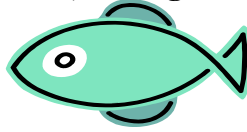


ENVIROSCIENTIFIC

Reg. Nr 2003/073511/23

Environmental Scientific, Management and Auditing Services

63 Berg Street
7140 Gordon's Bay
South Africa



Lourens: (+27) 82 805 2999
Peet: (+27) 82 921 5949
E-mail: enviroscientific@adept.co.za

&

EnviroAfrica

Environmental Planning and Impact Assessment Consultants
Omgewingsbeplanning en Impakbeoordeling Konsultante

Mount Royal Golf & Country Estate

OPERATIONAL MANAGMENT PROGRAM MANAGEMENT AND MAINTENANCE OF THE ESTATE

Developed by:

Enviroscientific & EnviroAfrica

Registered Professional Environmental, Soil & Ecological Scientists

This material was specifically developed for Mount Royal Golf and Country Estate and may not be duplicated or distributed in any way without written permission from Enviroscientific.

July 2006

©

TABLE OF CONTENTS

1#	INTRODUCTION AND PURPOSE	1
1.1	Major environmental aspects identified	1
2#	REFERENCES	2
3#	DEFENITIONS & ABBREVIATIONS	3
3.1	Definitions	3
3.2	Abbreviations	3
4#	ESTATE MANAGEMENT AND MAINTENANCE PROGRAM	4
4.1	Stormwater management	4
4.1.1	Description.....	4
4.1.2	Stormwater management Objective.....	4
4.1.3	Mitigation Measures.....	4
4.1.3.1	<i>Loss of a portion of the wetland due to housing layout</i>	5
4.1.3.2	<i>Increased potential for soil erosion</i>	5
4.1.3.3	<i>Impact on wetland communities due to quality of runoff</i>	6
4.1.3.4	<i>Physical disturbance of the wetland during construction and operational phase</i> .	6
4.1.3.5	<i>Increased vulnerability of wetlands to exotic vegetation</i>	6
4.1.3.6	<i>Construction of a weir across the Platteklip River and abstraction from the river.</i>	7
4.2	Domestic water supply	7
4.2.1	Describtion.....	7
4.2.1.1	<i>Potable Water</i>	7
4.2.1.2	<i>Irrigation Water</i>	8
4.2.1.3	<i>Water features</i>	8
4.2.2	Water utilization objectives	8
4.2.3	Mitigating measures.....	9
4.3	Sewerage disposal	9
4.3.1	Description.....	9
4.3.2	Sewerage disposal objective	9
4.3.3	Mitigating and management actions	10
4.4	Maintenance and housekeeping	10
4.4.1	Maintenance objectives	10
4.4.2	Mitigating and management actions	10
4.4.3	Emergency preparedness and response	11
4.4.3.1	<i>Accidental fires</i>	11

4.4.3.2	<i>Hydrocarbon spills</i>	11
4.4.3.3	<i>Concrete/cement spillages</i>	12
4.5	Construction	12
4.6	Waste Management	12
4.6.1	Description.....	12
4.6.2	Waste management objective.....	13
4.6.3	Mitigating and management actions	13
4.6.3.1	<i>Domestic waste</i>	13
4.6.3.2	<i>Hazardous waste</i>	13
4.6.3.3	<i>Composting</i>	14
4.7	Roads	14
4.7.1	Access Road	14
4.7.2	Internal Roads	14
4.8	Electricity	15

1: INTRODUCTION AND PURPOSE

The purpose of the Estate management and Maintenance Program is to address all operational management activities recognized in the Environmental Aspect and Impact Register (Refer to record 4.3.1.2 in the Mount Royal EMS Manual), which might have a detrimental effect on the environment if not properly managed. The Estate Maintenance Manager will be responsible for the implementation of this management and maintenance program. The EMS Manager will be responsible to monitor, evaluate and audit the environmental performances of the Estate Maintenance Manager.

1.1 MAJOR ENVIRONMENTAL ASPECTS IDENTIFIED

ASPECT(S)	POTENTIAL ENVIRONMENTAL IMPACT(S)	MITIGATING OR MANAGEMENT ACTION	REFERENCE
Stormwater Management	Soil erosion	Careful management and control of stormwater run-off (engineering design)	Refer to 4.1
	Sedimentation build-up in the river/wetland areas	Careful management and control of stormwater run-off (engineering design)	
	the pollution of the river/wetland areas as a result of runoff from fertilized areas	Monitoring water quality	
Domestic water supply	Utilizing a scarce resource	Monitoring and managing water demand	Refer to 4.2
	Managing water demand against available resources	Monitoring and managing water demand	
	Managing water quality	Water quality monitoring	
Sewerage disposal	Pollution and health risks as a result of sewerage effluent and solid waste	Monitoring of sewerage disposal and emergency response procedure	Refer to 4.3
General maintenance	Pollution as a result of using hazardous chemicals, pesticides and herbicides	Hazardous substances control procedure	Refer to 4.4
General housekeeping	Visual degradation	Maintenance and cleaning procedures and schedules	Refer to 4.4, 4.7 and 4.8
	Pollution as a result of bad waste disposal practices etc.	Maintenance and cleaning procedures and schedules	
	Pollution as a result of bad monitoring	Monitoring procedures and schedules	
Construction	Disturbance of natural environment	Operational management of building environment	Refer to 4.5
	Visual degradation as a result of not conforming to architectural guidelines	Operational management of building environment	
	Pollution as a result of bad building practices	Operational management of building environment	
	Spreading of non-indigenous (even invasive alien) species to the ecological corridors and or conservation areas as a result of not abiding to the environmental guidelines	Operational management of building environment	
Waste Management	Hazardous substances	Hazardous substances control procedure	Refer to 4.6
	General household waste	Correct storage of waste and regular waste disposal services	
	Organic garden waste (e.g. vegetation cutting)	Correct disposal or composting procedure	
	Recyclable waste material	Appropriate procedures for the recycling of waste	

Refer to the Aspect and Impact Register (Record 4.3.1.2 of the Mount Royal EMS Manual)

2: REFERENCES

CK Rumboll & Partners and Management Team. 2004. Mount Royal Country and Golf Estate: Development Framework. Unpublished report July 2004.

Day, Dr. L. 2003. Assessment of the likely impacts of the proposed Malmesbury Golf Estate on freshwater ecosystems. The Freshwater Consulting Group. Unpublished report prepared for EnviroAfrica. December 2003.

Department of Environmental Affairs and Development Planning's – Record of Decision: Condition of approval. Ref. no.: E12/2/1-68-ERF 327 & FARM696, MALMESBURY. Issued in terms of section 22 of the Environmental Conservation Act (Act 73 of 1989). Proposed upgrade of the Malmesbury Municipal Golf Course to construct the Mount Royal Golf and Country Estate on Erf 327 and the remainder of the farm Tweefontein no. 696, Malmesbury.

EnviroAfrica, January 2006. Mount Royal Golf and Country Estate. Environmental Management Plan, Construction Phase. Located on Erf 327, and the Remainder of Farm 696, Malmesbury. DEA&DP-EIMU Reference E12/2/1-68-Erf 327 & Farm 696, Malmesbury.

SKC Engineers. 2004: Mount Royal Golf and Country Estate: Municipal services report. W0824/102-04 C. Unpublished report: 21/04/2004.

3: DEFENITIONS & ABBREVIATIONS

3.1 DEFINITIONS

Environmental Aspect – Any element of any construction activity, product or services that can interact with the environment.

Environmental Impact – Any change to the environment, whether adverse or beneficial, wholly or partially resulting from any construction activity, product or services.

No-Go Area(s) – An area of such (environmental/aesthetical) importance that no person or activity are allowed within a designated boundary surrounding this area.

Site – The area and extent of the development works and infrastructure, including any areas off the main site on which works are to be carried out in order to allow the development to proceed successfully.

3.2 ABBREVIATIONS

DEA&DP	Department of Environmental Affairs and Development Planning
DEAT	Department of Environmental Affairs and Tourism
EMS	Environmental Management System
Mount Royal Estate	Mount Royal Golf and Country Estate
MSDS	Material Safety Data Sheet(s)
ROD	Record of Decision

4: ESTATE MANAGEMENT AND MAINTENANCE PROGRAM

4.1 STORMWATER MANAGEMENT

4.1.1 DESCRIPTION

The proposed stormwater network will consist of a combination of underground pipes and open channels. The stormwater will be released into the Platteklip River. Retention ponds will be constructed at the outlets of the main stormwater pipelines to minimize the impact on the environment due to the peak stormwater runoff (SKC Engineers, 2004).

The Platteklip River, a tributary of the Diep River, is a perennial stream which forms the south-western border of the property. A company specializing in freshwater ecosystems, the Freshwater Consulting Group, was appointed to assess the likely impact that the proposed development will have on the ecological condition of the Platteklip River. The report by Dr Liz Day (Day, 2003) provides guidelines and recommendations on the stormwater management for the development.

The following impacts are listed in the report:

- a) The loss of a portion of the seasonal wetland due to the housing layout.
- b) Increased potential for soil erosion due increased runoff.
- c) Impact on the wetland communities due to the quality of the runoff.
- d) Physical disturbance of wetland communities during the construction and operational phases.
- e) Increased vulnerability of wetlands to the invasion by exotic vegetation from garden waste.
- f) Construction of a weir across the Platteklip River and abstraction from the river.

4.1.2 STORMWATER MANAGEMENT OBJECTIVE

Stormwater management aims at protecting the property from flood damage, lost of topsoil and the effect of erosion and the Diep and Platteklip River from pollution and sedimentation.

4.1.3 MITIGATION MEASURES

All reasonable measures will be taken to control the erosive effects of storm water runoff particularly where excavation and construction activities form temporary channels. Suitable energy breaking devices, diversions and retention ponds, shall be employed to

ensure that storm water runoff from the Site is dissipated and to prevent the surface water from being concentrated in streams and from scouring the slopes, banks or other areas.

Where erosion and/or sedimentation occurs, rectification shall be carried out in accordance with details specified by the EMS Manager in consultation with a wetland specialist.

4.1.3.1 LOSS OF A PORTION OF THE WETLAND DUE TO HOUSING LAYOUT

The recommended distance between the edge of the river and the building line for the houses is 50 m. The layout of the residential erven has been revised accordingly and a minimum distance of 60 m was achieved.

4.1.3.2 INCREASED POTENTIAL FOR SOIL EROSION

a) Channels

The existing stormwater channels show signs of erosion due to the steep gradients of the slope towards the river. The channels need to be rehabilitated and upgraded to cope with the additional stormwater runoff. The banks of the earth channels will be graded, where possible, to a slope of 1:5 to create a wider vegetated channel surface. The channels will be planted with indigenous vegetation. A specialist will be approached to recommend suitable vegetation species.

Berms, made up of stone filled gabion cages, will be constructed across the channels at regular intervals. These structures will act as a retention facility as well as an energy break for stormwater. The proposed measures, together with regular future maintenance of the channels, will prevent long term soil erosion from taking place.

b) Retention Ponds

The stormwater retention ponds will be constructed at the outlets of the main stormwater outflow pipes. The *ponds* will minimise the effect of the peak stormwater flow on the environment and act as a trap for litter entering the stormwater network. These ponds will be designed as a retention facility only and will be replanted to create a wetland environment. This concept will reduce vegetation maintenance, maximise stormwater infiltration into the soil, as well as protect the river from being polluted.

Early indications are that the ponds will have a capacity of 1500 m³. The ponds will be positioned between the erf boundaries and the recommended 40 m setback line. The stormwater will be released into the river via open channels which will be constructed in

accordance with the proposals in paragraph 4.1.1.2(a) in close co-operation with wetland specialist(s).

4.1.3.3 IMPACT ON WETLAND COMMUNITIES DUE TO QUALITY OF RUNOFF

It has been alleged that the use of treated effluent for the irrigation of the golf course will result in an increase of concentrated nutrients in the subsurface and surface runoff which in turn would have a negative impact on the river ecosystem. To minimise such a possibility a buffer width of 50 m was recommended by the specialist between the river and the development. Not only has this guideline been adhered to in the layout design of the development, but in addition to the above, the residential erven have been positioned between the river and the proposed golf course. The minimum distance between the irrigated golf course and the river is approximately 200 m. This will minimize any negative impact that the irrigation runoff could have on the river ecosystem.

4.1.3.4 PHYSICAL DISTURBANCE OF THE WETLAND DURING CONSTRUCTION AND OPERATIONAL PHASE

a) Construction Phase

The construction environmental management plan will stipulate measures to be implemented by the contractors during the *construction* phases. These measures will include the temporary fencing off of the river.

b) Operational Phase

The main walking and jogging trails will be located within the secondary buffer area. This area falls between the 20 to 50 m setback lines from the river.

4.1.3.5 INCREASED VULNERABILITY OF WETLANDS TO EXOTIC VEGETATION

The buffer areas between the erven and the river will be utilized for recreational activities such as walking and jogging. The dumping of garden waste in this area will be highly visible and could therefore be removed before any damage is caused to the ecosystem. The private open spaces will be highly prized within the development and maintained to optimum standards by the Homeowners Association.

The existing alien vegetation such as the Port Jackson trees on river bank will be removed.

4.1.3.6 CONSTRUCTION OF A WEIR ACROSS THE PLATTEKLIP RIVER AND ABSTRACTION FROM THE RIVER.

During the early planning stages of the development, it was envisaged that water could be abstracted from the river for supplementary irrigation of sections of the golf course, as well as for the creation of water features. Initial specialist reports however indicated that this proposal may have a negative impact on the ecosystem of the river. The proposal will therefore not be pursued any further.

4.2 DOMESTIC WATER SUPPLY

4.2.1 DESCRIPTION

Water will be distributed using two separate networks for potable and irrigation water respectively.

4.2.1.1 POTABLE WATER

Potable water will be obtained from the Voëlvlei Water Scheme. The Swartland Municipality is the service provider and will also take ownership of the water network on completion. The main water supply pipeline of the scheme which crosses the estate is protected by 15 m wide servitude.

The average daily water demand for the fully developed estate will be 600 kiloliters. A 0,75 megaliter reservoir will be constructed to provide a 24 hour storage capacity for the estate. The reservoir will typically have a depth of 3 m and have a diameter of 20 m. The reservoir will be partially sunk into the ground and will not be visible from the N7 due to the proposed berm to be constructed on the eastern boundary of the development.

The internal water network will be installed in accordance with the Municipal regulations. The network will consist of HDPE pipes with diameters varying from 76 mm to 160 mm. A booster pump in the network will provide sufficient water pressure to the high lying erven. Each erf will be provided with a metered water connection.

Fire hydrants will be provided in the road reserves at maximum intervals of 90 m.

4.2.1.2 IRRIGATION WATER

The golf course will be irrigated using treated sewerage effluent from the Malmesbury treatment works. The effluent conforms to general standards as regulated by the Department of Water Affairs and Forestry. The treatment works produces 90 megaliters of effluent per month. The treated effluent is currently utilised for the irrigation of or the golf course as well as sports fields at the Wesbank and Malmesbury Rugby Clubs and the Swartland High School. The total demand for treated effluent is 30 megaliters/month. The current irrigation demand for the golf course is 15 megaliters/month. The irrigation demand for the upgraded golf course, estimated at 30 megaliters/month, will increase the total effluent demand at the sewerage works to 45 megaliters/month. The water is currently pumped from the sewerage treatment works in Malmesbury to a lined irrigation pond on the golf course. From here it is pumped into the irrigation network.

The proposed upgrading of the irrigation system will entail the construction of a booster pump installation on the existing main supply pipeline from the sewerage treatment works. The booster pump installation will be situated to the south of the existing golf course as shown on the layout plan. The installation will consist of a 25 kiloliter break pressure tank and a pump house fitted with a duty and a standby pump. Water will be pumped from the existing irrigation pond into the upgraded irrigation network.

4.2.1.3 WATER FEATURES

Water features, if incorporated in the final development plan, will form part of the golf course design. The water features will be designed as a closed system and would therefore, once established, require a minimal volume of water.

4.2.2 WATER UTILIZATION OBJECTIVES

Since the Golf course will utilize treated wastewater from the Municipal sewerage plant (according to the principle of beneficial irrigation of wastewater after treatment), domestic use is regarded as the most important water use on the Estate. The aim of water utilization on the Mount Royal Estate is to ensure that its water usage is managed in a sustainable way (water is a scarce resource) without detrimental effects to the environment.

4.2.3 MITIGATING MEASURES

- Water conservation measures such as low flow taps, dual flush toilets, water wise gardens, rainwater tanks etc. will be encouraged among residents and will be implemented at the Estate buildings.
- Water demand for the Estate will be monitored on a monthly basis with the aim of ever reducing the water usage.
- Every effort will be made reduce the long term water demand for irrigation purposes, particularly once the golf course and landscaped areas are well established.
- Environmental training of Estate staff will include water conservation awareness and water wastage.

4.3 SEWERAGE DISPOSAL

4.3.1 DESCRIPTION

A waterborne sewerage network will be installed with pipe diameters varying from 100 mm to 200 mm. The average daily flow from the proposed estate is estimated at 352 kiloliters. The sewerage will gravitate to a pump station as shown on the layout plan. The pump station, which will be fitted with a duty and a standby pump, will be incorporated in the operations monitoring system of the Swartland Municipality. All sewerage pump stations within the municipal boundary are telemetrically connected to the main frame computer which in turn is equipped with an early warning system should a pump failure occur. A 350 m³ storage pond will be constructed as an emergency measure and the entire installation fenced off. Sewerage will be pumped to the Malmesbury sewerage treatment works. The proposed rising main will connect to the existing pipeline network in the town.

The Malmesbury sewerage treatment works uses the activated sludge process and has a design capacity of 5.5 mega-litres per day. The treatment works is licensed by the Department of Water Affairs and Forestry. The current average sewerage discharge to the sewerage works is 3.8 mega-litres per day. The sewerage treatment works has adequate capacity to treat the additional 352 kiloliters of sewerage effluent from the estate.

4.3.2 SEWERAGE DISPOSAL OBJECTIVE

The aim of sewerage disposal is to manage it in order to ensure that the potential negative environmental impacts (odours, pollution of water resources) are minimized.

4.3.3 MITIGATING AND MANAGEMENT ACTIONS

- The sewerage disposal system will be inspected on a regular basis.
- The sewerage pump house will be fitted with a duty pump as well as a standby pump.
- The sewerage system will be incorporated in the operations monitoring system of the Swartland Municipality and will telemetrically connected to the main frame computer which in turn is equipped with an early warning system should a pump failure occur.
- A 350 m³ storage pond will be constructed as an emergency measure and the entire installation fenced off.

4.4 MAINTENANCE AND HOUSEKEEPING

The Estate offices, workshops and storages areas and the general maintenance of the Estate and its landscaped areas are the responsibility of the Estate Maintenance Manager.

4.4.1 MAINTENANCE OBJECTIVES

The main aim of the maintenance program is to keep the Estate neat and tidy and to minimize the potential of pollution by handling and storing potential hazardous substances responsibly.

4.4.2 MITIGATING AND MANAGEMENT ACTIONS

- Any litter or waste materials encountered will be cleaned immediately (combined with regular site cleanups). This material will be incorporated into the general waste or recycle stream (paragraph 4.7).
- All equipment will be stored/parked in designated area to minimize the visible impact as well as potential noise and other pollution possibilities.
- Hazardous or potential hazardous materials will be stored in designated storage areas in accordance with the specification of its Material Data Safety Sheet (MSDS) or as per manufacturer's instructions.
- Saw dust or hydrocarbon absorption material must be readily available at the maintenance and workshop area(s) to be used in case of a spill.

- Herbicides and pesticides will be stored apart and in accordance to the AFCASA guidelines (showers and washing facilities must be provided).
- All incidents (e.g. spills, fires) involving hazardous material must be recorded.

4.4.3 EMERGENCY PREPAREDNESS AND RESPONSE

Emergency response plan(s) must be documented for each potential emergency incident. The following document control applies:

- a) A copy of all emergency response plans pertaining to a specific area/function must be kept by the specific line manager.
- b) Key elements of the emergency plans must be displayed in prominent places for each area of of high risk.
- c) Each departmental/line manager is responsible to ensure that only the latest approved plans are kept and implemented.
- d) Emergency plans must be amended as necessary, and reviewed and updated at least once every 5 years.

The following potential emergency situations have been identified and include the procedure for responding to, and for preventing and mitigating the environmental impacts that may be associated with them.

4.4.3.1 ACCIDENTAL FIRES

To minimize the risk of accidental fires the following measures will be implemented:

- At least one mobile fire unit (ready for use) will be available on site.
- Fire extinguishers must be in place and available in areas where open flames are used.
- Mount Royal Estate will negotiate an emergency response agreement/call-out procedure with the local fire department.
- The EMS Manager, the specific line managers must have emergency contact numbers of the local fire department and any other emergency agency which might be needed.

4.4.3.2 HYDROCARBON SPILLS

To reduce the risk of hydrocarbon spills, no fuel storage or distribution facilities will be established on site. In addition the following preventative measures will also be observed:

- Vehicles will arrive on site already fuelled for the project.

- If additional fuel is needed, it will be brought in as needed (minimal volumes) and refuelling will be done using a pump and not a funnel (to minimize the risk of spills).
- Spill trays shall be used during re-fuelling.
- In the case of accidental spillages or leakage, the first step will be containment, then cleanup followed by rehabilitation.
- The EMS Manager and the specific line manager must be informed of the spillage and measures taken as soon as possible.
- The EMS Manager will advise the best rehabilitation procedure (in consultation with experts if necessary).

4.4.3.3 CONCRETE/CEMENT SPILLAGES

- In the case of accidental spill, the person responsible will be responsible for immediate containment and corrective action (e.g. stopping the leak), and to inform the specific line manager (and ultimately the EMS manager).
- The EMS manager will recommend the best possible environmental solution.

4.5 CONSTRUCTION

Refer to the operational management program for the build environment (Record 4.3.3.2).

4.6 WASTE MANAGEMENT

4.6.1 DESCRIPTION

Large quantities of domestic and garden waste (and possibly hazardous waste) will be generated at the Estate. Poor waste management can lead to adverse environmental impacts (e.g. odours, visual impact) as well as health risks. Sound waste management is thus non-negotiable. The Homeowners Association will be responsible for the solid waste collection and its disposal at the Highlands Regional Waste Disposal Site which is situated approximately 8 km outside Malmesbury. An alternative waste disposal option, involving the construction of a solid waste transfer station on the estate and making use of the bulk collection service offered by the Municipality, was investigated. This option will however not be pursued at this stage.

4.6.2 WASTE MANAGEMENT OBJECTIVE

Waste management will aimed at the reduction of waste through recycling and re-use options (where possible) and the hygienically storage, handling and disposing of waste materials.

4.6.3 MITIGATING AND MANAGEMENT ACTIONS

4.6.3.1 DOMESTIC WASTE

- A pamphlet explaining waste management procedures will be provided to all residents.
- No on-site burying or dumping of any waste materials, vegetation, litter or refuse shall occur.
- Domestic waste will be collected in waste containers at each private property and will be placed for removal once a week.
- The Homeowners Association will be responsible to supply a waste removal service on a regular basis (at least once a week).
- The residents will be encouraged to use a two drum system, one containing general waste and the other for recyclable waste.
- All workshops and Estate buildings will be equipped with a two drum system (one for domestic waste and one for recyclable waste).
- Refuge areas pertaining to workshops and other Estate building will be situated to ensure minimum visual impact and will be suitably protected against accidental pollution (wind, rain etc.)
- Any solid waste will be disposed of at a landfill licensed in terms of section 20 of the Environment Conservation Act (Act No. 73 of 1989).

4.6.3.2 HAZARDOUS WASTE

- All hazardous waste shall be disposed of at a licensed hazardous waste site.
- Hazardous material will be collected separately and stored in WasteTeck containers to be removed to a registered Hazardous waste disposal site.
- No paint products may be disposed of on Site.
- Refuse screens and oil traps shall be installed at runoff concentration points from large parking facilities, wash bays, stormwater outlets, inlets to detention ponds, workshop forecourt drainage points, ablution and eating areas. These facilities shall be serviced and monitored at the discretion of the Maintenance manager.

- Hazardous building materials (e.g. asbestos, fibre claddings, refrigerants, coolants, substation cooling oils, etc) shall be identified and dealt with in accordance with the relevant safety and health legislation.

4.6.3.3 COMPOSTING

If the Estate considers the option of a composting its organic waste the following must be adhered to:

- All composting (organic material) must be heaped on an impenetrable layer (e.g. cement, clay or plastic) and covered against rain to prevent organic acids from seeping out and polluting the soil.
- All leachate must be collected and disposed into the wastewater system if not contained.
- The composting area must be at least 200 m from any neighbour.

4.7 ROADS

4.7.1 ACCESS ROAD

Access to the development will be obtained from Voortrekker road on the National Route N7/Malmesbury interchange. A traffic impact study report has been submitted to the Department of Transport and Public Works for approval. The peak hour traffic generated by the development is estimated at 225 vehicles per hour. It have been recommended that a two-way stop controlled intersection be constructed on Voortrekker road to provide access to the Estate as well as the Malmesbury Golf Club. Residents travelling to Cape Town will travel through Malmesbury via Voortrekker road. This will encourage residents to support the local businesses.

4.7.2 INTERNAL ROADS

The main access collector through the development will be 6,0m wide. The road width of the secondary roads will vary from 4.5m tot 5,5m.

The road surface will be a combination of brick paving and asphalt. Mountable kerbs will be installed on both sides of the roadway. Traffic calming measures will be introduced to limit the speed of the vehicles in the village.

Traffic circles will be constructed on the major intersections. These intersections will be architecturally designed and will incorporate water features.

4.8 ELECTRICITY

The Swartland Municipality will provide bulk electricity to the development. The existing network in Malmesbury has sufficient capacity to provide electricity for the first phase. The network will be upgraded to make provision for the additional demand due to the further phases of the development. The main 11kV electric cables will cross the N7 through a sleeve pipe which will be jacked underneath the N7.

The internal network will be installed by the developer, but the **Swartland Municipality will take ownership thereof on completion.**

APPENDIX 1

Site Layout Plan

