

***THE CONSTRUCTION OF THE INNOVATION HUB
AND ASSOCIATED INFRASTRUCTURE
ON THE REMAINDER OF THE FARM
KOEDOESPOORT 456 JR,
PRETORIA***

**GENERIC
ENVIRONMENTAL MANAGEMENT PLAN
FOR BUILDINGS**

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LIST OF ABBREVIATIONS

ECO	Environmental Control Officer
ELO	Environmental Liaison Officer
EMP	Environmental Management Plan
GDACEL	Gauteng Department of Agriculture, Conservation, Environment and Land Affairs
IEM	Integrated Environmental Management
POA	Property Owners Association
SEF	Strategic Environmental Focus

1. Background

Strategic Environmental Focus cc (SEF) has been appointed by The Innovation Hub Management Company (Pty) Ltd to compile an environmental scoping report for the proposed construction of The Innovation Hub and associated infrastructure on the remainder of the farm Koedoespoort 456 JR, Pretoria. The report was submitted to the Department of Agriculture, Conservation, Environment and Land Affairs (GDACEL), and was approved subject to a number of conditions, *inter alia* the submission of detailed EMPs for various activities relating to the development of The Innovation Hub.

This EMP focuses on the construction of all buildings, which will form part of the development. The first building to be erected on the site will be in The Innovation Hub Core Area, which will contain a building of approximately 8 000m², supported by underground and surface parking. This component will be developed by The Innovation Hub Management Company (Pty) Ltd. Construction activities are envisaged to commence in April 2003.

The remainder of the site has been divided into several land parcels, which will be developed by various parties. Construction activities for these buildings are envisaged to take place over a period of time, dependent on market demand.

This EMP will be made binding on developers of the individual land parcels by virtue of the regulations of the Property Owners Association.

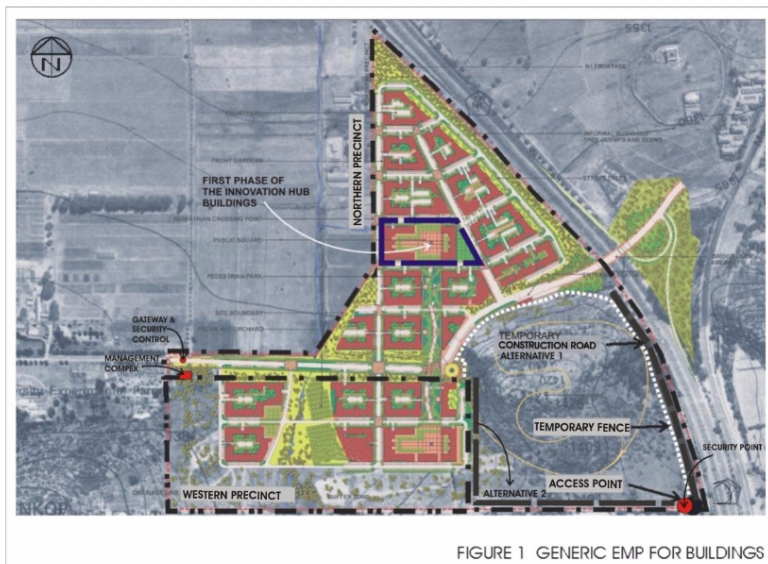


FIGURE 1 GENERIC EMP FOR BUILDINGS

1.1 Environmental Aspects Addressed

1.1.1 Introduction

The process which was followed in compiling the EMP is in compliance with Sections 21, 22 and 26 of the Environment Conservation Act, 1989 (Act no. 73 of 1989), and applies the principle of Integrated Environmental Management (IEM). The purpose of this EMP is to formulate mitigatory measures that should be made binding to all contractors during the construction phase as well as measures that should be implemented during the operational phase.

It should be noted that, at present, this development is conceptual in design. The mitigating measures that are proposed will thus depend on the final design, locality of the land parcel and impacts that may follow. The point of departure for this EMP is to take a pro-active route by addressing potential problems before they occur. This should limit corrective measures needed during the construction and operational phases of the development. Additional mitigation will be included throughout the project's various phases as necessary.

1.1.2 The development phases

a) The Planning Phase

From the scoping report it is clear that additional planning and detailed design of the buildings will still need to be undertaken. The EMP thus offers an ideal opportunity to incorporate pro-active environmental management measures with the goal of attaining sustainable development.

Pro-active environmental measures minimize the chance of impacts taking place during the construction and operational phase. There is still the chance of accidental impacts taking place; however, through the incorporation of contingency plans (e.g. this EMP) during the planning phase, the necessary corrective action can be taken to further limit potential impacts.

b) The Construction Phase

The bulk of the impacts during this phase will have immediate effect. If the site is monitored on a continual basis during the construction phase, it is possible to identify these impacts as they occur. These impacts will then be mitigated through the contingency plans identified in the planning phase, together with a commitment to sound environmental management from the developer.

As more detailed information becomes available, e.g. the Master Development Plan, Precinct Plan, Site Development Plan and/or Landscape Plan, additional (and more detailed) measures might have to be included into the existing generic EMP.

c) The Operational Phase

By taking pro-active measures during the planning and construction phases, potential environmental impacts emanating during the operational phase will be minimised. This, in turn, will minimise the risk and reduce the monitoring effort, but it does not make monitoring obsolete. Monitoring of certain sensitive issues such as water quality, storm water management and the proposed open space areas will still be required.

1.2 RESPONSIBILITIES

1.2.1 *The Environmental Control Officer*

It is recommended that an independent Environmental Control Officer (ECO) be appointed by the Developer to oversee all the environmental aspects relating to this development. The ECO should be appointed during the planning phase and form part of the project management team. He/she should attend project meetings as required, conduct audits to assess compliance with the EMP and be responsible for providing feedback on potential environmental problems associated with the development. In addition, the ECO would be responsible for:

- liaison with relevant authorities,
- liaison with project managers regarding environmental management,
- undertaking routine monitoring and appointing a competent person/institution to be responsible for specialist monitoring, if necessary.

1.2.2 *Liaison with Authorities*

The ECO would be responsible for liaising with GDACEL. During the construction phase, the ECO would be responsible for submitting monthly Environmental Audit Reports on the development to GDACEL. These audit reports will be based on the mitigating measures recommended and will include a description of the general state of the site, with specific reference to sensitive areas and areas of non-compliance. In order to keep a record of any impacts, an environmental log (refer to Table 2) should be kept on a continual basis.

1.2.3 *Liaison with Contractors*

The ECO will be responsible for informing the project manager and/or developer of any decisions that are taken concerning the natural and social environment during the construction phase of the development. It will then be the responsibility of the project manager and/or developer to inform the contractor. This would also include informing the contractors of the necessary corrective actions to be taken against employees transgressing the management activities stipulated in this EMP.

1.2.4 Environmental Liaison Officer (ELO)

The Environmental Liaison Officer (ELO) must be appointed by the Contractor to assist with the more regular monitoring of the construction activities. Any issues raised by the ECO will be routed through the project manager to the ELO for the Contractors' attention. The ELO shall be permanently on site to ensure daily environmental compliance with the EMP and would ideally also be a senior and respected member of the construction crew. Past experience has revealed that ELO's that can relate to the work force are the most effective for information transfer and ensuring compliance with the EMP.

1.3 Routine Monitoring

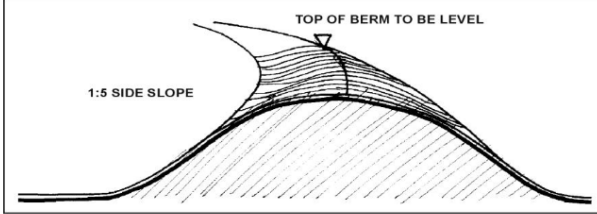
Routine monitoring would be necessary during the construction (monthly) and operational (annually) phases of this development. The final audit will be one year after the construction has been completed. The ECO would be responsible for this monitoring, which will entail auditing environmental performance against the mitigatory actions recommended in this report.

2. Environmental Management Plan

The following table forms the core of this EMP for the planning, construction and operational phases of this development. This table should be used as a checklist on site during the different phases. Compliance with this EMP must be audited monthly during the construction phase and once immediately following completion of construction. This should be followed up with annual audits hereafter.

Table 1: Generic Environmental Management Plan for the proposed Innovation Hub.

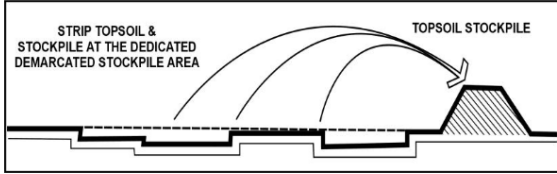
Phase of Development	Impacts/Issues	Action	Responsible Party	Frequency of Action
Planning	General	This EMP must be made binding to the main contractor as well as individual contractors. Only a specific and approved EMP for a specific phase or development area can replace the generic EMP.	Developer, ECO	Once off
		Compliance with the Departmental Standard Conditions from GDACEL must be adhered to.	Developer, ECO	Continuous
		The proposals included in the Tshwane Natural Resource Plan must be incorporated into any further planning initiatives associated with the site.	Developer, ECO	Once-off
		The developer must appoint an Environmental Control Officer (ECO) to oversee the environmental aspects of the development.	Developer	Once off
		The ECO should form part of the project management team and should attend project meetings as required.	ECO	Continuous
Planning	Erosion sedimentation and flooding	A stormwater management plan must be drawn up to indicate how stormwater will be managed on each site. Particular attention must be paid to discharge points of storm water channels, where flow of water is concentrated. If these points are not sufficiently stable for the increased flow rates, anticipated stabilisation measures have to be designed.	Engineer and Environmental Consultant	Once-off
		The rehabilitation of the drainage channel on site must be done according to the Stormwater Management Plan.	Engineer, Environmental consultant	Once-off

Phase of Development	Impacts/Issues	Action	Responsible Party	Frequency of Action
		Any berms to be constructed on a site must have changing gradients. Slopes of berms may not exceed 1 in 4 and may not be higher than 2m.	ECO	Once-off
				
		Plans of the proposed stormwater drainage system must be submitted and approved by the Environmental Control Officer (ECO) for each site. Stormwater shall, wherever possible, be retained on site for as long as possible to encourage groundwater recharge and retention. The design of stormwater management should include various aspects such as grassed swales and the use of permeable surface materials.	Engineer, ECO	Once-off
		No development may occur within the 1:100 year flood line.	Developer	Once-off
		If possible, construction activities should be scheduled for the dry winter months to decrease the risk of erosion during heavy thunderstorms	Developer	Once-off
Planning	Surface water contamination	Applicants for wet laboratory areas must be made aware of their responsibilities with regard to grease traps, water treatment or other requirements.	Developer	As necessary
		Grease traps must be designed to accommodate the anticipated contaminated water volumes and to drain the treated water into the sewage system to the approval of the local municipality.	Engineer	Once-off
		Waste management plans for wastes generated by wet laboratories must be submitted to the local authority for approval, and must contain information as required by local authority, national building regulations and safety requirements.	Developer, ECO	Once-off
Planning	Groundwater contamination	The site development plan for each building must indicate how sewage from the site will be connected to the existing sewage system.	Engineer	Once-off

Phase of Development	Impacts/Issues	Action	Responsible Party	Frequency of Action
Planning	Foundation stability	According to the geo-technical report, more detailed foundation investigations are recommended for all structures to be constructed on the site.	Developer	Once-off
Planning	Loss of agricultural land	The time frames regarding the moving of the agricultural experiments must be liased with the University of Pretoria.	Developer	Once-off
Planning	Destruction of vegetation	A Landscape Development Plan for each site must be submitted and approved by the local authority, taking the recommendations of the Landscape Policy into account.	Landscape architects	Once-off
		All areas that are to be incorporated into the open space system must be rehabilitated to the desired objective of the area and as stipulated in the Open Space System EMP.	Developer, POA, Landscape architects	As necessary
		No formal development is allowed at the toe line (foot) of the hill on site. Only development associated with access and passive recreational utilisation of the hill should be considered in this area (refer to Open Space System EMP).	Developer	Continuous
Planning	Impact on animal life	The Landscape Development Plan must indicate how habitats can be retained, conserved and created on each site.	Landscape architects	Once-off
Planning	Safety and security	Individual buildings must be designed to be safe, as the use of internal fences within the precinct will be prohibited.	Developer	Once-off
Planning	Sense of place	The individual building must be designed to comply with the concepts contained in the Urban Design Framework as well as the Landscape Policy.	Developer	Once-off
		Registered architects must be appointed to design the buildings.	Developer	Once-off
Planning	Traffic impact	Construction activities must be planned as to minimise the impact on the surrounding road network.	Developer	Once-off
Planning	Noise impact	The planning of construction activities must endeavour to minimise the noise impact on adjacent land owners.	Contractor	Continuous
Planning	Visual impact	The construction camps must be positioned as per POA regulations	Contractor	Once-off
		The solid waste management system must be integrated into the existing system in the area to the satisfaction of the local authority.	Developer	Once-off
		Parking areas should preferably be positioned behind building facades to limit the negative visual impact of cars from activity spines.	Developer	Once-off
		Artificial lighting of the site must minimise light pollution and must specifically be kept away from the natural areas.	Developer, ECO	Once-off

Phase of Development	Impacts/Issues	Action	Responsible Party	Frequency of Action
Construction	General	Prior to establishment of the site camp(s), the Contractor shall produce a plan showing the positions of all buildings, laydown yards, vehicle wash areas, fuel storage areas, and other infrastructure for approval by the POA and ECO.	Contractor, ECO	Once-off
		The Contractor shall not use the land forming the site of, or connected with, the Works for any purpose whatsoever other than for the proper carrying out of the Works under the Contract and shall place any camps that may be required for himself and his employees only on site(s) approved by the POA. No trees or bushes shall be damaged or cut down by the Contractor or by any of his employees whether for use on the Works or otherwise without the written consent of the ECO and then only where and in the manner as they may direct.	Contractor, ECO	Continuous
		All persons employed by the Contractor or his subcontractors shall abide by the requirements of this EMP. The ECO may report any employees of the Contractor or his subcontractors found to be in breach of any of the EMP specifications to the project manager and/or developer, who may order the person to leave the site forthwith. The order may be given orally or in writing. Confirmation of an oral order will be given as soon as practicable but lack of confirmation in writing shall not be a cause for the offender to remain on site. No extension of time will be granted for any delay or impediment to the Contractor brought about by a person ordered to leave the site.	Contractor, ECO	Continuous
Construction	Erosion, sedimentation and flooding.	Stormwater on the site must be managed as determined in the Stormwater Management Plan, including measures to ensure that the energy of storm water that is to be released into the drainage areas is dissipated. Measures must be implemented to distribute storm water as evenly as possible.	Developer, Contractor, Engineer	Once off
		Erosive agents should be minimised to prevent siltation of the drainage channel.	Contractor, ELO	Daily
		Vegetation clearance must be kept to a minimum.	Contractor, ELO	Daily
		Make use of existing tracks for vehicular circulation on site as far as possible to limit damage to the drainage line, fauna and flora.	Contractor, ELO	Daily
		No stockpiles or construction materials may be stored or placed within the natural drainage line or within 50m of it unless approved by the ECO.	Contractor, ELO	Daily
		The contractor must rehabilitate the construction camp once construction activities have terminated. Compacted areas will be ripped and mulched as described under "Management of topsoil" in order to ensure recovery of the natural vegetation cover.	Contractor, ELO	End of construction phase

Phase of Development	Impacts/Issues	Action	Responsible Party	Frequency of Action
		Where necessary, a suitable mixture of indigenous grass seed shall be used to reseed damaged areas.	Contractor, ELO	Once-off
		Where necessary damaged areas shall be cordoned off to enhance rehabilitation.	Contractor, ELO	Once-off
		The storm water drainage and sewerage system must incorporate measures to ensure water tightness of conduits .	Engineer	Once-off
		The quality of discharge of any water must comply with standards agreed with the Department of Water Affairs and Forestry.	Contractor, ELO	Once off
		Any water pollution incidence must be reported to DWAF immediately.	Contractor, ELO	As required
		Construction equipment and machinery must be kept in a demarcated area. The loss of oils and fuel onto the ground must be limited and contained. Where oils have leaked onto the soil, this soil must be removed and disposed of at an approved dumping site at the end of the construction phase or as required by the ECO	Contractor, ELO	Monitor weekly
Construction	Groundwater contamination	Only waterborne sewerage reticulation is permitted.	Engineer	Once-off
		Underground services should be designed in such a way so as to require minimum maintenance to avoid disturbance of the underground environment.	Engineer	Once-off
Construction	Geological conditions	All buildings and basements must be constructed according to the measures determined in the site-specific geo-technical assessments.	Developer, Engineer	Once off
Construction	Management of topsoil	Topsoil shall be stripped from all areas that are to be utilized during the construction period and where permanent structures and access is required. These areas will include the areas comprising the permanent works, pipeline trenches, stockpiles, access roads, construction camps and laydown areas. Topsoil shall be stripped after clearing of woody vegetation and before excavation or construction commences.	Contractor, ECO	Continuous
		Soil shall be deemed to be the top layer of soil containing organic material, nutrients and plant and grass seed. For this reason, it is an extremely valuable resource for the rehabilitation and vegetation of disturbed areas.	Contractor, ECO	Continuous

Phase of Development	Impacts/Issues	Action	Responsible Party	Frequency of Action
		At the beginning of the construction phase, topsoil removed for vegetation clearance must be stripped to a minimum depth of 150 mm and stockpiled on the demarcated topsoil stockpile area.	Contractor, ELO	Once-off
				
		At the beginning of the construction phase, topsoil removed for vegetation clearance must be stripped to a minimum depth of 150 mm and maximum depth of 250 mm and stockpiled on the higher lying areas.	Contractor, ELO	Once-off
		Herbaceous vegetation, overlying grass and other fine organic matter shall not be removed from the stripped soil.	Contractor, ELO	Once-off
		Temporary soil stockpiles shall not be higher than 2,5 m (to avoid compaction) and the slopes of soil stockpiles shall not be steeper than 1 vertical to 1,5 horizontal.	Contractor, ELO	Once-off
		No vehicles shall be allowed access onto the stockpiles after they have been placed.	Contractor, ELO	Daily
		Topsoil stockpiles shall be clearly demarcated in order to prevent vehicle access and for later identification when required.	Contractor, ELO	Once-off
		Once the construction activities have terminated, rehabilitation of all the disturbed and compacted areas shall occur by ripping, topsoiling and mulching these areas.	Contractor, ELO	Once-off
Construction	Destruction of vegetation	Ripping shall be done to a depth of 250 mm in two directions at right angles. Topsoil shall be placed in the same soil zone from which it had been stripped.	Contractor, ELO	Once-off
		Access to areas of the natural vegetation that are to be conserved must be prohibited. A temporary fence should remain on site until all construction activities have terminated.	Contractor, ELO	Once off, inspect daily
		Collection of firewood is prohibited.	Contractor, ELO	Continuous, inspect daily
		No fires may be ignited with the intent to destroy the flora on site and surrounding properties.	Contractor, ELO	Continuous, inspect daily

Phase of Development	Impacts/Issues	Action	Responsible Party	Frequency of Action
		Large trees to be retained or transplanted must be marked and protected against damage by construction activities.	Contractor, ELO	Once off, inspect daily
		To eliminate vegetation destruction, the main construction camp must be placed in an area that is not sensitive and already disturbed.	Contractor, ELO	Once off, monitor weekly
		Each individual building might require its own basic construction site. These sites must be located in areas allocated for parking and must be demarcated.	Contractor, ELO	Once off, monitor weekly
		Each land parcel must be landscaped according to the landscape development plan as approved by the local authority.	Developer, Landscape Contractor	Once off
Construction	Impact on animal life	All activities on site must comply with the regulations of the Animal Protection Act (Act 71 of 1962).	Contractor, ELO	Continuous
		No wildlife may be introduced into the area prior to the authorisation by GDACEL.	Contractor, ELO	Continuous
		No indigenous faunal species must be removed, killed, maimed or injured during construction activities.	Contractor, ELO	Monitor daily
		All litter generated on the building site must be stored in closed containers and collected regularly, as litter can pose a threat to fauna.	Contractor, ELO	Monitor daily
Construction	Destruction of heritage resources	Construction personnel must be alert and must inform the local authority should they come across potentially valuable findings.	Contractor	As necessary
		Any archaeological sites exposed during construction activities may not be disturbed prior to authorisation by the South African Heritage Resources Agency	Contractor	As necessary
Construction	Effects of the construction camp	Establishing the campsite		
		A site will be made available by the developer for the construction camp and depot.	Contractor	Once off
		▪ No campsite shall be located closer than 50m from any water source.	Contractor, ELO	Once off
		▪ The construction camp must be located on the higher lying areas	Contractor, ELO	Once-off
		▪ Vegetation and trees to be retained shall not be damaged or felled.	Contractor, ELO	Once off
		▪ Accommodation of personnel is to include both kitchen and sanitary facilities, if necessary.	Contractor, ELO	Once off
		▪ Fires will only be allowed in facilities especially constructed for this purpose and no trees may be specifically felled for the purpose of obtaining firewood.	Contractor, ELO	Once off, monitor daily
		▪ Heavy smoke may not be released into the air.	ELO	Daily

Phase of Development	Impacts/Issues	Action	Responsible Party	Frequency of Action
Construction	Effects of the construction camp	Toilet facilities, waste water and refuse disposal - An adequate number of toilets shall be supplied. - All toilets shall be serviced at least once a week if required. - Regular inspections shall be carried out to ensure toilets are kept in a hygienic state. - Toilet paper shall be supplied to all toilets. - Staff shall be advised to use the provided toilets at all times. - Toilets must be connected to the sewage system of the municipality if possible. - Refuse generated from the campsite, construction area, storage area or any other area shall be collected and placed in a suitable container on a daily basis. - A litter patrol around the construction camp is to take place twice a week to collect any litter that may have been strewn around. - Once full and on a regular basis, the refuse container shall be emptied and the contents disposed of at a licensed commercial facility for this purpose. - The refuse container is to be covered at all times. - The piling of any material that could rot and release unpleasant smells into the air will not be allowed.	Contractor Contractor, ELO ELO ELO ELO Contractor Contractor, ELO Contractor Contractor, Local Council ELO Contractor, ELO	Once off Weekly Daily Daily Once off, monitor daily As necessary Daily Bi-weekly Weekly Daily Daily
Construction	Effects of the construction camp	Provision of water - Sufficient potable water shall be provided for drinking, cooking and ablutions, if necessary. - Great care is to be taken that the water supply is not contaminated in any way. - Care is to be taken that the areas around water points are not turned into mud baths.	Contractor Contractor, ELO Contractor, ELO	Once off Once off, monitor weekly Daily
Construction	Effects of the construction camp	Air pollution - The construction camp shall be watered to control possible dust problems. - Excessive dust conditions shall be reported to the Consulting Engineers.	ELO ELO	As necessary As necessary

Phase of Development	Impacts/Issues	Action	Responsible Party	Frequency of Action
Construction	Effects of the construction camp	Noise Noise levels shall be kept within acceptable limits, and construction crew must abide by local by-laws regarding noise.	Contractor, ELO	Daily
Construction	Effects of the construction camp	Site security - The area of the construction camp shall be designated in such a manner that the movement of site personnel is limited. - Except for the 24 hour security guards, no workforce will stay on the site during the nights.	Contractor Contractor	Once off Monitor daily
Construction	Effects of the construction camp	Vehicle and equipment fuelling and maintenance - In the event of a breakdown, immediate steps shall be taken to prevent any spillage. - In the event of spillage of oil or fuel, steps must be taken to remove hydrocarbons (e.g. Drizit).	Contractor, ELO Contractor, ELO	As necessary As necessary
Construction	Effects of the construction camp	Cement - Cement mixing shall only be done at specifically selected sites. - Cleaning of cement mixing and handling equipment shall be done using proper cleaning trays. - All empty containers shall be removed from the site for appropriate disposal at a licensed commercial facility. - Any spillage which may occur will be investigated and immediate remedial action shall be taken.	Contractor Contractor, ELO Contractor, ELO Contractor, ELO	Once off, monitor daily Daily Daily As necessary
Construction	Effects of the construction camp	Provision of storage for construction material - A suitable area for storage of the construction material is to be provided. - If the area has to be cleared of trees and/or bushes, care must be taken to leave as much grass covering as possible to prevent any wind or water erosion.	Developer, Contractor Contractor, ELO	Once off Once off

Phase of Development	Impacts/Issues	Action	Responsible Party	Frequency of Action
Construction	Effects of the construction camp	Provision of storage or facilities for dangerous and toxic materials	Developer, Contractor	Once off, monitor daily
		- Materials such as fuel, oil, paint, herbicide and insecticides shall be stored in bermed areas or under lock and key, as appropriate, in well-ventilated areas. - Sufficient care must be taken when handling these materials to prevent pollution. - In the case of pollution, it must immediately be dealt with in the prescribed manner and be reported to the Consulting Engineer/s. - In the case of pollution of any surface or groundwater, the Regional Representative of the Department of Water Affairs must be informed immediately.	Contractor	As necessary
			Contractor, ELO	As necessary
			Contractor	As necessary
Construction	Effects of the construction camp	Rehabilitation of the campsite	Contractor, ELO	As necessary
		- On completion of construction, the campsite must be rehabilitated through the removal of all facilities, waste and any other feature constructed or established during the use of the campsite. - All areas devoid of vegetation or where spoils have been compacted due to the traffic must be scarified or ripped and, if necessary, fertilised and seeded with an indigenous seed mix or landscaped as required.	Contractor, ELO	As necessary
Construction	Traffic impact	Initially construction vehicles must access the site via Sapper's Contour. Once the bridge over the freeway has been constructed, Hotel Street could be used as an alternative access route.	Contractor, ELO	Daily
		No construction vehicles may access the site via South Street.	Contractor, ELO	Daily
		If required, traffic signs should be provided in order to regulate internal traffic and traffic on the surrounding street network.	Engineer, Contractor	Once-off
Construction	Safety and security	Each building site must be fenced with a 1,8m high mesh fence covered with 90% green shade cloth.	Developer, Contractor	Once-off and as necessary
		The site and crew are to be managed in strict accordance with the Occupational Health and Safety Act (Act 85 of 1993) and the National Building Regulations.	Contractor	Daily
		The contractor must supply his own security arrangements for each construction camp.	Contractor, ELO	Daily

Phase of Development	Impacts/Issues	Action	Responsible Party	Frequency of Action
		Limit access to the construction crew camp only to the workforce.	Contractor, ELO	Daily
		Illuminate the construction road entrance gate.	Developer, Contractor	Continuous
		Do not allow the movement of public within the development site by posting notices at the entrance gates.	Contractor, ELO	Once off, monitor daily
Construction	Noise pollution	The construction crew must abide by the National Noise laws and the local by-laws regarding noise.	Contractor	Daily
		All activities on site must comply with the Gauteng Province Noise Control Regulations.	Contractor	Daily
		Construction may only take place between 07h00 and 17h00 on weekdays and between 08h00 and 13h00 on Saturdays. No construction activities may be undertaken on Sundays and Public Holidays in order to minimize the disturbance caused by noise emanating from the construction site.	Contractor	Daily
Construction	Atmospheric pollution	Dust production must be controlled by regular watering of haul roads and construction sites, should the need arise.	Contractor	As necessary
		All vehicles transporting material that can be blown off (e.g. soil, rubble etc.) must be covered with a tarpaulin, and speed limits of 40km/h must be adhered to.	Contractor	Spot checks: daily- weekly, as necessary
		All building rubble, solid and liquid waste etc. must be disposed of at an appropriately registered refuse facility.	Contractor, ELO	Daily
		Points of ingress and egress onto public roads must be regularly cleaned of dust and mud.	ELO	Daily
		Vehicles to be used during the construction phase are to be kept in good working condition so as not to be the source of excessive fumes and nuisance.	Contractor	Daily
Construction	Visual impact	The construction camp and stockpile areas should routinely be checked for litter.	Contractor, ELO	Weekly
		Rubble and litter must be removed on a weekly basis and be disposed of at a suitably registered landfill.	ELO, Construction Crew	Weekly
		Indigenous vegetation should be used to create habitats that attract the natural fauna in the area.	Contractor, Landscape Contractor	As necessary

Phase of Development	Impacts/Issues	Action	Responsible Party	Frequency of Action
Construction	Adequacy of waste disposal facilities	The buildings that are to be erected should be aesthetically pleasing and blend into the area as far as possible.	Developer, Contractor	Once off
		Landscaping must enhance the aesthetic appeal of the development.	Developer, Landscape Contractor	Once off
		All contracts with contractors should contain a clause to the effect that the disposal of all construction-generated refuse/waste to an officially approved dumping site is the responsibility of the subcontractor in question and that the subcontractors are bound to the management activities stipulated in this EMP.	Developer, Contractor	Once off, monitor weekly
		All solid and chemical wastes that are generated must be removed and disposed of at a licensed waste disposal site.	Contractor	Weekly
		Chemical containers and packaging brought onto the site must be removed for disposal at a suitable site.	Contractor	As necessary
		Burning of waste is not allowed.	Contractor	As necessary

Phase of Development	Impacts/Issues	Action	Responsible Party	Frequency of Action
Operational	Site management	The POA will <i>inter alia</i> be responsible for the implementation of the EMP and sound environmental management during the operational phase. This should be supplemented by audits by independent environmental consultants.	Developer, POA	Once off
		A maintenance plan for the development must be developed with regard to maintaining buildings and perimeter fencing etc. in order to ensure that they do not deteriorate and become aesthetically unpleasant.	Developer, POA	Once off
		Environmental accountability should be included in the lease agreements, thereby controlling activities to be undertaken at the development.	Developer	Once off, monitor bi-annually
Operational	Erosion, sedimentation and flooding	The full site and the drainage channel must be inspected for signs of erosion and sedimentation. Erosion control measures must be taken, should erosion be in evidence.	POA, ECO	Continuous, monitor bi-annually
		The stormwater system, especially the discharge points, must be inspected and damaged areas must be repaired if required.	POA, ECO	Continuous, monitor bi-annually
		Litter blocking stormwater channels must be removed.	POA, ECO	Bi-weekly
		Provide for the monitoring of utilisation and site degradation on a regular basis, and implement a remedial programme when and if necessary. Improve surveillance when degradation is due to vandalism, and reduce usage pressure or improve tread conditions if the site, especially the "koppie" shows signs of degradation due to excessive erosion.	POA, ECO	Continuous, monitor bi-annually
		If soils compaction occurs – rip compacted areas to improve infiltration, reduce runoff and ease of landscaping; apply small regular gypsum additions. Maintain plant cover and avoid unnecessary trafficking.	POA, ECO	Continuous, monitor bi-annually
Operational	Surface water contamination	The grease traps on site must be inspected, maintained and emptied regularly. Any wastes that accumulated in the traps must be disposed of at an appropriate waste disposal site.	Building owner, local council	As necessary, monitor bi-annually
		Any incidence of water pollution must be reported to DWAF immediately	POA, building owner or ECO	As necessary
Operational	Groundwater contamination	Any damages to the sewage system must be repaired immediately.	POA, building owner or local council	As necessary

Phase of Development	Impacts/Issues	Action	Responsible Party	Frequency of Action
Operational	Vegetation	A management plan regarding the removal of the exotic herbaceous plant species in the open space system must be drawn up. Exotic species must be controlled on a continuous basis.	POA, Landscaper	As necessary, monitor weekly
Operational	Animal life	Only environmentally friendly products may be used for pest control, in order to maintain the animal life on the site.	POA, ECO	Continuous, monitor bi-annually
		The koppie area must be inspected for snares regularly. Any snares found on site must be removed immediately.	POA, ECO	Continuous, monitor monthly
Operational	Waste management	Disposal of all domestic waste must be undertaken by the local council or an independent company.	Local Authority or independent company	Weekly
		Litter bins should be placed at strategic points within the development.	POA	Once off, monitor monthly
Operational	Safety and Security	24 hr security at the access points to the development must be ensured.	POA	Continuous
		Entrance and exit gates must be illuminated at night and inspected for defects.	POA	Continuous
		Access to the site should only be allowed through the proposed entrances.	POA	Continuous
Operational	Traffic impact	It must be ensured that a backlog of traffic does not develop at the access points during peak hours, through the implementation of an efficient and effective access control system.	Developer,	Continuous, bi-annual audits
Operational	Noise impact	All activities on the site must abide by the National Noise Laws and the local noise by-laws.	POA, ECO	Continuous
Operational	Visual impact	All buildings and landscaped areas must be maintained throughout the operational phase.	POA, ECO	Continuous, monitor bi-annually

3. Conclusions and Recommendations

This Environmental Management Plan should be used as an on-site reference document during all phases of this development, and auditing should take place in order to determine compliance with this EMP. Parties responsible for transgression of this EMP should be held responsible for any rehabilitation that may need to be undertaken. Parties responsible for environmental degradation through irresponsible behaviour / negligence should receive penalties.

In order to have records of environmental incidences and the handling thereof, it is suggested that incidence logs (as supplied below) be filled in by the Environmental Control Officer or Environmental Liaison Officer. The Property Owners Association needs to be informed of such incidences and further actions need to be taken, should the need arise.

Table 2: Incident Log

Date	Env. Condition	Comments (Include any possible explanations for current condition and possible responsible parties. Include photographs, records etc. if available)	Corrective Action Taken (Give details and attach documentation as far as possible)	Signature