

ENVIRONMENTAL MANAGEMENT PROGRAMME

A professional team consisting of the following experts have been assembled in order to ensure the success of the proposed development:

- Geotechnical Engineer (See Appendix D.1 for a copy of this report) to determine whether the Geology and soils of the site is suitable for the proposed development.
 - Civil Engineer (See Appendix D.2 or a copy of the report) to determine the capability of existing infrastructure to be linked to proposed development and readily available bulk services.
 - Electrical Engineer (See Appendix D.3 for a copy of the report) to determine whether there are existing bulk electrical services which can be readily connected to the proposed development and whether there is sufficient capacity to serve the proposed development.
 - Town and Regional Planners and Architects (See Appendix D.7 for the Town planner's Memorandum), to ensure an optimal layout and visual amenity of the area is maintained.
 - Registered Environmental Assessment Practitioner (EAP) (see Paragraph 2.6 of this section for details of the EAP-firm).
 - Ecologists and Wetland Specialist (See Appendix D.6 (a) for a copy of the "Identification and classification of watercourses, such as potential wetlands and stream flow channels, for the western section of Portion 11 of the farm Frischgewaagd 96 JQ" as compiled by Rossouw Associates, Soil and water Science, Appendix D.4 (a) for a copy of the "Flora and fauna baseline survey for the Wesizwe housing project" as compiled by De Castro and Brits Ecological Consultants, Appendix D.6 (b) for a copy of the "Wetland assessment Report" as compiled by Reinier F. Terblanche of Anthene Ecological Consultants and Appendix D.4 (b) for a copy of the "Summer Ecological report" as compiled by Reinier F. Terblanche of Anthene Ecological Consultants
 - Heritage Consultant (See Appendix D.5), to identify and verify the presence and or absence of any cultural or historically significant aspects that need to be taken into consideration.
 - Surveyor, to map the contours of the site and to ensure the town planner's and architect's plans are implemented correctly
 - Noise specialist study (See Appendix D.8), to ensure the existing uses do not impact on the development or the development detrimentally impacts on existing surrounding uses.
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- ◆ The Civil Engineer designed the services in such a manner as to comply with the stipulations of the Red Book. He also devised ways and means to ensure that the project's drainage system takes the surface of the area into account.
 - ◆ The Town and Regional Planner designed the proposed development in such a way that the layout of the proposed development, takes into account the measures described by the Civil Engineer and that the layout satisfies the needs of future occupiers of the site.

- ◆ The Geotechnical Engineer assessed the ground and soil conditions of the area in order to ensure that the intended development can be constructed. His recommendations on construction methods, where applicable, must be complied with.
- ◆ The EAP must assess all possible environmental issues that may affect the proposed project and ensure that all interested and affected parties are notified in order to assist him in identifying possible impacts. He must also give mitigation measures where applicable.
- ◆ It will be essential to plan for the appointment of an Environmental Control Officer (ECO) who will be responsible to ensure that all aspects regarding the environmental issues are implemented and monitored. The ECO will also be responsible for maintaining a database of all records pertaining to the environment for the study area.
- ◆ The Ecologists evaluated the biological sensitivity of the site and proposed mitigation measures to ensure important habitats, faunal and floral species have been considered and where necessary conserved and or protected.
- ◆ Wetland studies was conducted to ensure the delineation of possible wetlands in the area.
- ◆ The SAHRA specialist conducted a Phase 1 Heritage Impact Assessment and has not identified any cultural heritage (archaeological or historical) in origin and significance.
- ◆ The Electrical Engineer determined that sufficient capacity is available in the area and he will also have to design the infrastructure.
- ◆ The surveyor ensured that the cadastral information is accurate, up to date and properly mapped. The contours of the area are accurately plotted.
- ◆ The Noise Specialist has conducted a Noise Impact Study and devised mitigation measures, which will ensure that there will be minimal noise impacts associated with the development.

It will be essential that the Environmental Management Plan (EMPr) should not become an additional requirement separate from day-to-day activities of the site. If the EMPr becomes another layer of control, staff will see it as an obstruction to normal duties and operations. For the EMPr to be effective it must be part of the company's routine operations (EPA, 1995a).

Commitment from all levels of management and the workforce is the most important element in the success of this EMPr.

The employees must be able to identify and act to minimise or avoid environmental impacts. This will only be possible by training and educating them to make the project their own. Once they realise that their actions can make a difference on a local and even on a global scale, it will result in a commitment to ensure better living conditions for themselves and generations to come.

- ◆ The developer will have to ensure that the contractors are aware of their responsibilities regarding the environmental issues.
- ◆ The developer will be responsible to ensure that an ECO is appointed and that the ECO knows his responsibilities.
- ◆ The developer will be responsible to ensure that the contractors are aware of all the design

specifications as planned for by the professional team.

- ◆ The developer will be responsible to ensure that the proposed development is constructed as planned.
- ◆ The ECO must monitor and report on the contractor's work.
- ◆ All incidents such as a spill of toxic or any other substance that may negatively affect the environment must be reported to the relevant authorities.

The developer will remain responsible for the rehabilitation of the area. He will have to ensure that the contractors rehabilitate as planned. It is the developer's responsibility to ensure that the Best Practicable Environmental Option is implemented where necessary to ensure a sustainable development in accordance with the Regulations.

DETAILS OF ASPECTS OF THE ACTIVITY

1. BIO-PHYSICAL ASPECTS

1.1 GEOLOGY

Pre-construction phase

- Plan for excavations that may be necessary to establish infrastructure. This will be the responsibility of the developer in conjunction with the civil engineer and the contractor.
- Plan for the dumping of excess rock spoils at a suitable site. No excess rock spoils will be allowed to remain on site. Ensure that contractors are aware of this prerequisite. It will be the responsibility of the developer and the contractor to ensure that this task is adequately planned for, and that an appropriate site is determined. The ECO will be responsible to monitor this aspect.
- Plan the construction of foundations according to the specifications as determined by the geotechnical Engineer. This will be the responsibility of the Civil Engineer to be monitored by the ECO.

Construction phase

- Use the most practical methods (limiting force) for the excavations necessary to establish the necessary infrastructure. If explosives are to be used, the ECO must first ensure that it is necessary and secondly ensure, together with the Safety Officer, that all procedures as required by law are implemented.
- Ensure that no rock spoils remain in the area. This should be monitored by the ECO and will remain the responsibility of the developer.
- Ensure that excess spoils are removed to a suitable site, as soon as practicable. Ensure that all excess spoils are removed from site once construction has ceased. This should be monitored by the ECO and will remain the responsibility of the developer.

Operational phase

- No further management steps are necessary for this variable during the operational phase of the project.

1.2 TOPOGRAPHY

Certain management steps, which are related to the topography, will be described in other sections of the management plan (climate, drainage, aesthetics etc.).

Pre-construction phase

- Plan the layout of the proposed development taking gradients into account. This will be the responsibility of the Town Planner and the Civil Engineer, using the topographical map provided by the Surveyor
- Plan to prevent concentrated runoff by means of a storm water management plan (Including detailed design of storm water outlet structures). This will be the Civil Engineer's responsibility, using the topographical map provided by the surveyor.
- The overall design criteria and approach, including geometric design and road layer design, are to be constructed to standards as specified in SABS 1200. Road materials conforming to the requirements of TRH 14 will be specified.

Construction phase

- Construct structures to prevent concentrated runoff. This will be done by the developer in accordance with the Town Planner's layout plan and Civil Engineer's Storm Water Management Plan to be monitored by the ECO.
- Roads are to be constructed to standards as specified in SABS 1200. Road materials conforming to the requirements of TRH 14 will be specified.
- All storm water management will be in accordance with DWA, READ and the Moses Kotane Local Municipalities specifications.
- The layouts of the proposed erven have been planned taking the prerequisite with regard to slopes and the optimisation of slopes into full consideration. Construct as planned. This will be the responsibility of the contractor.
- The ECO will have to monitor the above to ascertain that the measures taken are according to the designs.

Operational phase

- Maintain anti-erosion and runoff measures. This will be the responsibility of the developer after construction has been completed.
- Implement monitoring plans and safety checks of the associated water runoff structures, especially after high rainfall events.

1.3 CLIMATE

1.3.1 Rainfall

Pre-construction phase

- Plan for extreme events to ensure that no concentrated runoff in excess of the capacity of the drainage network occurs. In the event of an extreme event occurring, plan to move all contractors from the construction site. They can only move back to the construction sites once all damage caused by the extreme event has been mitigated. This will have to be initiated by the developer and executed by the contractor and monitored by the ECO.
- Develop a contingency plan to cope with very hot dry spells and the possibility of fires occurring. This will have to be done by the contractor and monitored by the ECO.
- Plan for extreme events to ensure that no concentrated runoff in excess of the capacity of the drainage network occurs. The Civil Engineer has to ensure the detailed design of the internal roads and related storm water system, to ensure that adequate provision will be made for storm water management.
- Plan for dust suppression during dry spells. This will have to be done by the contractor and monitored by the ECO.

Construction phase

- Implement the above-mentioned steps to ensure that the effects of extreme events can be mitigated. It is extremely important to ensure that the effects of high rainfall events are planned for during the pre-construction phase. This will prevent erosion during the construction phase when large tracts of the land could be denuded. This will have to be done by the contractor and monitored by the ECO.
- Implement fire prevention and control measures. To be implemented by the contractor and monitored by the ECO.
- Implement dust suppression measures. This is the responsibility of the contractor to be monitored by the ECO.

Operational phase

- Implement the steps described in the previous phase to ensure that the anti-erosion measures are implemented and that erosion prevention structures are maintained. This will be the responsibility of the developer after construction has been completed.

1.3.2 Temperature

No further management steps will be needed other than those described in the previous section with regard to the possibility of fires breaking out during extremely hot and dry spells.

1.3.3 Wind

If the management steps described in the section with regard to possible fires as well as dust suppression are properly implemented (see paragraph 1.3.2) no extra management steps will be needed to mitigate the possible effects of this variable.

1.4 SOIL

Pre- construction phase

- Plan the development and associated infrastructure in such a manner that minimum disturbance of soil is necessary. This will be the responsibility of the developer.
- Undertake the necessary detailed engineering investigations and plan to implement their findings. This has to be done by the Geotechnical Engineer and his findings will have to be incorporated into the town planner and architect's final designs.
- Each individual stand must be planned to minimise soil impacts and to ensure that the necessary Geotechnical findings are implemented. This will have to be done by the Geotechnical Engineer and his findings will have to be incorporated into the Town Planner's layout plan and Architect's designs.
- Ensure that the planned surface water runoff control structures do not cause erosion in the areas to which the water is diverted to. This will have to be planned for by the Civil Engineer.
- Plan to control erosion as specified in the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983).

Construction phase

- Construct the general infrastructure in such a manner that minimum disturbance of soil occurs. This will be the responsibility of the developer to be implemented by the contractor and monitored by the ECO.
- Implement the plans to ensure that the infrastructure will cause minimum soil disturbance. This will have to be done by the contractor and monitored by the ECO.
- Ensure that each individual stand is developed in such a way that soil impacts are minimised. This will have to be done by the contractor and monitored by the ECO.
- If topsoil is removed for construction purposes, it should be stockpiled in such a manner that the soil does not erode (a maximum side slope of 18° is allowable). Excess topsoil must be used for soil rehabilitation of previously disturbed areas. This is the responsibility of the contractor to be monitored by the ECO.
- Control erosion as specified in the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983).

Operational phase

- Implement a maintenance plan to ensure that no soil erosion can occur as specified in the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983).

- It is crucially important to maintain anti-erosion structures. See other sections dealing with surface drainage and flora. This will be the responsibility of the developer after construction has been completed.

1.5 WATER

1.5.1 Surface Water

Pre-construction phase

- Plan to ensure that all contractors that are employed on site are aware of their responsibilities with regard to the prevention of pollution of water according to the requirements of the National Water Act, 1998 (Act 36 of 1998). This will be the responsibility of the developer and will have to be monitored by the ECO.
- No raw sewage or other pollutants such as plastic, oil, cement, etc. will be allowed to pollute water. (See also sections on underground water and socio-economic aspects). This will be the responsibility of the developer and the contractor and will have to be monitored by the ECO.
- Develop a management plan to ensure a clean-water environment during all phases of the project. The services of a suitably qualified engineer are essential in the planning phase. The Civil Engineer will be responsible to develop such a plan.
- Design all storm water structures (and other surface water flow modifications) in such a manner that the impact on the natural systems are minimised (see section: 1.2 Topography, re: drainage and storm water flow above). The system must comply with the requirements of the Local Authority and DWA. Keep in mind that increased runoff invariably results from increased bare surfaces. All excess runoff structures must terminate in infiltration structures (thereby ensuring maximum groundwater recharge). The Civil Engineer will be responsible to develop such a plan.
- Plan to slope ground surfaces in such a way that no ponding occurs. This will have to be done by the contractor and monitored by the ECO.
- Plan the development to ensure that no development takes place below the 1:100 year flood lines as was determined by the Civil Engineer and will have to be incorporated into the Layout plan.

Construction phase

- Ensure that contractors are aware of their responsibilities as far as water pollution is concerned in terms of the requirements of the National Water Act, 1998 (Act 36 of 1998). It will be imperative to monitor their activities. It is suggested that a penalty clause be inserted in the contracts to enable the applicant to take the necessary rehabilitation measures in case of non-compliance. This will have to be done by the developer and monitored by the ECO.
- Implement the water management plan and construct the necessary storm water structures to ensure adequate and sustainable water dispersion (See Section 1.2 Topography). This will have to be done by the contractor and monitored by the ECO.
- Demarcate the area below the 1:100 year flood line as a no-go area. This will be the responsibility of the developer and will have to be monitored by the ECO.

Operational phase

- Maintain the surface water management infrastructure. This will be the responsibility of the developer after construction has been completed.
- Implement monitoring plans and safety checks of the water runoff structures.

1.5.2 Underground Water

Pre- construction phase

- Ensure that all activities that may possibly affect ground water are performed in accordance with the requirements of the National Water Act, 1998 (Act 36 of 1998), DWA and the Local Authority. The correct installation and maintenance of the sewerage system must be regarded as having a high priority.
- The Civil Engineer will do the planning of the installation of the above-mentioned system. The responsibility will however remain that of the developer to ensure that the contractors install the sewage system as planned. It will be essential that the ECO monitor this aspect very closely.
- Plan for adequate chemical toilets to be used by contractors during the construction phase. The provision and maintenance of which must form part of the contractor liabilities and must be described as such in their contracts. It will be essential that the ECO monitor this aspect very closely.
- Plan for the regular inspection of sewage pipelines throughout the life cycle of the project. This will be the responsibility of the developer.
- The storage and handling of lubricants, oils, paint and material such as cement must be provided for as part of the different contractor's contracts. Specially demarcated and secure storage facilities must be provided for. It will be essential that the ECO monitor this aspect very closely.
- Plan the disposal from hard surfaces in such a manner that the water can infiltrate into the underground without causing surface erosion. The Civil Engineer will do this.

Construction phase

- Implement the mitigation measures as described in the pre-construction phase. This will be the responsibility of the developer to be monitored by the ECO.
- Construct the sewage system in such a manner that no spillage is possible.
- Ensure that all construction activities that may possibly affect ground water are performed in accordance with the requirements of the National Water Act, 1998 (Act 36 of 1998), DWA and the Local Authority. This will have to be done by the contractor and monitored by the ECO.
- Ensure that adequate chemical toilets are available and are used by contractors during the construction phase - the provision and maintenance of which must form part of the contractor's liabilities. It will be essential that the ECO monitor this aspect very closely.
- The storage and handling of lubricants, oils, paint, and material such as cement must be provided for as part of contractor's contracts. Specially demarcated and secure storage facilities must be used. It will be essential that the ECO monitor this aspect very closely.

- Construct the disposal from hard surfaces in such a manner that the water can infiltrate into the underground water without causing surface erosion. This will have to be done by the contractor and monitored by the ECO to ensure that the construction is according to the plan.

Operational phase

- Continue to treat all operational activities that may possibly affect ground water in accordance with the requirements of DWA and the Local Authority. This will be the responsibility of the developer after construction has been completed.
- Maintain the disposal systems that originate on hard surfaces in order to allow the water to infiltrate into the underground without causing surface erosion. This will be the responsibility of the developer after construction has been completed.

1.6 FLORA

Pre-construction phase

- Plan for the rehabilitation of all areas disturbed during construction. This will be the responsibility of the developer.
- Prepare a contingency plan to deal with the invasive species in terms of the Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983). This will be the responsibility of the developer to be executed by the contractor and monitored by the ECO.
- Plan to prevent veldt fires in the adjoining land. Firebreaks should be established in terms of the requirements and conditions of the National Veldt and Forest Fires Act (Act No. 101 of 1998). Plan a fire-fighting program that adheres to the by-laws of the Local Municipality and the Mine's EMPR. This will be the responsibility of the contractor to be monitored by the ECO.

Construction phase

- Implement the eradication programme for invasive species in terms of the Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983). This will have to be done by the contractor and monitored by the ECO.
- Rehabilitate areas as soon as construction activities allows it. The sooner rehabilitation starts, the more beneficial it will be for the overall environment. To be implemented by the contractor and monitored by the ECO.
- Implement the plan to prevent veldt fires in the adjoining land. Establish firebreaks in terms of the requirements and conditions of the National Veldt and Forest Fires Act (Act No. 101 of 1998). Fire-fighting programs must adhere to the by-laws of the Local Municipality. This will have to be done by the contractor and monitored by the ECO.

Operational phase

- Implement the rehabilitation plan for disturbed areas. Ensure that rehabilitation is in accordance with the above-mentioned criteria. This will be the responsibility of the developer after construction has been completed.

- Continue with invader eradication. This will be the responsibility of the developer after construction has been completed.

1.7 FAUNA

Pre-construction phase

- Develop a management plan with CLEAR instructions to ensure that the least disturbance of fauna will take place during all phases of the project. The principle of NO disturbance of animal life must be the rule. This will be the responsibility of the developer to be executed by the contractor and monitored by the ECO.

Construction phase

- Implement the management plan to ensure that the least disturbance of fauna will occur. This will have to be done by the contractor and monitored by the ECO.

Operational phase

- Maintain management plan for the preservation of fauna. This will be the responsibility of the developer after construction has been completed.

1.8 AIR QUALITY

Pre-construction phase

- Plan for the re-vegetation of areas where vegetation has been disturbed. This will be the responsibility of the developer to be executed by the contractor and monitored by the ECO.
- Plan to impose a speed limit of 20 km/h on vehicles using all non-surfaced roads in order to curb dust. This will have to be done by the contractor and monitored by the ECO.
- Plan for the implementation of rehabilitation as described in previous sections of this management plan. This will be the responsibility of the developer to be executed by the contractor and monitored by the ECO.
- Ensure that contractors' contracts contain clauses with their responsibilities relating to possible losses incurred from fires originating from their contract areas. They will be held responsible for damages in the case of a fire spreading from their sites.
- Plan to ensure that NO refuse is burnt. This will be the responsibility of the developer to be executed by the contractor and monitored by the ECO.

Construction and operational phases

- Implement the measures devised in the pre-construction phase by rehabilitating as soon as possible. This will be the responsibility of the developer to be executed by the contractor and monitored by the ECO.
- Enforce the 20 km/h speed regulation during the construction phase. This will have to be done by the contractor and monitored by the ECO.

- No refuse may be burnt on site. This will have to be done by the contractor and monitored by the ECO.

1.9 NOISE

Pre-construction phase

- Plan to ensure that construction vehicles are fitted with proper noise reduction fittings such as silencers. This will have to be done by the contractor and monitored by the ECO.
- Plan to construct the berm between the mine and the southern portion of the residential area.

Construction and Operational phase

- Implement the measures devised in the pre-construction phase. This will have to be done by the contractor and monitored by the ECO.
- Normal working hours are between 08h00 and 17h00 (Mondays to Saturdays). No work will be allowed on Sundays. This will have to be done by the contractor and monitored by the ECO.
- Construct and maintain the berm between the mine and the southern portion of the residential area.

1.10 ARCHAEOLOGY

Pre-construction phase

- Plan to ensure that if any artefacts of archaeological significance (including the discovery of previously unknown graves) are found during any of the project phases that it will be adequately dealt with.

Construction phase / Operational phase

- If any artefacts of archaeological significance (including the discovery of previously unknown graves) are found during any of the project phases, it must immediately be reported to the SAHRA office in Mafikeng (within 48 hours) and all work on the site must be stopped and the area marked and fenced off until proper investigation by that body has been completed. This will have to be done by the contractor and monitored by the ECO. Should any structures older than 60 years be demolished, authorization must be obtained from SAHRA.

2. SOCIO ECONOMIC FACTORS

It will be imperative that the project must be managed throughout its entire life cycle. This will ensure that the impacts remain positive. Neglect will lead to environmental deterioration. This will be the responsibility of the developer.

2.1 CULTURAL SITES

No structures older than 60 years were found by the SAHRA specialist and therefore no steps as far

as this variable is concerned are needed.

2.2 AESTHETICS

Pre-construction phase

- ◆ Plan to/for:
 - Implement proper maintenance of all areas on the property that will help to enhance the aesthetics of the site. The Architect is responsible to ensure the design of the development enhances the aesthetics of the area; his plans need to be implemented by the developer during and after construction has been completed.

Construction and Operational phase

- Implement the steps described in the pre-construction phase. This will be the responsibility of the developer during and once construction has been completed.

2.3 OTHER SOCIO-ECONOMIC FACTORS

Pre-construction phase

- Plan the project in such a way that optimal use is made of local labour. All labour practices must conform to the rules and regulations of the Occupational Health and Safety Act, 85 of 1993. This will be the responsibility of the developer to be executed by the contractor and monitored by the ECO.
- Devise a management plan for the project as a whole to ensure that the environmental issues can be addressed as described in this report. This will be the responsibility of the developer.
- Ensure that the management steps concerning the construction phase of the project are part of the construction contracts. This will be the responsibility of the developer to be monitored by the ECO.
- Ensure that all the people involved with the project are aware of the implications of non-compliance. This will be the responsibility of the developer to be monitored by the ECO.
- It is imperative to devise a set of rules that must form part of the overall management strategy of the development. These rules must provide for all the issues raised in this document with regard to sound environmental practices as well as with regard to good housekeeping. This will be the responsibility of the developer to be monitored by the ECO.
- Plan for solid waste storage and disposal. All solid waste generated during all the phases of the project will be stored on site and disposed of only at a suitably licensed site in accordance with the stipulations of the National Environmental Act, 1998 (Act No. 107 of 1998, as amended). This will be the responsibility of the developer and contractors, to be monitored by the ECO.
- Plan to ensure that the transportation, storage and handling of hazardous materials on site conforms to the rules and regulations stipulated in terms of the Hazardous Substances Act, No. 15 of 1973. This will be the responsibility of the developer to be monitored by the ECO.
- Plan to implement all the instructions and mitigation measures contained in the specialists reports. This will be the responsibility of the developer to be monitored by the ECO.

Construction phase

- Utilise local labour optimally. Ensure that all labour practices conform to the rules and regulations of the Occupational Health and Safety Act, 85 of 1993. This will be the responsibility of the developer and contractors, to be monitored by the ECO.
- Solid waste storage and disposal. All solid waste generated during all the phases of the project will only be stored on site temporarily and disposed of at a suitably licensed site in accordance with the stipulations of the National Environmental Act, 1998 (Act No. 107 of 1998, as amended). This will be the responsibility of the developer and contractors, to be monitored by the ECO.
- Ensure that the transportation, storage and handling of hazardous materials on site conforms to the rules and regulations stipulated in terms of the Hazardous Substances Act, No. 15 of 1973. This will be the responsibility of the developer to be monitored by the ECO.
- Enforce management steps with regard to provisions in contractor contracts. This will be the responsibility of the developer to be monitored by the ECO.
- Install all services as planned and described in the various reports mentioned in this document. This will be the responsibility of the developer and the contractors, to be monitored by the ECO.

Operational phase

- Maintain all infrastructures in an environmentally responsible manner. This will be the responsibility of the developer after construction has been completed.
- All solid waste generated during this phase of the project will only be stored on site temporarily and disposed of at a suitably licensed site in accordance with the stipulations of the National Environmental Act, 1998 (Act No. 107 of 1998, as amended). This will be the responsibility of the developer.

2.4 SITE SPECIFIC MITIGATION MEASURES FOR THE CONSTRUCTION PHASE

2.4.1 Site Establishment

- Prior to the commencement of construction activities on site, the area must be fenced and a new access control gate established at the entrance to the development.
- No-go areas must be clearly demarcated.
- Construction routes and required access roads must be clearly defined.
- Access of all construction and material delivery vehicles should be strictly controlled, especially during wet weather to avoid compaction and damage to the topsoil structure.
- Ensure that all site personnel have a basic level of environmental awareness training. The Contractor must submit a proposal for this training to the ECO for approval. Topics covered should include;
 - What is meant by “Environment”
 - Why the environment needs to be protected and conserved
 - How construction activities can impact on the environment
 - What can be done to mitigate against such impacts
 - Awareness of emergency and spills response provisions
 - Social responsibility during construction e.g. being considerate to local residents
- Training should be undertaken by a party such as the ECO who has sufficient expertise and knowledge of environmental issues.
- It is the Contractor’s responsibility to provide the site foreman with environmental training and to ensure that the foreman has sufficient understanding to pass this information onto the construction staff.
- Use should be made of environmental awareness posters on site.
- The need for a “clean site” policy also needs to be explained to the workers.
- Staff operating equipment (such as excavators, loaders, etc.) shall be adequately trained and sensitised to any potential hazards associated with their tasks.
- Unsocial activities such as consumption or illegal selling of alcohol, drug utilisation or selling and prostitution on site shall be prohibited. Any persons found to be engaged in such activities should receive disciplinary or criminal action taken against them.
- Secure the site in order to reduce the opportunity for criminal activity in the locality of the construction site.
- No site staff, other than security personnel and skeleton staff will be housed on site. Security personnel and skeleton staff must be supplied with adequate protective clothing, ablution facilities, water and refuse collection facilities, facilities for cooking and heating so that open fires are not necessary.
- The site and crew are to be managed in strict accordance with the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) and the National Building Regulations.
- The contractor must ensure that all emergency procedures are in place prior to commencing work. Emergency procedures must include (but not be limited to) fire, spills, contamination of the ground,

accidents to employees, use of hazardous substances and materials, etc.

- The contractor must ensure that lists of all emergency telephone numbers/contact persons are kept up to date and that all numbers and names are posted at relevant locations throughout the construction site.
- The nearest emergency service provider must be identified during all phases of the project as well as its capacity and the magnitude of accidents it will be able to handle. The contact details of this emergency centre, as well as the police and ambulance services must be available at prominent locations around the construction site and the construction crew camps.

2.4.2 Construction camp

- Choice of site for the Contractor's camp requires the Project Manager and ECOs permission and must take into account location of local residents and / or ecologically sensitive areas, including flood zones and slip / unstable zones. A site plan must be submitted to the ECO for approval.
- The site camp must be contained within the development footprint to ensure the area to be transformed does not exceed 20 hectares.
- The construction camp may not be situated within the 1:100 year floodline or on slopes greater than 1:3.
- The size of the construction camp should be minimized (especially where natural vegetation or grassland has had to be cleared for its construction).
- Adequate parking must be provided for site staff and visitors. This should not inconvenience or serve as a nuisance to neighbours.
- The Contractor must attend to drainage of the camp site to avoid standing water and / or sheet erosion.
- Suitable control measures over the Contractor's yard, plant and material storage to mitigate any visual impact of the construction activity must be implemented.

2.4.3 Stockpiles

- All stockpiled material must be easily accessible without any environmental damage to adjacent grasslands/farmlands.
- All temporarily stockpiled material must be stockpiled in such a way that the spread of materials are minimised.
- The stockpiles may only be placed within the demarcated areas - the location of which must be approved by the ECO.
- The contractor must avoid vegetated areas that will not be cleared.
- Storm water run-off from the stockpile sites and other related areas must be directed into the storm water system with the necessary pollution prevention measures such as silt traps and may not run

freely into the immediate and surrounding environments.

- Stockpiles are to be stabilised if signs of erosion are visible.

2.4.4 Oil and chemicals

- The contractor must provide **method statements** for the "handling & storage of oils and chemicals", "fire", and "emergency spills procedures".
- These substances must be confined to specific and secured areas within the contractor's camp, and in a way that does not pose a danger of pollution even during times of high rainfall. These areas must be imperviously banded with adequate containment (at least 1.5 times the volume of the fuel) for potential spills or leaks
- Drip trays (minimum of 10cm deep) must be placed under all vehicles that stand for more than 24 hours. Vehicles suspected of leaking must not be left unattended, drip trays must be utilised.
- The surface area of the drip trays will be dependent on the vehicle and must be large enough to catch any hydrocarbons that may leak from the vehicle while standing.
- The depth of the drip tray must be determined considering the total amount/volume of oil in the vehicle. The drip tray must be able to contain the volume of oil in the vehicle.
- Spill kits must be available on site and in all vehicles that transport hydrocarbons for dispensing to other vehicles on the construction site. Spill kits must be made up of material/product that is in line with environmental best practice (SUNSORB is a recommended product that is environmentally friendly).
- All spilled hazardous substances must be contained in impermeable containers for removal to a licensed hazardous waste site, (this includes contaminated soils, and drenched spill kit material).

2.4.5 Cement

- The contractors must provide and maintain a **method statement** for "cement and concrete batching". The method statement must provide information on proposed storage, washing & disposal of cement, packaging, tools and plant.
- The mixing of concrete must only be done at specifically selected sites on mortar boards or similar structures to contain run-off into soils rocky outcrops, streams and natural vegetation.
- Cleaning of cement mixing and handling equipment must be done using proper cleaning trays.
- All empty containers must be stored in a dedicated area and later removed from the site for appropriate disposal at a licensed facility.
- Any spillage that may occur must be investigated and immediate remedial action must be taken.
- The visible remains either of concrete, solid, or from washings, must be physically removed immediately or disposed of as waste to a registered landfill site.
- Cement batching areas must be located in an area where residues are contained and that the

location does not fall within storm water channels.

2.4.6 Dangerous and Toxic Materials (Provision of storage facilities)

- Materials such as fuel and oil must be sealed and 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. Training on the handling of dangerous and toxic materials must be conducted for all staff prior to the commencement of construction.
- In the case of pollution of any surface or groundwater, the Regional Representative of the Department of Water Affairs (DWA) must be informed immediately.
- Storage areas must display the required safety signs depicting "no smoking", "No Naked lights" and "Danger". Containers must be clearly marked to indicate contents as well as safety requirements.
- The contractor must supply a method statement for the storage of hazardous materials.
- Material Safety Data Sheets (MSDS) must be prepared for all hazardous substances on site and supplied by the supplier where relevant. MSDS's must be updated as required.

2.4.7 Storage of fuels and oils

- The contractors must provide and maintain a method statement for "Fuel tanks and refuelling procedures".
- Fuel storage tanks on the site must be on an impervious surface that is bunded and able to contain at least 110% of the volume of the tanks. The filler tap must be inside the bunded area where possible and the bund wall must not have a tap or valve.
- A Flammable Liquid License must be obtained for diesel volumes greater than 200 litres.
- Environmental Authorisation is required for volumes greater than 80 000 litres
- Fuel storage tanks must be located in a portion of the construction camp where they do not pose a high risk in terms of water pollution (i.e. they must be located away from water courses).
- Fuel storage tanks must be placed so that they are out of the way of traffic, so that the risk of the tanks being ruptured or damaged by vehicles is minimised.

2.4.8 Use of dangerous and toxic materials

- The contractor must keep the necessary materials and equipment on site to deal with spills/ fire of the materials present, should they occur.
- The contractor must set up a procedure for dealing with spills/ fire, which will include notifying the ECO and the relevant authorities prior to commencing with construction. These procedures

- must be developed with consultation and approval by the appointed ECO.
- A record must be kept of all spills and the corrective action taken.

2.4.9 Toilets and ablution facilities

- The contractor is responsible for providing all sanitary arrangements for his and the sub-contractors team. A minimum of one chemical toilet must be provided per 15 persons.
- Sanitary arrangements must be to the satisfaction of the ECO and the local authority. Toilets must be of the chemical type.
- The contractor must keep the toilets in a clean, neat and hygienic condition. The contractor must supply toilet paper at all toilets at all times. Toilet paper dispensers must be provided in all toilets.
- The contractor must ensure that toilets move with the labour force.
- The contractor must be responsible for the cleaning, maintenance and servicing of the toilets. The contractor must ensure that all toilets are cleaned and emptied before the builders' or other public holidays.
- Toilets out on site must be secured to the ground and have a sufficient locking mechanism operational at all times.

2.4.10 Waste management

- The contractors must provide and maintain a method statement for "solid waste management". The method statement must provide information on proposed licensed facility to be utilised and details of proposed record keeping for auditing purposes.
- Waste must be separated into recyclable and non-recyclable waste, and must be separated as follows:
 - **Hazardous waste:** including (but not limited to) old oil, paint, etc,
 - **General waste:** including (but not limited to) construction rubble.
- Any illegal dumping of waste must not be tolerated, this action will result in a fine and if required further legal action will be taken. This aspect must be closely monitored and reported on; proof of legal dumping must be able to be produced on request.
- Bins must be clearly marked for ease of management.
- All refuse bins must have a lid secured so that animals cannot gain access.
- Sufficient closed containers must be strategically located around the construction site to handle the amount of litter, wastes, rubbish, debris, and builder's wastes generated on the site.
- Subcontractor(s) must 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. Proof of this undertaking must be issued to the ECO.
- All solid and chemical wastes that are generated must be removed and disposed of at a licensed waste disposal site. The contractor is to provide proof of such to the ECO.

- Chemical containers and packaging brought onto the site must be removed for disposal at a suitable site.
- A skip, with a cover, must be used to contain refuse from campsite bins, rubble and other construction material.

2.4.11 Dust

- The contractors must provide and maintain a method statement for "dust control". The method statement must provide information on the proposed source of water to be utilised and the details of the licenses acquired for such usage.
- Potable water must, wherever possible, not be used as a means of dust suppression and alternative measures must be sourced. The use of 'grey' water must be investigated as an alternative. The contractor will be responsible to source this water and obtain the required approvals to utilise this water for the purpose of dust suppression.
- The construction camp must be watered during dry and windy conditions to control dust fallout.
- Dust production must be controlled by regular watering of roads and works area, should the need arise.
- At the end of construction, the site camp must be fully rehabilitated by removing the temporary surface, ripping the area to loosen the soil and the area must be re-vegetated with locally indigenous vegetation only, according to the landscape development plan for the project.
- All vehicles transporting material upgrading material (e.g. soil, rubble etc.) must be covered with a tarpaulin, and speed limits of 20 km/h must be adhered to.
- Excessive dust conditions must be reported to the ECO.
- All forms of dust pollution must be managed in terms of the Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965)

2.4.12 Workshop equipment, maintenance and storage

- The contractors must provide and maintain a method statement for "workshop maintenance and cleaning of plant".
- Leaking equipment must be repaired immediately or be removed from site to facilitate repair. All potentially hazardous and non-degradable waste must be collected and removed to a registered waste site.
- Cleaning and remediation must be done with products that are in line with best environmental practice.
- A method statement is required from the Contractor, tendering for the project to show procedures for dealing with possible emergencies that can occur, such as fire and accidental leaks and spillage.
- The Contractor must be in possession of an emergency spill kit that is complete and available at all times on site. The Contractor must ensure that senior and other relevant members of the workforce are trained in dealing with spills by using emergency spill kits.
- The following must be applied:

- All contaminated soil shall be removed and disposed of as hazardous waste at a registered facility or placed in containers to be taken to one central point where bio-remediation can be done. (Bio-remediation should only be an option if an Environmental Authorisation has been issued)
- A specialist Contractor shall be used for the bio-remediation of contaminated soil where the required remediation material and expertise is not available on site. All spills of hazardous substances must be reported to the ECO.
- The contractor must comply with the regulations of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993).

2.4.13 Noise

- In terms of noise impact for various increases over the ambient, the National Noise Regulations define an increase of 7dB as "disturbing". Noise levels during construction must therefore be kept within 7dB of the baseline data.
- All construction vehicles must be in a good working order to reduce possible noise pollution.
- Noisy activities must be reserved for daytime hours.

2.4.14 Fires

- The contractors must provide and maintain a method statement for "fires", clearly indicating where and for what fires will be utilised plus details on the fuel to be utilised.
- Absolutely no burning of waste is permitted.
- Fires will only be allowed in facilities especially constructed for this purpose within fenced Contractor's camps. Wood, charcoal or anthracite are the only fuels permitted to be used for fires. The contractor must provide sufficient wood (fuel) for this purpose.
- Fires within the designated areas must be small in scale so as to prevent excessive smoke being released into the air.
- The contractor must designate a smoking area for labour force so as to prevent unanticipated incidents of veldt fires.
- No wood is to be collected, chopped or felled for fires from private or public property as well as from no-go or sensitive areas within the site and any surrounding natural vegetation.

2.4.15 Erosion and sedimentation

- Surface water or storm water must not be allowed to concentrate, or to flow down cut or fill slope routes without erosion protection measures being in place.
- It must be ensured that storm water channels do not discharge straight down the contours. These must be aligned at such an angle to the contours that they have the least possible gradient.
- To reduce the loss of material by erosion, the contractor must ensure that disturbance on site is kept to a minimum. The contractor is responsible for rehabilitating all eroded areas in such a way that the erosion potential is minimised after construction has been completed.

- All disturbed areas will require rehabilitation must be mulched to encourage vegetation re-growth. Mulch used must be free from alien seed.
- These areas must be cordoned off so that vehicles or construction personnel cannot gain access to these areas.

2.4.16 Fauna

- All activities on site must comply with the regulations of the Animal Protection Act, 1962 (Act No. 71 of 1962)
- All construction workers must be informed that the intentional killing of any animal is not permitted as faunal species are a benefit to society. Poaching is illegal and it must be a condition of employment that any employee caught poaching will be dismissed. Employees must be trained on how to deal with fauna species as intentional killing will not be tolerated. In the case of a problem animal e.g. a large snake, a specialist must be called in to safely relocate the animal if the ECO is not able to.
- Environmental induction training and awareness must include aspects dealing in safety with wild animals into and on site. Focus on animals such as snakes and other reptiles that often generate fear by telling workers how to move safely away and to whom to report the sighting. Workers should also be informed where snakes most often hide so that they can be vigilant when lifting stones, etc.

2.4.17 Flora

- The contractor must rehabilitate the construction camp and any other disturbed areas once construction activities have terminated. Compacted areas will be ripped and mulched in order to ensure recovery of the natural vegetation cover. A method statement must be provided and maintained by the contractor.
- Once activities on site are complete, rehabilitation of un-built areas must be undertaken in order to restore the aesthetic & ecological value of the area.
- No open fires shall be allowed on site under any circumstances, fires will only be permitted in adequate facility within the crew camp, Forest Act, 1984 (Act No. 122 of 1984).

2.4.18 Heritage

- In terms of the National Heritage Act, 1999 (Act No. 25 of 1999), construction personnel must be alert and must inform the local heritage agency should they come across any findings of heritage resources within 48 hours.
- Should any archaeological artefacts be exposed during site activities, work on the area where the artefacts were found must cease immediately and the ECO must be notified within 48 hours.

- Under no circumstances must archaeological artefacts be removed, destroyed or interfered with.

2.4.19 Visual Impact

- Rubble and litter must be removed every two weeks (or more often as the need arises) and be disposed of at a registered landfill.
- The ECO should comment on the visual impact as part of the ECO's monitoring requirements.

2.4.20 Geotechnical

- All trenches and excavation works must be properly backfilled and compacted according to specifications given in sub-clause 5.2.4. Of SABS 1200DA.
- Mechanical methods of rock breaking will have noise and dust impacts that must be managed. Method Statements for chemical breaking must be provided by the ER.
- All trenches dug for the placing of services should be backfilled with slightly moist natural soil, in layers not exceeding 150 mm, compacted by hand tampers or small mechanical tampers to the density of the natural undisturbed soil in the immediate vicinity. This recompaction of the soil will prevent unsightly subsidence. The civil engineering specification applicable is available in sub clause 5.2.4 of SABS 1200 DA: "Compaction. The material used in the fill shall be compacted at Optimum. Moisture Content to at least 90 % of Modified AASmO maximum density. Should the material be too wet, owing to rain or other cause, it shall be harrowed and allowed to dry out to the correct moisture - content before compaction is undertaken."

2.4.21 Hydrology

- Increased run-off during construction must be managed using berms and other suitable structures as required to ensure flow velocities are reduced; this must be done in consultation with the Resident engineer as well as the ECO.
- In the event of pollution caused as a result of construction activities, the contractor, according to section 20 of the National Water Act, 1998 (Act No. 36 of 1998) is to be responsible for all costs incurred by organisations called to assist in pollution control and/or to clean up polluted areas.
- No wastewater may run freely into any naturally vegetated areas. Run-off containing high sediment loads must not be released into drainage channels.
- Approval must be obtained from DWA for any activities that require authorisation in terms of Section 39 of the National Water Act, 1998 (Act No. 36 of 1998).

2.5 MONITORING, AUDITING AND REPORTING

It is the responsibility of the development's project team or their delegate to ensure that regular monitoring of environmental issues addressed in this management plan is undertaken. The applicant is responsible for the monitoring of infrastructure that provides services to individual stands.

Site inspections to determine maintenance needs during the operational phase are imperative for good housekeeping.

Internal environmental audits must be undertaken at regular monthly intervals throughout the construction phase to ensure compliance.

The applicant will be responsible for maintaining a database of all records pertaining to the environment for the study area.

All incidents such as spills of toxic or any other substance that may negatively affect the environment must be reported to the relevant authorities.