite areas)-C1.
9. Certain fills may contain contaminates which present a health risk. The nature of such fill should be evaluated and should be clearly demarcated as such.

| SITE CLASS | ESTIMATED TOTAL SETTLEMENT (mm) | CONSTRUCTION TYPE | FOUNDATION DESIGN AND BUILDING PROCEDURES |
|---|---|---|---|
| H | <7,5 | Normal | - Normal construction (strip footing or slab-on-the-ground foundations)<br>- Site drainage and service/plumbing precautions recommended |
| H1 | 7,5 – 15 | Modified normal | - Reinforced strip footings<br>- Articulation joints at all internal/external doors and openings<br>- Light reinforcement in masonry<br>- Site drainage and service/plumbing precautions |
| | | Soil raft | - Remove all or part of expansive horizon to 1,0 m beyond the perimeter of the structure and replace with inert backfill, compacted to 93% MOD AASHTO density at –1% to +2% of optimum moisture content.<br>- Normal construction with lightly reinforced strip footings and light reinforcement in masonry if residual movements are 7,5mm, or construction type appropriate to residual movements.<br>- Site drainage and service/plumbing precautions. |
| H2 | 15 – 30 | Stiffened or cellular raft | - Stiffened or cellular raft with articulation joints or lightly reinforced masonry.<br>- Site drainage and service/plumbing precautions. |
| | | Piled construction | - Piled foundations with suspended floor slabs with or without ground beams.<br>- Site drainage and service/plumbing precautions. |
| | | Split construction | - Combination of reinforced brickwork/block work and full movement joints.<br>- Suspended floors of fabric-reinforced ground slabs acting independently from structure.<br>- Site drainage and service/plumbing precautions. |
| | | Soil raft | - As for H1. |
| H3 | > 30 | Stiffened or cellular raft | - As for H2 |
| | | Piled construction | - As for H2 |
| | | Soil raft | - As for H1 |

**NOTES:**

1. Differential heave assumed to equal 50% of total heave.
2. The relaxation of some of these requirements, e.g. the reduction or omission of steel or articulation joints, may result in a Category 2 level of expected damage.

**FOUNDATION DESIGN, BUILDING PROCEDURES AND PRECAUTIONARY MEASURES FOR SINGLE-STOREY RESIDENTIAL BUILDINGS FOUNDED ON HORIZONS SUBJECT TO BOTH CONSOLIDATION AND COLLAPSE SETTLEMENT** (SAICE, 1995)

| SITE CLASS | ESTIMATED TOTAL SETTLEMENT (mm) | CONSTRUCTION TYPE | FOUNDATION DESIGN AND BUILDING PROCEDURES |
|---|---|---|---|
| C | <5 | Normal | - Normal construction (strip footing or slab-on-the-ground foundations)<br>- Good site drainage |
| C1 | 5 – 10 | Modified normal | - Reinforced strip footings<br>- Articulation joints at some internal and all external doors<br>- Light reinforcement in masonry<br>- Site drainage and service/plumbing precautions<br>- Foundation pressure not to exceed 50 kPa |
| | | Compaction of in situ soils below individual footings | - Remove in situ material below foundations to a depth and width of 1,5 times the foundation width or to a competent horizon and replace with material compacted to 93% MOD AASHTO density at –1% to +2% of optimum moisture content.<br>- Normal construction with lightly reinforced strip foundations and light reinforcement in masonry. |
| | | Deep strip foundations | - Normal construction with drainage requirements.<br>- Founding on a competent horizon below the problem horizon |
| | | Soil raft | - Remove in situ material to 1,0m beyond perimeter of building to a depth and width of 1,5 times the widest foundation or to a competent horizon and replace with material compacted to 93% MOD AASHTO density at –1% to +2% of optimum moisture content.<br>- Normal construction with lightly reinforced strip footings and light reinforcement in masonry. |
| C2 | >10 | Stiffened strip footings, stiffened or cellular raft | - Stiffened strip footing or stiffened or cellular raft with articulation joints or solid lightly reinforced masonry.<br>- Bearing pressure not to exceed 50kPa.<br>- Fabric reinforcement in floor slabs.<br>- Site drainage and service/plumbing precautions. |
| | | Deep strip foundations | - As for C1 but with fabric reinforcement in floor slabs |
| | | Compaction of in situ soils below individual footings | - As for C1. |
| | | Piled or pier foundations | - Reinforced concrete ground beams or solid slabs on piled or pier foundations.<br>- Ground slabs with fabric reinforcement.<br>- Good site drainage. |
| | | Soil raft | - As for C1. |

**NOTES:**

1. Differential settlement assumed to equal 75% of total settlement
2. The relaxation of some of these requirements, e.g. the reduction or omission of steel or articulation joints, may result in a Category 2 level of expected damage.

| FOUNDATION DESIGN, BUILDING PROCEDURES AND PRECAUTIONARY MEASURES FOR SINGLE-STOREY RESIDENTIAL BUILDINGS FOUNDED ON HORIZONS SUBJECT TO CONSOLIDATION SETTLEMENT (SAICE, 1995) | | | |
|---|---|---|---|
| **SITE CLASS** | **ESTIMATED TOTAL SETTLEMENT (mm)** | **CONSTRUCTION TYPE** | **FOUNDATION DESIGN AND BUILDING PROCEDURES** |
| S | 10 | Normal | - Normal construction (strip footing or slab-on-the-ground foundations)<br>- Good site drainage |
| S1 | 10-20 | Modified normal | - Reinforced strip footings<br>- Articulation joints at some internal and all external doors<br>- Light reinforcement in masonry<br>- Site drainage and service/plumbing precautions<br>- Foundation pressure not to exceed 50 kPa |
| | | Compaction of in situ soils below individual footings | - Remove in situ material below foundations to a depth and width of 1,5 times the foundation width or to a competent horizon and replace with material compacted to 93% MOD AASHTO density at –1% to +2% of optimum moisture content.<br>- Normal construction with lightly reinforced strip foundations and light reinforcement in masonry. |
| | | Deep strip foundations | - Normal construction with drainage requirements.<br>- Founding on a competent horizon below the problem horizon |
| | | Soil raft | - Remove in situ material to 1,0m beyond perimeter of building to a depth and width of 1,5 times the widest foundation or to a competent horizon and replace with material compacted to 93% MOD AASHTO density at –1% to +2% of optimum moisture content.<br>- Normal construction with lightly reinforced strip footings and light reinforcement in masonry. |
| S2 | >20 | Stiffened strip footings, stiffened or cellular raft | - Stiffened strip footing or stiffened or cellular raft with articulation joints or solid lightly reinforced masonry.<br>- Bearing pressure not to exceed 50kPa.<br>- Fabric reinforcement in floor slabs.<br>- Site drainage and service/plumbing precautions. |
| | | Deep strip foundations | - As for S1 but with fabric reinforcement in floor slabs |
| | | Compaction of in situ soils below individual footings | - As for S1. |
| | | Piled or pier foundations | - Reinforced concrete ground beams or solid slabs on piled or pier foundations.<br>- Ground slabs with fabric reinforcement.<br>- Good site drainage. |
| | | Soil raft | As for S1. |

**NOTES:**

1. Differential settlement assumed to equal 50% of total settlement
2. The relaxation of some of these requirements, e.g. the reduction or omission of steel or articulation joints, may result in a Category 2 level of expected damage.
3. Account must be taken on sloping site since differential fill heights may lead to greater differential settlements.
4. Settlements induced by loads imposed by deep filling beneath surface beds may necessitate the adoption of a construction type appropriate to a more severe site class.



# APPENDIX 3 : LABORATORY TEST RESULTS

MATROLAB GROUP TRADING AS
# TPT LAB
- CIVIL ENGINEERING SERVICES -
Reg.No.: 2003/029180/07 - VAT. Reg.No.: 4040210587

9A Saphire Street, Superbia,POLOKWANE,0699
P.O.BOX 112,POLOKWANE,0700

Tel. : 015 292 0511
Fax : 015 292 1243
Email :

## TEST RESULTS

WSM LESHIKA
PO BOX 3316
POLOKWANE
0700
Attention: CARL HOUPT

Project : SCHOONGELEGEN

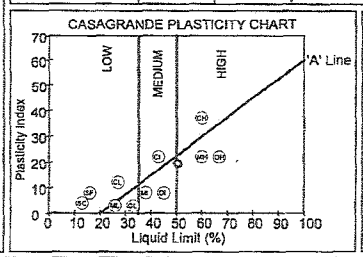
Your Ref :
Our Ref : 35968
Date Reported : 04/4/2007

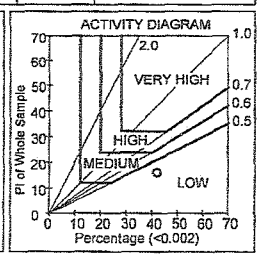
### FOUNDATION INDICATOR (ASTM: D422)

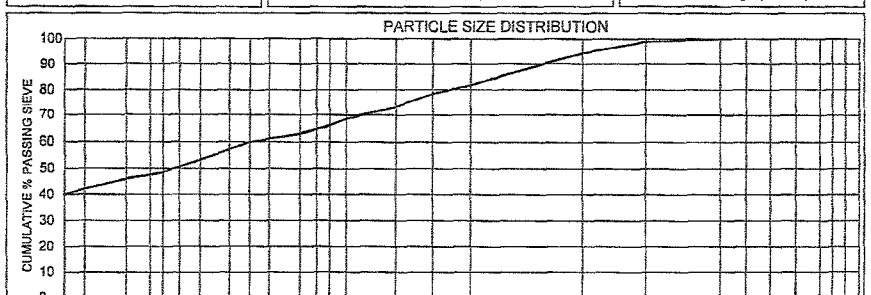
| | |
|---|---|
| Sample No. : | : C624 |
| Hole No. : | : TP 1 |
| Depth (mm) : | : 200-1000 |
| Liquid Limit (%) | : 50 |
| Plasticity Index | : 19 |
| Linear Shrinkage (%) | : 10.0 |
| PI of Whole Sample | : 16 |
| P.R.A. Classification | : A-7-5(12) |
| Unified Soil Classification | : CH |
| Activity | : 0.38 |
| Heave Classification | : LOW |
| Grading Modulus | : 0.55 |
| Percentage (<0.002) | : 42.0 |
| Moisture Content (%) | : 0.0 |

Material Description : DK REDDISH BROWN SILTY SANDY CLAY

| | Clay (%) | Silt (%) | Sand (%) | Gravel (%) | Classification |
|---|---|---|---|---|---|
| Jennings | 47.7 | 17.0 | 29.8 | 5.5 | CLAY |
| Astm | 47.7 | 20.7 | 30.5 | 1.1 | SANDY CLAY |
| British Standard | 42.2 | 23.9 | 28.4 | 5.5 | SANDY CLAY |




| Sieve Size (mm) | % Pass. Sieve |
|---|---|
| 0.0015 | 40 |
| 0.0020 | 42 |
| 0.0036 | 46 |
| 0.0050 | 48 |
| 0.0060 | 49 |
| 0.0075 | 51 |
| 0.0100 | 53 |
| 0.0150 | 57 |
| 0.0200 | 60 |
| 0.0260 | 61 |
| 0.0400 | 63 |
| 0.0500 | 65 |
| 0.0600 | 66 |
| 0.0750 | 68 |
| 0.1500 | 73 |
| 0.2500 | 78 |
| 0.4250 | 82 |
| 2.0000 | 95 |
| 4.7500 | 99 |
| 13.200 | 100 |
| 19.000 | 100 |
| 26.500 | 100 |
| 37.500 | 100 |
| 53.000 | 100 |
| 63.000 | 100 |
| 75.000 | 100 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| JENN | CLAY | SILT | | SAND | | | GRAVEL | | |
| ASTM | CLAY | SILT | | FINE SAND | MEDIUM SAND | COARSE SAND | GRAVEL | | |
| BS | CLAY | FINE SILT | MEDIUM SILT | COARSE SILT | FINE SAND | MEDIUM SAND | COARSE SAND | FINE GRAVEL | MEDIUM GRAVEL | COARSE GRAVEL |

Remarks :

FORM: A6 2.6 (17.08.2006) TPT LAB

MATROLAB GROUP TRADING AS
# TPT LAB
- CIVIL ENGINEERING SERVICES -
Reg.No.: 2003/029180/07 - VAT. Reg.No.: 4040210587

9A Saphire Street, Superbia,POLOKWANE,0699
P.O.BOX 112,POLOKWANE,0700

Tel. : 015 292 0511
Fax : 015 292 1243
Email :

## TEST RESULTS

WSM LESHIKA
PO BOX 3316
POLOKWANE
0700
Attention: CARL HOUPT

Project : SCHOONGELEGEN

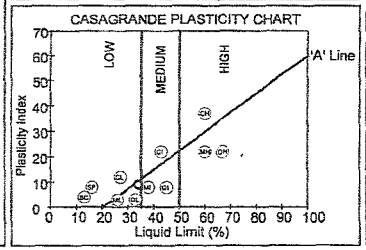
Your Ref :
Our Ref : 35968
Date Reported : 04/4/2007

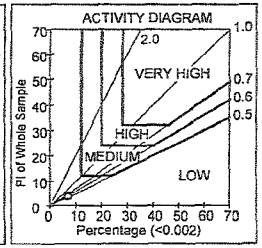
### FOUNDATION INDICATOR (ASTM: D422)

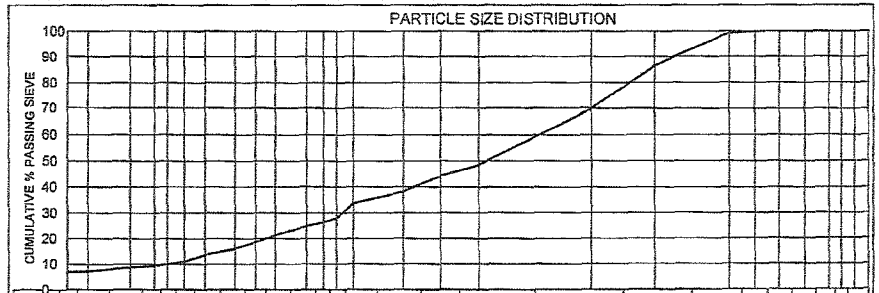
| | |
|---|---|
| Sample No. : | : C622 |
| Hole No. : | : TP 5 |
| Depth (mm) : | : 1000-1500 |
| Liquid Limit (%) | : 34 |
| Plasticity Index | : 9 |
| Linear Shrinkage (%) | : 4.0 |
| PI of Whole Sample | : 4 |
| P.R.A. Classification | : A-2-4(0) |
| Unified Soil Classification | : SM |
| Activity | : 0.56 |
| Heave Classification | : LOW |
| Grading Modulus | : 1.48 |
| Percentage (<0.002) | : 7.0 |
| Moisture Content (%) | : 0.0 |

Material Description : DK ORANGE BROWN GRAVELLY SILTY SAND

| | Clay (%) | Silt (%) | Sand (%) | Gravel (%) | Classification |
|---|---|---|---|---|---|
| Jennings | 9.5 | 17.0 | 43.3 | 30.2 | SILTY SAND |
| Astm | 9.5 | 24.3 | 52.8 | 13.4 | SILTY SAND |
| British Standard | 7.2 | 20.9 | 41.7 | 30.2 | SILTY SAND |




| Sieve Size (mm) | % Pass. Sieve |
|---|---|
| 0.0015 | 7 |
| 0.0020 | 7 |
| 0.0036 | 9 |
| 0.0050 | 10 |
| 0.0060 | 10 |
| 0.0075 | 11 |
| 0.0100 | 14 |
| 0.0150 | 16 |
| 0.0200 | 19 |
| 0.0260 | 21 |
| 0.0400 | 25 |
| 0.0500 | 27 |
| 0.0600 | 28 |
| 0.0750 | 34 |
| 0.1500 | 38 |
| 0.2500 | 44 |
| 0.4250 | 49 |
| 2.0000 | 70 |
| 4.7500 | 87 |
| 13.200 | 99 |
| 19.000 | 100 |
| 26.500 | 100 |
| 37.500 | 100 |
| 53.000 | 100 |
| 63.000 | 100 |
| 75.000 | 100 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| JENN | CLAY | SILT | | | SAND | | | GRAVEL | |
| ASTM | CLAY | SILT | | | FINE SAND | MEDIUM SAND | COARSE SAND | GRAVEL | |
| BS | CLAY | FINE SILT | MEDIUM SILT | COARSE SILT | FINE SAND | MEDIUM SAND | COARSE SAND | FINE GRAVEL | MEDIUM GRAVEL | COARSE GRAVEL |

Remarks :

FORM: A6 2.6 (17.08.2006) TPT LAB

MATROLAB GROUP TRADING AS
# TPT LAB
- CIVIL ENGINEERING SERVICES -
Reg.No.: 2003/029180/07 - VAT. Reg.No.: 4040210587

9A Saphire Street, Superbia,POLOKWANE,0699
P.O.BOX 112,POLOKWANE,0700

Tel. : 015 292 0511
Fax : 015 292 1243
Email :

1014

## TEST RESULTS

WSM LESHIKA
PO BOX 3316
POLOKWANE
0700
Attention: CARL HOUPT

Project : SCHOONGELEGEN

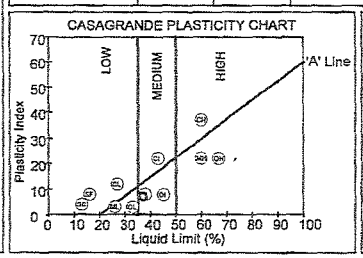
Your Ref :
Our Ref : 35968
Date Reported : 04/4/2007

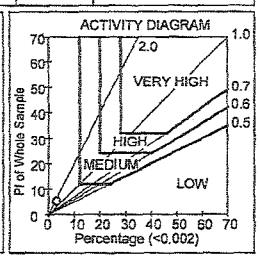
### FOUNDATION INDICATOR (ASTM: D422)

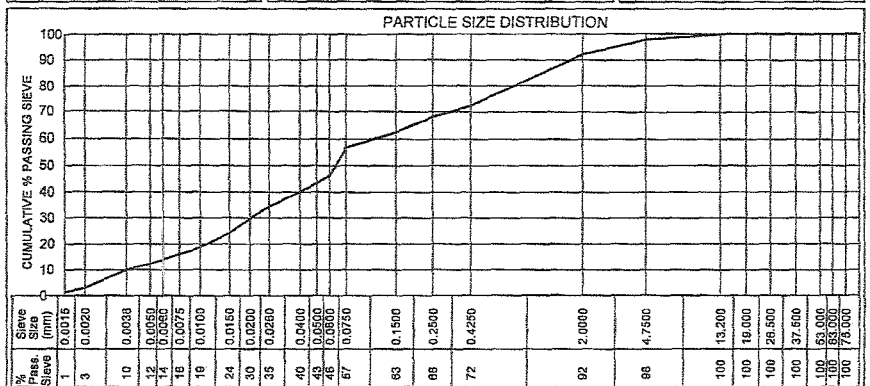
| | |
|---|---|
| Sample No. : | : C623 |
| Hole No. : | : TP 5 |
| Depth (mm) : | : 1500-2000 |
| Liquid Limit (%) | : 37 |
| Plasticity Index | : 7 |
| Linear Shrinkage (%) | : 3.5 |
| PI of Whole Sample | : 5 |
| P.R.A. Classification | : A-4(4) |
| Unified Soil Classification | : OL |
| Activity | : 1.66 |
| Heave Classification | : LOW |
| Grading Modulus | : 0.79 |
| Percentage (<0.002) | : 3.0 |
| Moisture Content (%) | : 0.0 |

Material Description : LT ORANGE BROWN CLAYEY SANDY SILT

| | Clay (%) | Silt (%) | Sand (%) | Gravel (%) | Classification |
|---|---|---|---|---|---|
| Jennings | 12.4 | 30.9 | 48.9 | 7.8 | SILTY SAND |
| Astm | 12.4 | 44.4 | 41.1 | 2.1 | SANDY SILT |
| British Standard | 3.0 | 43.3 | 45.9 | 7.8 | SILTY SAND |




| Sieve Size (mm) | 0.0015 | 0.0020 | 0.0038 | 0.0050 | 0.0060 | 0.0075 | 0.0100 | 0.0150 | 0.0200 | 0.0260 | 0.0400 | 0.0500 | 0.0600 | 0.0750 | 0.1500 | 0.2500 | 0.4250 | 2.0000 | 4.7500 | 13.200 | 19.000 | 26.500 | 37.500 | 53.000 | 63.000 | 75.000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % Pass. Sieve | 1 | 3 | 10 | 12 | 14 | 16 | 19 | 24 | 30 | 35 | 40 | 43 | 46 | 67 | 63 | 68 | 72 | 92 | 98 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| JENN | CLAY | SILT | | | SAND | | | GRAVEL | |
| ASTM | CLAY | SILT | | | FINE SAND | MEDIUM SAND | COARSE SAND | GRAVEL | |
| BS | CLAY | FINE SILT | MEDIUM SILT | COARSE SILT | FINE SAND | MEDIUM SAND | COARSE SAND | FINE GRAVEL | MEDIUM GRAVEL | COARSE GRAVEL |

Remarks :

FORM: A6 2.6 (17.08.2006)

TPT LAB

# Geo-hydrological Investigation

- WSM Leshika

The geo-technical investigation was conducted on the whole of Portion 1 of Schoongelegen 432-LT, based on Activity Alternative A1 and Site Alternative S1 (proposed township establishment on the whole of Portion 1). It was subsequently found that this alternative is fatally flawed due to geo-technical constraints on a large portion of the property. Activity Alternative A2 and Site Alternative S2 (proposed shopping centre on a **small section of Portion 1**) is therefore now proposed and was investigated in more detail (the geo-hydrological assessment on this smaller proposed development site is attached in the following section).

## GHIORDES cc

# HYDROGEOLOGICAL INVESTIGATION FOR A PROPOSED RETAIL SHOPPING COMPLEX DEVELOPMENT ON PORTION 1 OF THE FARM SCHOONGELEGEN 432 LT, LIMPOPO PROVINCE

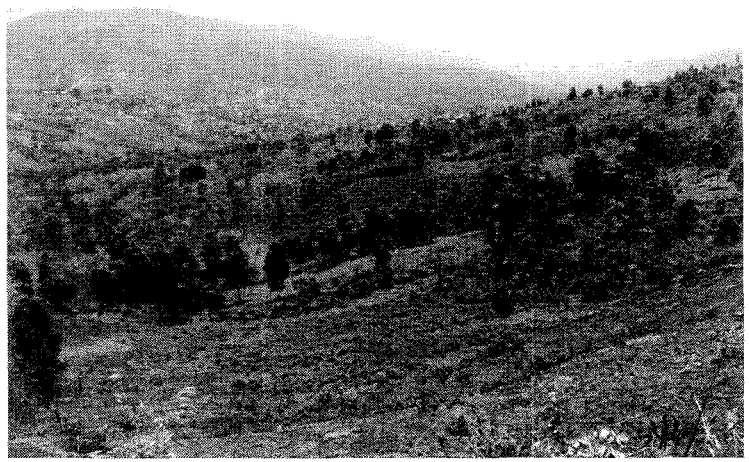
## HYDROGEOLOGICAL ASSESSMENT

February 2010

WSM LESHIKA CONSULTING (Pty) Ltd

GHIORDES cc

# HYDROGEOLOGICAL INVESTIGATION FOR A PROPOSED RETAIL SHOPPING COMPLEX DEVELOPMENT ON PORTION 1 OF THE FARM SCHOONGELEGEN 432 LT, LIMPOPO PROVINCE



**Hydrogeological Investigation**
**WH07017 - SCHOONGELEGEN**

COMPILED BY


**WSM LESHIKA CONSULTING (PTY) LTD**

Postnet Suite #8
Private Bag X9676
**POLOKWANE**
0700
TEL : (015) 296-1560

2 Rhodesdrift Street
Hampton Court
**POLOKWANE**
0699
FAX : (015) 296-4158

CONTACT PERSON : **C J HAUPT, PrSciNat**

WSM LESHIKA CONSULTING (Pty) Ltd
Engineers, Geohydrologists, ISD Practitioners & Project Managers

POLOKWANE
2 Rhodesdrift Street
Polokwane, 0699
P.O. Box 3316, Polokwane, 0700

TEL : 015 296-1560
FAX : 015 296-4158
E-MAIL : polokwane@wsmleshika.co.za

## 1. INTRODUCTION

This report gives the results of a Hydrogeological study conducted regarding the ground water resources and assesses the envisaged impact of the proposed Retail Shopping Complex development on these resources and makes recommendations to mitigate these impacts.

The hydrogeological conditions pertaining to the area and potential impacts accessed are based on the field census conducted, existing borehole information and the experience of **WSM Leshika (Pty) Ltd** in the area.

## 2. TERMS OF REFERENCE

The proposal submitted by WSM Leshika (Pty) Ltd was approved by Ghiordes cc whom instructed us to proceed with the investigation.

## 3. SCOPE OF WORK

WSM Leshika was tasked with providing:

- A list of existing available borehole information
- Evaluation of ground water resources and water quality
- Evaluation of the impact the development will have on the ground water resources
- Give recommendations to mitigate these impacts



## 4. SITE LOCALITY AND DESCRIPTION

### 4.1 Location

The site is situated to approximately 13km east of Duiwelskloof, on portion 1 of the farm Schoongelegen 432 LT, Limpopo Province. The locality is depicted in Figure 1. The land is privately owned.

### 4.2 Climate

The regional climate can be defined in three distinct seasonal occurrences. From May to July it is dry with warm, usually cloudless days and nights. From August to October daily temperatures begin to rise, day time temperatures are generally hot, the nights however still tend to be cool.

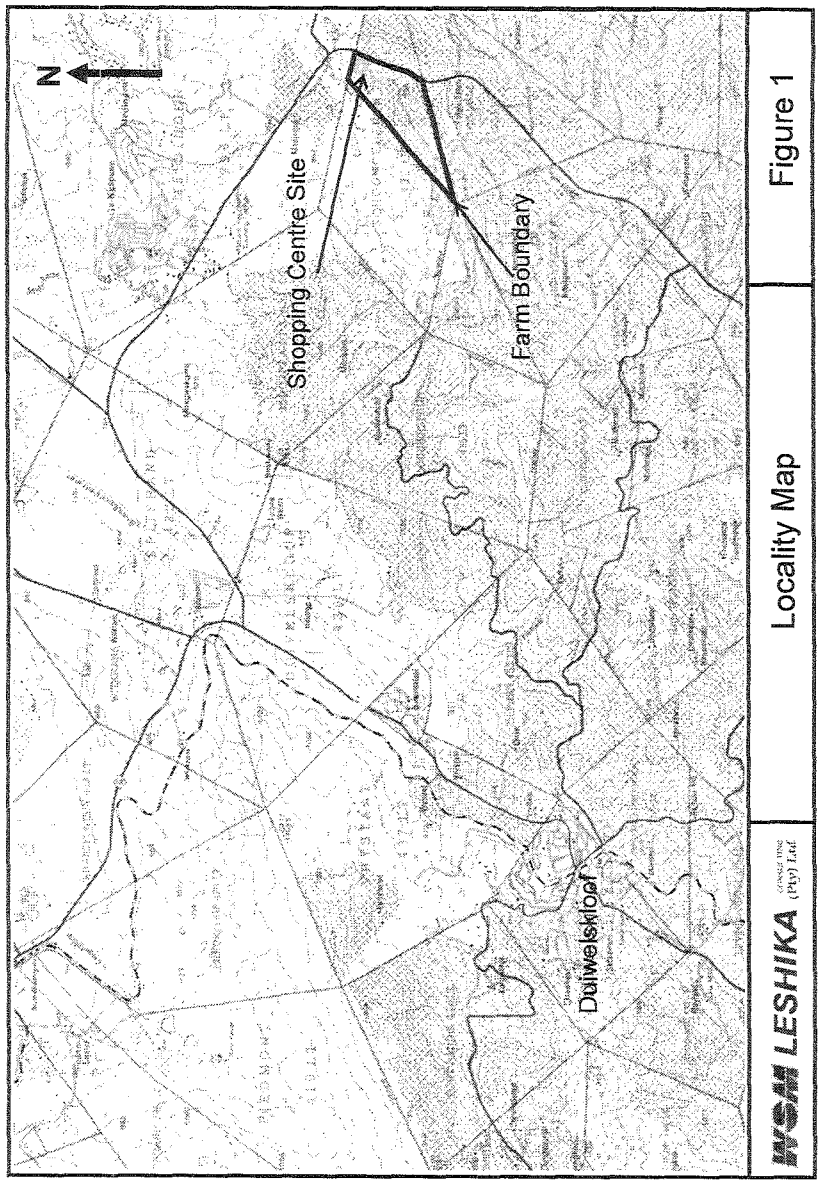
The regional wet season extends from November to April, a hot period with heavy thundershowers. About 85 per cent of the annual rainfall occurs during these months. Mean annual precipitation (MAP) is 627mm and the mean annual S-pan evaporation (MAE) is approximately 1 593 mm for the area (WR 2005).

### 4.3 Physiography and drainage

The site is located in the upper reaches of the Molototsi river, B 81 G quaternary catchment. The area is hilly with drainage towards the north east.

### 4.4 Soils and vegetation

Clayey silty soils exist over the site. The site is vegetated with veldt, trees and bush and parts of the site are also cultivated.




## 5. REGIONAL GEOLOGY

Based on the 1:250 000-scale geological sheet, the site is underlain by leucocratic biotite granite, of Vaalian age.

The Stratigraphy and geology are depicted in Table 1 and Figure 2 respectively.

**TABLE 1 : STRATIGRAPHY FROM YOUNGEST TO OLDEST**

| No. | Lithology | Sedimentary & Volcanic | | | Intrusive | Age |
|---|---|---|---|---|---|---|
| | | Formation | Group | Supergroup | Suite | |
| Vlg | Biotite granite | — | — | — | — | Vaalian |
| **Structural Features** | | | | | | |
| ---------- | Fault, concealed or not accurately locates | | | | | Unknown |
| ———— | Diabase dyke | | | | | Vaalian |
| ..... | Lineament derived from aerial photographs and LANDSAT | | | | | Unknown |
| ———— Qv | Quartz vein | | | | | Unknown |

## 6. HYDROGEOLOGICAL EVALUATION

### 6.1 Existing borehole data

Information on existing boreholes was obtained from the Department of Water Affairs, Limpopo, GRIP Data Base. A field census was conducted but only 2 of the boreholes could be identified in the field. The information is listed in Table 1 with the positions also illustrated on Figure 3 and 4.

# HYDROGEOLOGICAL INVESTIGATION FOR A PROPOSED RETAIL SHOPPING COMPLEX DEVELOPMENT ON PORTION 1 OF THE FARM SCHOONGELEGEN 432 LT, LIMPOPO PROVINCE

## HYDROGEOLOGICAL ASSESSMENT

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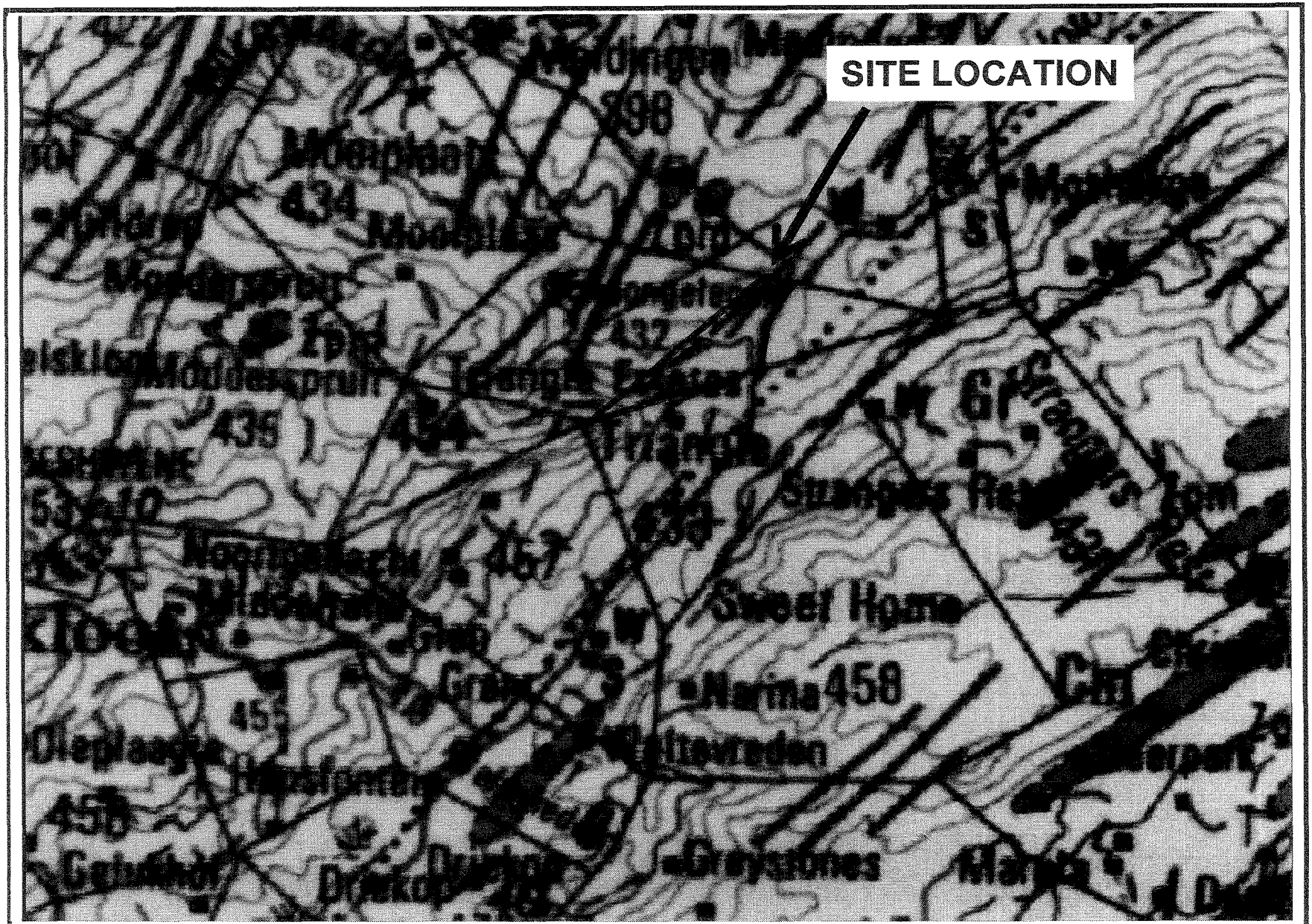
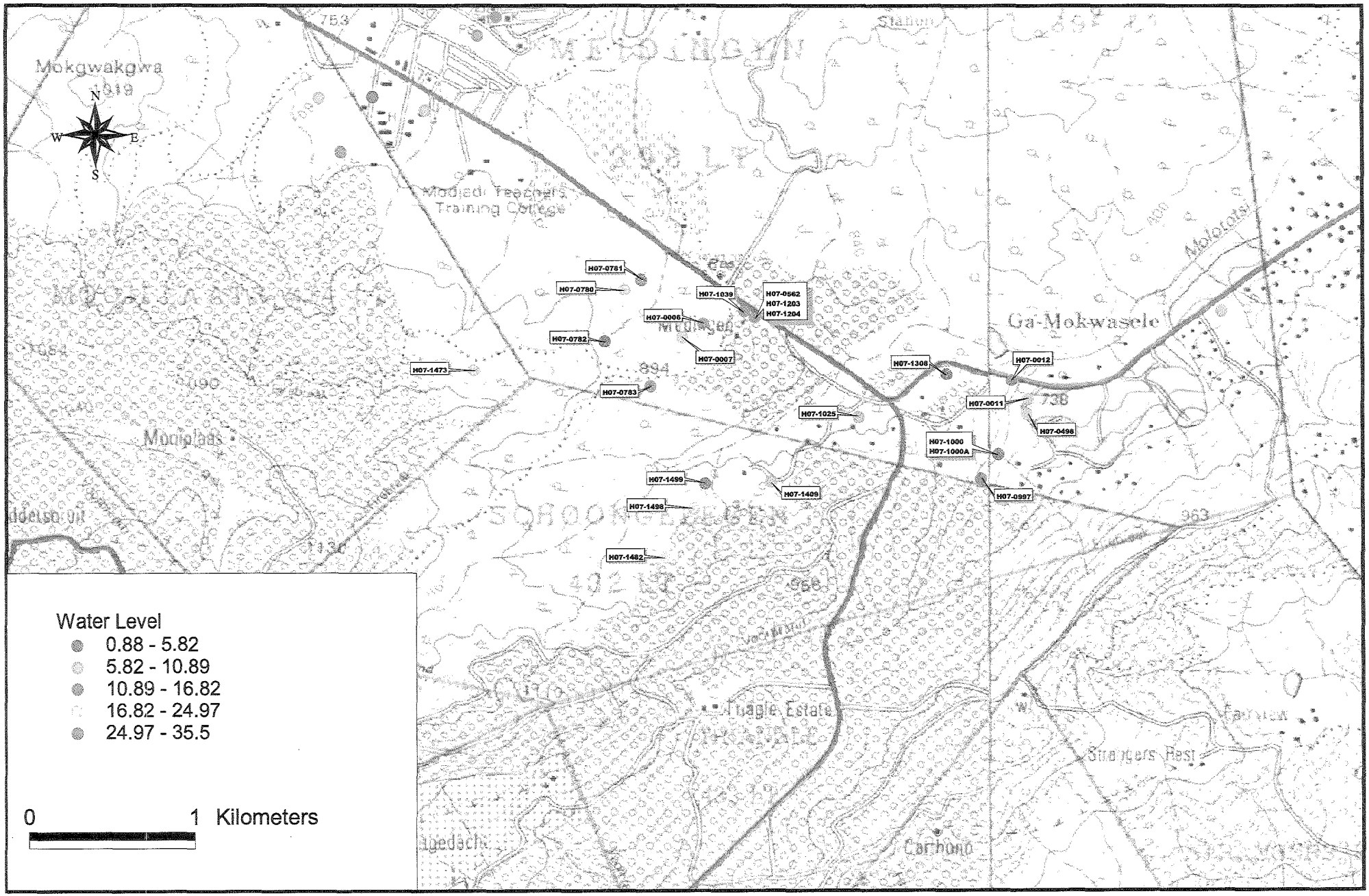


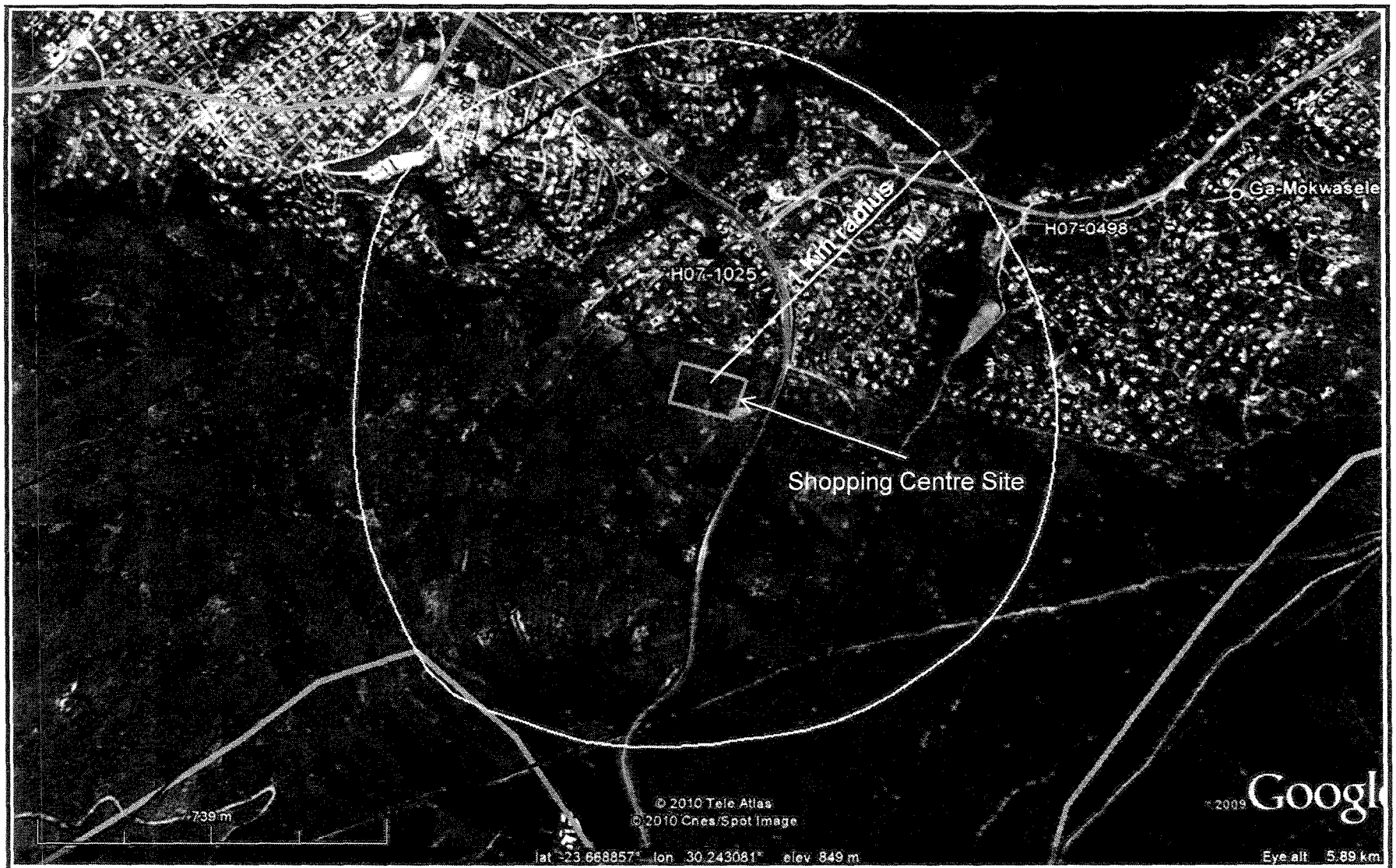

| | | |
|---|---|---|
| WSM LESHIKA CONSULTING (Pty) Ltd | Site Geology | Figure 2 |




WSM LESHIKA CONSULTING (PTY) LTD

**Borehole Localities and Water Levels**

**Figure 3**




| | | |
|---|---|---|
| WSM LESHIKA CONSULTING (Pty) Ltd | Borehole Census boreholes | Figure 4 |

**TABLE 1: BOREHOLE INFORMATION**

| BH Number | Longitude | Latitude | Site Status | Pump Type | Engine Type | Depth (m) | Blow Yield (l/s) | Water Level (m) | Testing Yield1 (l/s) | Testing Cycle1 (hrs) | Testing Yield2 (l/s) | Testing Cycle2 (hrs) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H07-0002 | 30.22917 | -23.64322 | U - Unused | N - No Equipment | NV | 66 | - | - | - | - | - | - | |
| H07-0003 | 30.23067 | -23.64094 | G - In Use | H - Handpump | H - Hand | 53.9 | - | 15.71 | 10 | 10 | 0 | 24 | |
| H07-0004 | 30.23119 | -23.64056 | U - Unused | N - No Equipment | NV | -9999 | - | - | - | - | - | - | |
| H07-0005 | 30.23128 | -23.64053 | U - Unused | N - No Equipment | NV | -9999 | - | - | - | - | - | - | |
| H07-0006 | 30.23481 | -23.65903 | G - In Use | M - Mono | E - Electric | 83.56 | - | 20.71 | 0.7 | 8 | 0.23 | 24 | |
| H07-0007 | 30.23397 | -23.65906 | G - In Use | H - Handpump | H - Hand | 53.67 | 0.3 | 22.62 | 0.2 | 10 | 0 | 24 | |
| H07-0008 | 30.23322 | -23.65722 | U - Unused | N - No Equipment | NV | 72 | - | - | - | - | - | - | |
| H07-0009 | 30.24653 | -23.64086 | G - In Use | H - Handpump | H - Hand | -9999 | - | - | - | - | - | - | |
| H07-0010 | 30.25042 | -23.63472 | G - In Use | M - Mono | D - Diesel | -9999 | - | - | - | - | - | - | |
| H07-0011 | 30.25417 | -23.66317 | G - In Use | Z - Other | E - Electric | 26.88 | 2.5 | 8.61 | 1.5 | 12 | - | - | |
| H07-0012 | 30.25156 | -23.66214 | G - In Use | Z - Other | E - Electric | 23 | 7 | 11.3 | - | 10 | - | 24 | |
| H07-0380 | 30.22961 | -23.63750 | G - In Use | H - Handpump | H - Hand | 78.46 | - | 34.58 | 0.2 | 10 | 0 | 24 | |
| H07-0401 | 30.21850 | -23.63278 | D - Destroyed | N - No Equipment | NV | 26.33 | 2.7 | 9.92 | 0 | 10 | 0 | 24 | |
| H07-0433 | 30.26294 | -23.65828 | G - In Use | H - Handpump | H - Hand | 88 | 0.33 | 6.63 | 0.3 | 10 | 0.13 | 24 | |
| H07-0433A | 30.26308 | -23.65828 | U - Unused | N - No Equipment | NV | -9999 | - | - | - | - | - | - | |
| **H07-0498** | **30.25236** | **-23.66397** | **G - In Use** | **Z - Other** | **E - Electric** | **90** | **1.5** | **7.82** | **2.5** | **10** | **1.05** | **24** | **Located in field census** |
| H07-0562 | 30.23750 | -23.65875 | U - Unused | N - No Equipment | NV | 72.46 | - | 20.3 | 0.4 | 10 | 0.17 | 24 | |
| H07-0566 | 30.25194 | -23.63681 | G - In Use | H - Handpump | H - Hand | 39.85 | 0.62 | 24.33 | 0.2 | - | 0.08 | 24 | |
| H07-0567 | 30.24150 | -23.64314 | G - In Use | M - Mono | E - Electric | -9999 | - | - | - | - | - | - | |
| H07-0726 | 30.25181 | -23.66547 | G - In Use | M - Mono | NV | 57.56 | - | 35.6 | 0.4 | 10 | 0.17 | 24 | |
| H07-0780 | 30.23103 | -23.65708 | G - In Use | H - Handpump | H - Hand | 97 | - | 20.56 | 0.5 | 10 | 0.21 | 24 | |
| H07-0781 | 30.23144 | -23.65666 | G - In Use | M - Mono | E - Electric | 90.63 | - | 13 | 1.2 | 10 | 0.5 | 24 | |
| H07-0782 | 30.23019 | -23.66017 | G - In Use | H - Handpump | H - Hand | 64.85 | - | 1.79 | 0.3 | 10 | 0.13 | 24 | |
| H07-0783 | 30.23211 | -23.66233 | G - In Use | H - Handpump | H - Hand | 70 | - | 35.69 | 0.1 | 8 | 0 | 24 | |
| H07-0976 | 30.25883 | -23.62719 | G - In Use | M - Mono | H - Hand | 59.2 | 0.21 | 15.09 | 0.2 | 10 | 0.08 | 24 | |
| H07-0997 | 30.24989 | -23.66750 | G - In Use | M - Mono | E - Electric | 97.65 | 0.73 | 2.2 | 1.1 | 10 | 0.6 | 24 | |
| H07-1000 | 30.25081 | -23.66617 | G - In Use | M - Mono | E - Electric | 60 | 1 | 5.44 | 0.7 | 8 | 0.28 | 24 | |
| H07-1000A | 30.25075 | -23.66619 | U - Unused | NV | NV | -9999 | - | - | - | - | - | - | |
| H07-1006 | 30.21908 | -23.64744 | U - Unused | N - No Equipment | NV | -9999 | - | - | - | - | - | - | |
| **H07-1025** | **30.24325** | **-23.66417** | **U - Unused** | **H - Handpump** | **NV** | **66.85** | **0.52** | **6.81** | **0.2** | **10** | **0** | **24** | **Located in field census** |
| H07-1039 | 30.23703 | -23.65833 | U - Unused | N - No Equipment | NV | 85.26 | - | 18.92 | - | - | - | - | |
| H07-1086 | 30.24272 | -23.64047 | G - In Use | S - Submersible | E - Electric | -9999 | - | - | - | - | - | - | |
| H07-1201 | 30.23142 | -23.64006 | U - Unused | N - No Equipment | NV | -9999 | - | - | - | - | - | - | |
| H07-1203 | 30.23761 | -23.65869 | U - Unused | N - No Equipment | NV | -9999 | - | - | - | - | - | - | |
| H07-1204 | 30.23761 | -23.65867 | G - In Use | M - Mono | NV | -9999 | - | - | - | - | - | - | |
| H07-1253 | 30.21403 | -23.64700 | D - Destroyed | N - No Equipment | NV | 31 | - | - | - | - | - | - | |
| H07-1254 | 30.21406 | -23.64706 | D - Destroyed | N - No Equipment | NV | 57 | 0.1 | - | - | - | - | - | |
| H07-1255 | 30.21391 | -23.64678 | U - Unused | N - No Equipment | NV | 106.7 | 0.2 | 10.06 | - | - | - | - | |
| H07-1256 | 30.21436 | -23.64925 | D - Destroyed | N - No Equipment | NV | 61 | - | - | - | - | - | - | |
| H07-1257 | 30.21911 | -23.64736 | G - In Use | S - Submersible | NV | 78.49 | - | - | - | - | - | - | |

Photo 1 – H07-0498

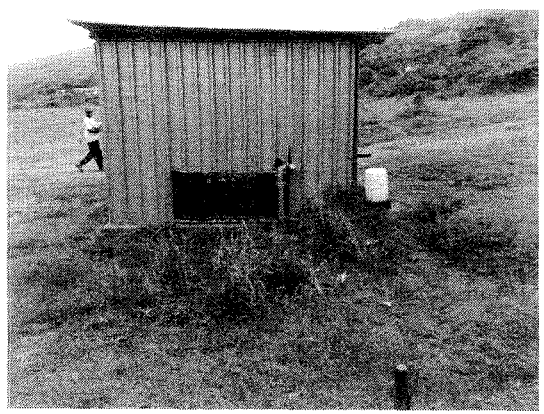


Photo 2 – H07-1025

To the north of the proposed shopping centre numerous boreholes exist which are used for domestic use (see photo's 1 and 2 above).



Borehole yields are generally low to moderate, generally less than 1.0 l/s for a 24 hour pumping period.

## 6.2 Aquifers

The main aquifers in the area are thought to be fractured and weathered aquifers in the granitic rocks and the fractured contact with diabase intrusives.

## 6.3 Aquifer storage

The aquifer storage is difficult to determine. As the predominant aquifer type is known to be a fractured and weathered aquifer, the storage is estimated from Vegters Maps to be about 0.001.

If we assume that the exploitable part of the aquifer is only about 10m thick (would like to limit the drawdown to 10m to limit the impacts) and we utilise the farm area the storage capacity would be;

AREA x THICKNESS x STORATIVITY

= 1 050 000$m^2$ x 10m x 0.001

= 10 500 $m^3$

## 6.4 Groundwater levels and flow

The static water levels in the area vary between 1.8m and 35.7m (see table 1). However around the shopping centre water levels are expected to be around 10m below surface. The large variation is probably due to the mountainous topography and therefore flow is expected to mimic a subdued form of the surface topography. Groundwater flow is therefore expected to be in a north east direction.

## 6.5 Recharge

Recharge can be described as the replenishment from rainfall to the aquifers. Information from the Groundwater Resources Assessment Study (GRA II) gives recharge as 25.26mm. The total available water from recharge for the property area is thus evaluated as:

= 1 050 000m$^2$ x 0.02526m

= 26 523m$^3$/annum or 72 m$^3$ / day

## 6.6 Sustainable yield

During drought or low rainfall periods, recharge could be significantly reduced and any abstraction would need to draw water from storage. Evaluation of drought indices (F P Cornelius and E A Nel) indicates that drought periods in the study area could last for 7 – 8 years. If we assume that for these 7 – 8 year periods recharge would only be 70% of the average annual i.e. 0.70 x 26 523 = 18 566 m$^3$/annum and that for a 2 year period within this drought period there would only be 20% of the average annual recharge i.e (0.20 x 26 523) = 5 305 m$^3$/annum. If storage is utilised over this 2 year period the available yield would then be 5 305 + (10 500/2) = 10 555 m$^3$/annum.

The sustainable yield would therefore be evaluated as about 10 555 m$^3$/annum or 29m$^3$/day.

## 6.7 Water quality

Water samples were taken from boreholes H07-0498 and H07-1025. The results are given in table 2 below.



TABLE 2 : WATER CHEMISTRY

| ANALYSES | UNIT | H07-0498 | H07-1025 | CLASSIFICATION | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 09/12/2009 | 09/12/2009 | Class 0 | Class 1 | Class 2 | Class 3 | Class 4 |
| pH | | 6.44 | 6.45 | 5.5 - 9.5 | 4.5 - 10 | [illegible] | 3 - 11 | < 3 or > 11 |
| Conductivity | mS/m | 12.3 | 19.7 | < 70 | 70 - 150 | [illegible] | 370 - 520 | > 520 |
| TDS | mg/l | 91 | 141 | < 450 | 450 - 1000 | [illegible] | 2400 - 3400 | > 3400 |
| Nitrate (N) | mg/l | 0 | 0 | < 6 | 6 - 10 | [illegible] | 20 - 40 | > 40 |
| Fluoride | mg/l | 0 | 0 | < 0.7 | 0.7 - 1 | | 1.5 - 3.5 | > 3.5 |
| Sulphate | mg/l | 16 | 18 | < 200 | 200 - 400 | [illegible] | 600 - 1000 | > 1000 |
| Chloride | mg/l | 9.8 | 13.7 | < 100 | 100 - 200 | | 600 - 1200 | > 1200 |
| P - Alkalinity | | 0 | 0 | | | | | |
| M - Alkalinity | | 42.1 | 58.7 | | | | | |
| Carbonate | | 0 | 0 | | | | | |
| Bicarbonate | | 51.3 | 71.6 | | | | | |
| Total Hardness | CaCo3 | 81.3 | 114.6 | < 200 | 200 - 300 | [illegible] | > 600 | |
| Ca - Hardness | | 24.5 | 38.2 | | | | | |
| Mg - Hardness | | 56.8 | 76.4 | | | | | |
| Calcium | mg/l | 9.8 | 15.3 | < 80 | 80 - 150 | [illegible] | > 300 | |
| Magnesium | mg/l | 13.8 | 18.5 | < 70 | 70 - 100 | [illegible] | 200 - 400 | > 400 |
| Sodium | mg/l | 10.2 | 11.3 | < 100 | 100 - 200 | [illegible] | 400 - 1000 | > 1000 |
| Potassium | mg/l | 1.03 | 1.28 | < 25 | 25 - 50 | [illegible] | 100 - 500 | > 500 |
| Iron | mg/l | 0 | 0 | < .5 | .5 - 1 | [illegible] | 5 - 10 | > 10 |
| Manganese | mg/l | 0 | 0 | < .1 | .1 - .4 | [illegible] | 4 - 10 | > 10 |
| WATER CLASS | | | | | | | | |
| Sum Cations | | 2.09 | 2.81 | | | | | |
| Sum Anions | | 2.11 | 2.85 | | | | | |

From the results it can be seen that the water quality is excellent (class 0) and therefore suitable for domestic use.

# 7. PROPOSED DEVELOPMENT

The proposed development will consist of a shopping complex. From the services report it is estimated that the Shopping Complex will require 23.7m$^3$/day and will produce about 19m$^3$/day of treated effluent.

## 8. IMPACT ASSESSMENT OF THE PROPOSED DEVELOPMENT ON THE GROUNDWATER RESOURCE AND PROPOSED MITIGATION MEASURES

### 8.1 Groundwater Abstraction

The property therefore has sufficient ground water resources to meet the proposed shopping complexes water demand. Available groundwater 29m$^3$/day, demand 23.7m$^3$/day. A production borehole yielding 0.9 l/s pumping 8 hours per day would thus be required.

### 8.2 Potential Groundwater Pollution

Due to the clayey nature of the soils near surface, it may be assumed that the pollutants will travel through the upper soils and weathered bedrock at a relatively slow rate down to the less weathered bedrock. As the boreholes in the area are thought to have low to moderate yields it is assumed that the bedrock will be fairly well fractured in places. These permeable fracture zones could provide preferential flow paths.

It can therefore be assumed that the aquifer will be at a low to moderate risk to pollution from surface spills.

The following precautionary measures are therefore recommended:

- Sealing of the parking and forecourt areas where potential pollutants are expected to be handled to prevent infiltration of potential pollutants from entering the soil underlying the site.
- Storm water draining from the surfaced areas should ideally be collected in a sealed sump to be treated or removed.
- Preventative measures should be installed to prevent the storm water or other liquids draining into the natural soil.
- The site will need some good planning to cope with surface runoff and runoff volumes must be calculated and proper separation facilities



installed.
- Polluted water must be removed from site by a licensed contractor.

## 9. MANAGEMENT AND MONITORING

As no long-term water levels and abstraction rates are available the above evaluation is based on the best knowledge and experience available. However it is strongly advised that a proper management and monitoring programme be implemented to ensure that the groundwater resources protected. This should include:-

- Identify monitoring borehole downstream of the site
- Monitor water levels and abstractions
- take water samples at least twice annually and analyse for microbiological, macro elements and TPH/BTEXN
- implement management and monitoring programme together with neighbours to obtain a greater regional perspective

## 10. WATER USE AUTHORISATION

Presently water use is authorised as schedule 1 use, i.e. taking water for reasonable domestic use in that person's household, small gardening (not for commercial purposes) and watering of animals which graze on the land (excluding feedlots).

Water use authorisation will be required for taking water from groundwater resources and for the discharge of the treated effluent. In catchment B 81 G authorisation can be obtained under general authorisations for up to 45m$^3$/ha/annum. For the property this amounts to 105 X 45 = 4 725m$^3$/annum or 13 m$^3$/day. This is insufficient for the proposed demand and thus a water use license application will be required for the abstraction. The effluent discharge volume falls within the general authorisations limit and therefore this use will only need to be registered.

## 11. CONCLUSIONS AND RECOMMENDATIONS

From the evaluation, the following conclusions are made:

- Existing boreholes are presently used for domestic and stock;
- Groundwater occurs mainly in fractured and weathered granitic rocks and diabase contact zones;
- Water table is relatively shallow with a north east flow direction;
- Storage capacity is expected to be low 0.001 or only 10 500m3;
- Average annual recharge is estimated to be 25.26mm or 26 523$m^3$/annum (72$m^3$/day) for the farm area;
- Drought periods of up to 8 years could occur, reducing recharge during this period to 18 566$m^3$/annum;
- Extreme drought periods of 2 years could occur where recharge could be reduced to only 5 305$m^3$/annum;
- Taking the storage capacity of the aquifers into account for these extreme drought periods the sustainable groundwater yield is thus calculated as 10 555$m^3$/annum or 29$m^3$/day;
- Water quality is excellent – Class 0;
- The available ground water is sufficient to meet to proposed shopping complexes water demand;
- The aquifer will be at a low to moderate risk to pollution from potential pollutants and thus the mitigation measures discussed in paragraph 8 will need to be implemented;
- Water Use Authorisation will be required for the groundwater abstraction (licensing) and the discharge of the treated effluent (registration under general authorisations).

The following recommendations are also made:

- That the mitigation measures be implemented as described in paragraph 8;
- That a proper monitoring and management plan be implemented as described in section 9;



- That water use authorisation be obtained for the water uses, i.e. licensing of the groundwater abstraction and registration of the effluent discharge under general authorisations.

C J HAUPT BSc (Hons) Pr.Sci. Nat

# Flood Line Report

- WSM Leshika

## 3. REQUIRED SERVICES

### 3.1 WATER

#### 3.1.1 Commercial water supply:

Initial discussions were held with the Greater Letaba Municipality to determine the viability of supplying bulk potable water to the proposed development. Approval was received with the condition that Lepelle Northern Water needs to be contacted as they are the Water Service Provider for the specific area. After discussion with Lepelle it became clear that there is a real problem with continuous water supply to the proposed development. A letter to this effect was requested from them but nothing has been received to date.

t was then decided to investigate the possibility of extracting groundwater through a borehole, naintained by the development itself. The Department of Water Affairs was contacted to determine if he required demand falls within the General Authorisation for the specific area, but due to the higher lemand required it was pointed out that the development would have to apply for an extraction letter.

t the meeting held with the municipality on 11 June 2009, the municipality remarked that there is an xisting borehole on site with a potential of 20litre/second supply. It is at present equipped with a andpump but can be utilised for the development as well. As the development only requires 65litre/sec (24hour period) the developer offered to fit taps at the handpump position and to install igation to the soccerfield as well. Written consent from the municipality for the use of this borehole is quired. (please see the attached letter of consent from the municipality as well as the minutes of the eeting held on 11 June 2009).

e water supply falls under the jurisdiction of Greater Letaba Municipality and according to information ceived will be sufficient for the proposed development.

nstruction of the internal services will be done according to the specifications of the Guidelines for gineering Services for Township Development and any other details as received from the nicipality.



The design was done according to the "Red Book" and is based on a commercial area, with variables allowed on the proposed supply to ensure that the final usage is sufficient for the proposed development.

Recommended internal pipe material to be used is uPVC/HDPE pipes to Class 9 and various sizes as will be determined by the final design.

Design specifications are as follows:

- Shops:
  - 26 x 150-215m² shops = 26 x 40litre/cap/day x 3cap =3.12KL/day
  - 2 x 470m² restaurants = 2 x 50litre/seat/day x 117seats =11.7KL/day
  - 1 x 2210m² Supermarket = 400litre/100m² x 22.1 =8.85KL/day

- Required daily demand = 3.12KL/day + 11.7KL/day + 8.85KL/day = 23.7 KL/day
- Peak Factor = 1.5
- Waistage and leaks = 20%
- Parks/gardens = 15KL/day
- Reservoir capacity (48hrs) = {[(23.7KL/day x1.5 )+20%] + 15KL/day} x 2 = **120KL**

- Required average flow = 1.65litre/sec (24hrs)

- Pipe sizes as per the drawing was acquired by using the above demand figures in the design
- Internal reticulation pipes will all be Class 9.

#### 3.1.2 Fire reticulation:

As per the municipal -, and fire prevention specifications, a separate fire reticulation network will be required. It is recommended that the fire reticulation be individually supplied from the reservoir with a booster connection at an approachable position. The network will consist of class 16 pipes, which will allow the fire prevention unit to boost the pressure in the network to 16 Bar. A non-return valve will be installed at the booster position to prevent this pressure pushing back into the reservoir.

The following design specifications are relevant:

- Natural ground level at reservoir position = 844.000
- Natural ground level at top level of shopping centre = 839.000
- Natural ground level at bottom level of shopping centre = 834.000
- Reservoir (elevated tank) outflow level = 854 (10m high tank stand)
- Pressure at top level of shopping centre = 1.5 Bar (150Kpa)
- Pressure at bottom level of shopping centre = 2.0 Bar (200Kpa)
- 1 Fire Hydrant for every 1000 sq m of structures (depending on industry type) – preliminary 8 hydrants are required)
- Fire hydrants not to be more than 90m apart
- Preliminary design allows for 20 Fire Hose Reels within the proposed structure
- Required demand of 20litre/sec at each hydrant (1 hydrant operating alone)
- Class 16 pipes required

Resultant pipe sizes are as per the design and shown on the attached layout drawing.

### 3.2 SANITATION

The connection of the sewer outflow from the development to the network in Ga-Kgapane was nvestigated, but due to the high cost involved it was decided to rather investigate alternative methods. t is recommended that the "Package Plant" as supplied by Calcamite be utilised for the treatment of ;ewer effluent. The Biomite BM150 Wastewater treatment plant is basically a septic tank system with ›rimary anaerobic digestion, secondary aerobic digestion and tertiary disinfection using ozonation. The ystem is based on a proven process utilised by many municipalities (Bardenphlo process). The "grey" vater can then be safely utilised for irrigation purposes.

he plant will be positioned at the northwestern point of the development, which will suit the outflow onditions to a maximum. With this plant the outflow into the stream, with resultant pollution, will be inimised.

ne internal reticulation will consist of 160mm dia pipes as per the engineering requirements. anholes/rodding eyes will be constructed according to detail (see attached detail drawings)



The design was done according to the "Red Book" and is based on a commercial type outflow with a conventional water-borne sewer reticulation flowing towards the treatment plant.

Recommended material to be used is uPVC Supra Lite sewer pipes to classes and sizes as determined by the final design.

The design capacity was determined with the design considerations as follows:

- Calculation method - Unit Flow
- Peak factor = 2.5
- Infiltration = 15%
- Units = 29 (Commercial – based on 80% of water usage as stated in 3.1)
- Peak flow = 2.8 litre/sec.

### 3.3 STORMWATER

There are no existing stormwater structures situated close to the proposed development. The current stormwater run-off moves as landflow over the whole stand from southeast to northwest. The Development will, however, necessitate the channelling of the run-off (stormwater), which might create erosion problems at the lowest collection point. (refer stormwater drawing) Further stormwater attenuation will be installed within the development/structure.

Stormwater run-off will be handled as follows:

Storms with a 5-year recurrence period will be handled by the internal roads/paving through strategically constructed cross-falls and cambers. Areas within the development will be surfaced/paved to achieve this. From the development the run-off will drain into the proposed channel as shown on the attached drawing

Larger storms will mainly be accommodated by the surfaced area, the outflow channel and strategically placed stormwater outlets.

Material to be used will mainly consist of concrete stormwater pipes as well as concrete catchpits, stormwater outlets and concrete lined channels. All stormwater measures are as shown on the attached drawing.

### 3.4 ROADS

The proposed development will connect to the D447 road, situated to the east of the property. Due to sight distances, the non-official road serving the stands to the north of the development will have to be closed. This can create discomfort to the residents and therefore an alternative access road will be provided for these residents (please see the attached drawing indicating the position of this road).

The proposed shopping centre will be connected to the main road by a dedicated road with a traffic circle for access to the shopping centre, the alternative access for the residents as described above and to any future developments.

A traffic study was done and the recommendations are incorporated in the design/layout. An application was also forwarded to the Road Agency of Limpopo for the proposed connection

It is recommended that the roads in the area be constructed as follows:

150 mm roadbed (rip and recompact)
150 mm selected (G7)
150mm G5 subbase
80mm interlock paving on 20mm sand

The detail of the main access road to the development will be as was determined by the traffic study.

### 3.5 ELECTRICITY

Please refer to the attached report from the Electrical Consultant, Giel de Kock (Pienaar & Erwee).

There is an Escom supply line running through the property from East to West on the Northern boundary.

Further detail will be provided after conclusion of the investigation.

t is recommended that Telkom be contacted prior to implementation to determine their required services.





The following points are relevant:

- The site will be zoned as commercial with a electricity requirement as calculated by the Electrical Consultant.
- The developer will need to install a mini-sub, an all ancillaries, for the development (refer report)
- An application was already forwarded to Escom
- There are existing overhead cables at the Northern boundary of the development.
- The supply needs to be sufficient for this development only – future developments will require new investigations and additional supply. Required demand for this first portion is as shown in the report by Pienaar & Erwee Engineers.

### 3.6 1:100 YEAR FLOODLINE

As per the report submitted by WSM Leshika (please see section 5 of this report) there is a small stream situated within the development area. The impact on the development is minimal. The stream will be filled during the construction of the platform and the run-off from the top portion of the catchment area for this stream will be accommodated within the stormwater attenuation of the development.

### 3.7 WASTE MANAGEMENT

The greater Letaba Municipality agreed that they would provide waste removal services to the proposed development. A transfer station will be required on site where all the shops can dump their waste. The transfer station must be positioned in such a way that it will be easily accessible to both the municipality and the shops. This will be incorporated in the design of the shopping centre. (Please see attached minutes of the meeting held with the municipality as well as the confirmation letter forwarded)

DMV LIMPOPO (PTY) LIMITED
Reg No 02/017837/07
DEVELOPMENT MANAGEMENT
ENGINEERING CONSULTANTS
Proliv House, 2 Pierre St, Polokwane
55825, Polokwane, 0700
(015) 296 1486/296 1499
Fax (015) 296 1497

FOR ATTENTION: MR W MOLOKOMME

Greater Letaba Municipality
P O Box 36
MODJADJISKLOOF
0835

Ref :W Molokomme.wpd
Date :25 June 2009

**Re : PROPOSED NEW SHOPPING CENTRE ON PART OF PORTION 1 OF THE FARM SCHOONGELEGEN 432LT - ENGINEERING SERVICES**

With reference to the meeting held on 11 June 2009, we would hereby like to confirm the following:

**1) Water supply to above development:**

As per the discussion there is an existing borehole on the property that was equipped by the municipality. The developer has your permission to utilise this borehole for the development provided that a standardized fee is paid to the municipality. Furthermore the developer will install sufficient taps for the use of the surrounding community as well as possible irrigation to the nearby soccer field.

**2) Refuse removal:**

During the meeting you confirmed that the municipality will provide a refuse removal service to the proposed development and that you will forward written confirmation. This service is also dependant on the payment of a standardized fee to the municipality and that a waste transfer station be established on site.

Please be so kind to forward your written confirmation, and possible conditions, on the above matters.

I trust you find this in order.

Yours faithfully

E M HAGEMAN PR TECH ENG

GREATER LETABA MUNICIPALITY

DMV LIMPOPO (PTY) LTD

## GREATER LETABA MUNICIPALITY

**APPOINTMENT OF DESIGN/SUPERVISING ENGINEER**

Proposed New Development/Services on

***PART OF PORTION 1 OF FARM SCHOONGELEGEN 432 LT***, by ***GHIORDES CC***

I/we, the undersigned, **DMV LIMPOPO (PTY) LTD** have been appointed as supervising engineer(s) the abovementioned work in terms of the specifications as per the Service Agreement inclusive of Municipal By-laws and I/we hereby undertake as follows :

A That the design of all the engineering services involved in the construction of the civil services t the abovementioned development has been/is being designed by me/us in accordance with th relevant sections of the specified Municipal Service Agreement as per the documents referre to therein. Including in particular provisions relating to demands, pressures, fire requirements loads, and stability.

B That I/we shall undertake inspection and supervision of the carrying out of the said constructior work to such an extent and at such intervals as is ordinarily and reasonably necessary in accordance with sound professional practise in order to ensure that the work is properly carried out in and is in accordance with the approved Services Agreement.

C That I/we shall as soon as possible inform the Council's Engineer if at any time in my/our opinion the work for which I/we am/are responsible, is not being carried out properly or not in accordance with the approved Services Agreement

D That I/we shall notify the Council's Engineer forthwith should my/our appointment terminate.

**SIGNATURE** ..... **DATE** 01/06/2007

**DMV LIMPOPO (PTY) LTD**

PO BOX 55825
POLOKWANE, 0700

Tel 015 296 1486 / Fax 015 296 1497

WATER USAGE:

150m² - 215m² shops - 26
470m² - 2
2210m² - 1
Total - 29

Normal shops - 26
Restaurants - 2
Anchor - Supermark - 1
Total - 29

Normal shops:
40litres/person/day
40 x 3 - 120litres/day
x 26 - 3120litres/day

Restaurants:
50litres/seat/day
1 seat/2m²
470/2/2 x 50 - 5875litres/day
x 2 - 11750litre/day

Supermark (includes butchery & Bakery):
400litre/100m² - 8850litre/day

TOTAL FOR DOMESTIC USE:
3120 + 11750 + 8850 - 23720litre/day
Peak demand:
23720 x 1.5 = 35580litre/day
Wastage and leaks:
35580 + 20% = 42696litre/day
Required flow:
42696/10hours/3600 = 1.25 litre/sec

TOTAL FOR PARKS/OPEN SPACES:
5000m² - 15000litre/day

TOTAL WATER DEMAND / DAY:
42696 + 15000 = 57696litre/day
RESERVOIR CAPACITY:
57696 x 2 (48hr cap) = 120KL
BOREHOLE REQUIREMENT:
1.25(domestic) + 0.4 (parks)
= 1.65litre/sec

SANITATION:
42696 x 80% = 35000litre/day
Estimated outflow:
35000/10/3600 = 1 litre/sec

| SECTION | DESCRIPTION | REQUIRED | PROVIDED |
|---|---|---|---|
| Area | Gross Floor Area | | 11155 m |
| A20 | Occupancy classification | F1 | F1 |
| T14 | Division area permitted | | |
| T13 | Any Combustible suspended ceiling used | None | None |
| T14 | Any Combustible floor materials used | Class 5 (Protected by Sprinkler System) | Class 5 (Protected by Sprinkler System) |
| T26 | All Markings & signposting done as per SABS 1186 | All signs to comply with SABS 1186 | All signs Comply with SABS 1186 |
| T31 | Provision of fire detection & alarm systems | Fire detection, evacuation as SABS 0139 | Fire detection, evacuation as SABS 0139 |
| T33 | Water reticulation for fire fighting equipments | 75mm Hydrants & 50mm FHR | 75mm Hydrants & 50mm FHR |
| T34 | Provision of fire hose reels | 1 for every 300m | 22 fire hose reels |
| T35 | Provision of fire hydrants | As per Municipal Requirements | As per Municipal Requirements |
| T36 | Provision of sprinkler systems | Any area exceeding 300m | Provided |
| T37 | Provision of portable fire extinguishers | 1 per 200m | 5A or 4.5kg Dry Chemical 1kgm |

Notes

| BUILDING SIZE | | Single Area | | Multiple Area |
|---|---|---|---|---|
| Site | | 138193m² | | |
| Lower Ground | | 4460m² | 1 | 4460m² |
| Upper Ground | | 3759m² | 1 | 3759m² |
| | | 2087m² | 1 | 2087m² |
| | | 0 m² | 1 | 0 m² |
| First Floor | | 849m² | 1 | 849m² |
| | | 0 m² | 1 | 0 m² |
| | | 0 m² | 1 | 0 m² |
| | | 0 m² | 1 | 0 m² |
| Footprint | 8634m² | | | |
| Lettable Area | 9294m² | | | |
| Usable Area | 8234m² | | | |
| SUB-TOTAL (excluding balc. etc) | | 9068 m² | | 9068 m² |
| TOTAL | | 11155 m² | | 11155 m² |

| CONTROL FACTOR | REQUIRED | | PROVIDED |
|---|---|---|---|
| Zoning | Special | | Special |
| Number of units | 1 | | 1 |
| Coverage | 50% | | 5% |
| G.F.A. | 69000m² | | 11155m² |
| G.L.F.A | 300000m² | | 9294m² |
| F.A.R. | 5 | | 0.1 |
| Parking | | | 250 Bays |

| No. | DATE | INITIALS | DESCRIPTION |
|---|---|---|---|
| | | | |

AMENDMENTS

DAV LIMPOPO (PTY) LIMITED
REG NO. 00/01/00/00

DEVELOPMENT MANAGEMENT AND ENGINEERING CONSULTANTS


DAV LIMPOPO - TZANEEN
PROVINCIAL BUILDING
23 PEACE STR
Tel : 015-307 2042
015-307 1267/8
Fax : 015-307 2043
EMAIL : davtzan@mweb.co.za

DAV LIMPOPO - POLOKWANE
PROLITY HOUSE
2 PIERRE STR
BEACON
Tel : 015-298 1405
FAX : 015-298 1407
EMAIL : dav.pol@absamail.co.za

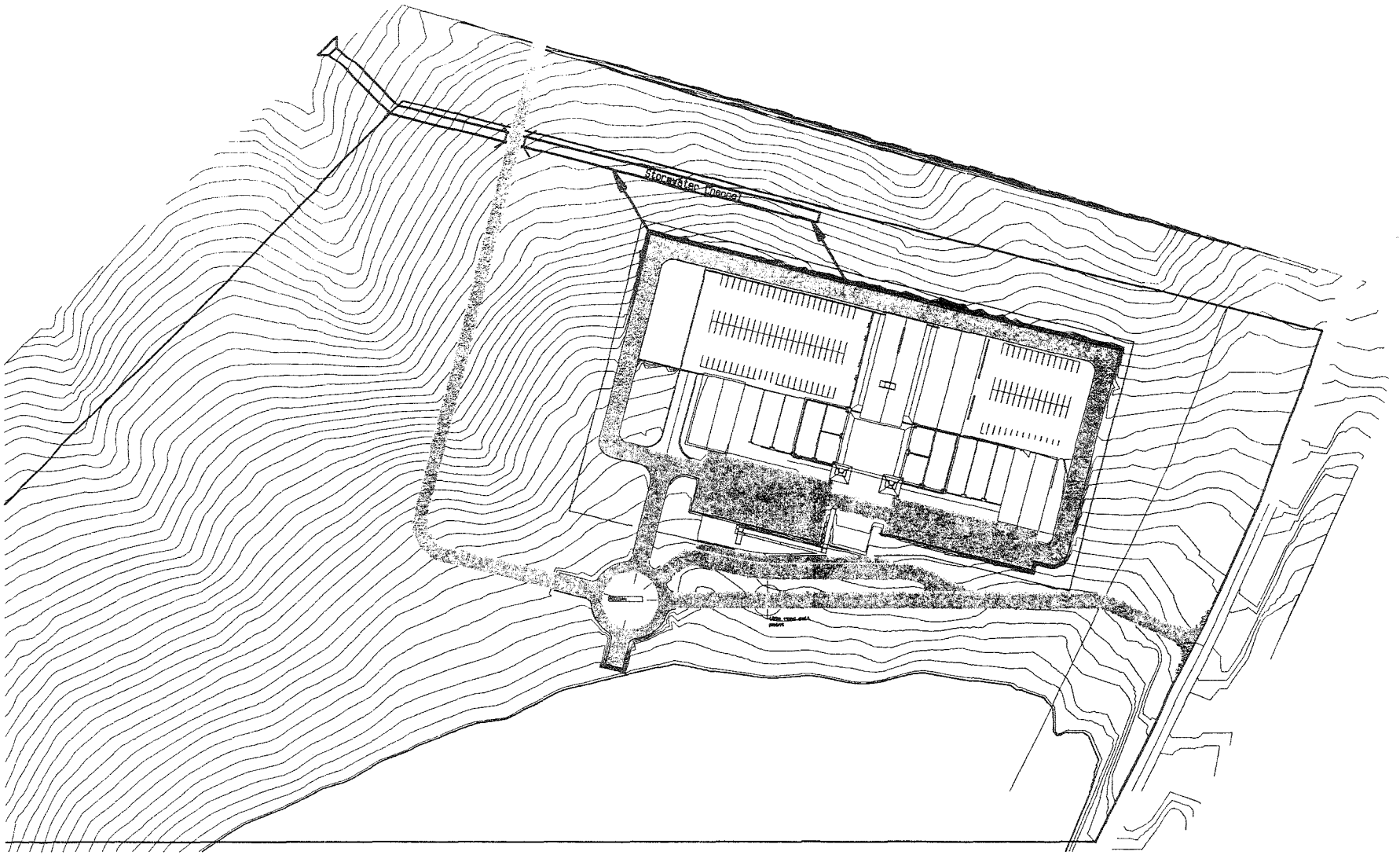

PROJECT

GHIORDES SHOPPING CENTRE
GA-KGAPANE

DESCRIPTION

DESIGN DETAIL

| | |
|---|---|
| DESIGN | E.M.H |
| CHECKED | E.M.H |
| DRAWN | E.M.H |
| ENGINEER | H.M.K |
| DATE | JUNE 2009 |
| APPROVED | |
| PRINT DATE | |
| CLIENT REF. | |
| SCALE | AS SHOWN |
| DRAWING NUMBER | 07701/000 |




| NO. | DATE | INITIALS | DESCRIPTION |
|---|---|---|---|
| | | | |

AMENDMENTS

DMV LIMPOPO (PTY) LIMITED
REG. NO. 90/01770/07

DEVELOPMENT MANAGEMENT AND
ENGINEERING CONSULTANTS

DMV LIMPOPO - TZANEEN
PROPARK BUILDING
23 PEACE STR
Tel : 015-307 2842
015-307 1287/8
Fax : 015-307 2843
EMAIL : dmv-tzn@mweb.co.za

DMV LIMPOPO - POLOKWANE
PROLITY HOUSE
2 PIERRE STR
BEACON
Tel : 015-298 1488
Fax : 015-298 1497
EMAIL : dmv.pdk@absamail.co.za

PROJECT

GHIORDES SHOPPING CENTRE
GA-KGAPANE

DESCRIPTION

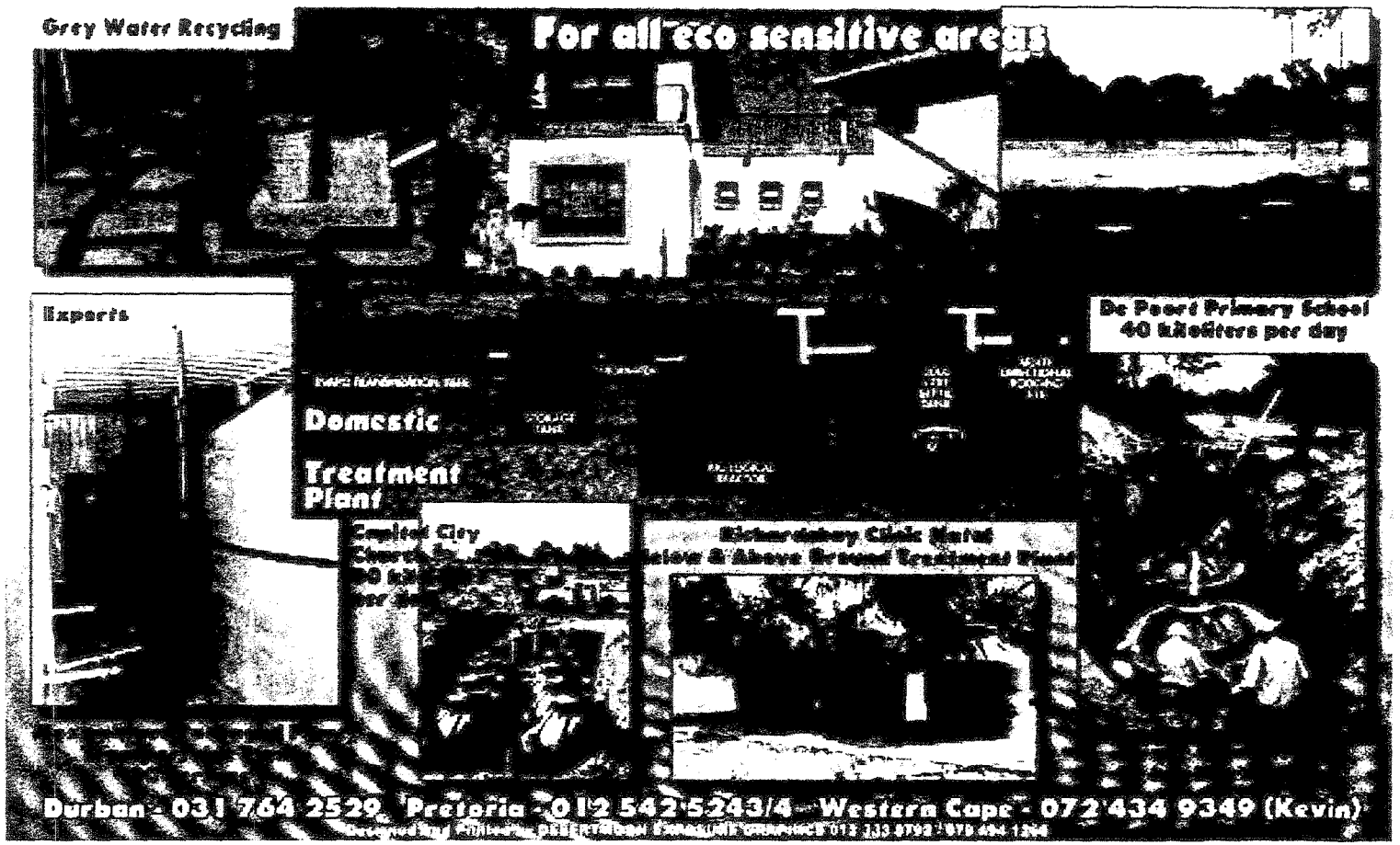
ROADS AND STORMWATER
LAYOUT

| | |
|---|---|
| DESIGN | E.M.H |
| CHECKED | E.M.H |
| DRAWN | E.M.H |
| ENGINEER | H.M.X |
| DATE | JUNE 2009 |
| APPROVED | |
| PRINT DATE | |
| CLIENT REF. | |
| SCALE | 1:1750 |
| DRAWING NUMBER | 07701/000 |

SERVICE CALCAMITE SANITARY SERVICES (PTY) LTD.

# PRESERVE & PROTECT
## Consume & Re-use

Bio-Mite Waste Water Treatment




SERVICE CALCAMITE SANITARY SERVICES (PTY) LTD.

PRESERVE & PROTECT
Consume & Re-use

Bio-Mite Waste Water Treatment

Ghiordes

| No. | DATE | INITIALS | DESCRIPTION |
|---|---|---|---|

AMENDMENTS

DMV LIMPOPO (PTY) LIMITED

REG NO. 02/01/780/07

DEVELOPMENT MANAGEMENT AND ENGINEERING CONSULTANTS

DMV LIMPOPO - TZANEEN
PROVAN BUILDING
23 PEACE STR
Tel : 015-307 2642
015-307 1267/8
FAX : 015-307 2642
EMAIL : dmvlim@mweb.co.za

DMV LIMPOPO - POLOKWANE
PROLIV HOUSE
2 PIERRE STR
BENDOR
Tel : 015-296 1488
Fax : 015-296 1487
EMAIL : dmv.pdb@smail1.co.za

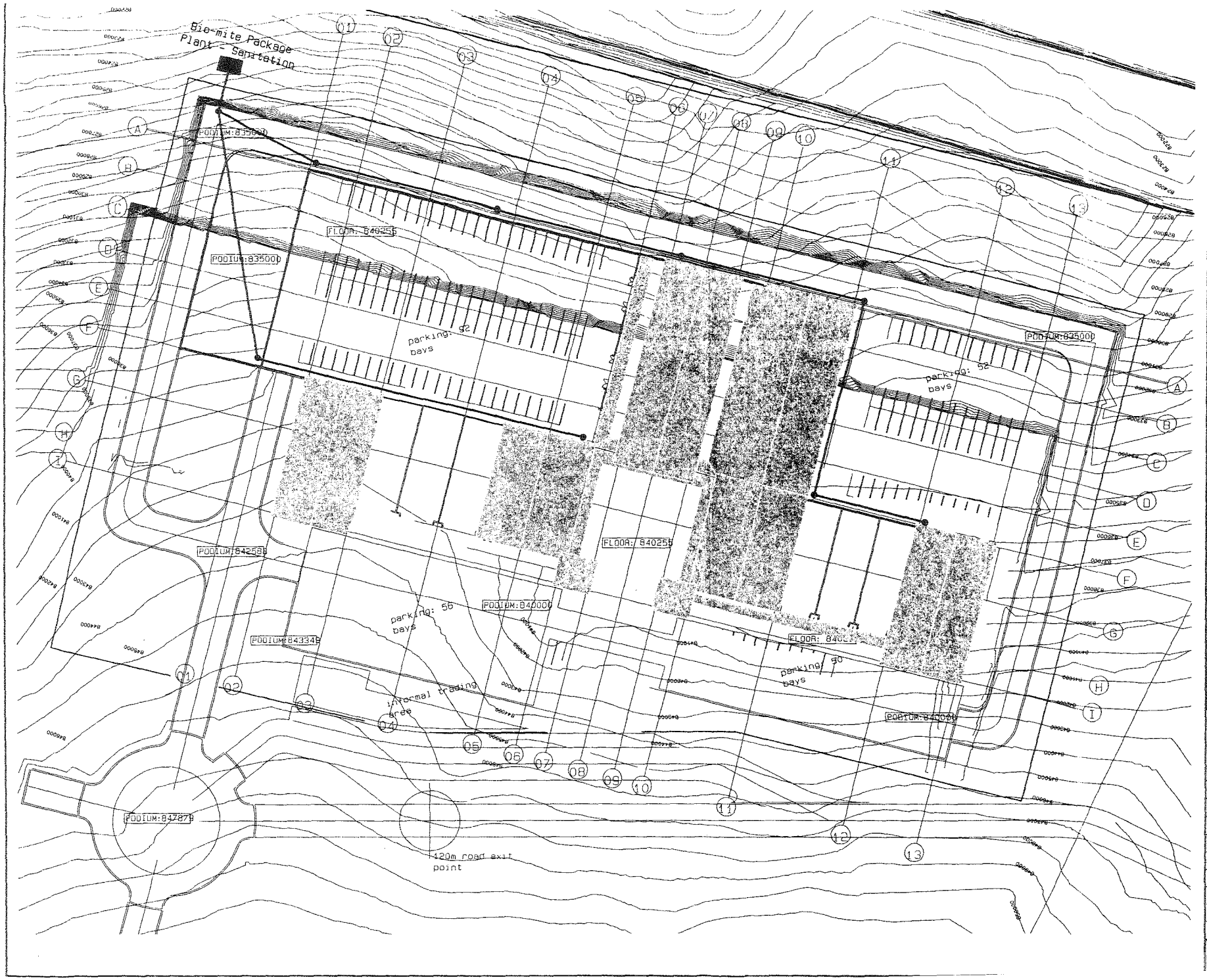
PROJECT

GHIORDES SHOPPING CENTRE
GA-KGAPANE

DESCRIPTION

DETAIL SEWER TREATMENT PLANT

| | |
|---|---|
| DESIGN | E.N.H |
| CHECKED | E.N.H |
| DRAWN | E.N.H |
| ENGINEER | H.H.K |
| DATE | JUNE 2009 |
| APPROVED | |
| PRINT DATE | |
| CLIENT REF. | |
| SCALE | N.T.S |
| DRAWING NUMBER | 07701/000 |




Sewerpipe

Sewer Manhole

| No. | DATE | INITIALS | DESCRIPTION |
|---|---|---|---|

AMENDMENTS

DWV LIMPOPO (PTY) LIMITED

REG NO. 1998/01760/07

DEVELOPMENT MANAGEMENT AND ENGINEERING CONSULTANTS

DWV LIMPOPO - TZANEEN
PROPARK BUILDING
23 PEACE STR
Tel : 015-307 2842
015-307 1267/8
Fax : 015-307 2843
EMAIL : dwvtzn@mweb.co.za

DWV LIMPOPO - POLOKWANE
PROLIV HOUSE
2 PIERRE STR
SENDER
Tel : 015-298 1486
Fax : 015-298 1487
EMAIL : dwv.pol@sosmail.co.za

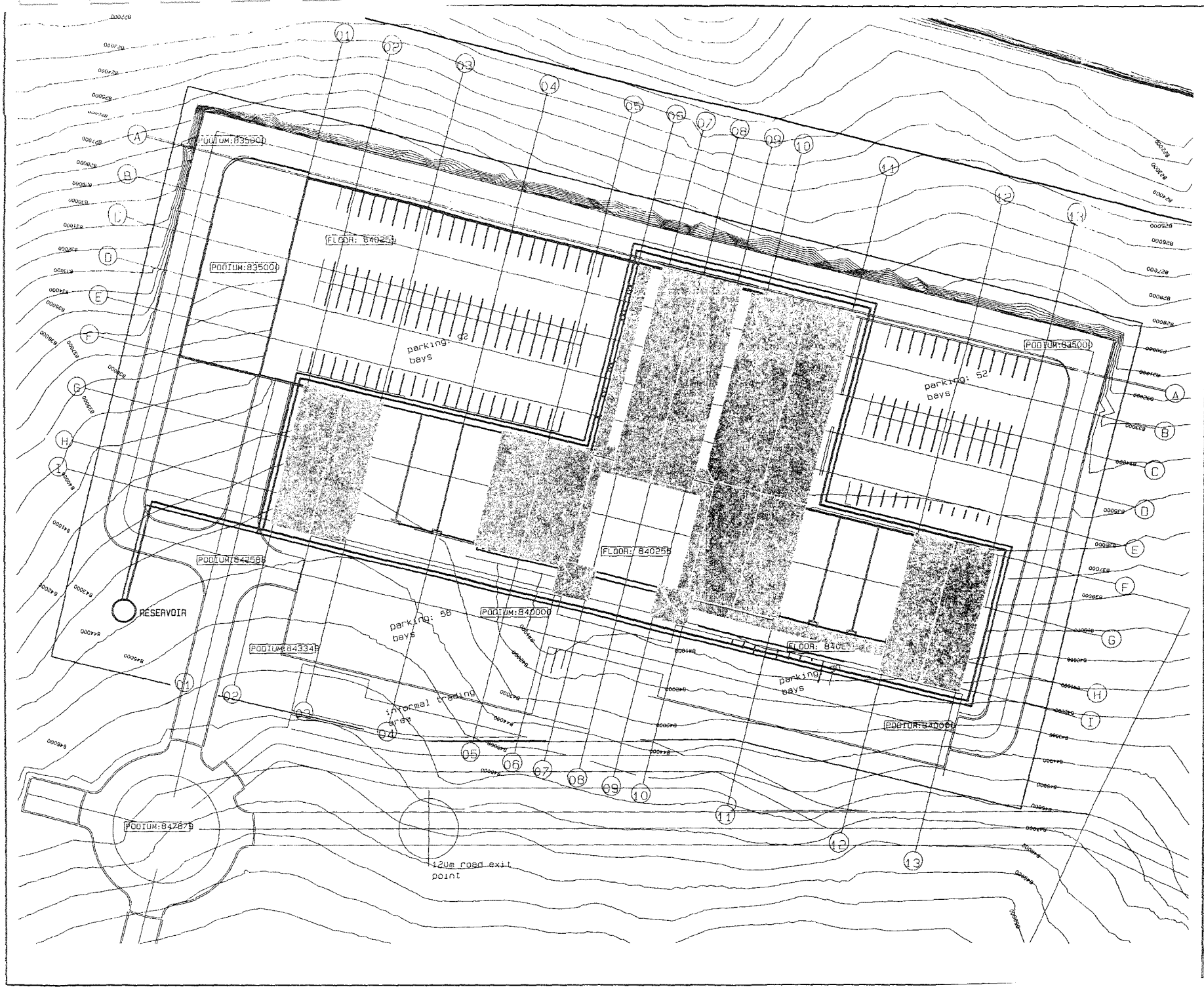
PROJECT

GHIORDES SHOPPING CENTRE
GA-KGAPANE

DESCRIPTION

ALL LEVELS
SEWER RETICULATION

| | |
|---|---|
| DESIGN | E.M.H |
| CHECKED | E.M.H |
| DRAWN | E.M.H |
| ENGINEER | H.M.K |
| DATE | JUNE 2009 |
| APPROVED | |
| PRINT DATE | |
| CLIENT REF. | |
| SCALE | 1:750 |
| DRAWING NUMBER | 07701/000 |




Water - domestic
Water - Fire

| NO. | DATE | SHEETS | DESCRIPTION |
|---|---|---|---|

AMENDMENTS

DMV LIMPOPO (PTY) LIMITED
REG. NO. 02/01/783/07

DEVELOPMENT MANAGEMENT AND ENGINEERING CONSULTANTS

DMV LIMPOPO - TZANEEN
PROPAN BUILDING
23 PEACE STR
Tel : 015-307 2842
015-307 1267/8
Fax : 015-307 2843
EMAIL : dmvlim@mweb.co.za

DMV LIMPOPO - POLOKWANE
PROLIV HOUSE
2 PIERRE STR
BENDOR
Tel : 015-298 1468
Fax : 015-298 1497
EMAIL : dmv.polokwane@ll.co.za

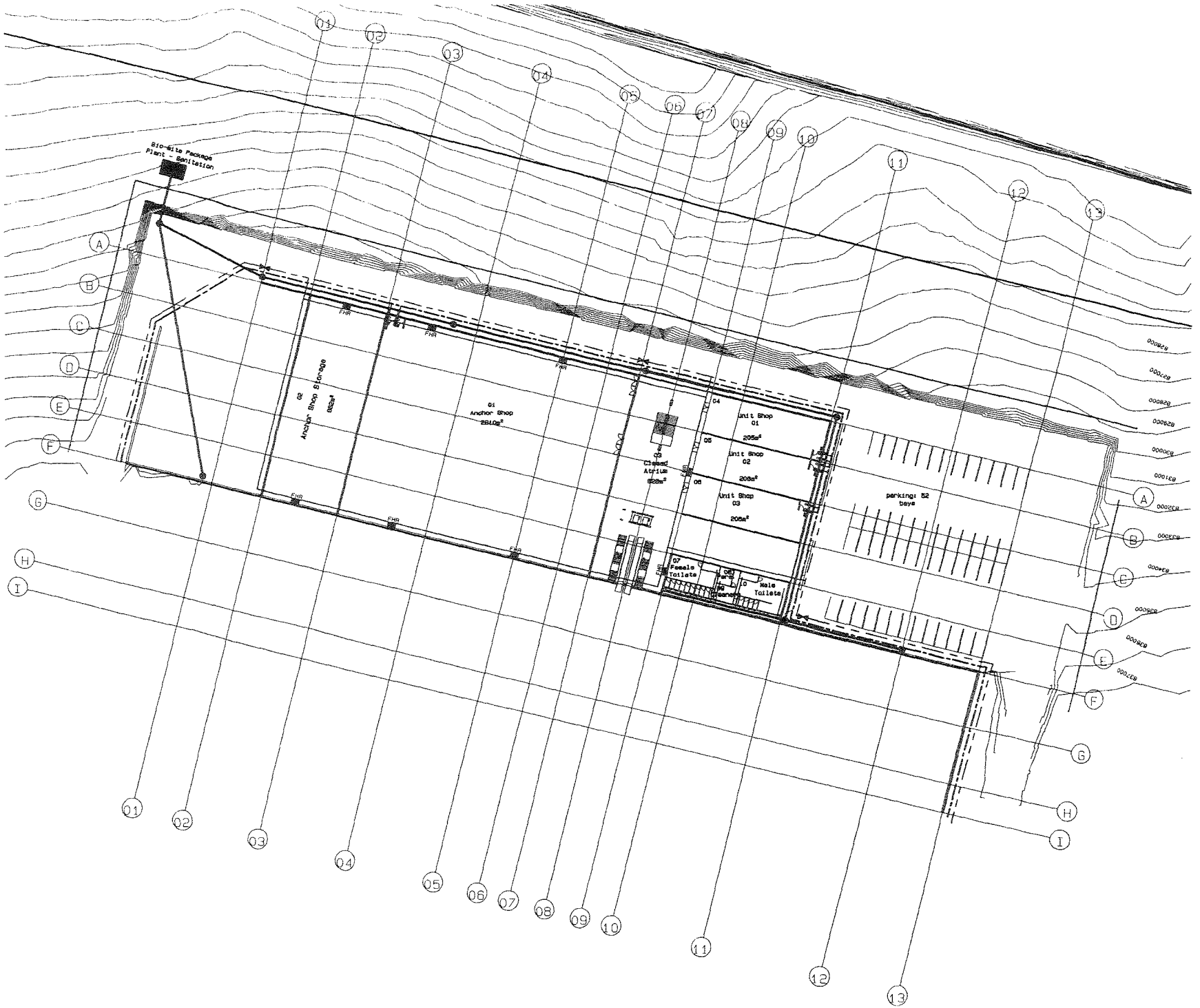
PROJECT

GHIORDES SHOPPING CENTRE
GA-KGAPANE

DESCRIPTION

ALL LEVELS
WATER RETICULATION

| | |
|---|---|
| DESIGN | E.M.H |
| CHECKED | E.M.H |
| DRAWN | E.M.H |
| ENGINEER | H.N.K |
| DATE | JUNE 2008 |
| APPROVED | |
| PRINT DATE | |
| CLIENT REF. | |
| SCALE | 1:750 |
| DRAWING NUMBER | 07701/000 |




Sewerpipe
Water - domestic
Water - Fire
Sewer Manhole
Fire Hydrant
Fire hose reel

| NO. | DATE | DETAILS | DESCRIPTION |
|---|---|---|---|

AMENDMENTS

DMV LIMPOPO (PTY) LIMITED
REG NO. 02/01783/07

DEVELOPMENT MANAGEMENT AND ENGINEERING CONSULTANTS


DMV LIMPOPO - TZANEEN
PROPARK BUILDING
22 PEACE STR
Tel : 015-307 2042
015-307 1267/8
Fax : 015-307 2843
EMAIL : dmvtzan@mweb.co.za

DMV LIMPOPO - POLOKWANE
PROLIV HOUSE
2 PIERRE STR
SENDOW
Tel : 015-296 1488
Fax : 015-296 1497
EMAIL : dmv.lpdbs@gmail.co.za

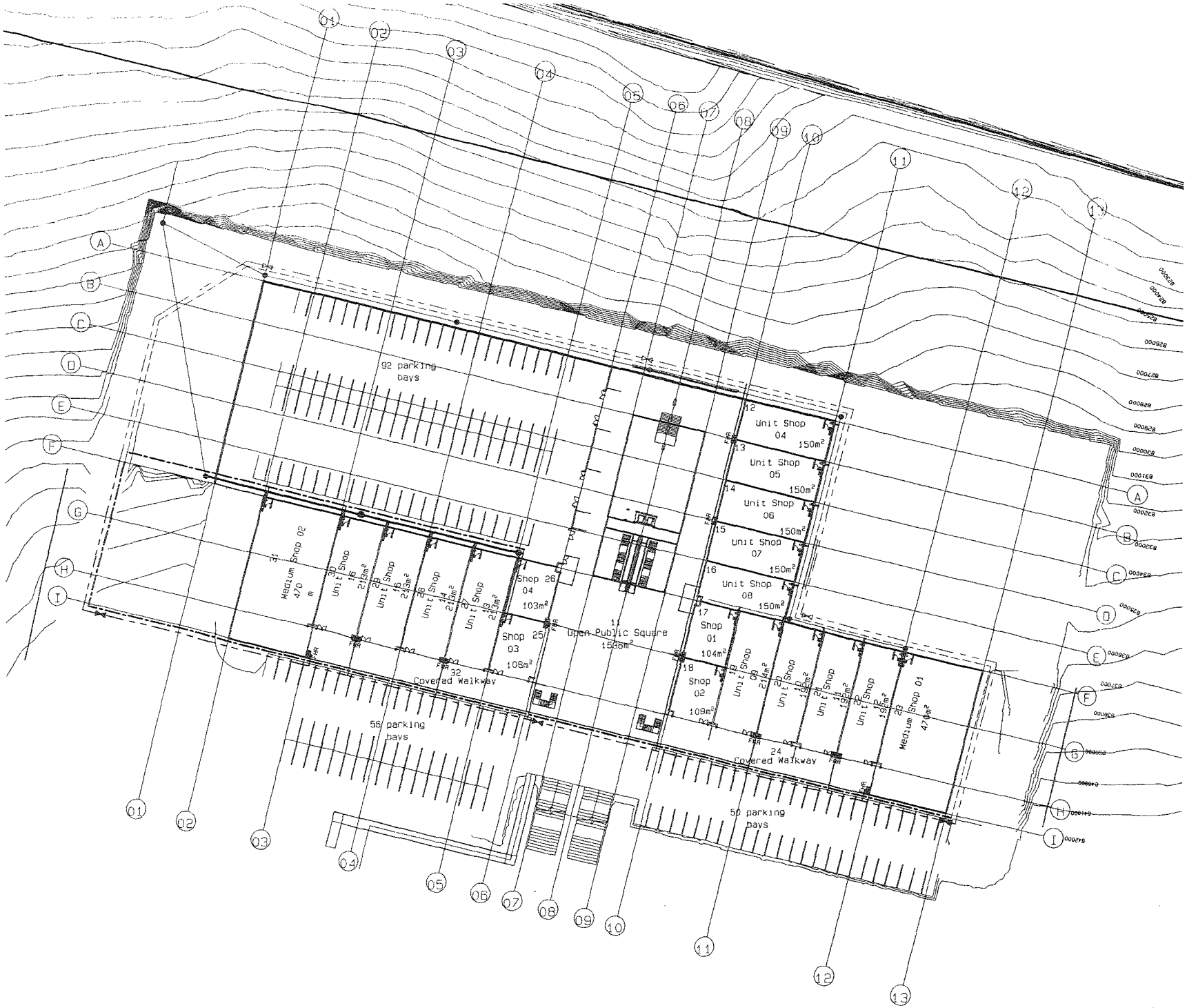

PROJECT

GHIORDES SHOPPING CENTRE
GA-KGAPANE

DESCRIPTION

LEVEL 1
WATER AND SANITATION

| | |
|---|---|
| DESIGN | E.M.H |
| CHECKED | E.M.H |
| DRAWN | E.M.H |
| ENGINEER | H.M.K |
| DATE | JUNE 2009 |
| APPROVED | |
| PRINT DATE | |
| CLIENT REF. | |
| SCALE | 1:750 |
| DRAWING NUMBER | 07701/000 |




Sewerpipe
Water - domestic
Water - Fire
Sewer Manhole
Fire Hydrant
FHR Fire hose reel

| No | DATE | DETAILS | DESCRIPTION |
|---|---|---|---|

AMENDMENTS

DWV LIMPOPO (PTY) LIMITED
REG NO. 04/01/7753/07

DEVELOPMENT MANAGEMENT AND ENGINEERING CONSULTANTS

DWV LIMPOPO - TZANEEN
PROPARK BUILDING
23 PEACE STR
Tel : 015-307 2042
015-307 1257/8
Fax : 015-307 2043
EMAIL : dwvtzn@dwvp.co.za

DWV LIMPOPO - POLOKWANE
PROLIV HOUSE
2 PIERRE STR
GEMOOR
Tel : 015-298 1488
FAX : 015-298 1487
EMAIL : dwv.polokwane@mail.co.za

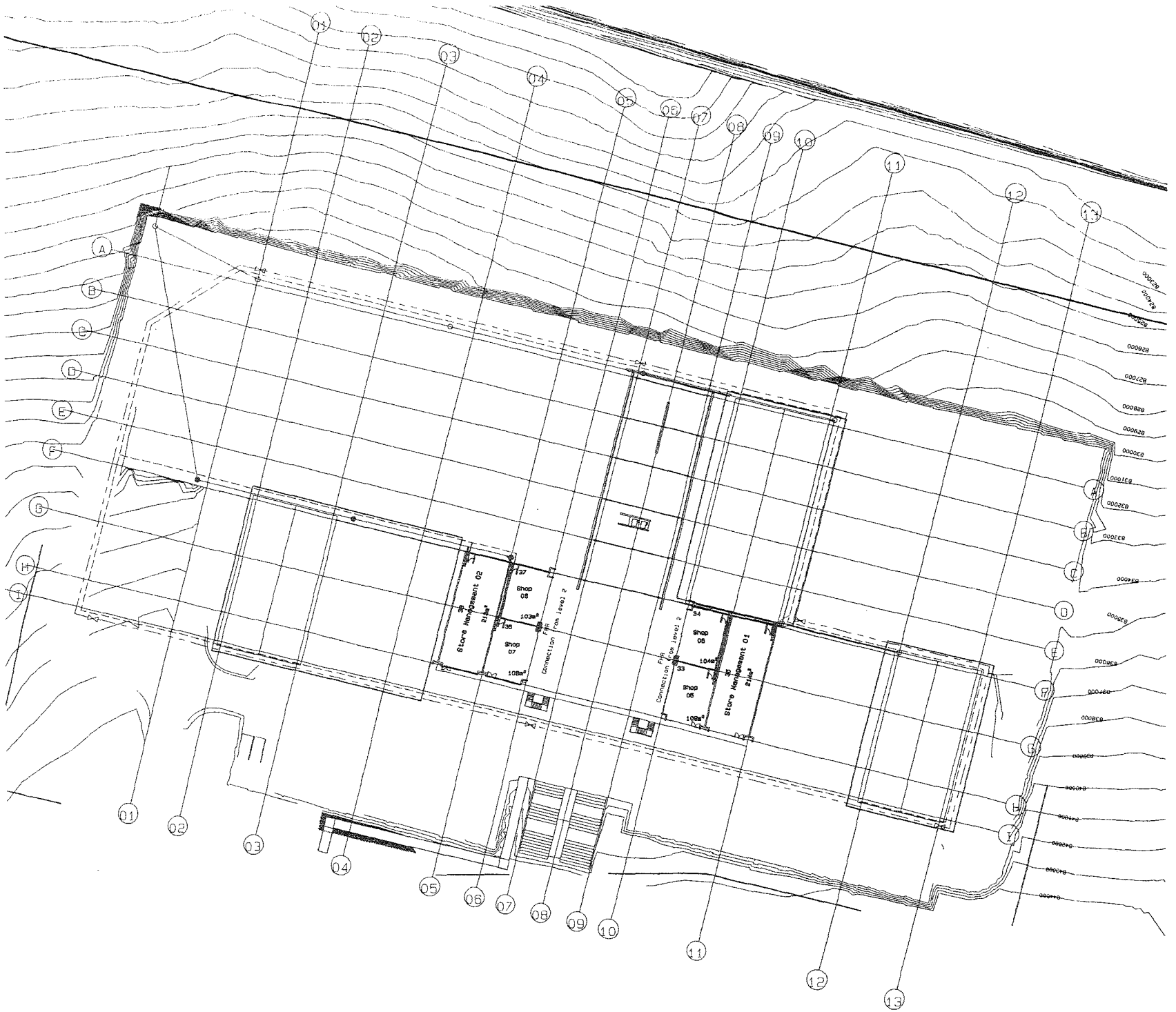
PROJECT

GHIORDES SHOPPING CENTRE
GA-KGAPANE

DESCRIPTION

LEVEL 2
WATER AND SANITATION

| | |
|---|---|
| DESIGN | E.M.H |
| CHECKED | E.M.H |
| DRAWN | E.M.H |
| ENGINEER | H.M.K |
| DATE | JUNE 2009 |
| APPROVED | |
| PRINT DATE | |
| CLIENT REF. | |
| SCALE | 1:750 |
| DRAWING NUMBER | 07701/000 |




Sewerpipe
Water - domestic
Water - Fire
Sewer Manhole
Fire Hydrant
FHR Fire hose reel

AMENDMENTS

DWV LIMPOPO (PTY) LIMITED

DEVELOPMENT MANAGEMENT AND ENGINEERING CONSULTANTS

DWV LIMPOPO - TZANEEN
PROPARK BUILDING
23 PEACE STR
Tel : 015-307 2842
015-307 1267/8
FAX : 015-307 2843
EMAIL : dwvlim@web.co.za

DWV LIMPOPO - POLOKWANE
PROLIV HOUSE
2 PIERRE STR
BENDOR
Tel : 015-298 1480
FAX : 015-298 1487
EMAIL : dwv.pdb@mweb.co.za

PROJECT

GHIORDES SHOPPING CENTRE
GA-KGAPANE

DESCRIPTION

LEVEL 3
WATER AND SANITATION

| | |
|---|---|
| DESIGN | E.M.H |
| CHECKED | E.M.H |
| DRAWN | E.M.H |
| ENGINEER | H.M.K |
| DATE | JUNE 2009 |
| APPROVED | |
| PRINT DATE | |
| CLIENT REF. | |
| SCALE | 1:750 |
| DRAWING NUMBER | 07701/000 |

# Services Agreement

GREATER LETABA MUNICIPALITY

**SCHOONGELEGEN SHOPPING CENTRE**
**PART OF PORTION 1 OF THE FARM SCHOONGELEGEN 432 LT**
**GA-KGAPANE**
**MODJADJISKLOOF**

**SERVICES AGREEMENT**

## INDEX



GREATER LETABA MUNICIPALITY

GREATER LETABA MUNICIPALITY

# SERVICES AGREEMENT

**(IN TERMS OF THE DEVELOPMENT FACILITATION ACT, 67 OF 1995)**

PROPOSED LAND DEVELOPMENT AT
Part of Portion 1 of the Farm Schoongelegen 432LT

***ENTERED INTO BY AND BETWEEN:***

**GREATER LETABA MUNICIPALITY**

**Herein represented by** .....in his capacity

as ..... and duly authorized thereto by virtue of a Resolution of the

council dated .....

(hereinafter referred to as **"the COUNCIL"**)

***AND***

**GHIORDES CC**

**Herein represented by** .....in his capacity

as .....

(hereinafter referred to as **"the OWNER"**)



GREATER LETABA MUNICIPALITY

**WHEREAS** the OWNER, is the registered owner of:

Portion 1 of the farm Schoongelegen 432, Registration Division L T, Limpopo Province
Measuring: 106.253 (One Hundred and Six comma Two Five Three) hectares
Currently held by Deed of Transfer .....

(hereinafter referred to as "the PROPERTY")

**AND WHEREAS** the Owner applied for the establishment of a land development area on the said property which will comprise, *inter alia*, of a shopping centre facilities with ancillary uses (hereinafter referred to as "the LDA");

**AND WHEREAS** the parties are desirous to enter into this Services Agreement;

**AND WHEREAS** the OWNER must, to the satisfaction of the COUNCIL, being the applicable Local Authority within whose jurisdiction the PROPERTY is situated, arrange for the supply and maintenance of the Engineering Services to and within the LDA, in terms of the provisions of the Development Facilitation Act, Act 67 of 1995 read with the Regulations and Rules as contained in Government Gazette no 17395 dated 30 August 1996 as amended as well as the founding conditions which may be applicable; and

**AND WHEREAS** the following municipal services must be supplied to the LDA:

A. The supply of water fit for human consumption;
B. The supply of a sewage drainage system;
C. The supply of an electricity service
D. The supply of stormwater drainage system
E. The supply of accessible roads
F. The provision of adequate waste management

(Hereinafter referred to as the SERVICES)

**AND WHEREAS** the COUNCIL is not required to supply these services but must, as local authority, oversee and control the installation and provision thereof to the LDA subject to the terms and conditions set out hereunder;

**AND WHEREAS** the COUNCIL requires that the OWNER, at its own cost, shall be responsible and liable for the supply of the SERVICES to the LDA;

**NOW THEREFORE THE SAID COUNCIL AND THE OWNER HEREWITH AGREE AS FOLLOWS:**

## 1.

## DEFINITIONS

1.1 In this Agreement, unless the context indicates otherwise:

1.1.1 importing the singular shall include the plural and *vice versa;*
1.1.2 importing the masculine shall include the female and neuter genders; and
1.1.3 importing juristic persons shall include natural persons and *vice versa.*

1.2 Unless the context otherwise indicates, the following words and expressions shall mean:

1.2.1 **"date of approval"** the date on which the Tribunal declares the LDA on which the specific application is applicable, an approved town in terms of the Development Facilitation Act, 67 of 1995 as amended;

1.2.2 **"water supply"** – the supply of sufficient water to the LDA;

1.2.3 **"electricity supply"** – the supply of sufficient electricity to the LDA;

1.2.4 **"sewerage management system"** – the design, supply, installation and putting into commission of a sewerage system for the LDA;

1.2.5 **"stormwater attenuation"** – the design, installation and putting into commission of an adequate stormwater drainage system for the LDA

1.2.6 **"access road"** – the design, installation and putting into commission of accessible roads to the LDA;

1.2.7 **"waste management"** – the provision of adequate waste management facilities for the LDA

1.2.8 **"the COUNCIL"** – the POLOKWANE MUNICIPALITY as proclaimed on 5 December 2000, it's Assigns or any person to whom the powers, authorities and obligations of the Municipality are delegated;

1.2.9 **"the LDA"** – refers to the Property as described above.

1.2.10 **"the SERVICES"** – refers to the water supply, electricity supply, stormwater attenuation, access road, waste management and the sewerage management system.

1.2.11 **"The Act"** – the Development Facilitation Act, 67 of 1996 read together with the Regulations and rules as contained in Government Gazette no 17395 dated 30 August 1996.





## 2.

## PLANS AND DRAWINGS

2.1 The COUNCIL may require that the OWNER shall, at his own cost, see to the design of the SERVICES and shall hall have the required plans and drawings prepared by a competent, registered, professional engineer according to the specifications, standards and guidelines which are deemed to be within the OWNER'S knowledge and which forms an integral part of this agreement. The COUNCIL may require that prior to the commencement of construction of any services by the OWNER, the OWNER shall submit to the COUNCIL, the required plans, drawn by the professional engineer, for their approval. In such instance the professional engineer shall, with lodgments of said plans, confirm in writing to the COUNCIL that he has sufficient professional indemnity insurance.

2.2 The COUNCIL may or not, in its discretion, accept said plans, and in the event of said plans not being accepted, the OWNER shall, at his own cost, see the necessary amendments thereto, to the satisfaction of the COUNCIL.

## 3.

## SUPPLY OF THE SERVICES TO THE LDA

3.1 It is recorded that:

3.1.1 Eskom will supply the electricity to the LDA;
3.1.2 An existing borehole will supply water to the LDA – municipality will maintain and client will provide taps for community + irrigation for soccerfield;
3.1.3 The municipality will supply waste management services for the LDA;
3.1.4 The client will supply a transfer station for waste management for the LDA;
3.1.5 The client will provide an access road to the LDA;
3.1.6 A septic tank sewer management system is installed or alternative will be installed at the LDA, which will be regularly cleaned on a contractual basis by the relevant service provider.

3.2 The OWNER shall, to the satisfaction of the COUNCIL and prior to the commencement of any construction works, arrange for the supply of the SERVICES to the LDA and submit written proof of the availability thereof and copies of the contracts concluded with the suppliers thereof to the COUNCIL.

3.3 The COUNCIL shall have no responsibility to supply any municipal services to the LDA except for waste removal.

3.4 The OWNER shall be liable for all the costs relating to the installation of the SERVICES, as well as the cost pertaining to any connecting services that may be required.

4.

**CESSION OF RIGHTS AND TRANSFER OF OBLIGATIONS**

The OWNER shall not be entitled to surrender, cede or transfer any of his rights or obligations in terms of this agreement, without the prior written consent of the COUNCIL.

5.

**GENERAL PROVISIONS**

5.1 Should the OWNER fail to comply with any of this agreement, the COUNCIL shall be entitled to notify the OWNER of any such failure and should the OWNER fail to rectify any such failure within 14 (FOURTEEN) days, calculated from the date of postage, by registered mail, of the COUNCIL'S notice, alternatively the date on which such notice was delivered by hand to the OWNER'S duly authorized official, the COUNCIL may, in its discretion, cancel this agreement, alternatively claim specific performance from the OWNER in terms of this agreement.

5.2 In the event of cancellation, the COUNCIL shall be entitled to claim damages from the OWNER, for damages which the COUNCIL suffered or may suffer as a result of the OWNER'S failure/neglect to comply with any provision of this agreement.

5.3 Should the COUNCIL decide to enforce this agreement and claim specific performance from the OWNER, all amounts owing by the OWNER to the COUNCIL in terms of this agreement, shall become immediately due and payable, and the COUNCIL shall further be entitled to claim from the OWNER, any damages suffered by the COUNCIL as a result of the OWNER'S failure to strictly comply with any provision of this agreement.

5.4 No concession, relaxation, indulgence or non-enforcement, which may be allowed by any party regarding any provision of this agreement, shall prejudice any of the rights of the party allowing such concession, relaxation, indulgence or non-enforcement.

5.5 In terms of Section 45 of Act 32 of 1944, the parties consent to the jurisdiction of any Magistrate's Court having jurisdiction in terms of Section 28(1) of the said Act, regarding any legal proceedings connected with this agreement. Notwithstanding the aforegoing, the COUNCIL reserves the right to institute all or any proceedings connected with this Agreement in any division of the High Court of South Africa having jurisdiction, in which event the High Court scale of the tariffs shall apply.





5.6 The parties agree that this agreement constitutes the whole of the agreement between the parties and that they entered into no other agreement, whether verbally or in writing. Any addition to or amendment of this agreement, after signature thereof, shall not be binding or enforceable, unless any such addition or amendment is reduced to writing and signed by all parties. In the event of conflicting terms between this agreement and any other documentation, the provisions of this agreement shall have preference.

6.

**DOMICILIUM CITANDI ET EXECUTANDI**

The parties choose as their *domicilium citandi et executandi,* for the services of any notices in terms of this agreement, the following:

6.1 The COUNCIL at the municipal buildings, 44 Botha str, Modjadjiskloof.

6.2 The OWNER at the PROPERTY

**THUS** done and signed for the COUNCIL at **MODJADJISKLOOF** on this ..... day of ....., in the presence of the following witnesses:

AS WITNESSES:

1. ..... .....
for **THE COUNCIL**

2. .....

**THUS** done and signed for the OWNER at **MODJADJISKLOOF** on this ..... day of ....., in the presence of the following witnesses:

AS WITNESSES:

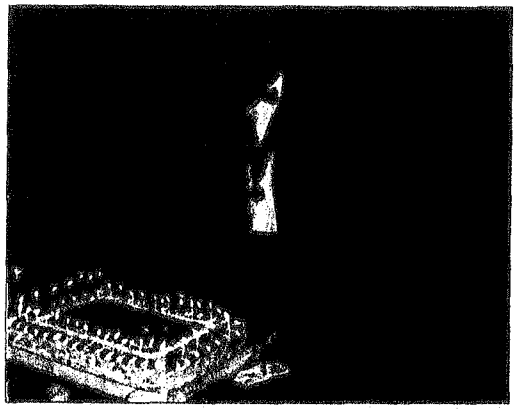
1. ..... .....
for the **OWNER**

2. .....

# APPENDIX K

## ADVERTISMENT OF SCOPING-PHASE PUBLIC MEETING AND AVAILABILITY OF DRAFT ESR FOR PUBLIC COMMENT

- Copies of newspaper advertisement
- Photos of site notices
- Proof of direct notification of stakeholders and neighbouring residents



# Malcolm new President

THE Letaba Lions Club held their presidents induction last Saturday.

The meeting was a glitzy black-tie affair held at Tzaneen Country Lodge and was attended by Lions members, business associates and guests.

Several Lions, as well as members and businesses of the community, were given awards lauding them for their contributions and their work on various projects. Letaba Herald was awarded for their involvement in the community and for their constant support and assistance in helping the Lions make a difference.

The previous Lions President, Martin Froise, graciously made way for his successor, Malcolm Banks, amidst an evening of fine dining, good company and lilting music.

Special mention should be made of one Lions member, Helmut Hanaczek. He was awarded for his 100% attendance over the past 40 years! He is the club's only Charter Member.

Just when it seemed there could be no improvement to a well rounded night, the new president, Malcolm Banks, announced that Dave Loam would make a donation of R10 000 to the club's Tzaneen Hospice project.

A well orchestrated night in celebration of the best of qualities that the Lions hold high, and hopefully, the start of a strong term for their new president.

**MALCOLM Banks, incoming president of the Lions Club, cuts the cake for the club's 40th birthday celebration in the photo left. See photo on p1.**





**PATRICK Mashaba van ZZ2, ds Edmund de Beer en Jip Bette staan voor net 'n bietjie van die items ingesamel vir behoeftige Zimbabwiërs.**





# Kerk help weer

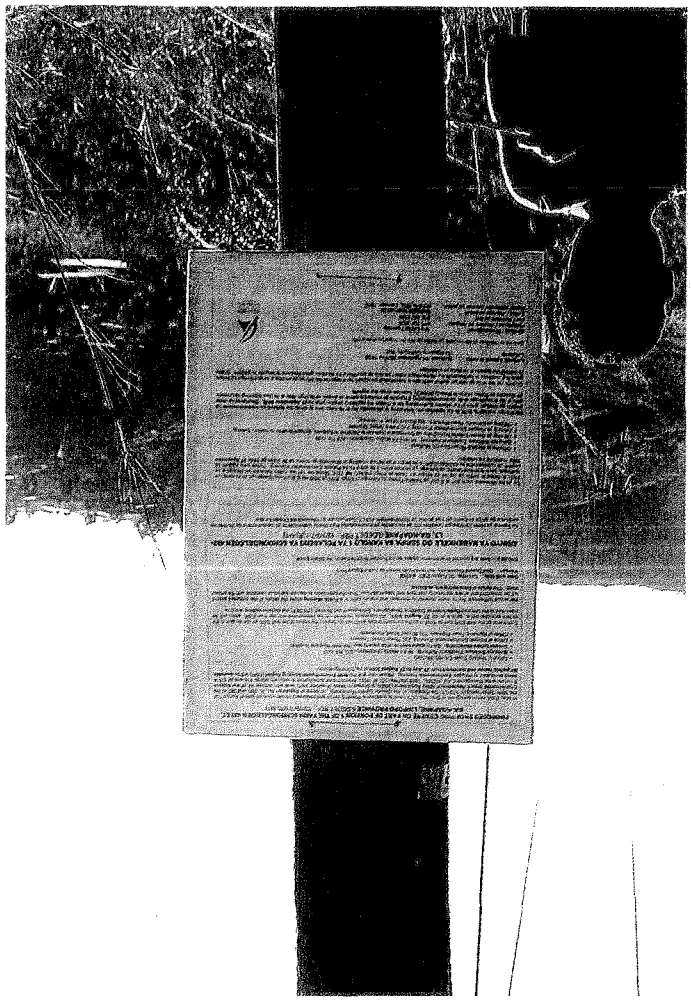
DIE Gereformeerde Kerk gaan weer vanjaar Zimbabwe toe met liefdadigheids pakkette wat daar uitgedeel gaan word.

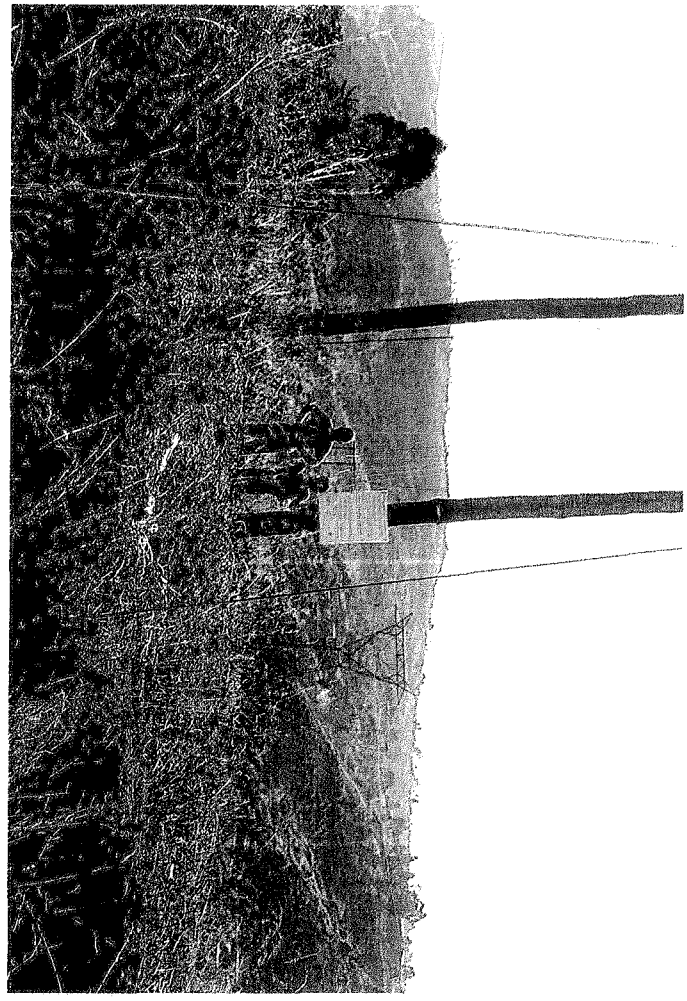
Die hele Tzaneen gemeenskap het saamgetrek om die kerk se inisiatief weer eens 'n sukses te maak.

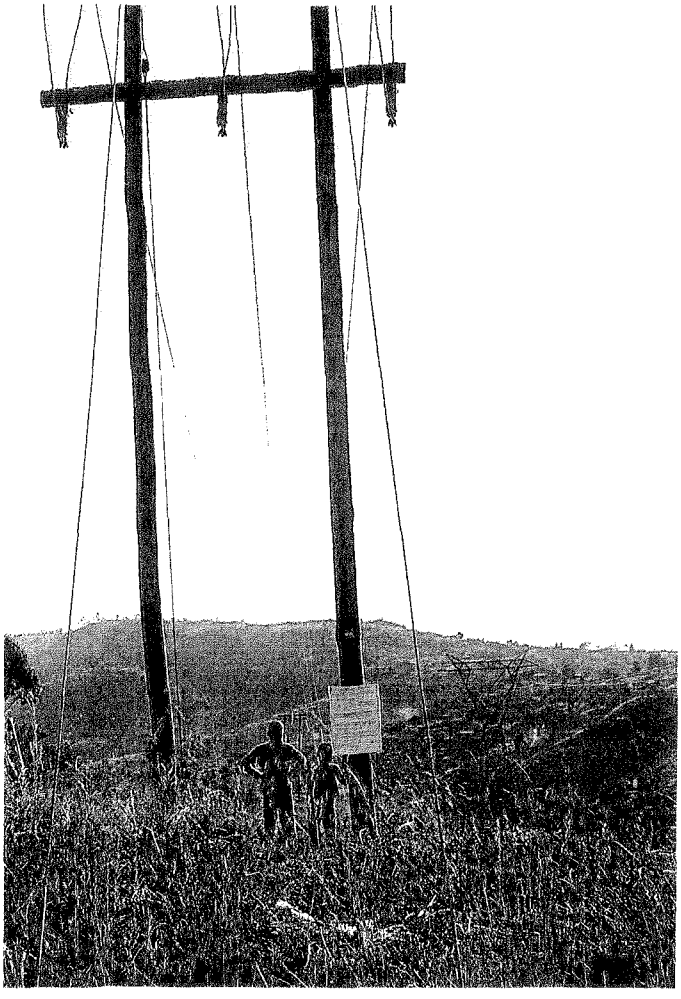
Nie bederfbare produkte soos meel, koffie, toilet papier, blikkieskos en nog meer is ingesamel, ter waarde van meer as R150 000, sowel as 600 Bybels waarmee die Woord versprei gaan word.

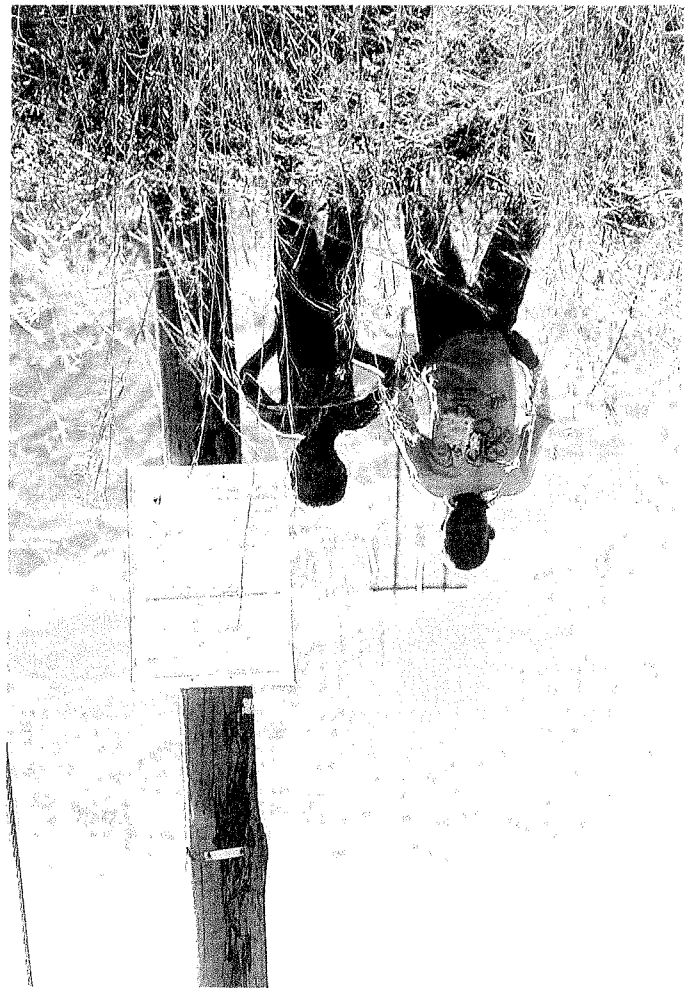
ZZ2 het ook vanjaar weer 'n trok beskikbaar gestel en werkers gereël om te help met "Operasie Zimbabwe".

Die Gereformeerde kerk hoop om aan sowat 300 persone maand pakkette te oorhandig, tussen die grens van SA, en 'n punt omtrent 80 km van die Zambiëse grens. Ds Edmund de Beer en die Gereformeerde Kerk wil graag alle betrokke partye bedank vir hulle bydraes. Dit word vir die beste van doeleindes gebruik.









MODJADJI

STOP

POLYGON
ENVIRONMENTAL PLANNING

## ENVIRONMENTAL IMPACT ASSESSMENT PROCESS:

**PROPOSED ESTABLISHMENT OF A SHOPPING CENTRE AND ASSOCIATED INFRASTRUCTURE ON PART OF PORTION 1 OF THE FARM SCHOONGELEGEN 432-LT, GA-KGAPANE, LIMPOPO PROVINCE**

**DELIVERY OF NOTICES TO SURROUNDING RESIDENTS / BUSINESSES: AVAILABILITY OF DRAFT ENVIRONMENTAL SCOPING REPORT FOR PUBLIC REVIEW AND COMMENT, 27 JULY TO 27 AUGUST 2009**

| NAME & SURNAME | COMPANY / BUSINESS | PHYSICAL ADDRESS | POSTAL ADDRESS | TELEPHONE / CELL NUMBER | FAX NUMBER / E-MAIL ADDRESS | SIGNATURE |
|---|---|---|---|---|---|---|
| Moseamela Ngwako | Bakgaga Bamapa | | Box 140 Tzaneen 0850 | 0729976701 | | Gave 30 copies of the notice to him to distribute among community. |
| Susan | Modjadji T/A | | | | | Gave 3 copies of notice. |
| Donald Ramulepe. | Local resident | | Box ~~72~~ 17 21 Kgapane. | 0787978799 | | |
| Merriam Ramboiwela | | | P.O Box 1547 Ga-Kgapane 0838 | 0834565684 | | Ramawela M.F |
| Merriam Ramalwela | Local resident | | | | | Gave notice to her, the granddaughter to give to family. |
| Elizabeth Maluluvela | OWO Mamphokhathi 0838 | | P.O. Box 1386 Ga-Kgapane 0838 | 083 953 0070 | | B.E. Maluluvela |
| Mapyosho Magdeline | 471 Mamphokhathi 0838 | | P.O. Box 1025 Ga-Kgapane 0838 | 082 293 2250 | | M.M. Mapyosho |

| | | | | | | |
|---|---|---|---|---|---|---|
| Vusokazi Simamane | Resident | Mamphakathi Village | 4438 Ga-Kgapane 0838 | 073 5390022 | | |
| Nkhwerhwi Hazel, Ntombi Zedwa | Resident | Mamphakathi Village | 4438 Ga-Kgapane 0838 | 071 926 8720 | | |
| Ramalatso Mysse | Residiat | Mmamphakathi | 7566 Ga-kgapane 0838 | 0723319015 | | |
| Raseale margaret | Resident | mmamphakathi | 4852 Ga-kgapane 0838 | 072 217 9905 | | |
| Ramoetio Tshegofatso | Resident | mmamphakathi | 4852 Ga-Kgapane 0838 | N.A | | |
| + | | | | | | |
| Magret Sekgoea | | | | | | |
| Maria Ramaepe | | | | | | |
| RAMOETO SARAH | | | | | | |
| ~~Ramoeto~~ Ramiwela Tebatso | Resident | mmamphakathi | 4852 Ga-Kgapane 0838 | | | |
| Anna Seatane | Resident and subsistence farmer on point of Pen. | | | 0798202008 | | |

********** -COMM. JOURNAL- ********** DATE 03-AUG-2009 ***** TIME 10:18 *******

MODE = MEMORY TRANSMISSION START=03-AUG 09:55 END=03-AUG 10:17

FILE NO.=198

| TN ). | COMM. | ONE-TOUCH/ ABBR NO. | STATION NAME/EMAIL ADDRESS/TELEPHONE NO. | PAGES | DURATION |
|---|---|---|---|---|---|
| 001 | OK | a | 0153099419 | 002/002 | 00:00:40 |

..*** DP-8020P ********** - - ***** - - *********

# FACSIMILE


From: Louise Agenbag
Date: 28 July 2009
Pages: 2

P O BOX 1935
TZANEEN
0850

Tel : +27(0)15 307 3606
Fax : +27(0)15 307 3080
E-mail : louise@polygon.co.za

POLYGON
ENVIRONMENTAL PLANNING


| | Attention | Company | Fax Nr. |
|---|---|---|---|
| To | The Director: Technical Services | Greater Letaba Municipality | 015 309 9419 |
| Cc | Mr H.A. Nkuna: Director – Community Services | | |
| Cc | The Assistant Director: Community Services – Waste Management | | |
| Cc | The Assistant Director: Community Services – Environmental Management | | |
| Cc | Mr William Molokomme: Director – Infrastructural Development | | |
| Cc | Hon. Cllr. D.I. Mogale: Ward Councillor – parts of Ga-Kgapane | | |
| Cc | Hon. Cllr. C.M. Mololai: Ward Councillor – parts of Ga-Kgapane | | |
| Cc | Mr Obed Sewape: Town Planner | | |

Dear Sir / Madam,

**PROPOSED SHOPPING CENTRE ON PART OF PORTION 1 OF THE FARM SCHOONGELEGEN 432-LT, GA-KGAPANE, LIMPOPO PROVINCE**

In May 2009, notice was given of Ghiordes CC's intent to establish a shopping centre and associated infrastructure on part of Portion 1 of the farm Schoongelegen 432-LT, Ga-Kgapane.

Please note that the draft Environmental Scoping Report (ESR) is available for public review and comment from 27 July to 27 August 2009 at the following venues:

- Office of Modjadji Royal Council, Modjadji
- Bakgaga BaMaupa Traditional Authority: Mr KA Maake (Secretary) – 072 719 1929
- Greater Letaba Municipality: Ga-Kgapane satellite office (next to beer hall, near Kgapane Hospital)
- Office of Polygon Environmental Planning, 21C Peace Street, Tzaneen
- Office of Kamekho Town Planners, 10a Biccard Street, Polokwane

Kindly submit your comments on the draft ESR to us at the details above, before or on 27 August 2009.

You are also cordially invited to a Public Meeting regarding this proposed project, to be held on Saturday, 8 August 2009 at 09:00 at the Ga-Kgapane Community Hall (also known as the Sasko Bakery Hall) in Ga-Kgapane.

Should you have any comments, queries or concerns, please do not hesitate to contact us.

Kind regards,

Louise Agenbag
POLYGON ENVIRONMENTAL PLANNING CC

SIV.

From: Louise Agenbag
Date: 28 July 2009
Pages: 2

P O BOX 1935
TZANEEN
0850

Tel : +27(0)15 307 3606
Fax : +27(0)15 307 3080
E-mail : louise@polygon.co.za

POLYGON
ENVIRONMENTAL PLANNING

| | Attention | Company | Fax Nr. |
|---|---|---|---|
| To | The Environmental Manager | Lepelle Northern Water | 015 295 1912 |

ear Sir / Madam,

**ROPOSED SHOPPING CENTRE ON PART OF PORTION 1 OF THE FARM SCHOONGELEGEN 432-LT, GA-GAPANE, LIMPOPO PROVINCE**

1 May 2009, notice was given of Ghiordes CC's intent to establish a **shopping centre and associated frastructure** on part of Portion 1 of the farm Schoongelegen 432-LT, Ga-Kgapane.

lease note that the **draft Environmental Scoping Report** (ESR) is **available for public review and comment** om **27 July to 27 August 2009** at the following venues:

- Office of Modjadji Royal Council, Modjadji
- Bakgaga BaMaupa Traditional Authority: Mr KA Maake (Secretary) – 072 719 1929
- Greater Letaba Municipality: Ga-Kgapane satellite office (next to beer hall, near Kgapane Hospital)
- Office of Polygon Environmental Planning, 21C Peace Street, Tzaneen
- Office of Kamekho Town Planners, 10a Biccard Street, Polokwane

ndly submit your comments on the draft ESR to us at the details above, before or on **27 August 2009**.

u are also cordially invited to a **Public Meeting** regarding this proposed project, to be held on **Saturday, 8 August 09** at **09:00** at the **Ga-Kgapane Community Hall** (also known as the Sasko Bakery Hall) in Ga-Kgapane.

ould you have any comments, queries or concerns, please do not hesitate to contact us.

d regards,

ise Agenbag
YGON ENVIRONMENTAL PLANNING CC

| NO. | COMM. | PAGES | FILE | DURATION | X/R | IDENTIFICATION | DATE | TIME | DIAGNOSTIC |
|---|---|---|---|---|---|---|---|---|---|
| 148 | 420 | 000 | 122 | 00:00:39 | RCV | | 27-JUL | 13:44 | 0000000000000 |
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| 150 | STOP | 000/002 | 124 | 00:00:00 | XMT | ☎ 0158123428 | 28-JUL | 12:34 | 0000000000000 |
| 151 | OK | 002 | 125 | 00:00:37 | XMT | ☎ 0152957404 | 28-JUL | 12:35 | 200FA2000ADC0 |
| 152 | STOP | 000/002 | 126 | 00:00:00 | XMT | ☎ 0153099419 | 28-JUL | 12:50 | 0000000000000 |
| 153 | OK | 002 | 127 | 00:02:03 | XMT | ☎ 0152974988 | 28-JUL | 12:51 | 2108A20001070 |
| 154 | OK | 002 | 128 | 00:00:41 | XMT | ☎ 0158124301 | 28-JUL | 12:55 | 010FA2000BDD0 |
| 155 | 634 | 000/002 | 129 | 00:00:00 | XMT | ☎ 0153283017 | 28-JUL | 13:11 | 0000000000000 |
| 156 | OK | 003 | 130 | 00:01:30 | XMT | ☎ 0158124200 | 28-JUL | 13:15 | 010FA2000A070 |
| 157 | STOP | 000/002 | 131 | 00:00:00 | XMT | ☎ 0158123428 | 28-JUL | 14:13 | 0000000000000 |
| 158 | STOP | 000/002 | 132 | 00:00:00 | XMT | ☎ 0153451753 | 28-JUL | 14:18 | 0000000000000 |
| 159 | OK | 002 | 133 | 00:01:33 | XMT | ☎ 0153071282 | 28-JUL | 14:19 | 010FA2000A070 |
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| 164 | 634 | 000/002 | 137 | 00:00:00 | XMT | ☎ 0158123428 | 28-JUL | 15:27 | 0000000000000 |
| 165 | OK | 002/002 | 139 | 00:00:26 | XMT | ☎ 0158122889 | 28-JUL | 15:29 | 010FA2000BDC0 |
| 166 | 634 | 000/002 | 140 | 00:00:00 | XMT | ☎ 0153451753 | 28-JUL | 15:45 | 0000000000000 |
| 167 | 634 | 000/002 | 141 | 00:00:00 | XMT | ☎ 0153078049 | 28-JUL | 15:47 | 0000000000000 |
| 168 | OK | 002 | 142 | 00:00:30 | XMT | ☎ 0214624509 | 28-JUL | 15:49 | 010FA2000ADC0 |
| 169 | OK | 002 | 143 | 00:00:32 | XMT | ☎ 0158124301 | 28-JUL | 15:51 | 010FA2000BDD0 |
| 170 | OK | 002 | 144 | 00:00:35 | XMT | ☎ 0153079955 | 28-JUL | 15:54 | 210FA2000ADC0 |
| 171 | OK | 002 | 145 | 00:00:33 | XMT | ☎ 0152957404 | 28-JUL | 15:56 | 200FA2000ADC0 |
| 172 | OK | 002 | 147 | 00:00:30 | XMT | ☎ 0153071621 | 28-JUL | 16:00 | 010FA2000ADD0 |
| 173 | STOP | 000/002 | 146 | 00:00:00 | XMT | ☎ 0152974988 | 28-JUL | 16:11 | 0000000000000 |
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| 175 | OK | 002 | 149 | 00:00:51 | XMT | ☎ 0153110004 | 28-JUL | 16:16 | 010FA2000A070 |
| 176 | OK | 002/002 | 150 | 00:01:12 | XMT | ☎ 0153284028 | 28-JUL | 16:23 | 010FA2000A070 |
| 177 | OK | 002 | 152 | 00:00:42 | XMT | ☎ 0152951912 | 28-JUL | 16:28 | 010FA2000AD20 |
| 178 | 634 | 000/002 | 151 | 00:00:00 | XMT | ☎ 0158123428 | 28-JUL | 16:35 | 0000000000000 |
| 179 | OK | 001 | 153 | 00:00:17 | RCV | | 28-JUL | 16:39 | 0507C0000BCD0 |
| 180 | OK | 001 | 154 | 00:00:37 | RCV | | 28-JUL | 18:20 | 0507C00009070 |
| 181 | OK | 001/001 | 155 | 00:01:06 | XMT | ☎ 0152974988 | 29-JUL | 01:37 | 2108A20001070 |
| 182 | OK | 003 | 156 | 00:00:41 | XMT | ☎ 0152954013 | 29-JUL | 08:15 | F10FA2000BDD0 |
| 183 | OK | 002 | 157 | 00:00:22 | XMT | ☎ 0159641075 | 29-JUL | 10:35 | 010FA2000ADB0 |
| 184 | OK | 001 | 158 | 00:00:36 | RCV | | 29-JUL | 13:25 | 0507C0000A070 |
| 185 | OK | 001 | 159 | 00:00:37 | RCV | | 29-JUL | 13:26 | 0507C0000A070 |
| 186 | OK | 001 | 160 | 00:00:36 | RCV | | 29-JUL | 13:27 | 0507C0000A070 |
| 187 | OK | 001 | 161 | 00:00:36 | RCV | | 29-JUL | 13:28 | 0507C0000A070 |
| 188 | OK | 002 | 162 | 00:00:55 | RCV | 0153071276 | 30-JUL | 09:37 | 0502C00001070 |
| 189 | OK | 002 | 163 | 00:00:21 | RCV | 0152957403 | 30-JUL | 09:42 | 0507C0000BCC0 |
| 190 | OK | 001/001 | 164 | 00:00:21 | XMT | ☎ 0152955015 | 30-JUL | 09:47 | F00FA2000BC90 |
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| 196 | OK | 002 | 171 | 00:00:35 | XMT | ☎ 0152764998 | 30-JUL | 15:33 | 010FA2000BDB0 |
| 197 | OK | 015/015 | 168 | 00:02:24 | XMT | ☎ 0153072480 | 30-JUL | 15:36 | 000FA2000BDC0 |

<< CONTINUE >>

***** DP-8020P ********** ***** *********

:********** -COMM. JOURNAL- ********** DATE 30-JUL-2009 ***** TIME 16:18 *******

MODE = MEMORY TRANSMISSION START=30-JUL 16:17 END=30-JUL 16:18

FILE NO.=178

| N | COMM. | ONE-TOUCH/ ABBR NO. | STATION NAME/EMAIL ADDRESS/TELEPHONE NO. | PAGES | DURATION |
|---|---|---|---|---|---|
| 01 | OK | | 0158123428 | 002/002 | 00:00:30 |

**** DP-8020P ********** - - ***** - - *********

# FACSIMILE


From: Louise Agenbag
Date: 28 July 2009

Pages: 2

P O BOX 1935
TZANEEN
0850

Tel : +27(0)15 307 3606
Fax : +27(0)15 307 3080
E-mail : louise@polygon.co.za

POLYGON
ENVIRONMENTAL PLANNING


| | Attention | Company | Fax Nr. |
|---|---|---|---|
| To | Mrs ME Madzibane | Limpopo Department of Agriculture (District Manager: Mopani) | 015 812 3428 |
| | Mr Letsoalo | Department of Agriculture (Letaba Office) | 015 328 4028 |
| | Mr Nyandani | Limpopo Department of Agriculture | 015 812 3428 |

Dear Sirs and Madam,

**PROPOSED SHOPPING CENTRE ON PART OF PORTION 1 OF THE FARM SCHOONGELEGEN 432-LT, GA-KGAPANE, LIMPOPO PROVINCE**

In May 2009, notice was given of Ghiordes CC's intent to establish a **shopping centre and associated infrastructure** on part of Portion 1 of the farm Schoongelegen 432-LT, Ga-Kgapane.

Please note that the **draft Environmental Scoping Report** (ESR) is **available for public review and comment** from **27 July to 27 August 2009** at the following venues:

- Office of Modjadji Royal Council, Modjadji
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- Office of Polygon Environmental Planning, 21C Peace Street, Tzaneen
- Office of Kamekho Town Planners, 10a Biccard Street, Polokwane

Kindly submit your comments on the draft ESR to us at the details above, before or on **27 August 2009**.

You are also cordially invited to a **Public Meeting** regarding this proposed project, to be held on **Saturday, 8 August 2009** at **09:00** at the **Ga-Kgapane Community** Hall (also known as the Sasko Bakery Hall) in Ga-Kgapane.

Should you have any comments, queries or concerns, please do not hesitate to contact us.

Kind regards,

**Louise Agenbag**
POLYGON ENVIRONMENTAL PLANNING CC

********** -COMM. JOURNAL- ********** DATE 28-JUL-2009 ***** TIME 16:30 *******

MODE = MEMORY TRANSMISSION START=28-JUL 16:26 END=28-JUL 16:30

FILE NO.=152

| STN NO. | COMM. | ONE-TOUCH/ ABBR NO. | STATION NAME/EMAIL ADDRESS/TELEPHONE NO. | PAGES | DURATION |
|---|---|---|---|---|---|
| 001 | OK | 8 | 0152951912 | 002/002 | 00:00:42 |

***** DP-8020P ********** - - ***** - - *********

# FACSIMILE


From: Louise Agenbag
Date: 28 July 2009
Pages: 2

P O BOX 1935
TZANEEN
0850

Tel : +27(0)15 307 3606
Fax : +27(0)15 307 3080
E-mail : louise@polygon.co.za

POLYGON
ENVIRONMENTAL PLANNING


| | Attention | Company | Fax Nr. |
|---|---|---|---|
| To | The Environmental Manager | Lepelle Northern Water | 015 295 1912 |

Dear Sir / Madam,

**PROPOSED SHOPPING CENTRE ON PART OF PORTION 1 OF THE FARM SCHOONGELEGEN 432-LT, GA-KGAPANE, LIMPOPO PROVINCE**

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Should you have any comments, queries or concerns, please do not hesitate to contact us.

Kind regards,

**Louise Agenbag**
POLYGON ENVIRONMENTAL PLANNING CC

**Louise Agenbag**

**From:** Louise Agenbag [louise@polygon.co.za]
**Sent:** 28 July 2009 08:08 PM
**To:** 'phine@sahra.org.za'; 'mleslie@sahra.org'
**Subject:** Proposed Schoongelegen shopping centre: Notice of Public Meeting and draft ESR availability
**Attachments:** Schoongelegen_notice of PM and draft ESR.pdf

Dear Ms Hine / Ms Leslie

**PROPOSED ESTABLISHMENT OF A SHOPPING CENTRE AND ASSOCIATED INFRASTRUCTURE ON PART OF PORTION 1 OF THE FARM SCHOONGELEGEN 432-LT, GA-KGAPANE, LIMPOPO PROVINCE**

With regards to the Environmental Impact Assessment (EIA) being undertaken for the above-mentioned proposed project, herewith please find notification of the availability of the **draft Environmental Scoping Report** (ESR) for review and comment by stakeholders and the public. The report is available from 27 **July to 27 August 2009** at the following venues:

- Office of Modjadji Royal Council, Modjadji
- Bakgaga BaMaupa Traditional Authority: Mr KA Maake (Secretary) – 072 719 1929
- Greater Letaba Municipality: Ga-Kgapane satellite office (next to beer hall, near Kgapane Hospital)
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Should you have any comments, queries or concerns, kindly contact us before or on 27 August 2009.

Kind regards,

*Louise Agenbag*
*Environmental Scientist*

***Polygon Environmental Planning CC***
*Tel: 015 307 3606*
*Fax: 015 307 3080*
*Cell: 083 339 2731*
*E-mail: louise@polygon.co.za*
*PO Box 1935, TZANEEN, 0850*

POLYGON

***John 3:16 - "For God so loved the world that he gave his only begotten son, that whosoever believeth in him should not perish, but have everlasting life."***

**Louise Agenbag**

**From:** Louise Agenbag [louise@polygon.co.za]
**Sent:** 28 July 2009 08:06 PM
**To:** 'tshivhasesp@ral.co.za'
**Subject:** Proposed Schoongelegen shopping centre: Notice of Public Meeting and draft ESR availability
**Attachments:** Schoongelegen_notice of PM and draft ESR.pdf

Dear Sheni

**PROPOSED ESTABLISHMENT OF A SHOPPING CENTRE AND ASSOCIATED INFRASTRUCTURE ON PART OF PORTION 1 OF THE FARM SCHOONGELEGEN 432-LT, GA-KGAPANE, LIMPOPO PROVINCE**

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Should you have any comments, queries or concerns, kindly contact us before or on 27 August 2009.

Kind regards,

*Louise Agenbag*
*Environmental Scientist*

***Polygon Environmental Planning CC***
*Tel: 015 307 3606*
*Fax: 015 307 3080*
*Cell: 083 339 2731*
*E-mail: louise@polygon.co.za*
*PO Box 1935, TZANEEN, 0850*

POLYGON

***John 3:16 - "For God so loved the world that he gave his only begotten son, that whosoever believeth in him should not perish, but have everlasting life."***

**Louise Agenbag**

**From:** Louise Agenbag [louise@polygon.co.za]
**Sent:** 28 July 2009 08:05 PM
**To:** Marencia Kekana (kekanama@dwaf.gov.za); 'matukaa@dwaf.gov.za'; 'ombim@mopani.gov.za'; Magdeline Msimanga (msimangam@dwaf.gov.za); 'pramalamula@lp.sahra.org.za'; 'Ngobenir'; 'obed@glm.gov.za'; 'katem@glm.gov.za'; 'William Molokomme'; 'idlu@mweb.co.za'; 'wessa@limpopomail.co.za'; 'lekgolo@crp.org.za'; 'ramaselela@telkomsa.net'; 'ReneO@L2B.co.za'; 'louis.weber@mondibp.com'
**Subject:** Proposed Schoongelegen shopping centre: Notice of Public Meeting and draft ESR availability
**Attachments:** Schoongelegen notice of PM and draft ESR.pdf

Dear Interested and/or Affected Party

**PROPOSED ESTABLISHMENT OF A SHOPPING CENTRE AND ASSOCIATED INFRASTRUCTURE ON PART OF PORTION 1 OF THE FARM SCHOONGELEGEN 432-LT, GA-KGAPANE, LIMPOPO PROVINCE**

With regards to the Environmental Impact Assessment (EIA) being undertaken for the above-mentioned proposed project, herewith please find notification of the availability of the **draft Environmental Scoping Report** (ESR) for review and comment by stakeholders and the public. The report is available from **27 July to 27 August 2009** at the following venues:

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- Bakgaga BaMaupa Traditional Authority: Mr KA Maake (Secretary) – 072 719 1929
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- Office of Polygon Environmental Planning, 21C Peace Street, Tzaneen
- Office of Kamekho Town Planners, 10a Biccard Street, Polokwane

You are also cordially invited to a **Public Meeting** regarding this proposed project, to be held on **Saturday, 8 August 2009** at **09:00** at the **Ga-Kgapane Community Hall** (also known as the Sasko Bakery Hall) in Ga-Kgapane.

Should you have any comments, queries or concerns, kindly contact us before or on 27 August 2009.

Kind regards,

*Louise Agenbag*
*Environmental Scientist*

***Polygon Environmental Planning CC***
*Tel: 015 307 3606*
*Fax: 015 307 3080*
*Cell: 083 339 2731*
*E-mail: louise@polygon.co.za*
*PO Box 1935, TZANEEN, 0850*

POLYGON

***John 3:16 - "For God so loved the world that he gave his only begotten son, that whosoever believeth in him should not perish, but have everlasting life."***

**Louise Agenbag**

**From:** Louise Agenbag [louise@polygon.co.za]
**Sent:** 28 July 2009 08:26 PM
**To:** 'mleslie@sahra.org.za'
**Subject:** Proposed Schoongelegen shopping centre: Notice of Public Meeting and draft ESR availability
**Attachments:** Schoongelegen_notice of PM and draft ESR.pdf

Dear Ms Leslie

**PROPOSED ESTABLISHMENT OF A SHOPPING CENTRE AND ASSOCIATED INFRASTRUCTURE ON PA PORTION 1 OF THE FARM SCHOONGELEGEN 432-LT, GA-KGAPANE, LIMPOPO PROVINCE**

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Should you have any comments, queries or concerns, kindly contact us before or on 27 August 2009.

Kind regards,

*Louise Agenbag*
*Environmental Scientist*

***Polygon Environmental Planning CC***
*Tel: 015 307 3606*
*Fax: 015 307 3080*
*Cell: 083 339 2731*
*E-mail: louise@polygon.co.za*
*PO Box 1935, TZANEEN, 0850*

POLYGON
ENVIRONMENTAL PLANNING

***John 3:16 - "For God so loved the world that he gave his only begotten son, that whosoever believeth in him should not perish, but have everlasting life."***

********** -COMM. JOURNAL- ********** DATE 28-JUL-2009 ***** TIME 12:36 *****

MODE = MEMORY TRANSMISSION START=28-JUL 12:34 END=28-JUL 12:36

FILE NO.=125

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..*** DP-8020P ********** - - ***** - - *********

# FACSIMILE


From: Louise Agenbag
Date: 28 July 2009
Pages: 2

P O BOX 1935
TZANEEN
0850

Tel : +27(0)15 307 3606
Fax : +27(0)15 307 3080
E-mail : louise@polygon.co.za

POLYGON
ENVIRONMENTAL PLANNING


| | Attention | Company | Fax Nr. |
|---|---|---|---|
| To | Mr Blessing Mphila | **Department of Rural Development and Land Reform:** Limpopo Regional Land Claims Commissioner | 015 295 7404 |

Dear Mr Mphila,

**PROPOSED SHOPPING CENTRE ON PART OF PORTION 1 OF THE FARM SCHOONGELEGEN 432-LT, GA-KGAPANE, LIMPOPO PROVINCE**

In May 2009, notice was given of Ghiordes CC's intent to establish a **shopping centre and associated infrastructure** on part of Portion 1 of the farm Schoongelegen 432-LT, Ga-Kgapane.

Please note that the **draft Environmental Scoping Report** (ESR) is **available for public review and comment** from **27 July to 27 August 2009** at the following venues:

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Kindly submit your comments on the draft ESR to us at the details above, before or on **27 August 2009**.

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Should you have any comments, queries or concerns, please do not hesitate to contact us.

Kind regards,

**Louise Agenbag**
POLYGON ENVIRONMENTAL PLANNING CC

********** -COMM. JOURNAL- ********** DATE 28-JUL-2009 ***** TIME 12:54 *****

MODE = MEMORY TRANSMISSION START=28-JUL 12:51 END=28-JUL 12:54

FILE NO.=127

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***** DP-8020P ********** - - ***** - - *********

# FACSIMILE


From: Louise Agenbag
Date: 28 July 2009
Pages: 2

P O BOX 1935
TZANEEN
0850

Tel : +27(0)15 307 3606
Fax : +27(0)15 307 3080
E-mail : louise@polygon.co.za

POLYGON
ENVIRONMENTAL PLANNING


| | Attention | Company | Fax Nr. |
|---|---|---|---|
| To | The Chief Director | **Department of Rural Development and Land Reform:** Provincial Land Reform Office | 015 297 4988 |

Dear Sir,

**PROPOSED SHOPPING CENTRE ON PART OF PORTION 1 OF THE FARM SCHOONGELEGEN 432-LT, GA-KGAPANE, LIMPOPO PROVINCE**

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Should you have any comments, queries or concerns, please do not hesitate to contact us.

Kind regards,

**Louise Agenbag**
POLYGON ENVIRONMENTAL PLANNING CC

********** -COMM. JOURNAL- ********** DATE 28-JUL-2009 ***** TIME 12:56 *****

MODE = MEMORY TRANSMISSION START=28-JUL 12:55 END=28-JUL 12:56

FILE NO.=128

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***** DP-8020P ********** - - ***** - - ********

# FACSIMILE


From: Louise Agenbag
Date: 28 July 2009
Pages: 2

P O BOX 1935
TZANEEN
0850

Tel : +27(0)15 307 3606
Fax : +27(0)15 307 3080
E-mail : louise@polygon.co.za

POLYGON
ENVIRONMENTAL PLANNING


| | Attention | Company | Fax Nr. |
|---|---|---|---|
| To | **Mr Robert Ngobeni**<br>- Assistant Director: Planning and Development Division | Mopani District Municipality | 015 812 4301 |
| | **Ms MO Mathebula**<br>- Director: Community Services | Mopani District Municipality | 015 812 4301 / 4570 |

Dear Sir and Madam,

**PROPOSED SHOPPING CENTRE ON PART OF PORTION 1 OF THE FARM SCHOONGELEGEN 432-LT, GA-KGAPANE, LIMPOPO PROVINCE**

In May 2009, notice was given of Ghiordes CC's intent to establish a **shopping centre and associated infrastructure** on part of Portion 1 of the farm Schoongelegen 432-LT, Ga-Kgapane.

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Should you have any comments, queries or concerns, please do not hesitate to contact us.

Kind regards,

**Louise Agenbag**
POLYGON ENVIRONMENTAL PLANNING CC

POLYGON ENVIRONMENTAL PLANNING CC

Tel : (015) 307 3606
Cell : 083 339 2731
Fax : (015) 307 3080
E-mail : louise@polygon.co.za

Premier Plaza Block C
21 Peace Street
PO Box 1935
Tzaneen 0850

CK nr: 2007/049025/23
VAT nr: 4330235997

Bakgaga BaMaupa Traditional Authority
PO Box 140
TZANEEN
0850

27 July 2009

Dear Sirs,

**ENVIRONMENTAL IMPACT ASSESSMENT: PROPOSED ESTABLISHMENT OF A SHOPPING CENTRE AND ASSOCIATED INFRASTRUCTURE ON PART OF PORTION 1 OF THE FARM SCHOONGELEGEN 432-LT, TZANEEN**

The Environmental Impact Assessment (EIA) process being conducted for the proposed establishment of a shopping centre and associated infrastructure on part of Portion 1 of the farm Schoongelegen 432-LT in Ga-Kgapane has reference. The process is being conducted by Polygon Environmental planning as part of the application for environmental authorization for the proposed development.

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Should you have any further comments, queries or concerns, or if you require additional information, please do not hesitate to contact me.

Yours faithfully,

Louise Agenbag
**POLYGON ENVIRONMENTAL PLANNING CC**

Received by: MAPIKE M.C.
Signature:
Date: 28/07/2009

********** -COMM. JOURNAL- ********** DATE 28-JUL-2009 ***** TIME 16:25 ******

MODE = MEMORY TRANSMISSION START=28-JUL 16:13 END=28-JUL 16:25

FILE NO.=150

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***** DP-8020P ********** - - ***** - - *********

# FACSIMILE


From: Louise Agenbag
Date: 28 July 2009
Pages: 2

P O BOX 1935
TZANEEN
0850

Tel : +27(0)15 307 3606
Fax : +27(0)15 307 3080
E-mail : louise@polygon.co.za

POLYGON
ENVIRONMENTAL PLANNING


| | Attention | Company | Fax Nr. |
|---|---|---|---|
| To | Mrs ME Madzibane | Limpopo Department of Agriculture (District Manager: Mopani) | 015 812 3428 |
| | Mr Letsoalo | Department of Agriculture (Letaba Office) | 015 328 4028 |
| | Mr Nyandani | Limpopo Department of Agriculture | 015 812 3428 |

Dear Sirs and Madam,

**PROPOSED SHOPPING CENTRE ON PART OF PORTION 1 OF THE FARM SCHOONGELEGEN 432-LT, GA-KGAPANE, LIMPOPO PROVINCE**

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Kind regards,

**Louise Agenbag**
POLYGON ENVIRONMENTAL PLANNING CC

POLYGON ENVIRONMENTAL PLANNING CC

Tel : (015) 307 3606
Cell : 083 339 2731
Fax : (015) 307 3080
E-mail : louise@polygon.co.za

Premier Plaza Block C
21 Peace Street
PO Box 1935
Tzaneen 0850

CK nr: 2007/049025/23
VAT nr: 4330235997

Mr MT Modjadji
Regent: Modjadji Royal Council

27 July 2009

Dear Mr Modjadji,

**ENVIRONMENTAL IMPACT ASSESSMENT: PROPOSED ESTABLISHMENT OF A SHOPPING CENTRE AND ASSOCIATED INFRASTRUCTURE ON PART OF PORTION 1 OF THE FARM SCHOONGELEGEN 432-LT, TZANEEN**

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Should you have any further comments, queries or concerns, or if you require additional information, please do not hesitate to contact me.

Yours faithfully,

Louise Agenbag
**POLYGON ENVIRONMENTAL PLANNING CC**

Received by:
Signature:
Date:

POLYGON ENVIRONMENTAL PLANNING CC

Tel : (015) 307 3606
Cell : 083 339 2731
Fax : (015) 307 3080
E-mail : louise@polygon.co.za

Premier Plaza Block C
21 Peace Street
PO Box 1935
Tzaneen 0850

CK nr: 2007/049025/23
VAT nr: 4330235997

Ms Vhonani Ramalamula
SAHRA Polokwane
PO Box 1371
Polokwane
0700

RECEIVED
2009 -07- 2 0
SAHRA LIMPOPO

29 July 2009

Dear Ms Ramalamula,

**AND ASSOCIATED INFRASTRUCTURE ON PART OF PORTION 1 OF THE FARM SCHOONGELEGEN 432-LT, TZANEEN**

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Should you have any further comments, queries or concerns, or if you require additional information, please do not hesitate to contact me.

Yours faithfully,

Louise Agenbag
POLYGON ENVIRONMENTAL PLANNING CC

Received by : Mpho Maepela
Signature : [illegible]
Date : 29/07/09

POLYGON
ENVIRONMENTAL PLANNING

# POLYGON ENVIRONMENTAL PLANNING CC

Tel : (015) 307 3606
Cell : 083 339 2731
Fax : (015) 307 3080
E-mail : louise@polygon.co.za

Premier Plaza Block C
21 Peace Street
PO Box 1935
Tzaneen 0850

CK nr: 2007/049025/23
VAT nr: 4330235997

Ms Magdeline Msimanga
DWAF Polokwane
Private Bag X9506
Polokwane
0700

29 July 2009

Dear Ms Msimanga,

**ENVIRONMENTAL IMPACT ASSESSMENT: PROPOSED ESTABLISHMENT OF A SHOPPING CENTRE AND ASSOCIATED INFRASTRUCTURE ON PART OF PORTION 1 OF THE FARM SCHOONGELEGEN 432-LT, TZANEEN**

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Yours faithfully,

Louise Agenbag
POLYGON ENVIRONMENTAL PLANNING CC

Received by: Msimanga M.M
Signature : Msimange
Date : 29/07/2009

POLYGON ENVIRONMENTAL PLANNING CC

POLYGON
ENVIRONMENTAL PLANNING

Tel : (015) 307 3606
Cell : 083 339 2731
Fax : (015) 307 3080
E-mail : louise@polygon.co.za

Premier Plaza Block C
21 Peace Street
PO Box 1935
Tzaneen 0850

CK nr: 2007/049025/23
VAT nr: 4330235997

Ms Charlotte van der Merwe
Kamekho Town Planners
PO Box 4169
POLOKWANE
0700

28 July 2009

Dear Ms Van der Merwe,

**ENVIRONMENTAL IMPACT ASSESSMENT: PROPOSED ESTABLISHMENT OF A SHOPPING CENTRE AND ASSOCIATED INFRASTRUCTURE ON PART OF PORTION 1 OF THE FARM SCHOONGELEGEN 432-LT, TZANEEN**

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Herewith please find a copy of the draft Environmental Scoping Report (ESR) for the above-mentioned project for perusal by the public and/or stakeholders at your offices at 10a Biccard Street, Polokwane. The draft ESR is available for public review and comment for a period of 31 days, from 27 July to 27 August 2009; thank you for allowing the report to be available at your offices during this period. You are welcome to keep the report at your office for your records after the review period. Should any parties review the report, kindly have them complete the attached register in order to capture their details and comments; they can also send their comments directly to me. Following the public review period, any and all comments received on the report will be incorporated into the final ESR, which will be submitted to the Limpopo Department of Economic Development, Environment and Tourism (L DEDET) for decision-making.

Should you have any further comments, queries or concerns, or if you require additional information, please do not hesitate to contact me.

Yours faithfully,

Louise Agenbag
POLYGON ENVIRONMENTAL PLANNING CC

Received by: Mpelani
Signature: M. Mpelani
Date: 29/07/09

# APPENDIX L

## ADVERTISMENT OF IMPACT ASSESSMENT PHASE PUBLIC MEETING AND AVAILABILITY OF DRAFT EIR & EMP FOR PUBLIC COMMENT

- Copies of newspaper advertisement
- Photos of site notices
- Proof of direct notification of stakeholders and neighbouring residents

TO BE INCLUDED IN FINAL
ENVIRONMENTAL IMPACT REPORT

## SECTION 7 ENVIRONMENTAL MANAGEMENT OF CONSTRUCTION AND OPERATIONAL ACTIVITIES

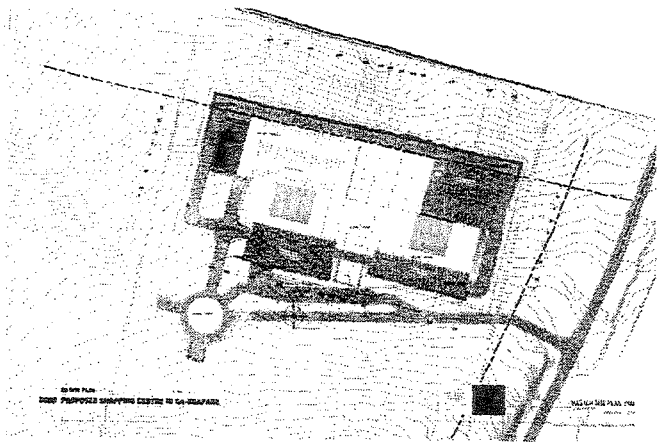
This section describes all the management and mitigation measures to be used during each phase of the project as per the identified impacts.

Table 1 provides an indication of the mechanisms that causes environmental impacts for each type of activity undertaken.

Tables 2 - 4 below provides the mitigation measures, the management objectives, measurable targets for each mitigation measure, frequency that actions should be taken at and where needed, notes to the DEO and ECO.

# SCHOONGELEGEN 432 LT, LIMPOPO PROVINCE

## PROPOSED SHOPPING CENTRE IN GA-KGAPANE: FLOODLINE INVESTIGATION



JUNE 2009

WSM LESHIKA CONSULTING (Pty) Ltd CESA


**PREPARED FOR:**

Kamekho Town Planners
PO Box 4169
Polokwane
0700

**ENQUIRIES:**

R Coetzee
623 Rubenstein Avenue
Moreleta Park
0044
(012) 997-6760


# SCHOONGELEGEN 432 LT, LIMPOPO PROVINCE

## PROPOSED SHOPPING CENTRE IN GA-KGAPANE: FLOODLINE INVESTIGATION

### TABLE OF CONTENTS

**ITEM** **PAGE NO.**

# 1. INTRODUCTION

WSM Leshika Consulting (Pty) Ltd was appointed to determine the affected floodlines for the 1:100 year flood for the upper tributaries of the Molototsie River on the Farm Schoongelegen 432 LT. The site is situated about 15 km north east of Tzaneen in the Ga Mokwasele village west of road D447. The location of the site is 30° 14' 30" E and 23° 40' 07" S.

Figure 1 shows the locality of the site.

The design run-off was determined by using information on 1:50 000 topographical maps 2330 CA and the 0.5 m contour survey map.

The floodlines were based on the surveyed drawing with 0.5 m contour intervals of the site. Note that this is a status quo study, i.e. the runoff calculations and floodlines were based on existing conditions (June 2009).

This report describes the methodology used, gives the resultant flood peaks and associated floodlines and discusses the impact of these on the site.

# 2. HYDROLOGY

## 2.1 Introduction

Flood peaks can be estimated by using empirical, statistical and deterministic methods. In this study the deterministic method was used. Statistical methods are based on analyses of river flow data, which is not available for this site, while in deterministic methods the flood hydrograph (the effect) is derived from precipitation and catchment characteristics (the causes).

The method that has been used is described below.

## 2.2 Rational Method with alternative (Adamson) method of calculating rainfall intensity.

This method as described in the SANRAL Drainage Manual (2006) was used to determine the flood peaks. The software 'Utility Programs for Drainage' which has been developed by Sinotech, using the methods in the Manual, was used in this study





The parameters for the calculations are as follows:

- the rainfall intensity is derived from the modified Hershfield equation for low time of concentrations and from factors given by Adamson (1981) for longer times.
- the time of concentration is calculated for stream and overland flow as applicable.
- the runoff factor is calculated for each area respectively as it may differ, for instance in the slope and vegetation cover.
- the percentage reduction factor for estimating the average precipitation over the catchments is applied.

Data from one rainfall-gauging station, reasonably close to the site, given in Adamson's study was used to obtain the representative rainfall information for the study area. The data are shown in Table 1.

**TABLE 2.1: RAINFALL DATA**

| Station Number | Description | MAP (mm) | 24-Hour Rainfall (mm) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 1:2 | 1:5 | 1:10 | 1:20 | 1:50 | 1:100 |
| 679401 | Triangle | 1018 | 108 | 165 | 212 | 266 | 350 | 424 |

Table 2 shows the general characteristics of the single catchment area that is affected by the proposed construction of the shopping centre.

**TABLE 2.2: CATCHMENT CHARACTERISTICS**

| DESCRIPTION | TOTAL CATCHMENT |
|---|---|
| Catchment area ($km^2$) | 0.2 |
| Length of watercourse to boundary (km) | 0.26 |
| Average stream slope (m/m) | 0.173 |
| Runoff factor | 0.39 |

Figure 2 shows the affected catchment area within the study area.

**TABLE 2.3: RESULTS OF FLOOD PEAK CALCULATIONS ($m^3/s$) FOR THE ALTERNATIVE RATIONAL METHOD**

| CATCHMENT | Flood peak per recurrence period ($m^3/s$) | | | | | |
|---|---|---|---|---|---|---|
| | 1:2 | 1:5 | 1:10 | 1:20 | 1:50 | 1:100 |
| Total Catchment Area | 0.18 | 0.33 | 0.46 | 0.60 | 0.79 | 0.95 |

## 3. HYDRAULIC MODELING

Hydraulic modeling of the river reach shown in Table 3.1 was performed by means of the HEC-RAS program. A Manning roughness coefficient of 0,045 was used. The associated 1:100-year flood levels, for the various cross-sections that were used to define the river course, are shown on Figure 3.

From Figure 3 it is clear that the proposed shopping centre is affected by the 1:100 year flood line. However, it should be kept in mind that the New Water Act (Act 36 of 1998) requires that the 1:100 year flood line be indicated on the development plan and it does not differentiate between the size of the catchment area and size of stream, as was prescribed in the previous Act 54 of 1956. The old Act specified that no floodline will be required in the event where the accumulative catchment area is smaller than 1 km². The drainage line under consideration has a rather small catchment area of only 0.2 km².

The topography just upstream of the proposed development is relatively steep and has no defined stream. This will result in overland flow towards the shopping centre, which could easily be diverted. The existing stream indicated on Figure 3 will be obliterated by the proposed earthworks required to form the building platform, and will thus no longer have an affect on the shopping centre.

The stream to the east of the shopping centre that crosses the proposed access road is not defined and therefore no floodline could be indicated. In the design of the road, provision should be made for a culvert that can accommodate a flow of at least one cubic meter per second.

**TABLE 3.1: HYDRAULIC MODELING BY MEANS OF THE HEC-RAS PROGRAM**

| Reach | River Sta | Profile | Q Total | Min Ch El | W.S. Elev | Crit W.S. | E.G. Elev | E.G. Slope | Vel Chnl | Flow Area | Top Width | Froude # Chl |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | (m3/s) | (m) | (m) | (m) | (m) | (m/m) | (m/s) | (m2) | (m) | |
| 1 | 7 | PF 1 | 0.9 | 840 | 840.42 | 840.42 | 840.53 | 0.036407 | 1.46 | 0.62 | 2.94 | 1.02 |
| 1 | 6 | PF 1 | 0.9 | 839.5 | 839.79 | 839.84 | 839.95 | 0.081377 | 1.74 | 0.52 | 3.52 | 1.45 |
| 1 | 5 | PF 1 | 0.9 | 836.5 | 836.61 | 836.68 | 836.88 | 0.26741 | 2.31 | 0.39 | 4.28 | 2.45 |
| 1 | 4 | PF 1 | 0.9 | 830 | 830.29 | 830.34 | 830.45 | 0.087761 | 1.8 | 0.5 | 3.47 | 1.51 |
| 1 | 3 | PF 1 | 0.9 | 825 | 825.13 | 825.19 | 825.33 | 0.29031 | 1.98 | 0.45 | 6.74 | 2.44 |
| 1 | 2 | PF 1 | 0.9 | 819.5 | 819.7 | 819.76 | 819.86 | 0.1323 | 1.74 | 0.52 | 5.19 | 1.75 |
| 1 | 1 | PF 1 | 0.9 | 816 | 816.17 | 816.25 | 816.45 | 0.289677 | 2.33 | 0.39 | 4.48 | 2.53 |





## 4. CONCLUSIONS

The maximum discharges associated with the various return periods were calculated by means of the Rational Method, using the Adamson Method for the rainfall intensity estimation. The associated flood levels at various cross sections were modeled by means of HEC-RAS.

We hereby certify that in accordance with the Water Act (Act 36 of 1998), the lines indicated on Figure 3 have been properly determined and represent the maximum levels that will probably be reached during floods with an expected recurrence interval of 1:100 years.

R COETZEE
ASSOCIATE

AMJ VAN VUUREN Pr Eng
DIRECTOR

## REFERENCES

Kruger, E (ed). *Drainage Manual*. SANRAL, 2006, Pretoria

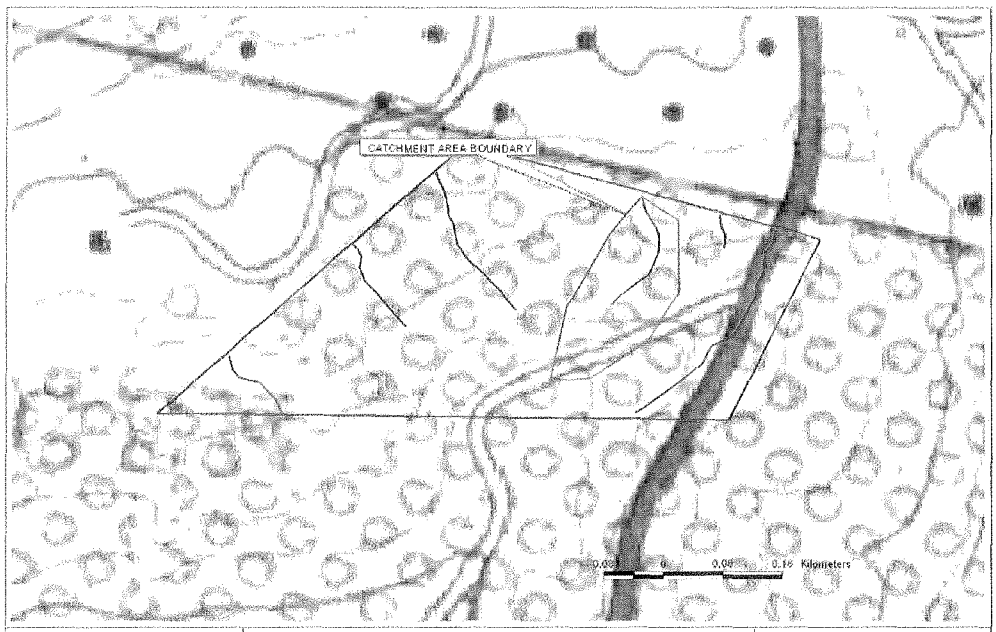
Adamson, PT. *Southern African Storm Rainfall*, Rep No TR102, DWAF, 1981, Pretoria

# FIGURES


WSM LESHIKA CONSULTING (Pty) Ltd
Engineers, Geohydrologists, ISO Practitioners & Project Managers

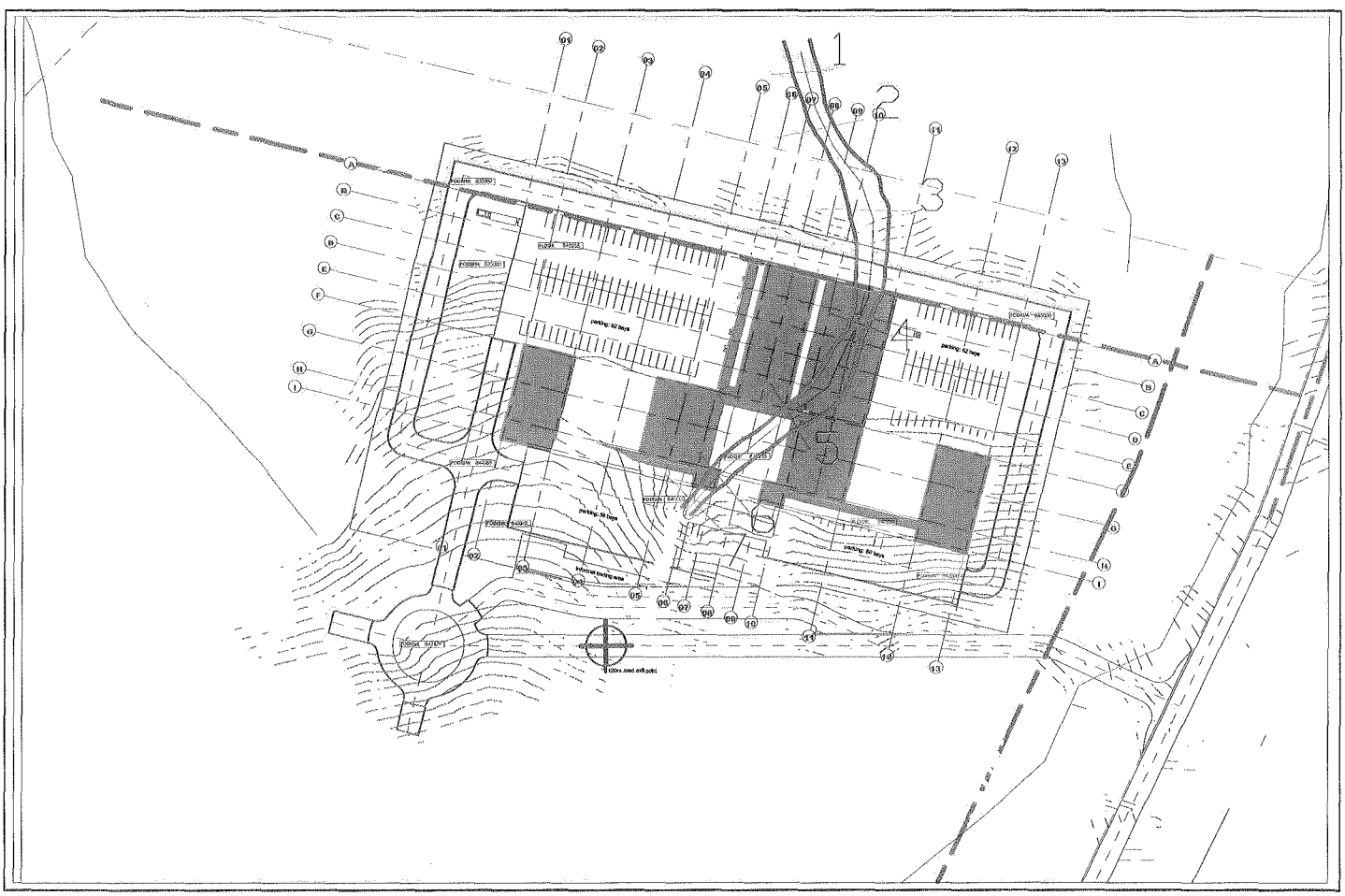
LOCALITY MAP

FIGURE 1




| | | |
|---|---|---|
| WSM LESHIKA (Pty) Ltd Engineers, Geologists, ISD Facilitators & Project Managers | CATCHMENT AREA | FIGURE 2 |





| | | |
|---|---|---|
| WSM LESHIKA (Pty) Ltd Engineers, Geologists, ISD Facilitators & Project Managers | *Pre-Development : 1:100 Year Flood Line* | *Figure 3* |

# Traffic Impact Assessment

- Siyazi Limpopo

# TRAFFIC IMPACT ASSESSMENT

**MEMORANDUM**


**PROPOSED SHOPPING CENTRE (GA-KGAPANE)**
**ON THE FARM SCHOONGELEGEN 432LT**

**JULY 2009**

SIYAZI
LIMPOPO


***Prepared for:***
**Ghiordes BK**
**P O Box 2192**
**POLOKWANE**
**0700**

***Prepared by:***
**Siyazi Limpopo (Pty) Ltd**
**P O Box 11182**
**BENDOR**
**0699**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## APPENDICES

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Section

# 1. INTRODUCTION

Siyazi Transportation and Services Limpopo (Pty) Ltd was appointed by Ghiordes BK during June 2009 to conduct a Traffic Impact Assessment for the proposed development of a Shopping Centre which is situated South of Ga-Kgapane in the Limpopo Province on the farm Schoongelegen 432 LT. Table 1.1 provides a summary of the Land Use Schedule as provided by Kamekho Town and Regional Planners.

**TABLE 1.1: LAND USE SCHEDULE**

| Land Use Type | GLA |
|---|---|
| Retail | 10000 m² |

The optimal size of the Ga-Kgapane Retail Development was determined by Demacon Market Studies during May 2007. The study further contains the relevant market research findings and recommendations.

The most important role players involved in this study are as follows:

a) The client, Ghiordes BK
b) Town and Regional Planners, Kamekho
c) Road Agency Limpopo (RAL)

The following intersections were evaluated as part of the Traffic Impact Assessment:

a) Point A: Intersection of Roads D447 / D3180
b) Point B: Intersection of Road D447 / Proposed Access to the shopping centre

Figure A-1 provides a graphical presentation of the locality of the proposed development. Both the roads is under the jurisdiction of the Roads Agency Limpopo (RAL)

The purpose of this study is to undertake an assessment of the implications of the traffic that would be generated by the proposed development on the farm Schoongelegen 432 LT, and to determine:

a) The impact that the change in land use would have on road and related infrastructure
b) Whether it is possible to accommodate the proposed development within acceptable norms
c) The mitigating measures required to accommodate the proposed development within acceptable norms.

The following sections of memorandum elaborate on the:

a) Findings and recommendations
b) Detailed information related to findings and recommendations.



Section

# 2. FINDINGS AND RECOMMENDATIONS

*Based on a site inspection of the existing road network adjacent to the site of the proposed new development, the traffic surveys, calculations and reference to the relevant guideline documents, the following findings and recommendations were made:*

## a) SITE ACCESSIBILITY AND CIRCULATION

Proper, safe and reliable access could be provided to the proposed new development provided that the required alterations are made to the road network.

Two alternatives could be implemented at the respective intersections, namely: Roundabouts or Traffic Lights Signals. Tables 2.2 and 2.3 respectively indicate the following:

i) Table 2.2: Required road network improvements should roundabouts be implemented (alternative 1)
ii) Table 2.3: Required road network improvements should traffic lights be implemented (alternative 2)

It is recommended that the proposed road layout should be provided as indicated Figure 2.2 while Figure 2.1 provides a graphical presentation of the existing road layout.

Special care should be taken in terms of road safety when the design of the roundabout is prepared; since road safety could be a serious issue should it not be done correctly.

## b) TRAFFIC IMPACT

Owing to the type and nature of the proposed development, it is expected that the proposed new development will have a manageable impact on traffic, provided that road improvements and public transport facilities are implemented to mitigate the impact of the proposed land development area.

## c) PARKING

Based on the Demacon Market Study the following are relevant:

i) The *neighbourhood centre* should include between 15 – 40 shops.
ii) Ample parking should be provided at a ratio of 4 bays per 100m² retail GLA.
iii) The parking area should be accessible, convenient, paved and well lit in the evenings.

Due to the locality of the proposed development and the type of transport modes to be used by the shoppers, it is recommended that a public transport facility should be located on the site regardless of the parking to be provided. The detailed design of the relevant facilities should be conducted by a specialist public transport engineer. It is essential that the required consultation should be conducted with the Taxi Industry and with the relevant local and District Municipalities.

d) NEED FOR IMPROVEMENTS

It is recommended that the following improvements should be made:

i) The improvements as indicated in Table 2.2 or 2.3 should be provided
ii) Proper intersection lighting should be installed at the respective intersections in cases where such lighting are not currently provided
iii) Proper road markings and traffic signs should be provided as part of the detailed design phase
iv) Paved pedestrian walkways should be constructed along the development frontages for the Shopping Centre for at least one side of the road. The improvements arising from the proposed development will not only provide better road safety for pedestrians but will definitely also ensure a more secure environment for pedestrians, owing to better lighting and traffic signal or roundabout intersection control.
v) The development will require public transport facilities, therefore it is recommended that loading and off-loading points for public transport should be provided along Road D447 and the proposed new Public Road (Detailed information could be provided as part of the Site Development Plan)
vi) Detailed design drawings will be submitted to the various authorities for approval purposes, and where necessary the required way leaves to conduct the required road improvements.

See Figure 2.2 for more details of the proposed improvements.

e) TRAFFIC MANAGEMENT IMPROVEMENTS

The following recommendations are made:

i) Either type of traffic control as indicated in Tables 2.2 or 2.3 could be introduced.
ii) That the necessary traffic and information signs, as well as road markings, should be provided to ensure safe access to the proposed development as part of the detailed design process. All the above-mentioned intersections should also include distinctive road markings for non-motorised transport.

In conclusion, it is recommended that **Road Agency Limpopo (RAL)** should approve the Traffic Impact Assessment based on the recommendations of this report.



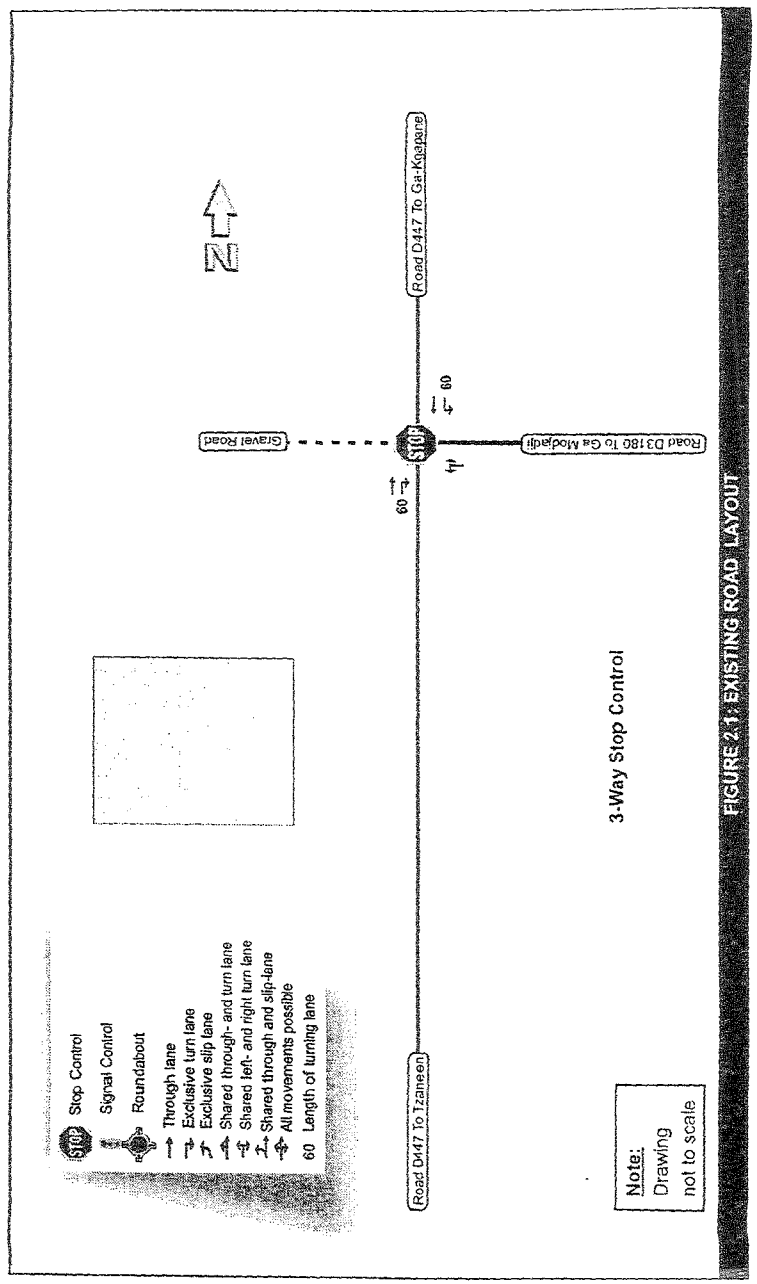


FIGURE 2.1: EXISTING ROAD LAYOUT

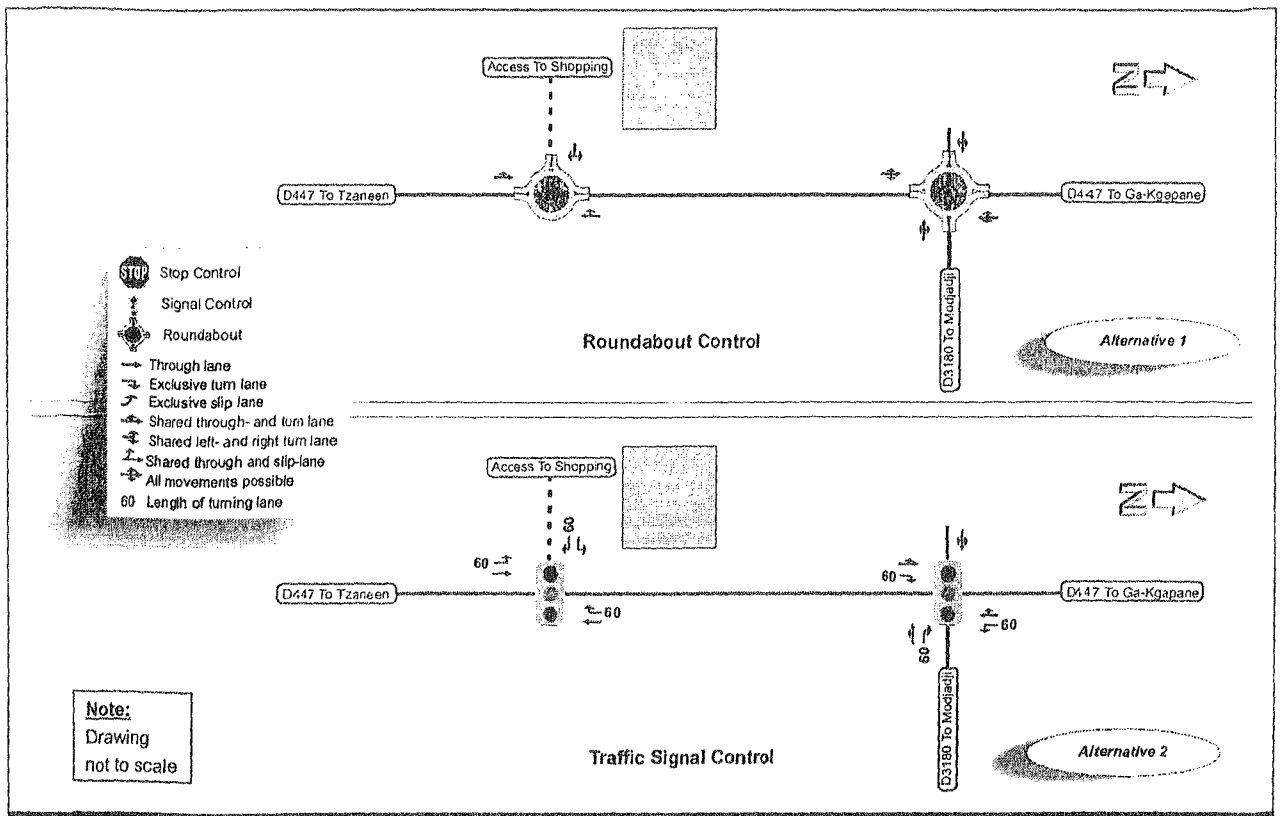



FIGURE 2.2: PROPOSED ROAD LAYOUTS



TABLE 2.2: REQUIRED ROAD NETWORK IMPROVEMENTS SHOULD ROUNDABOUTS BE IMPLEMENTED (ALTERNATIVE 1)

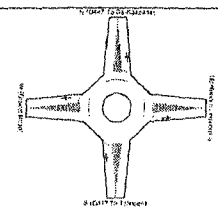
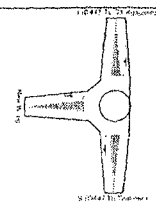
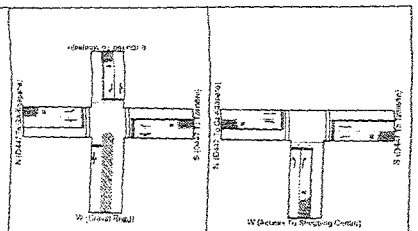
| *Point* | *Intersection* | *Main Type of Road Traffic Control* | *Improvements Required* | *Geometry* |
|---|---|---|---|---|
| A | Roads D447 and D3180 | ROUNDABOUT CONTROLLED | a) Intersection control could be a roundabout<br>b) A more detailed study should be conducted in order to determine the detailed layout of a roundabout should it be provided. The following guidelines could be utilised:<br>i) *Standards for roundabouts,* recently published by the Department of Public Transport, Roads and Works, Gautrans.<br>ii) *Roundabouts (Traffic Circles)* on Provincial Roads in Gauteng: Proposed Warrants, Gauteng Department of Public Transport, Roads and Public Works, August 2002<br>iii) *Roundabouts: an information guide,* US Department of Transport, Federal Highway Administration, June 2000.<br>iv) *National Guidelines for Road Access Management in South Africa,* Gautrans and Cape Metropolitan Councils, October 2001. |  |
| B | Road D447 and proposed access to the proposed Shopping Centre | ROUNDABOUT CONTROLLED | a) Intersection control could be a roundabout.<br>b) A more detailed study should be conducted in order to determine the detailed layout of a roundabout should it be provided. The following guidelines could be utilised:<br>i) *Standards for roundabouts,* recently published by the Department of Public Transport, Roads and Works, Gautrans.<br>ii) *Roundabouts (Traffic Circles)* on Provincial Roads in Gauteng: Proposed Warrants, Gauteng Department of Public Transport, Roads and Public Works, August 2002<br>iii) *Roundabouts: an information guide,* US Department of Transport, Federal Highway Administration, June 2000.<br>iv) *National Guidelines for Road Access Management in South Africa,* Gautrans and Cape Metropolitan Councils, October 2001. |  |

**TABLE 23: REQUIRED ROAD NETWORK IMPROVEMENTS SHOULD TRAFFIC LIGHTS BE IMPLEMENTED (ALTERNATIVE 2)**

| Point | Intersection | Main Type of Road Traffic Control | Improvements Required | Geometry |
|---|---|---|---|---|
| A | Roads D447 and D3180 | TRAFFIC LIGHT SIGNAL CONTROLLED | a) The intersection should be changed to a traffic light<br>b) A section of the western approach should be surfaced |  |
| B | Road D447 and proposed access to the proposed Shopping Centre | TRAFFIC LIGHT SIGNAL CONTROLLED | a) A dedicated right turn lane should be provided on the northern approach (60m + 60m Taper)<br>b) A dedicated short left turn lane should be provided on the southern approach (60m +60m Taper)<br>c) A full left turn lane and a dedicated right turn lane should be provided for traffic exiting the proposed access road (60m + 60m Taper). |  |





## 3. DETAILED INFORMATION RELATED TO FINDINGS AND RECOMMENDATIONS

The purpose of section 3 is to provide the following detailed information related to the findings and recommendations:

a) The *status quo* of the land use, as well as the road characteristics
b) The future land use, as well as the road characteristics
c) The current and future levels of service at the relevant intersections that would provide access to the proposed development
d) Other traffic-related issues such as access separation, sight distances and site circulation.

The following subsection elaborates on the above-mentioned.

### 3.1 Status quo of land use, as well as road characteristics

The following information is discussed in terms of the *status quo* of the existing land use and road characteristics:

a) Existing land use information
b) The traffic counts conducted as a basis for making the traffic calculations
c) Existing road characteristics and modal distribution.

#### *3.1.1 Existing land use information*

The relevant section of the Farm Schoongelegen 432 LT is currently zoned as "agricultural" but is not used for agricultural purposes.

For the purposes of this study, the following assumptions are made:

a) That the average rate of growth in through traffic along Road D447 will be 3% per annum between 2009 and 2014. (Main Road Background Traffic growth)
b) That the average rate of growth in through traffic along Road D3180 will be 3% per annum (Secondary Road Background Traffic growth)
c) That the proposed Shopping Centre will be fully operational within 5 years from the base year (2014)
d) That the absorption rate by all other types of completed development will maintain the same status for the next five years.

### 3.1.2 *Traffic counts, in order to make the traffic calculations*

In order to gain a better understanding of the existing traffic patterns and movements adjacent to the proposed development, 7-hour Friday and 6-hour Saturday manual traffic counts were conducted at intersections that would potentially be affected by the proposed development.

Traffic counts were conducted at the following intersection of point A at the intersection of Roads D447 and D3180. Traffic counts at the relevant intersection were conducted on Friday 26 June 2009 and Saturday 27 June 2009 respectively. These dates represent a month-end Friday and Saturday. It is standard practice to conduct traffic surveys at the end of the month when the traffic is expected to reach its highest peaks when the proposed development includes a significant component of retail land use.

**Note:** The traffic volumes at point B were derived from intersection of point A

The combined hourly total of all the vehicles for the traffic surveys conducted is shown as follows:

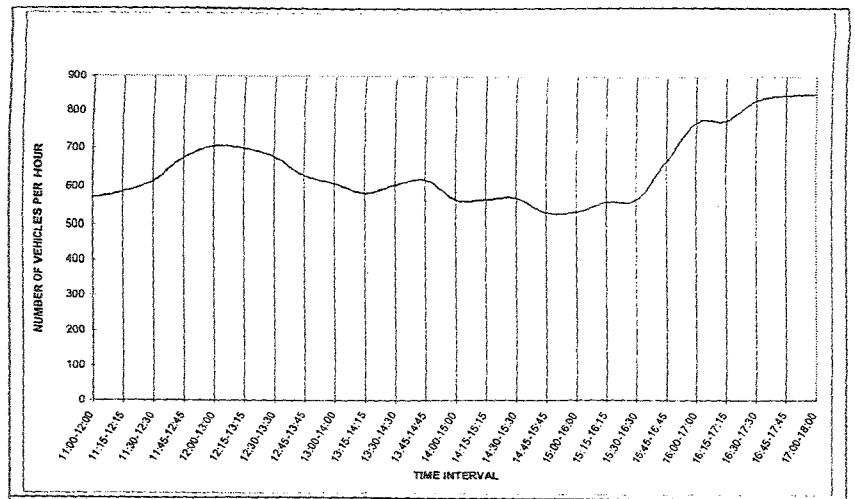
a) On Friday 26 June 2009 between 11:00 and 18:00 indicated in Tables A-1 of Appendix A of this report.
b) On Saturday 27 June 2009 between 09:00 and 15:00 indicated in Tables A-2 of Appendix A of this report. The description of vehicle movements appears in Figure A-2 of Appendix A.

The respective peak-hour flows for the traffic counts at the relevant intersection were identified as follows:

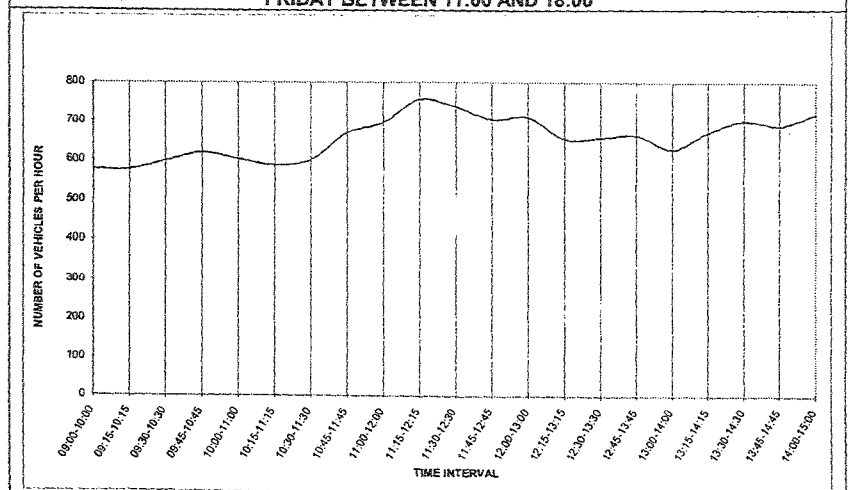
a) Friday PM Peak: 17:00 – 18:00 (total of 854 vehicles per hour)
b) Saturday Peak: 11:15 – 12:15 (total of 756 vehicles per hour).

Figure 3.1 is a graph of the hourly traffic pattern, per 15-minute interval, for all modes of vehicles at the intersection of Roads D447 and D3180 between 11:00 and 18:00 on Friday 26 June 2009 and between 09:00 and 15:00 on Saturday 27 June 2009.






FRIDAY BETWEEN 11:00 AND 18:00




SATURDAY BETWEEN 09:00 AND 15:00

FIGURE 3.1: HOURLY TRAFFIC PATTERN PER 15-MINUTE INTERVAL FOR ALL MODES OF VEHICLES

### 3.1.3 *Existing road characteristics and modal distribution*

Table 3.1 contains more details of the relevant road sections at the intersection of Roads D447 and D3180.

| TABLE 3.1: SUMMARY OF THE ROAD CHARACTERISTICS AT THE INTERSECTION OF ROADS D447 / D3180 | |
|---|---|
| Item | Description |
| a) Class of major road | ➢ Road D447 can be classified as a class 3 road that serves as activity arterial; it is also the link between R36 and Tzaneen |
| b) Class of secondary road | ➢ Distributor and links the surrounding villages including Ga-Modjadji. |
| c) Traffic control for major road | Stop Control |
| d) Traffic control for minor road | Stop Control |
| e) Road reserve, major road | ➢ 40 m |
| f) Road reserve , minor road | ➢ 40 m |
| g) Number of lanes per direction at access point, major road | ➢ Tarred road. One lane per direction |
| h) Number of lanes per direction at access point, minor road | ➢ Tarred road. One lane per direction |
| i) Lane widths, major road | ➢ 3,7 m with no shoulders |
| j) Lane widths, minor road | ➢ 3,5 m with no shoulders |
| k) Median width, major road | ➢ No median |
| l) Median width, minor road | ➢ No median |
| m) Pedestrian paths, major road | ➢ Medium volume of pedestrians |
| n) Pedestrian paths, minor road | ➢ Medium volume of pedestrians |
| o) Speed limit, major road | ➢ 80 km/h |
| p) Speed limit, minor road | ➢ 60 km/h |

## 3.2 Determination of future land use and road characteristics:

The following are relevant:

a) Land use information, including possible future developments in the area
b) Information about the expected future modal distribution
c) Determination of the vehicle trips expected to be generated by the proposed development
d) Determination of the total traffic expected to be generated at the relevant intersections.

The subsections below elaborate on the above-mentioned future land use and road characteristics.

### 3.2.1 *Land use information, including possible future developments in the area*

The following are relevant:

a) Table B-1 contains a copy of the notice of intention to establish a Shopping Centre, which was prepared by Kamekho Town and Regional Planners
b) A diagram showing the layout of the proposed township appears in Figure B-1 of Appendix B of this memorandum
c) Table 3.2 below contains the land use schedule for the proposed development of a Shopping Centre which is situated South of Ga-Kgapane in the Limpopo Province on the farm Schoongelegen 432 LT.



| TABLE 3.2: LAND USE SCHEDULE | |
|---|---|
| Land Use Type | GLA |
| Retail | 10000 m² |

### 3.2.2 *Information about the expected future modal distribution*

Most of the vehicles travelling to and from the proposed development would be for private use, except for a few service vehicles, such as refuse removal and delivery vehicles, entering and leaving the proposed development.

### 3.2.3 *Determination of vehicle trips expected to be generated by the proposed development*

Table 3.4 indicates the trip generation rates, the number of vehicle trips which are expected to be generated by the proposed development as well as the distribution of the vehicle trips to and from the respective areas of the development. The trips generation rates are based on the *South African Trip Generation Rates*, Second Edition, 1995.

Due to the locality and the type of the proposed development an adjustment factor was applied for the expected number of vehicle trips to be generated by the proposed developed. The reason for the adjustment factor is the fact that the modal choice for urban and rural area shopping centres differs. Table 3.3 contains a comparison of potential number of vehicle trips that could be generated by an urban versus a rural type of shopping centre for a Friday PM Peak)

Based on Table 3.3 the relation between a typical urban type of shopping centre and this rural type of shopping centre for a Friday PM Peak is 619 versus 980 vehicle trips that represents a reduction factor of 0,63. The reduction factor for a Saturday would be the same as for a Friday since the same modal splits and vehicle occupation figures would be accepted.

# APPENDIX A

## INFORMATION RELATED TO STATUS QUO

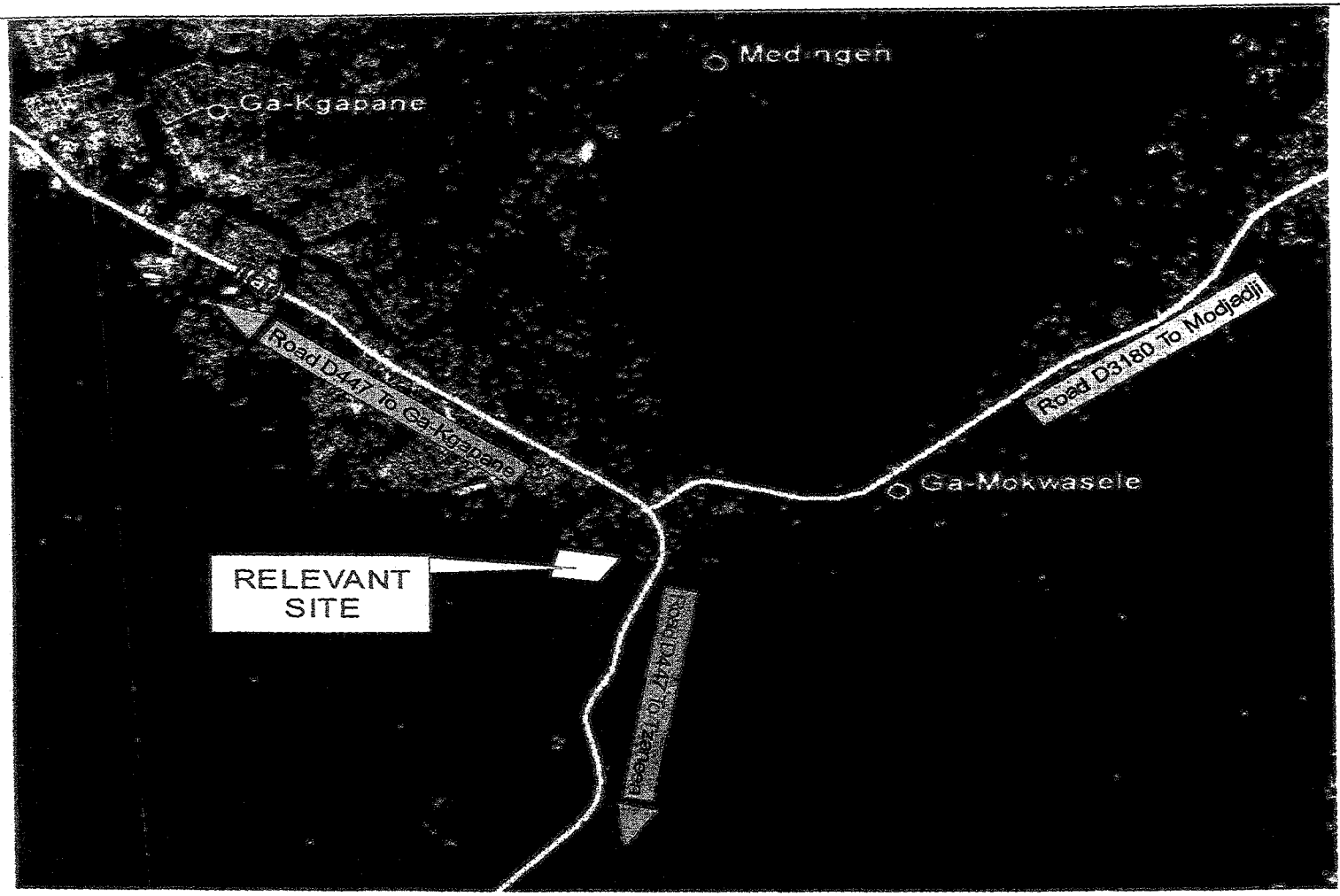



FIGURE A-1: LOCALITY OF PROPOSED DEVELOPMENT

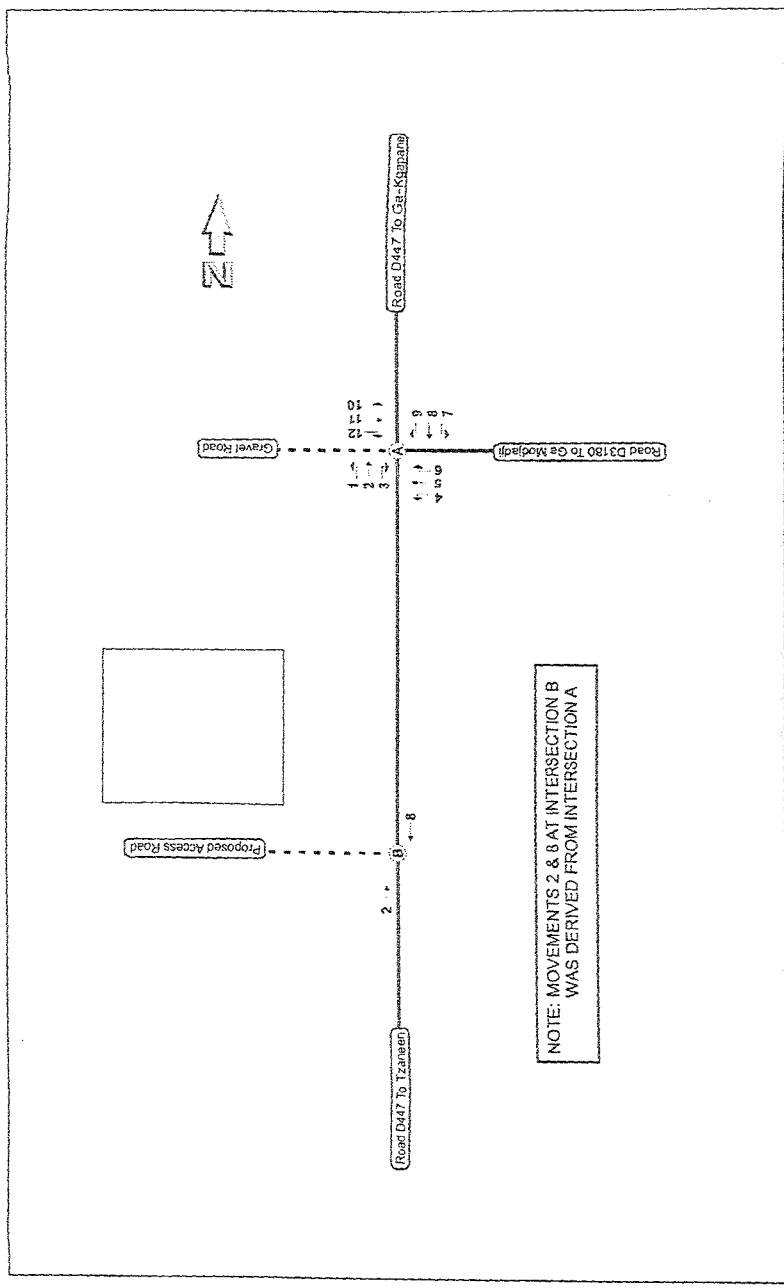



FIGURE A-2: DESCRIPTIONS OF RELEVANT MOVEMENTS RELATED TO TRAFFIC COUNTS

| TIME INTERVALS | MOVEMENTS | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | TOTAL |
| 11:00-12:00 | 16 | 69 | 24 | 70 | 3 | 156 | 107 | 77 | 15 | 11 | 11 | 9 | 568 |
| 11:15-12:15 | 16 | 61 | 25 | 74 | 2 | 160 | 105 | 82 | 20 | 12 | 11 | 16 | 584 |
| 11:30-12:30 | 19 | 61 | 20 | 86 | 4 | 162 | 108 | 81 | 21 | 15 | 14 | 24 | 615 |
| 11:45-12:45 | 20 | 51 | 29 | 87 | 6 | 188 | 113 | 98 | 20 | 15 | 19 | 26 | 672 |
| 12:00-13:00 | 22 | 47 | 36 | 89 | 5 | 201 | 120 | 104 | 14 | 18 | 22 | 26 | 704 |
| 12:15-13:15 | 20 | 46 | 39 | 82 | 6 | 189 | 128 | 106 | 16 | 19 | 23 | 24 | 698 |
| 12:30-13:30 | 17 | 39 | 48 | 77 | 4 | 179 | 125 | 108 | 17 | 18 | 24 | 20 | 676 |
| 12:45-13:45 | 21 | 43 | 44 | 69 | 4 | 147 | 123 | 92 | 18 | 19 | 26 | 23 | 629 |
| 13:00-14:00 | 18 | 44 | 44 | 57 | 7 | 121 | 122 | 97 | 16 | 21 | 28 | 30 | 605 |
| 13:15-14:15 | 20 | 36 | 42 | 60 | 7 | 126 | 104 | 88 | 13 | 21 | 32 | 31 | 580 |
| 13:30-14:30 | 18 | 41 | 40 | 51 | 6 | 139 | 116 | 92 | 11 | 23 | 32 | 32 | 601 |
| 13:45-14:45 | 17 | 54 | 43 | 41 | 6 | 140 | 130 | 88 | 10 | 22 | 33 | 32 | 616 |
| 14:00-15:00 | 19 | 55 | 40 | 35 | 4 | 144 | 115 | 84 | 11 | 15 | 25 | 20 | 567 |
| 14:15-15:15 | 17 | 59 | 49 | 30 | 4 | 136 | 129 | 83 | 11 | 13 | 20 | 17 | 568 |
| 14:30-15:30 | 14 | 75 | 66 | 30 | 5 | 124 | 121 | 82 | 12 | 11 | 16 | 16 | 572 |
| 14:45-15:45 | 8 | 71 | 64 | 31 | 3 | 109 | 111 | 85 | 14 | 10 | 11 | 13 | 530 |
| 15:00-16:00 | 4 | 81 | 68 | 31 | 4 | 97 | 110 | 79 | 12 | 15 | 14 | 17 | 532 |
| 15:15-16:15 | 1 | 96 | 65 | 31 | 4 | 100 | 113 | 90 | 13 | 16 | 16 | 16 | 561 |
| 15:30-16:30 | 3 | 102 | 67 | 28 | 4 | 101 | 116 | 86 | 13 | 15 | 18 | 14 | 567 |
| 15:45-16:45 | 6 | 122 | 98 | 27 | 4 | 123 | 128 | 95 | 14 | 16 | 18 | 16 | 667 |
| 16:00-17:00 | 13 | 141 | 113 | 38 | 2 | 140 | 153 | 108 | 18 | 16 | 17 | 14 | 773 |
| 16:15-17:15 | 13 | 137 | 116 | 34 | 2 | 135 | 158 | 117 | 20 | 16 | 16 | 15 | 779 |
| 16:30-17:30 | 12 | 145 | 113 | 38 | 3 | 128 | 176 | 135 | 32 | 18 | 20 | 17 | 837 |
| 16:45-17:45 | 12 | 149 | 112 | 37 | 6 | 117 | 191 | 152 | 28 | 16 | 19 | 12 | 851 |
| 17:00-18:00 | 7 | 139 | 112 | 28 | 6 | 107 | 206 | 172 | 27 | 14 | 20 | 16 | 854 |

TABLE A-1: HOURLY TRAFFIC COUNTS FOR ALL VEHICLES SIMULTANEOUSLY AT THE INTERSECTION OF ROADS D447 AND D3180 (26TH DAY OF JUNE 2009)



Traffic Impact Study: Proposed Schoongelegen Shopping Centre near Ga-Kgapane

| TIME INTERVALS | MOVEMENTS | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | TOTAL |
| 09:00-10:00 | 6 | 45 | 31 | 75 | 8 | 107 | 114 | 134 | 14 | 16 | 14 | 13 | 577 |
| 09:15-10:15 | 6 | 53 | 31 | 66 | 2 | 113 | 114 | 133 | 14 | 16 | 18 | 10 | 576 |
| 09:30-10:30 | 4 | 58 | 41 | 59 | 3 | 136 | 115 | 131 | 14 | 12 | 17 | 8 | 598 |
| 09:45-10:45 | 4 | 67 | 49 | 63 | 3 | 144 | 117 | 128 | 10 | 11 | 15 | 8 | 619 |
| 10:00-11:00 | 2 | 72 | 48 | 58 | 2 | 152 | 108 | 122 | 11 | 7 | 14 | 7 | 603 |
| 10:15-11:15 | 3 | 67 | 58 | 55 | 2 | 146 | 107 | 116 | 8 | 6 | 12 | 7 | 587 |
| 10:30-11:30 | 4 | 82 | 54 | 55 | 1 | 144 | 106 | 109 | 11 | 9 | 14 | 12 | 601 |
| 10:45-11:45 | 7 | 103 | 64 | 43 | 5 | 143 | 114 | 138 | 11 | 11 | 17 | 13 | 669 |
| 11:00-12:00 | 10 | 103 | 67 | 48 | 4 | 131 | 120 | 160 | 9 | 12 | 16 | 16 | 696 |
| 11:15-12:15 | 8 | 105 | 61 | 45 | 4 | 147 | 144 | 180 | 17 | 13 | 16 | 16 | 756 |
| 11:30-12:30 | 7 | 97 | 57 | 43 | 6 | 135 | 157 | 175 | 12 | 15 | 18 | 15 | 737 |
| 11:45-12:45 | 4 | 78 | 46 | 47 | 3 | 138 | 161 | 158 | 23 | 14 | 17 | 15 | 704 |
| 12:00-13:00 | 0 | 77 | 44 | 49 | 3 | 154 | 160 | 148 | 31 | 14 | 18 | 11 | 709 |
| 12:15-13:15 | 0 | 87 | 49 | 41 | 6 | 135 | 144 | 129 | 23 | 14 | 17 | 10 | 655 |
| 12:30-13:30 | 0 | 92 | 51 | 38 | 6 | 136 | 139 | 133 | 25 | 13 | 15 | 10 | 658 |
| 12:45-13:45 | 0 | 105 | 61 | 38 | 6 | 128 | 136 | 122 | 26 | 12 | 16 | 14 | 664 |
| 13:00-14:00 | 0 | 96 | 65 | 29 | 9 | 120 | 138 | 113 | 18 | 12 | 16 | 14 | 630 |
| 13:15-14:15 | 0 | 101 | 65 | 36 | 7 | 127 | 151 | 121 | 22 | 11 | 16 | 15 | 672 |
| 13:30-14:30 | 2 | 119 | 81 | 36 | 5 | 123 | 154 | 127 | 20 | 9 | 13 | 13 | 702 |
| 13:45-14:45 | 3 | 105 | 76 | 27 | 6 | 137 | 155 | 141 | 8 | 10 | 12 | 9 | 689 |
| 14:00-15:00 | 3 | 114 | 80 | 29 | 4 | 154 | 148 | 145 | 10 | 10 | 12 | 10 | 719 |

TABLE A-2: HOURLY TRAFFIC COUNTS FOR ALL VEHICLES SIMULTANEOUSLY AT THE INTERSECTION OF ROADS D447 AND D3180 (27TH DAY OF JUNE 2009)



# APPENDIX B

## INFORMATION RELATED TO THE PROPOSED DEVELOPMENT

[Regulation 21(10) of the Development Facilitation Regulations in terms of the DFA, 1995]

**NOTICE OF LAND DEVELOPMENT AREA APPLICATION**

Kamekho Town Planners has lodged an application in terms of the Development Facilitation Act 1995 for the establishment of a land development area on a part of Portion 1 of the farm Schoongelegen 432 LT, Polokwane.

- The Limpopo Development Tribunal is requested to suspend the provisions of The Subdivision of Agricultural Land Act, 1970 (Act 70 of 1970), pertaining to the subdivision of the land in question i.t.o. section 33(2)(j)(iv) of the Development Facilitation Act, 1995 (Act no. 67 of 1995);
- The Limpopo Development Tribunal is further requested to suspend the provisions and application of The Advertising on Roads and Ribbon Development Act, 1940 (Act 21 of 1940), i.t.o. section 33(2)(j)(i) of the Development Facilitation Act, 1995 (Act no. 67 of 1995);
- The division of Portion 1 of the farm Schoongelegen 432 LT into two portions; and
- The establishment of a land development area on a part of Portion 1 of the farm Schoongelegen 432 LT, Polokwane, consisting of a land development area zoned "Business 2" for a shopping centre (on a Land Development Area comprising 5,8ha in total).

This land use rights shall be controlled by the Greater Letaba Land Use Management Scheme, 2008.

The application property is situated south adjacent of Ga-Kgapane, Limpopo Province on Part of Portion 1 of the farm Schoongelegen 432 LT in close proximity to the Modjadjiskloof Road, the main collectors in the area.

The relevant plans documents and information are available for inspection at Hensa Towers, cnr of Rabe and Landdros Maré street, and the land development applicant for a period of 21 days from ___ 2009, being the first date of publication.

The application will be considered at a Tribunal hearing to be held at_____, Polokwane, on ___ 2009 at 10:00am and the pre-hearing conference will be held at___, on ___ 2009 at 10:00am.

Any person having an interest in the application should please note:

1. You may within a period of 21 (twenty one) days from ____ 2009, being the date of the first publication of this notice, provide the land development applicant with your written representation in support of the application or any other written representation not amounting to an objection, in which case you are not required to attend the tribunal hearing; or
2. If your comments constitute an objection to any aspect of the land development application, you must appear in person or through a duly authorised representative before the Tribunal at the pre-hearing conference. Any written objection or representation must state the name and address of the person or body making the objection or representation, the interest that such person or body has in the matter, and the reasons for the objection or representation, and must be delivered to the Designated Officer and Land Development Applicant at his or her address set out below within the said period of 21 days from 1 May 2009, being the date of the first publication of this notice.

You may contact the designated officer if you have any queries at office no. 124, Hensa Towers, cnr of Rabe and Landdros Maré street, Polokwane or Private Bag X 9485, Polokwane 0700,
tel 015 294 2338 and e-mail: lindequeh@limdlgh.gov.za

LAND DEVELOPMENT APPLICANT.

Kamekho Town Planners, 10A Biccard Street, Polokwane, P.O.Box 4169, Polokwane, 0700,
Tel: 015 295 7382, Fax: 015 295 9693, rowan@kamekho.co.za

**TABLE B-1: COPY OF NOTICE OF INTENTION TO ESTABLISH TOWNSHIP**



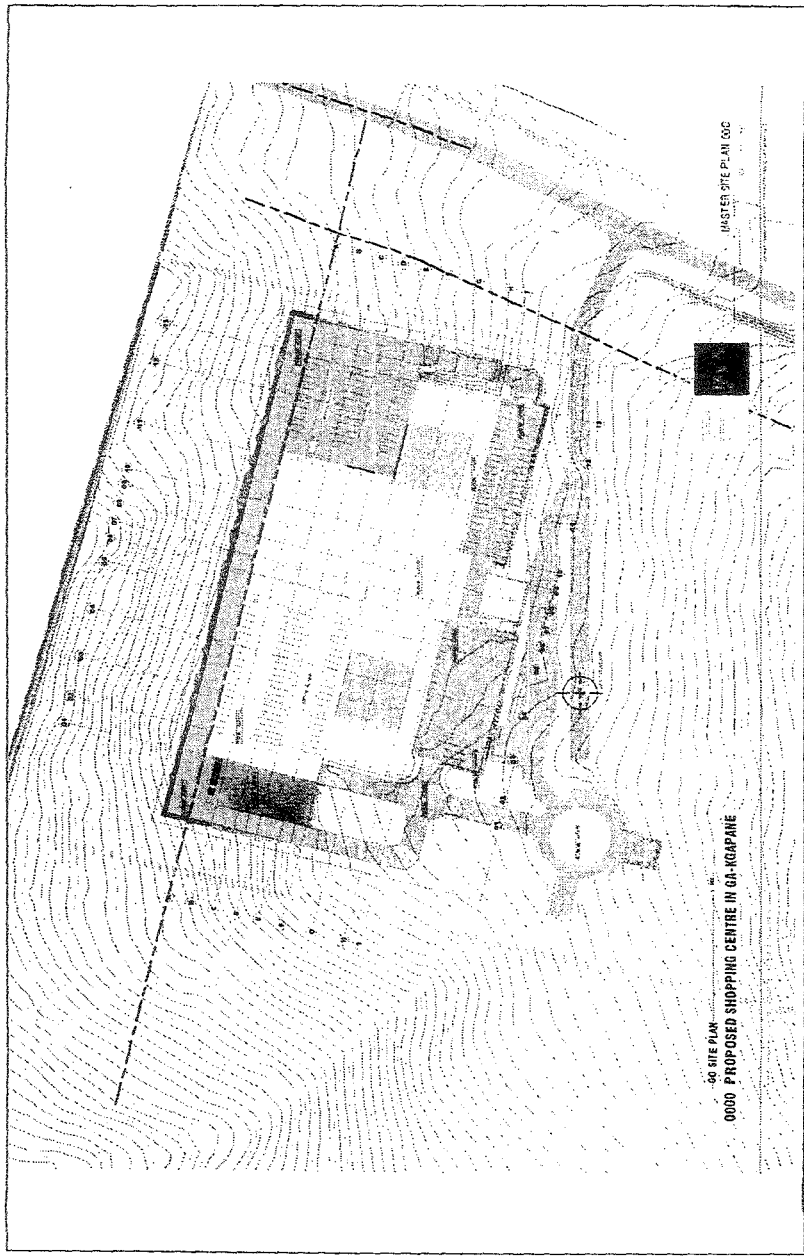



**FIGURE B-1: GRAPHICAL PRESENTATION OF THE PROPOSED DEVELOPMENT**

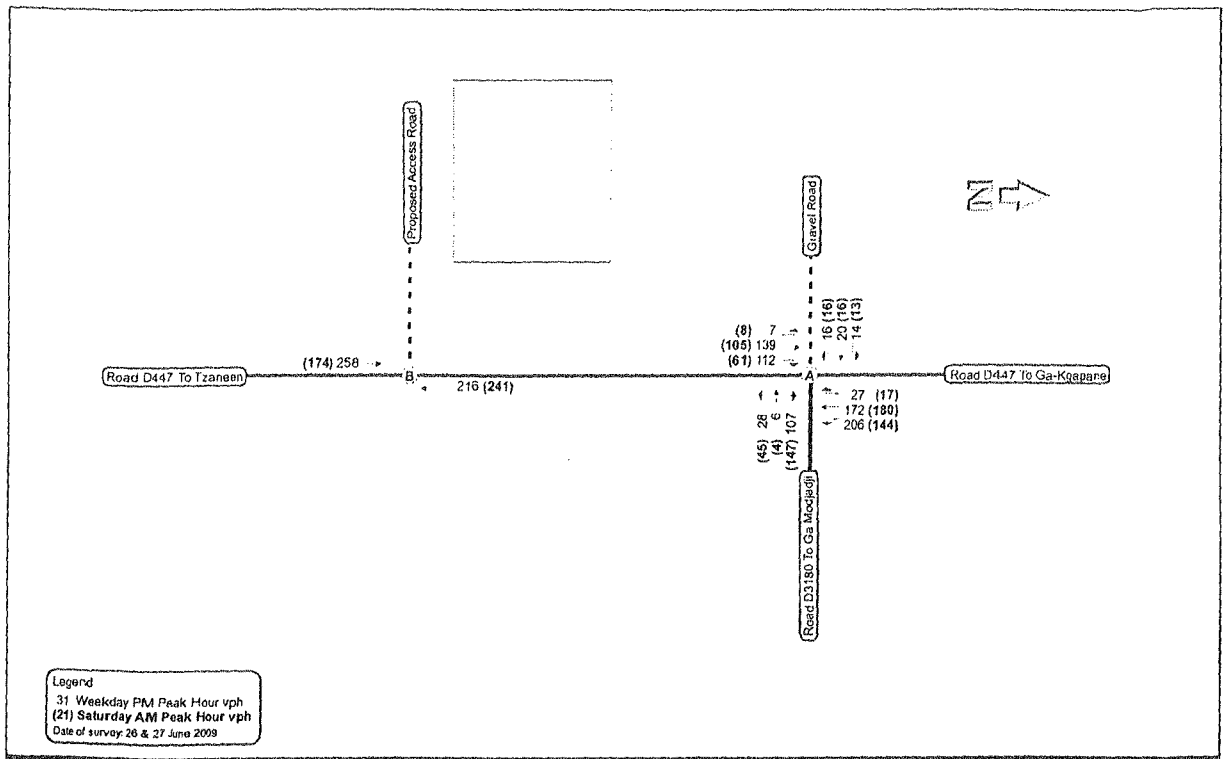



FIGURE B-2: BASE YEAR PEAK HOUR TRAFFIC WITHOUT THE PROPOSED DEVELOPMENT (2009) (SCENARIO 1)



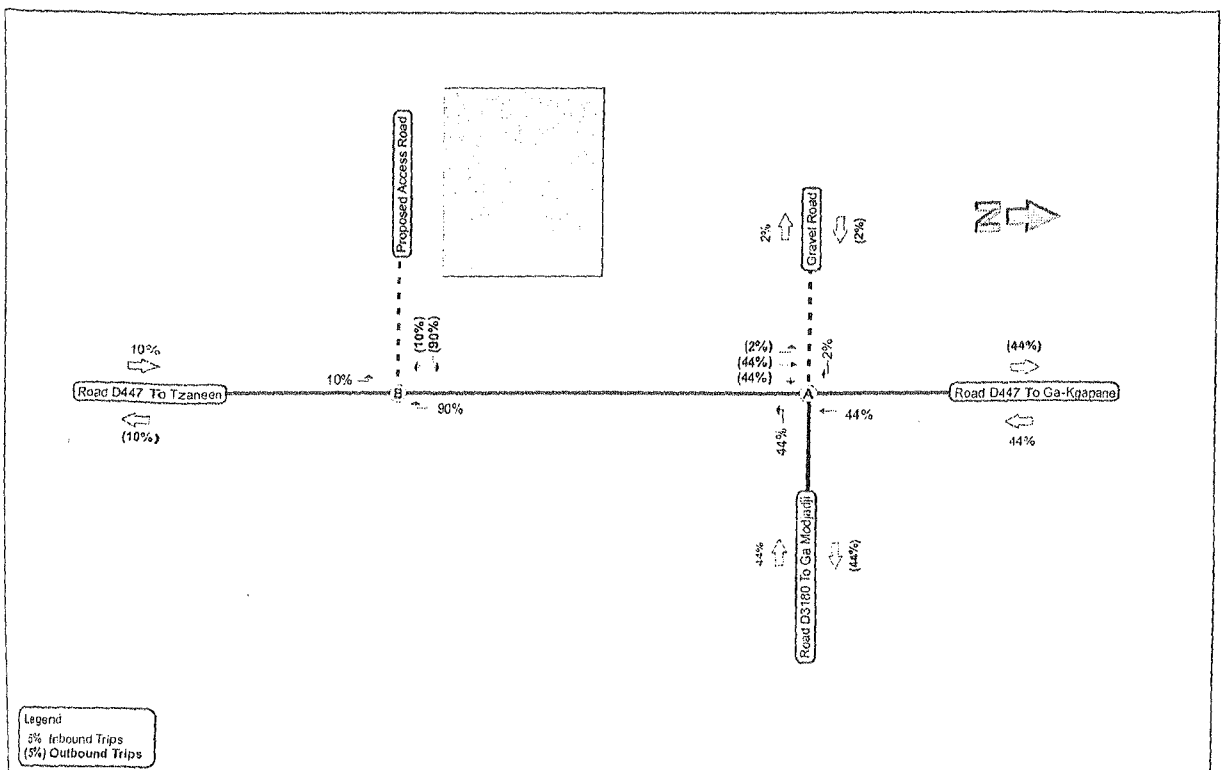



FIGURE B-3: PROJECTED TRIP DISTRIBUTION FOR THE PROPOSED DEVELOPMENT

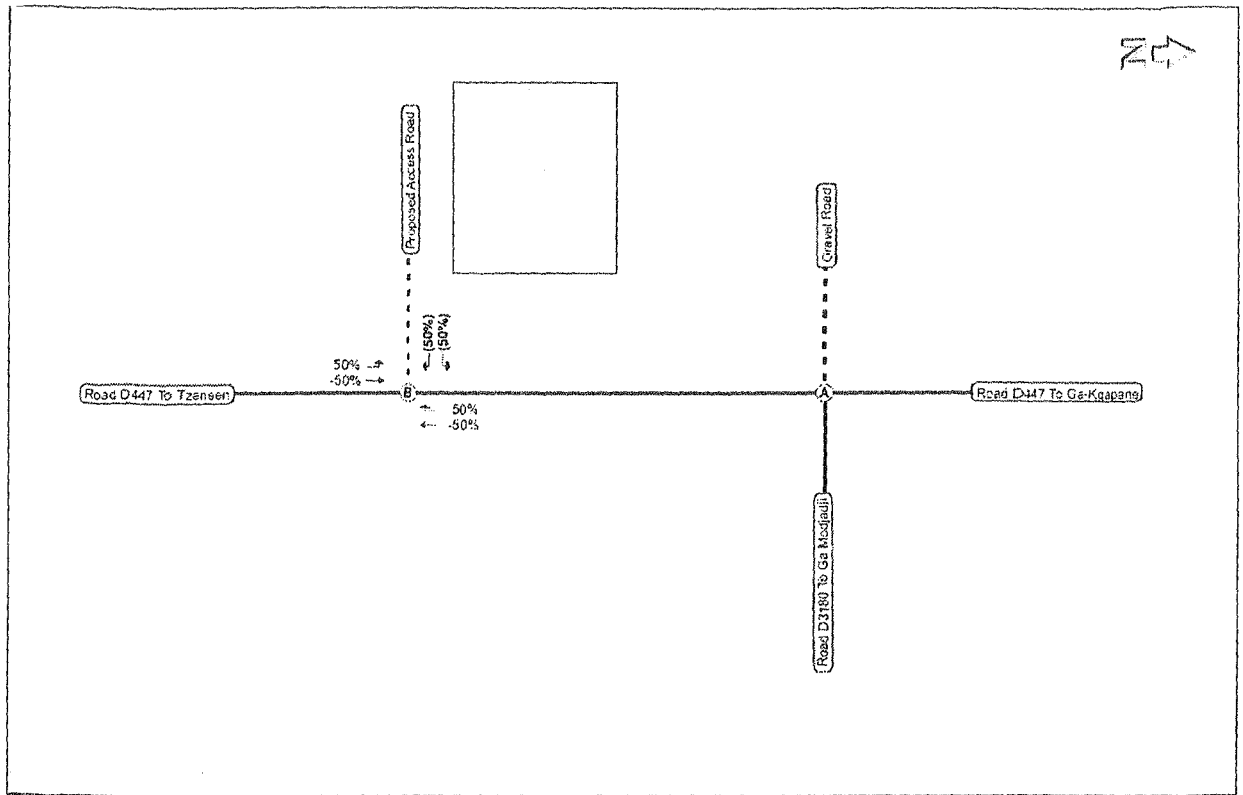



FIGURE B-4: PROJECTED TRIP DISTRIBUTION FOR PASSER-BY TRAFFIC FOR THE PROPOSED DEVELOPMENT



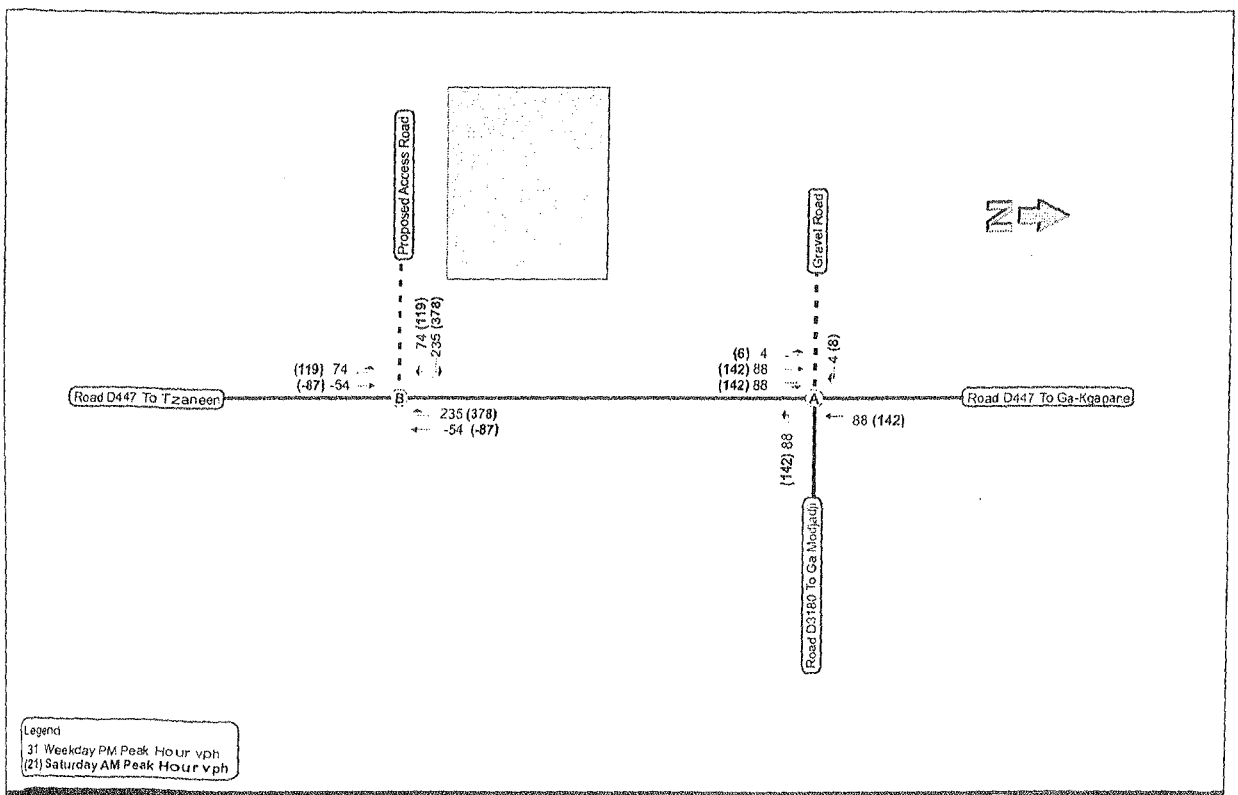



FIGURE B-5: TRIPS GENERATED BY THE PROPOSED DEVELOPMENT INCLUDING PASSER-BY TRAFFIC

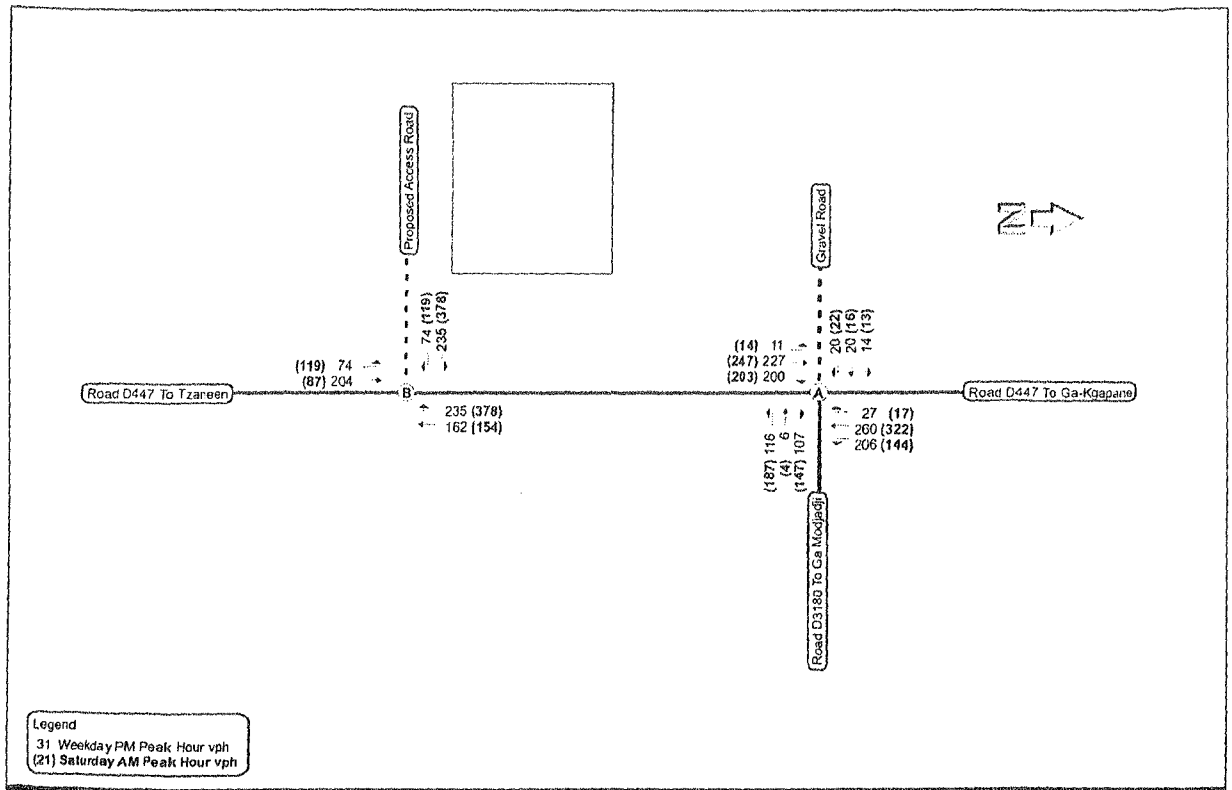



FIGURE B-6: 2009 TRAFFIC WITH THE PROPOSED DEVELOPMENT (SCENARIO 2)



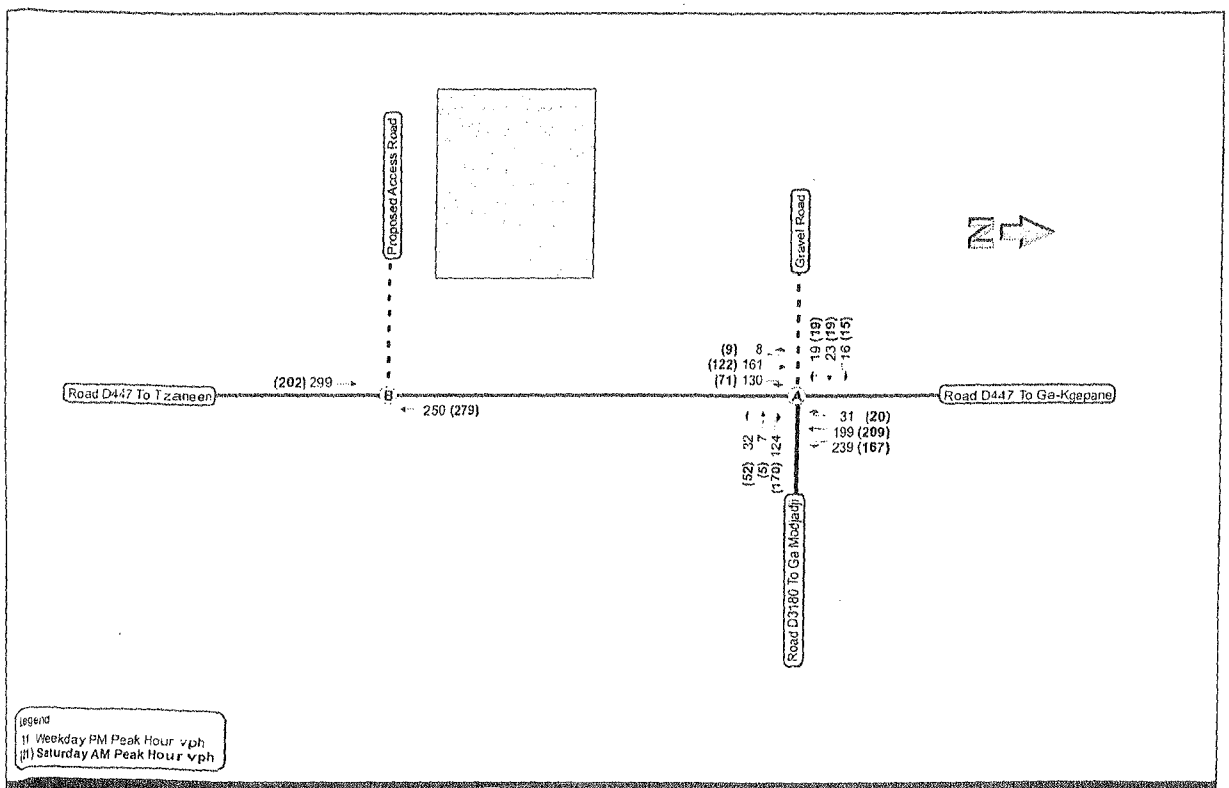



FIGURE B-7: PROJECTED 2014 TRAFFIC WITHOUT THE PROPOSED DEVELOPMENT (SCENARIO 3)

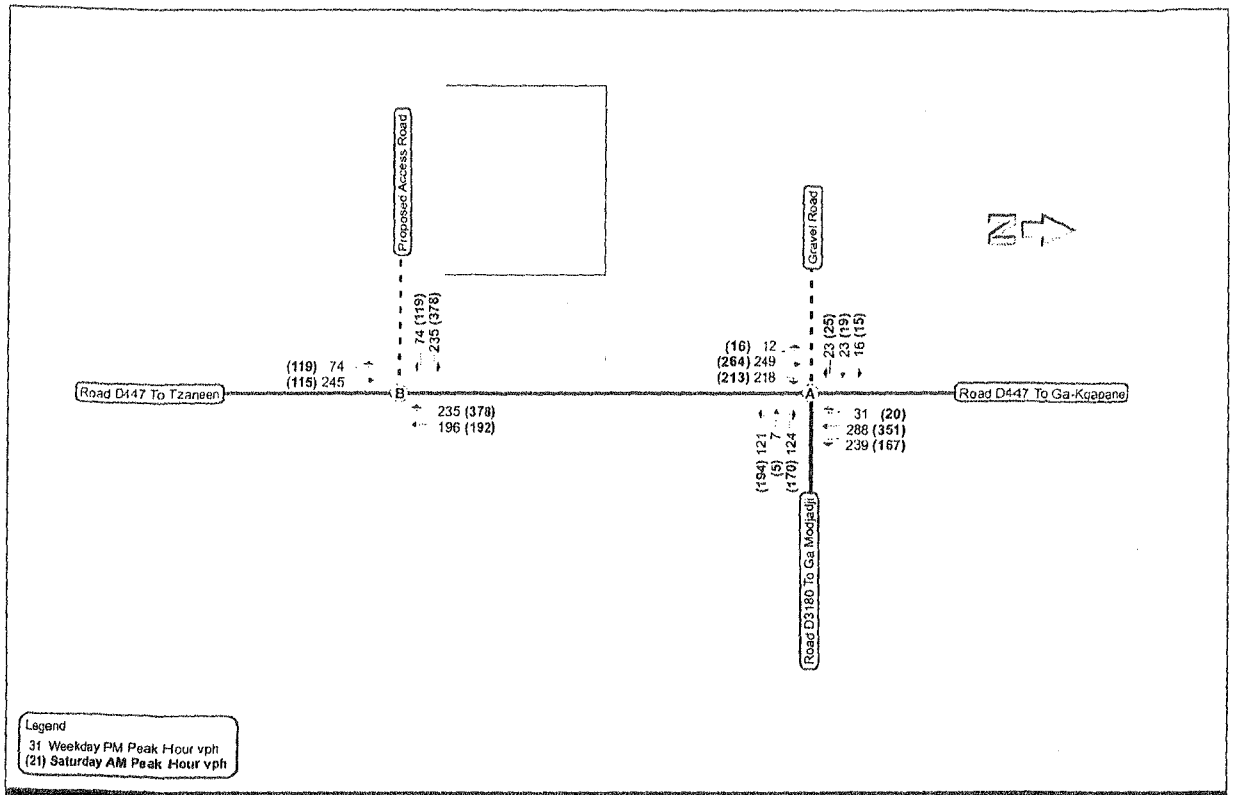


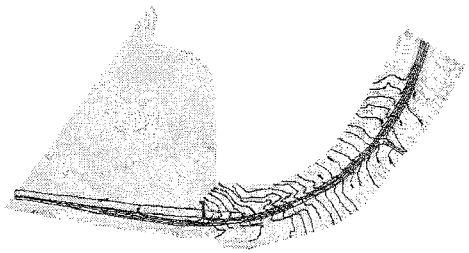

FIGURE B-8: PROJECTED 2014 TRAFFIC WITH THE PROPOSED DEVELOPMENT (SCENARIO 4)

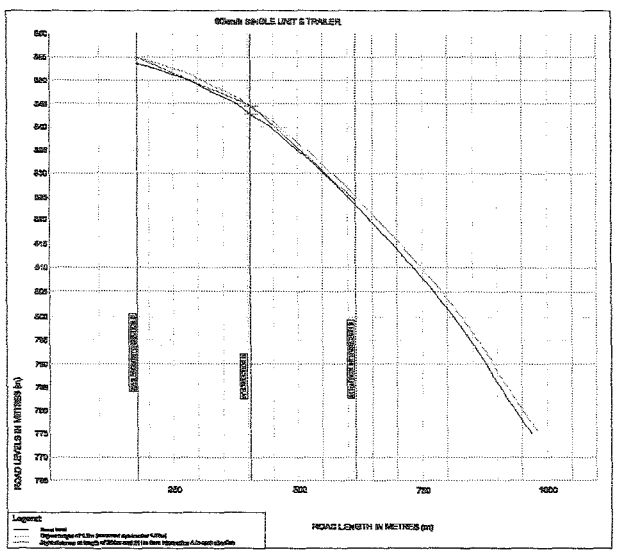
# APPENDIX C

## INFORMATION RELATED TO SIGHT DISTANCE

| TABLE C-1: SIGHT DISTANCE CALCULATIONS FOR SCHOONGELEGEN | | | | | | | |
|---|---|---|---|---|---|---|---|
| Date | 18 November 2008 | | | | | | |
| Type of Development | Retail, Commercial | | | | | | |
| Recommended Vehicle | Single Unit | | | | | | |
| DESCRIPTION | SOUTHERN SIDE OF INTERSECTION | | | NORTHERN SIDE OF INTERSECTION | | | COMMENTS |
| Available sight distance horizontal | 254m<br>Based on available information | | | 211m | | | See 08097/LS/01 |
| Available sight distance vertical | 205m | | | 211m | | | See 08097/LS/01 |
| Gradient of road section | +3.81% | | | -3.75% | | | None. |
| Design speed | 60km/h | | | 60km/h | | | None. |
| Type of vehicle | Passenger Car | Single Unit | Single Unit & Trailer | Passenger Car | Single Unit | Single Unit & Trailer | |
| 1) **Required intersection sight distance (m).** *Based on SANRAL Geometric Design Guidelines. Road Access Management in South Africa. (Table 7.4)(Same as minimum required Gap Acceptance Distance)* | 120m | 180m | 225m | 120m | 180m | 225m | a) None. |
| | Pass | Pass | Fail | Pass | Pass | Fail | |
| 2) **Required stopping sight distances (m) (depend on gradient** *(Based on SANRAL Geometric Design Guidelines. (Table 3.5 and Figure 3.2)* | 90m | 90m | 90m | 90m | 90m | 90m | a) None. |
| | Pass | Pass | Pass | Pass | Pass | Pass | |
| 3) **Minimum required gap acceptance sight distance (m)** *(Based on the National Guidelines for Road Access Management in South Africa. (Table 7.4))* | 120m | 180m | 225m | 120m | 180m | 225m | a) None. |
| | Pass | Pass | Fail | Pass | Pass | Fail | |
| 4) **Required sight distance for traffic signals** *(National Guidelines for Road Access Management in South Africa. Table 7.3)* | 190m | 190m | 190m | 190m | 190m | 190m | a) Rural conditions<br>b) If no traffic light or four way stop is provided this would not be a problem) |
| | Pass | Pass | Pass | Pass | Pass | Pass | |

**Note:** The requirements for a speed of 60km/h for a single unit are met should the intersection be free flow for the main traffic.






| | | | |
|---|---|---|---|
| Pvt 22 Doornfontein Petrohuma 0201 | PO Box 11122 Bendor 0699 | CLIENT: | - |
| Tel: (012) 789 5999 Fax: (012) 789 5910 | info@ctrans.co.za www.ctrans.co.za | | |

| APPROVED | | |
|---|---|---|
| | SIGNED | DATE |
| | | |
| | | |

| NO | DATE | REVISION | CHECKED |
|---|---|---|---|
| | | | |

| | INITIAL | SIGNATURE | DATE |
|---|---|---|---|
| DESIGNED: | - | | |
| DRAWN: | - | | |
| CHECKED: | - | | |



PROJECT: SCHOONGELEGEN SHOPPING CENTRE

DRAWING TITLE: LONG-SECTION

DRAWING NUMBER: 08097_LS_02

SCALE: Hor 1:5000 Vert 1:500

SHEET: -

DATE: -

# APPENDIX J

## SERVICES

- Electricity
- Water and Sanitation
- Services Agreement

# Electrical Services Report

- Pienaar & Erwee Engineers

## LAND DEVELOPMENT AREA : PART OF PORTION 1 OF THE FARM SCHOONGELEGEN 432 LT

# BULK ELECTRICAL ENGINEERING SERVICES REPORT

**DATE: 2009-06-18**

## 1. INTRODUCTION

1.1 This report discusses the implications of the proposed development of the land Development area in respect of bulk electrical engineering services.

1.2 The above information is based on drawings received from Kamekho Town Planners.

## 2. SUPPLY AUTHORITY

2.1 The supply authority for the area of the proposed development is ESKOM.

2.2 Bulk electricity to the Development must be supplied by ESKOM.

## 3. BULK ELECTRICITY SUPPLY

### 3.1 DEMAND REQUIRED

The demand of the development will be 1 250kVA.

### 3.2 BULK SUPPLY

#### 3.2.1 APPLICATION

An application for bulk supply to the development has been made to ESKOM as follows:

| | | |
|---|---|---|
| Demand | - | 1 250kVA. |
| Supply voltage | - | 22kV. |
| Application reference no. | - | 24646445. |
| Date of application | - | 2009-05-04. |

#### 3.2.2 FEEDBACK ON APPLICATION

To date no feedback has been received on the application from ESKOM.

## 4. ELECTRICAL LINK SERVICE

The application for bulk supply to ESKOM includes the link service to the site of the Development which must be done by ESKOM.

## 5. INTERNAL ELECTRICAL DISTRIBUTION

The Developer will be responsible for the electrical distribution on the site of the development. This distribution system will include all medium and low voltage cables, transformers, switchgear, metering and area lighting.

This distribution system must be designed and installed in accordance with SANS 10142 for the wiring of premises.

**PIENAAR & ERWEE ENGINEERS (Pty) Ltd**
Electrical Engineers & Project Managers

PER

**M. DE KOCK Pr. Eng.**

/dp B846 schoongelegen eng services report 01

# Water and Sanitation Services Report

**SCHOONGELEGEN SHOPPING CENTRE**
**PORTION 1 OF FARM SCHOONGELEGEN 432 LT**
**GA-KGAPANE**
**MODJADJISKLOOF**

**SERVICES REPORT**

## INDEX





## 1. INTRODUCTION

### 1.1 GENERAL

DMV Limpopo Pty (Ltd) was appointed by Ghiordes CC to conduct certain actions, as per the appointment letter, to investigate the bulk services to the abovementioned farm portion in Ga-Kgapane in the Greater Letaba Municipal area, for the construction of a Shopping Center. The area was visited and an on site investigation took place between the client and the Engineer. The following items form part of the Scope of Work:

- Services investigations at Ga-Kgapane - Bulk Services.
- Compiling of a services report for the area as described.
- Preliminary design on all services according to the requirements.
- Cost estimate on the different services.

### 1.2 TERMS OF REFERENCE

The investigation was requested by the client with the specified terms of reference as described in the acceptance letter as forwarded.

The appointment and terms of reference was confirmed in the meeting held at Ghiordes Offices in Polokwane.

### 1.3 INFORMATION

The following information and Publications were used for this report:

- Existing Water reticulation in Greater Letaba Municipality – Ga-Kgapane/Modjadji.
- Existing Sewer reticulation and information available in Ga-Kgapane.
- Standards and Guidelines - Provision of Engineering Services.
- Ancillary documentation and information
- Stormwater Statistics - National Drainage Manual
- Sanitation treatment (Bio-mite Calcamite)

## 1.4 PROJECT LOCATION

Portion 1 of the farm Schoongelegen is situated in Ga-Kgapane (see attached sketch) in the Greater Letaba Municipal (GLM) area situated in Limpopo Province. GLM forms part of the Mopani District Municipality

The study area is located on the farm Schoongelegen in Ga-Kgapane, and will be referred to as the "site". It is defined by the following co-ordinates:

| TABLE 1: CO-ORDINATES OF STAND | | | | |
|---|---|---|---|---|
| Schoongelegen 432 LT | | Co-ordinates | | |
| | | Longitude | Latitude | |
| Portion 1 | Ga-Kgapane | 30°14'40" | 23°40'06" | |

## 1.5 TOPOGRAPHY

The site is located on a strong northerly sloping hill from Nooitgedacht farm towards the stream situated to the north of the site. The highest elevation is 846.00 amsl and the lowest elevation of the site is 827.00 amsl.

The area can be defined as hilly (10%-30% slope) with semi permeable soil covered in light bush and grass.

## .6 DRAINAGE

Drainage is mainly by means of surface flow, with storm water flowing onto the lower lying areas towards the nearby stream.

## 7 CLIMATE

The area is situated in the summer rainfall region. The yearly precipitation is in the order of 600 millimeters. The climatic N-value (Weinert, 1980) of the area is between 3 and 4.



## 2. SCOPE OF THE INVESTIGATION

The following items form part of the services report. The aims of the investigation are thus:

- To investigate the existence of existing services in the scoping area and if information exist to compare to the site requirements with specific reference to a new shopping centre,
- To correlate the capacity of the existing services with the new development,
- To recommend design procedures and necessary precautionary measures,
- To determine what type and size of service will be required and do the preliminary design,
- To determine all variables according to the Guidelines for Engineering Services,
- To indicate where problems might occur and what possible solutions can be taken,
- To discuss the provision of services with the local municipality and determine responsibilities,
- Services to be investigated are Water (bulk and internal); Sanitation (bulk and internal); Stormwater, (bulk and internal); Roads (internal); Waste Management (bulk and internal) – DMV Limpopo
- Electrical Bulk supply service – Pienaar & Erwee
- Geo-technical investigation & Floodline determination – WSM Leshika
- To prepare a cost estimate on the provision of the services when required.