

2nd DRAFT

ENVIRONMENTAL MANAGEMENT PLAN

for the proposed

**VLAKKELAND RESIDENTIAL DEVELOPMENT ON ERF 8359,
RE/ERF 8370, ERF 8378, ERF 8399, ERF 8400, ERF 12628, ERF
12633 AND ERF 33027 IN PAARL, WESTERN CAPE**

(21 Day PP Review Period)

(DEA&DP REF:16/3/1/2/B3/28/1006/13)

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SECTION M: ENVIRONMENTAL MANAGEMENT PROGRAMME

INTRODUCTION

Please note that all changes to the 1st Draft EIR was made in Blue for ease of Reference and to assist with the review process of this EIR

Guillaume Nel Environmental Consultants (GNEC), as independent environmental consultants and impact assessors, has been appointed by the Western Cape Department of Housing, on behalf of Drakenstein Municipality, to facilitate the Integrated Environmental Management (IEM) procedure for the proposed residential development on Erf 8359, Re/Erf 8370, Erf 8378, Erf 8399, Erf 8400, Erf 12628, Erf 12633 and Erf 33027 (known as Vlakkeland) in Paarl, Western Cape.

The region of Paarl and Wellington suffers from a shortage of houses for the local community. Developable land in Paarl/Wellington area is scarce due to the sensitive nature of the natural environment in general, the heritage and visual sensitivity of most of the area as well as the good quality of most of the agricultural land in the area. Over population is therefore a major concern and this proposed development will provide the needed housing for the local community.

The proposed site is situated in the Paarl Valley between Paarl and Wellington in the Western Cape. The 105ha site is located south of Newton residential development and east of Mbekweni residential area. The western boundary of the site is bounded by Jan van Riebeeck Drive, Bo-Dal Road serves as the site's eastern boundary. Agricultural farm lands are situated east of Bo Dal Road and a heritage conservation site is situated to the south. The proposed site is zoned for agricultural use but it is currently standing mostly vacant and is an area prone to attract trouble makers. A group of informal farmers (mostly pigs and goats) have settled close to the western site boundary.

The municipality proposes to develop a residential development with approximately 3 260 units, consisting of a combination of subsidy housing, subsidy double storey housing an activity spine, GAP housing and GAP and rental apartments on the above mentioned property. It is proposed to allocate four erven for Primary Schools and two erven for Secondary Schools. Specific locations will be set out to accommodate Places of Worship, Creches, Pre-Primary Schools, Sport Fields and taxi bays. A conceptual open space network will run throughout the development. A Civic and Business Node will be created in the centre of the development, providing a location for retail, offices, a Library, a Post Office and a Community Centre. A primary storm water drainage system with a large storm water retention facility will be constructed in the south eastern corner and alongside the southern border. This area will also serve as a sport facility, providing sport fields for the local community.

Access to the site will be taken from Jan van Riebeeck Drive (770m south of Mbekweni intersection west of the site)

This document is based on the EMP Guideline provided by DEA&DP which was compiled in accordance with the Integrated Environmental Management (IEM) philosophy which aims to achieve a desirable balance between conservation and development (DEAT, 1992). IEM is a key instrument of the National Environmental Management Act [NEMA] (Act No. 107 of 1998). NEMA promotes the integrated environmental management of activities that may have a significant effect on the environment, while IEM prescribes a methodology for ensuring that environmental management principles are fully integrated into all stages of the development process. It advocates the use of several environmental and management tools that are appropriate for the various levels of decision-making. One such tool is an Environmental Management Plan (EMP).

The IEM guidelines intend encouraging a pro-active approach to sourcing, collating and presenting information in a manner that can be interpreted at all levels. The basic principles underpinning IEM are that there be:

- informed decision-making;
- accountability for information on which decisions are taken;
- accountability for decisions taken;
- a broad meaning given to the term environment (i.e. one that includes physical, biological, social, economic, cultural, historical and political components);
- an open, participatory approach in the planning of proposals;
- consultation with interested and affected parties;
- due consideration of alternative options;
- an attempt to mitigate negative impacts and enhance positive aspects of proposals;
- an attempt to ensure that the 'social costs' of development proposals (those borne by society, rather than the developers) be outweighed by the 'social benefits' (benefits to society as a results of the actions of the developers);
- democratic regards for individual rights and obligations;
- compliance with these principles during all stages of the planning, implementation and decommissioning of the proposals (i.e. from 'cradle to grave'), and
- The opportunity for public and specialist input in the decision-making process.

These principles are in line with NEMA, which has repealed a number of the provisions of the Environment Conservation Act, 1989 [ECA] (Act No. 73 of 1989), and is focussed primarily on co-operative governance, public participation and sustainable development. The Environmental Impact Assessment Regulations that took effect in July 2006 regulate the procedures and criteria for the submission, processing, consideration and decision on applications for environmental authorisation of listed activities.

M-1.2 SCOPE AND TERMS OF REFERENCE

The general principles contained within this document apply to all **PRE-CONSTRUCTION, CONSTRUCTION AND OPERATIONAL** activities.

Principles of this EMP

This EMP is compiled using the following concepts and implementation requirements so that the higher principles of sustainable development are realised:

- **Continuous improvement.** The project proponent (or implementing organisation) must be committed to review and to continually improve environmental management, with the objective of improving overall environmental performance.
- **Broad level of commitment.** A broad level of commitment will be required from all levels of management as well as the workforce in order for the development and implementation of this EMP to be successful and effective.
- **Flexible and responsive.** The implementation of the EMP must be responsive to new and changing circumstances, i.e. rapid short-term responses to problems or incidents. The EMP is a dynamic “living” document and thus regular planned review and revision of the EMP must be carried out.
- **Integration across operations.** This EMP is integrated across existing line functions and operational units such as health, safety and environmental departments in a company/project. This is done to change the redundant mindset of seeing environmental management as a single domain unit.
- **Legislation.** It is understood that any development project during its construction phase is a dynamic activity within a dynamic environment. The Developer, Engineer, Contractor and sub-contractor must therefore be aware that certain activities conducted during construction may require further licensing or environmental approval, e.g. river or stream diversions, bulk fuel storage, waste disposal, etc. The Contractor must consult the RE, EO and ECO on a regular basis in this regard.

SECTION M-2 – SITE SPECIFIC INFORMATION

M-2.1 PROPOSED ACTIVITY AND LOCAL CONTEXT

M-2.1.1 Summary of impacts associated with the proposed activity

- A low visual impact is expected since the site is within the urban edge and borders on existing residential areas;
- There may be some noise impacts during both the construction and operational phases.
- Impacts on the aquifer on the site;
- Botanical Impacts
- There may be concern that construction and operational related activities could have a negative effect on the fauna and flora present on the site.
- No significant impact is expected on the natural heritage of the site but some level of impact may be experienced by the heritage site on erf 8359, located south of the proposed development.
- Significant impacts are expected (without the prescribed mitigation measures) on traffic during both the construction and operational phases.
- There will be increased pressure on the municipal services such as electricity, solid waste removal and water demand.

M-2.1.2 [Proponents] environmental management policy and commitments

The proponent understands the importance of conserving the environment, and will endeavour to apply all necessary mitigation measures to conserve and maintain sensitive areas and prevent environmental degradation.

M-2.1.3 Interpretations

The implementation of the EMP is not an additional or “add on” requirement. The EMP is legally binding through NEMA and the relevant EA. This EMP is to be used during the planning, construction and operational phases of the proposed project. The Environmental Control Officer, appointed by the developer after environmental approval, must use this EMP during the ECO audits to determine the developer’s compliance to it.

Further on, the proponent is to ensure that through the project tender process the EMP forms part of the Project Construction Contract Document to be incorporated in line with:

- General project specifications; and
- SANS 1200 A or SANS 1200 AA, as applicable.

The proponent is also to ensure that through any tender or appointment process, the operational EMP forms part of the management contract with all service providers and contractors, for a period of time as stipulated by the DEA&DP during which the development will be audited for compliance to the operational EMP. This EMP is compiled in line with relevant legislation and general construction project specifications. However, to ensure

sound environmental practice, the measures as described in the operational EMP should be implemented for the full operational life of the development.

M-2.1.4 Project phase

The first part of this EMP is specifically compiled for the ***period of time prior to commencement of and activities associated with construction of the above mentioned activity***, and for the ***operational phase*** of the proposed development.

If and when applicable, where specific activities of the proposed development fall outside of the general principles contained herein, the Department will attach further 'activity – specific' EMP's as appendices to this document.

M-2.1.5 Role players and responsibility matrix

In order for the EMP to be successfully implemented, all the role players involved in the project need to co-operate. For this to happen, role players must have a clear understanding of their roles and responsibilities in the project, must be professional, form respectful and transparent relationships, and maintain open lines of communication. The EMP therefore clearly defines the role players involved and indicates their role in the implementation of the generic EMP.

Typically, these role players or the project team may include the Authorities (A), Other Authority (OA), Developer/Proponent (D), Consulting Engineers (CE), Resident Engineer (RE), Environmental Officers (EO), Environmental Control Officer (ECO), Project Manager (PM), Contractors (C), Environmental Assessment Practitioner (EAP). Further; landowners, interested and affected parties and the relevant environmental and project specialists are also important role players.

SECTION M-3 – ENFORCEMENT, MONITORING AND AUDITING

M-3.1 Pre-Construction and Construction Phase

The D must appoint, at his own cost, an ECO and full time EO (as part of the construction team) who will oversee the implementation of the EMP.

The independent ECO is responsible for audits during construction and one audit after completion of the project to ensure compliance to relevant environmental legislation, conditions of the Environmental Authorisation (EA), and the EMP for the project.

The ECO shall conduct, at a frequency as determined by the Department and stipulated in the relevant Environmental Authorisation (EA) for the project, independent environmental audits. The audits are to verify the projects compliance with the EMP and conditions of the Environmental Authorisation (EA). *It is recommended that the independent audits be conducted every two weeks during the construction period.*

Before any construction activities commence, the ECO must compile an audit checklist based on the contents of this EMP and conditions of the Environmental Authorisation (EA). The ECO shall at the request of the Department forward audit reports to the Department at a frequency determined by the Department which shall be stipulated in the Environmental Authorisation (EA).

Evidence of the following as **key performance indicators**, must be included in the audit reports:

- Complaints received from landowners and actions taken.
- Environmental incidents, such as oil spills, concrete spills, etc. and actions taken (litigation excluded).
- Incidents leading to litigation and legal contraventions.
- Environmental damage that needs rehabilitation measures to be taken.

M-3.2 Operational Phase

The ECO shall conduct, at a frequency as determined by the DEA&DP and stipulated in the relevant Environmental Authorisation (EA) for the project, independent environmental audits. The audits are to verify the developments compliance with the operational EMP and conditions of the Environmental Authorisation (EA).

The ECO must compile, for the approval by the DEA&DP, an audit checklist based on the contents of this EMP and conditions of the Environmental Authorisation (EA). The ECO shall at the request of the DEA&DP forward audit reports to the Department at a frequency determined by the Department which shall be stipulated in the Environmental Authorisation (EA).

The following **Key Performance Indicators** must be included in the audit reports:

- Complaints received from landowners and actions taken.
- Environmental incidents, such as oil spills, fires etc. and actions taken.
- Incidents possibly leading to litigation and legal contraventions.

- Environmental damage that needs rehabilitation measures to be taken.

The minutes of site meetings, to which the ECO will have unrestricted access to, shall be the official record of environmental activities, complaints and communications. These minutes will be circulated to the entire project team. A copy of the standard site meeting agenda is available on request.

M-3.3 MEASUREMENT AND PAYMENT

It is understood that environmental requirements included in this EMP will entail costs over and above those of the civil requirements. These include provision for: mitigation and enhancement actions; training and environmental awareness requirements; monitoring; auditing; and corrective actions. The proponent shall recognise this and make provision for it in the tender. Costing for management action should be done with inputs and advice from appropriate technical members of the project team and relevant EAP who have knowledge of the management actions being recommended as well as practical experience in implementing similar measures and techniques.

A lump sum must be allocated for the management of Environmental Specifications where it is not possible to cost requirements of the EMP.

M-3.4 GENERAL GUIDELINES

Guidelines as per standardised construction documentation must be used.

M-3.5 AWARENESS (INDUCTION) TRAINING

M-3.5.1 Construction Phase

The ECO is responsible in ensuring everyone on site is given an environmental awareness induction session which not only clearly defines what the environment is and specifics detailing the local environment but outlines the requirements of the EMP as a management tool to protect the environment.

Refresher courses must be conducted as and when required. The EO must ensure daily toolbox talks include alerting the workforce to particular environmental concerns associated with the tasks for that day or the area/habitat in which they are working. Awareness posters and a hand out must be produced to create awareness throughout the site.

M-3.5.2 Operational Phase

The ECO is responsible in ensuring everyone involved in the operation of the development at ground level receives an environmental awareness induction which not only clearly defines what the environment is and specifics detailing the local environment but outlines the requirements of the EMP as a management tool to protect the environment.

Awareness posters and a hand out must be produced to create awareness throughout the site.

M-3.6 SITE DOCUMENTATION

M-3.6.1 Construction Phase

The following is list of documentation that must be held on site and must be made available to the ECO and/or DEA&DP on request.

- Access negotiations and physical access plan
- Site daily diary /instruction book
- Records of all remediation / rehabilitation activities

- Copies of EO reports (management and monitoring)
- Environmental Management Plan (EMP)
- [River Maintenance Plan \(RMP\)](#)
- Complaints register

M-3.6.2 Operational Phase

The following is list of documentation must be held on sight and must be made available to the ECO and/or DEA&DP on request.

- Environmental monitoring reports (if required)
- Records of all remediation / rehabilitation activities (if required)
- Environmental Management Plan (EMP)
- [River Maintenance Plan \(RMP\)](#)
- Complaints register

M-3.6.3 Pro forma documentation

M-3.6.3.1 *Prior to the commencement of construction activities*

The following attached pro forma documentation is to be filled out and is binding to the EMP and project contract and includes, but not limited to, the following:

- Declaration of understanding by the Developer
- Declaration of understanding by the Contractor

M-3.6.3.2 *During construction activities*

The following attached pro forma documentation is to be filled out and maintained. These are binding to the EMP and project contract. They include, but are not limited to, the following:

- Environmental incidents
- Records of all remediation / rehabilitation activities

M-3.6.3.2 *During the Operational Phase*

The following attached pro forma documentation is to be filled out and is binding to the EMP and project contract and includes, but not limited to, the following:

- Declaration of understanding by the Proponent
- Environmental incidents

SECTION M-4 - GENERIC CONSTRUCTION PHASE EMP - IMPLIMENTATION

M-4.1 PREAMBLE

The point of departure for the Vlakkeland Residential Development EMP is to empower a pro-active rather than re-active approach to environmental performance by addressing potential problems before they occur. This will limit corrective measures needed during the construction phase of the project. Therefore the purpose of this EMP is to provide management measures that must be implemented by the Drakenstein Municipality and all contractors and sub-contractors alike to ensure that the potential impacts of a proposed rezoning and construction and establishment of the Vlakkeland Residential Development are minimised. It must also be ensured that the *EMP is maintained and upheld as a dynamic document* in order for the *project team to add or improve on issues* that might be considered left out or not relevant to the project. In such instances the DEA&DP may authorise the ECO to make such changes.

The following tables form the core mitigation measures appropriate to the pre-construction and construction phase. The tables present the objectives to be achieved and the management actions that need to be implemented in order to mitigate the negative impacts and enhance the benefits of the project. Associated responsibilities, criteria/targets and timeframes are clearly specified.

The **'pre-construction'** section of this generic EMP, refers to the period of time leading up to and prior to commencement of construction activities, and is included to ensure pro-active environmental management measures with the goal of identifying avoidable environmental damage at the outset and sustain optimal environmental performance throughout the construction phase. Most impacts will occur during the construction phase and must be mitigated through the contingency plans identified in the pre-construction phase.

The bulk of environmental impacts will have immediate effect during the 'construction' phase (e.g. noise, dust, and water pollution). 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 measures outlined in this section, together with a commitment to sound environmental management from the project team.

The "construction" section refers to all construction and its operation-related activities that will occur within the approved area and access roads, until the project is completed. This "construction" section is divided into three functional areas, namely "materials"; "plant"; and "construction". Each of these functional areas within the EMP contains specific generic mitigation requirements and requested contractor method statements stipulated where required.

Many potential environmental impacts will have immediate or long term effects during the 'operational' phase (e.g. noise, waste management, and water pollution). If the development is monitored on a continual basis during operations, it is possible to identify these impacts as they occur. These impacts will then be mitigated through the measures outlined in this section, together with a commitment to sound environmental management from the proponent and management team.

It must be noted that the responsible party for the majority of the mitigation measures is that of the Management body, unless otherwise stipulated. The names of the responsible parties must be made available to DEA&DP for record purposes.

The management body must ensure that a maintenance team is employed with the correct equipment and skill to maintain boardwalks, pathways, fences etc. The following tables will refer to the responsible party as “Management body: ‘to be announced’ and “maintenance crew”.

M-4.2 STRUCTURE AND CONTENTS OF THE TABLES

The table consists of seven parts as follows:

“Phase of development” - This row will identify either pre-construction (planning) or actual construction phase.

“Impact / issue” - This row will identify the issue being addressed, e.g. Materials, site demarcation, heritage, etc.

Mitigation Measure - This column will include all the necessary mitigation measures for each impact/issue’.

Management objectives - This column will indicate what the management objectives to be achieved for each mitigation measure are.

Measurable targets - This column will indicate what evidence is to be used as an indication to whether or not the ‘Management objectives’ have been implemented and hence achieved.

Responsible party - This column will provide information as to which role player, e.g. ECO, RE, etc. is responsible for the implementation and or management of each mitigation measure.

Frequency of action - These columns provide time guidelines for the ‘Responsible party’ by which he/she is to action or manage the required mitigation.

M-4.2.1 SPECIALIST RECOMMENDATIONS

M-4.2.1.1 Pre-Construction and Construction Phases

The last part of the table provides space for the EAP to add specialist recommendations that need to be addressed during the pre-construction and construction phases.

M-4.2.1.2 Operational Phase

Additional requirements may need to be added to the table pending conditions required in the Environmental Authorisation (EA). The last part of the table provides space for such conditions, which must be added before the “declaration of understanding” is signed by the proponent and ECO.

Table 1: VLAKKELAND PRE-CONSTRUCTION (PLANNING) PHASE EMP

Phase of development	PRE-CONSTRUCTION (PLANNING)
Impact / issue	GENERAL

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
<p>Visual Impact</p> <ul style="list-style-type: none"> • A green conservation area / buffer of 120m and 40m will be created along the eastern and southern boundary respectively of the site. This will serve as a visual barrier between the development and neighbouring farms. • A tree line will be planted along the urban edge to ensure a visual barrier between the development and the surrounding area. • Light output is to be confined within property boundaries through using specifically designed luminaires such as full cut-off luminaires to minimise upward spread of light near to and above the horizontal (Figure – A); <ul style="list-style-type: none"> ▪ Spotlight luminaires to be tilted in order to direct the light to the intended spot, instead of allowing it to light areas outside its purpose (Figure – B); ▪ Outdoor spot lights to be mounted on the appropriate pole height. Higher mounting heights allow lower main beam angles which can reduce glare (Figure 1– C). ▪ Utilise control systems to reduce light levels during inactive periods or at predetermined times while 	<ul style="list-style-type: none"> • To reduce the visual impact of the proposed development in the area 	<ul style="list-style-type: none"> • Contract records. • Signed declaration pro forma's. 	Project team.	Design and implementation.

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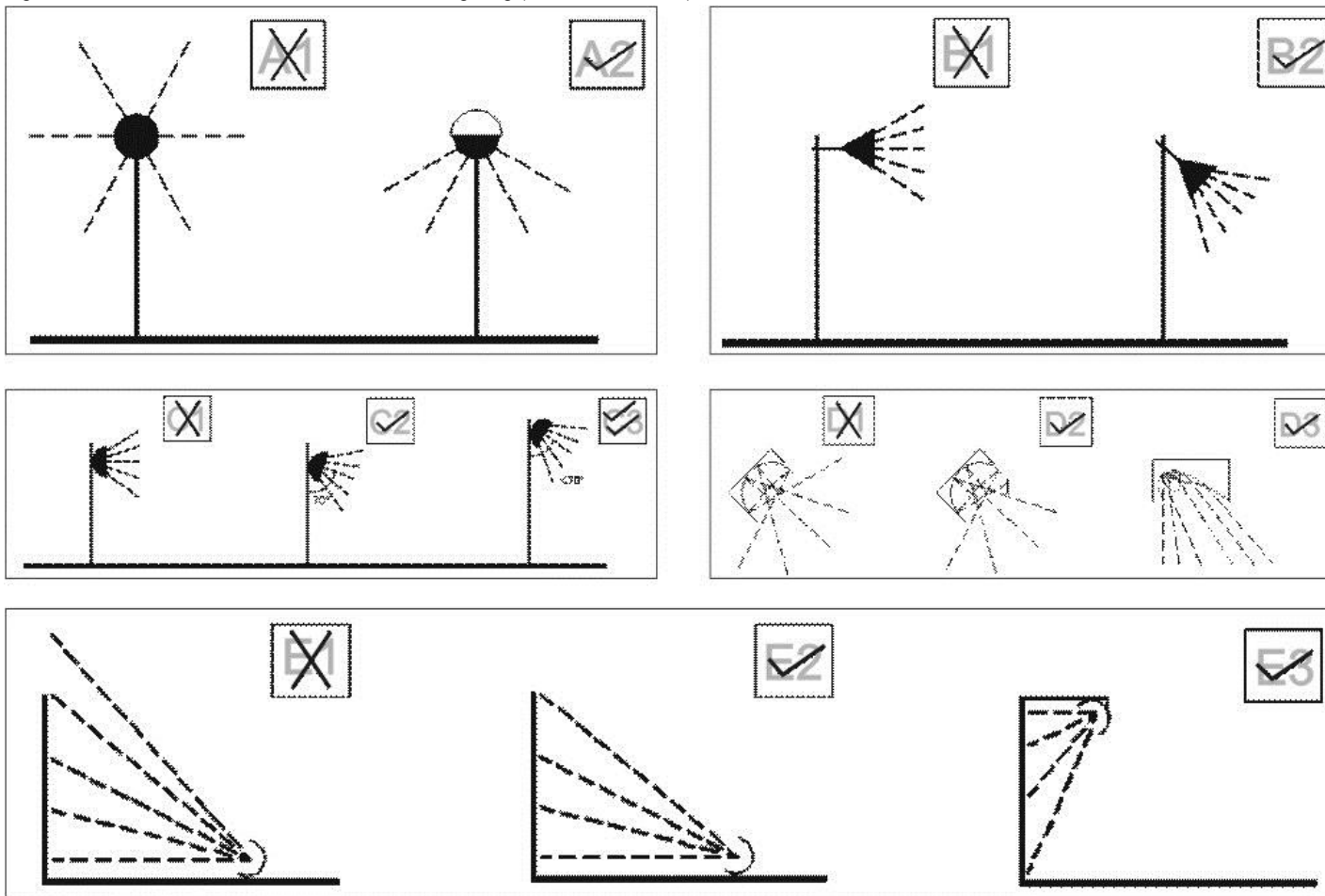
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MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
<p>maintaining sufficient lighting for safety and security (NEMA, 2000).</p> <ul style="list-style-type: none"> ▪ Where vertical surfaces are illuminated, such as buildings façades, luminaires must light downwards. (Figure – 2). 				

Figure 2: Guidelines for the reduction of obtrusive lighting (Source: ILE, 2005)



<p>Project contract and programme</p> <p>The EMP must be included as part of the tender documentation thereby making it part of the enquiry document to make the recommendations and constraints, as set out in this document, enforceable under the general conditions of contract.</p> <p>A copy of this EMP must be available on site. The Contractor shall ensure that all the personnel on site, sub-contractors and their team, suppliers, etc. are familiar with and understand the specifications contained in the EMP.</p>	<ul style="list-style-type: none"> • Contingencies for minimising negative impacts anticipated to occur during the construction phase. • Ensure environmental awareness and formalise environmental responsibilities and implementation. 	<ul style="list-style-type: none"> • Contract records. • Signed declaration pro forma's. 	Project team.	-
<p>Traffic Impact</p> <p>Background Traffic: The following upgrades are proposed for this scenario:</p> <p>Jan v. Riebeeck / Roggeland- / Ring Road intersection:</p> <p>Install a Traffic Signal, if and when warranted.</p> <p>Jan v. Riebeeck / Mbekweni / (Future Vlakkeland access) intersection:</p> <p>Install a Traffic Signal, if/when warranted. Also construct northbound left-turn lane and southbound right-turn lane on Jan van Riebeeck Road plus provide an access road to Mbekweni.</p> <p>Jan v. Riebeeck Drive / Bo Dal Road:</p> <p>Install a Traffic Signal, if and when warranted.</p> <p>Development Trips: The development is expected to</p>	<ul style="list-style-type: none"> • To reduce possible traffic impact to expectable standards. 	<ul style="list-style-type: none"> • The existing level of traffic. 	Project team.	Design and implementation.

<p>generate 2 013 weekday a.m. peak hour trips (992/1 021, in-/outbound) and 1 356 p.m. peak hour trips (792/564, in-/outbound).</p> <p>Access: The main access to the Vlakkeland development will be from a new intersection along Jan van Riebeeck Drive (MR201), approximately 770 meters south of Buitekant Street and 800 meters north of Roggeland Road/Ring Road. Other accesses to Jan van Riebeeck Drive will also be possible via Rand Street to the north and/or Roggeland Road/Ring Road to the south of the site.</p> <p>Total Traffic: The following upgrades are proposed for this scenario: <u>Jan v. Riebeeck Drive / Roggeland Road / Ring Road intersection:</u></p> <ul style="list-style-type: none"> • Construct dedicated east- and westbound right-turn lanes and upgrade the traffic signal phases and settings to allow for turning phases from the side roads. <p><u>Jan v. Riebeeck Drive / Mbekweni / Vlakkeland Access intersection:</u></p> <ul style="list-style-type: none"> • Construct a southbound left-turn lane and northbound right-turn lane along Jan van Riebeeck Road. Provide a separate right-turn lane and a shared through and left-turn lane on the westbound / development approach and upgrade the traffic signal phases and settings. <p>The upgrades should be funded by the developer, since it is directly related to the development.</p> <p>Pedestrians: Provide pedestrian signal heads and phases</p>				
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<p>at the traffic signals of the Jan van Riebeeck Drive / Vlakkeland Development Access intersection. Also provide a fence along the site boundary / frontage to force pedestrians to only cross at intersections. Provide a sidewalk of at least 2 meters wide along all major roads on-site and provide a pedestrian sidewalk between the commercial node within Vlakkeland, all the way along Rand Road and Newton Street to the Jan van Riebeeck Road / Buitekant Street intersection.</p> <p>Street lighting should be provided at the future Jan van Riebeeck Drive / Vlakkeland Development Access intersection. This should improve the visibility and safety of this intersection for pedestrians during early mornings and late afternoons.</p> <p>Public Transport: It is recommended that bus / taxi embayment's be provided along Jan van Riebeeck Drive on the downstream side of the new Vlakkeland Access intersection. Bus / taxi embayment's should also be provided on-site along all the major routes on-site.</p> <p>Three development accesses are proposed, as follows:</p> <ul style="list-style-type: none"> • From the existing Jan van Riebeeck Drive / Buitekant Street intersection, through the north of the site via Rand Street and Newton Street. It is recommended that the vehicle demand through Rand Street and Newton Street be kept as low as possible and that no additional road improvements are done along this road section to discourage additional traffic. However, it is recommended that a pedestrian sidewalk of approximately 2 meters wide be provided from the commercial node within Vlakkeland, all the way along Rand Road and Newton Street to the Jan van Riebeeck Road / Buitekant Street intersection, to 				
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<p>encourage pedestrian movement along this route.</p> <ul style="list-style-type: none">• A new traffic signal controlled intersection, located 770 meters south of Buitekant Street and 800 meters north of Roggeland Road/Ring Road. This is the main development access and most development trips should be encouraged to use this access to enter and exit the site. This intersection will also provide a future link into Mbekweni. This future signalised intersection will enable safer pedestrian crossing between Vlakkeland and Mbekweni.• From the existing Jan van Riebeeck Drive / Roggeland Road / Ring Road intersection, to the south of the site via Beets Street.				
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<p>Ecological Impacts</p> <ul style="list-style-type: none"> • No development is appropriate in areas of High or Very High conservation value, and all such areas should have a development buffer of at least 10m. The remaining areas (agricultural lands of Very Low conservation value) are suitable for development. • It is essential that the proposed ecological corridors linking the Eastern Buffer with the SAHRA site. • A large green conservation area must be created along the eastern border of the site. This area will be rehabilitated and enforced to prevent any polluting during and after construction. This area will also be regarded as a no go area. • Extensive alien clearing of large woody species will not be necessary on site, but those that there are (mainly in Area 5) should be cleared using appropriate DWAF approved methods. Control of alien invasive herbs and grasses will be an important management task that needs to be addressed in the EMP, as well as the need for fire in the Fynbos every ten to fifteen years. • The removal of regular, heavy grazing and trampling by cattle may benefit the proposed conservation areas, and they should recover well, and will soon look more attractive, especially with selective planting of suitable locally indigenous tree species. These open space areas can then be used as a recreation area for 	<ul style="list-style-type: none"> • To reduce possible ecological impact to expectable standards. 	<ul style="list-style-type: none"> • 	<p>Project team.</p>	<p>Design and implementation.</p>
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<p>residents, and an area in which a number of footpaths can provide access.</p> <ul style="list-style-type: none"> • The planting or maintenance of invasive alien species (see CARA legislation) should not be permitted on site. • All sensitive areas must be fenced off before construction commences, using as a minimum two-strand wire inter threaded with danger tape and string. • A search and rescue shall be conducted during the winter and early spring prior to the start of construction. • All viable plants i.e. young plants and those able to re-sprout are to be dug up from the construction site, planted into bags, grown and stored under nursery conditions all to accepted horticultural practice and used for rehabilitation of the construction site and surroundings once construction has been completed. • These plants shall also be used in the properties adjacent to the conservation areas and riparian areas as no non local indigenous species will ne allowed in these properties. • All ripe seed is to be collected for later redistribution. • All nonviable vegetation is to be removed, chipped and stored for use as mulch. • 				
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<p>Guidelines for Building Foundations</p> <p>According to the Geotechnical study conducted on site, the following foundations are appropriate for the houses in the various areas and could be considered:</p> <p>(i) Northern Area –</p> <p>Lightly reinforced strip footings with articulation joints at all internal/external doors and openings and light reinforcement in the masonry. Site drainage and plumbing/service precautions will be necessary.</p> <p>(ii) Northern Area – evaporation pond area –</p> <p>Once the material from the embankment walls has been removed and placed as thin engineered fill in the basal parts of the ponds, the layout and measures described for (i) above are again considered appropriate.</p> <p>(iii) Central Strip –</p> <p>Normal construction comprising strip footings founded at 0.6m depth are considered appropriate. Site drainage and plumbing/service precautions are recommended.</p> <p>(iv) Central Strip –</p> <p>Provided that the material from the embankment wall is placed and compacted according to specifications, normal strip footings founded at 0.6m depth are considered appropriate. Site drainage and plumbing precautions are recommended.</p> <p>(v) South western Area – non seasonally wet sub area –</p> <p>Normal strip footings founded at 0.6m depth with foundation pressures not exceeding 50kPa are considered appropriate. Good site drainage is essential.</p>	<ul style="list-style-type: none"> • Protect buildings from the possible influences of the soil and earth structure 	<ul style="list-style-type: none"> • No negative impact on buildings and houses due to soil conditions. 	<p>Architect and Contractor</p>	<p>As and when required</p>
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<p>(vi) South western Area – seasonally wet sub area –</p> <p>The soils are likely to soften/loosen seasonally with increases in soil moisture. Normal strip footings typically founded at 0.6m depth with foundation pressures not exceeding 50kPa will be appropriate for this area. However, allowance should be made for modified normal, lightly reinforced footings in approximately 60% of the houses. It should be noted that special drainage measures and/or raising of the ground levels are essential in this seasonally wet area.</p> <p>Raft foundations could be used in all the sub areas of the site with the exception of the seasonally wet parts of the South western Area. The rafts should be carefully designed and constructed to ensure that settlement or heave of the soils are handled by the raft.</p>				
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<p>Appointments and duties of project team</p> <p>The contact details for the ECO, RE, EO, Contractor and ESO shall be completed on the attached pro forma and a copy kept on site. This document must be made available to the DEA&DP on request.</p> <p>Before construction activities commence, role players must have a clear indication of their role in the implementation of this EMP.</p> <p>Subcontractor(s) contracts with the principle contractor 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.</p>	<ul style="list-style-type: none"> Contingencies for minimising negative impacts anticipated to occur during the construction phase. 	<ul style="list-style-type: none"> Contract records. Signed declaration pro forma's. 	<p>Project team.</p>	<p>-</p>
<p>Site demarcation and development</p> <p>The surveys for the overall project area and construction footprint as approved in the Environmental Authorisation (EA) must be complete and clearly demarcated before the contractors set up their crew camps or begin construction.</p> <p>All relevant 'general' and 'specific' conditions contained in the Environmental Authorisation (EA) must be included in the space provided below and included as part of this EMP.</p>	<ul style="list-style-type: none"> Contingencies for minimising negative impacts anticipated to occur during the construction phase. 	<ul style="list-style-type: none"> Demarcated areas. Filled in section of this document. 	<p>EAP specialist, Engineer, contractor.</p>	<p>As and when required.</p>

<p>Emergencies, non-compliance and communication</p> <p>The contractor must provide method statements on the protocols to be followed, and contingencies to be put in place for the following potential incidents before construction may begin: Contamination of soils from spills; and fire.</p> <p>Communication in emergencies must follow the suggested lines of communication as stipulated figure 1.</p>	<ul style="list-style-type: none"> Contingencies for minimising negative impacts anticipated to occur during the construction phase. 	<ul style="list-style-type: none"> Method statements. 	<p>Contractor, Engineer.</p>	<p>As and when required.</p>
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Table 2: ADDITIONAL CONDITIONS CONTAINED IN THE EA TO BE INCLUDED IN THE VLAKKELAND DEVELOPMENT EMP

Phase of development	PLANNING	EA reference number	16/3/1/2/B3/28/1006/13		
Impact / issue	EA Conditions	Ms Anthea Shortles			
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION	
	•	•			
	•	•			
	•	•			

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Table 3: VLAKKELAND DEVELOPMENT CONSTRUCTION PHASE EMP (Materials)

Phase of development	CONSTRUCTION				
Impact / issue	Materials				
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION	
Handling					
<p>Oil and chemicals</p> <p>The contractor must provide method statements for the “handling & storage of oils and chemicals”, “fire”, and “emergency spills procedures”.</p> <p>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 bunded with adequate containment (at least 1.1 times the volume of the fuel) for potential spills or leaks</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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</p>	<ul style="list-style-type: none"> • Prevention of pollution of the environment. • Minimise chances of transgression of the acts controlling pollution. 	<ul style="list-style-type: none"> • No pollution of the environment. • No litigation due to transgression of pollution control acts. • No complaints from I & AP’s. • Method statements. 	Contractor.	Daily.	

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Phase of development	CONSTRUCTION			
Impact / issue	Materials			
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
<p>material/product that is in line with environmental best practice (sunsorb is a recommended product that is environmentally friendly).</p> <p>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).</p>				
<p>Cement</p> <p>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</p> <p>The mixing of concrete shall 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.</p> <p>Cleaning of cement mixing and handling equipment shall be done using proper cleaning trays.</p> <p>All empty containers must be stored in a dedicated area and later removed from the site for appropriate disposal at a licensed commercial facility.</p> <p>Any spillage that may occur must be investigated and immediate remedial action shall be taken.</p> <p>The visible remains of concrete, either solid, or from washings, shall be physically removed immediately and</p>	<ul style="list-style-type: none"> Minimise the possibility of cement residue entering into the surrounding environment. Minimise pollution of soil, surface and ground water resources. 	<ul style="list-style-type: none"> No evidence of contaminated soil on the construction site. No evidence of contaminated water resources. Method statement. 	Contractor.	Monitored daily.

Phase of development	CONSTRUCTION			
Impact / issue	Materials			
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
<p>disposed of as waste to a registered landfill site.</p> <p>Cement batching areas must be located in consultation with the RE, EO or ECO to ensure residues are contained and that the proposed location does not fall within sensitive areas such as drainage lines, storm water channels, etc.</p>				
<p>DANGEROUS AND TOXIC MATERIALS</p> <p>Provision of storage facilities</p> <p>Materials such as fuel, oil, paint, herbicide and insecticides must be sealed and stored in bermed areas or under lock and key, as appropriate, in well-ventilated areas.</p> <p>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.</p> <p>In the case of pollution of any surface or groundwater, the Regional Representative of the Department of Water Affairs and Forestry (DWAF) must be informed immediately.</p> <p>Storage areas shall display the required safety signs depicting “no smoking”, “No Naked lights” and “Danger” containers shall be clearly marked to indicate contents as well as safety requirements.</p> <p>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.</p>	<ul style="list-style-type: none"> • Prevention of pollution of soil, surface and ground water resources in the immediate and surrounding environments. • Minimise chances of transgression of the acts controlling pollution. 	<ul style="list-style-type: none"> • No visible signs of pollution. • No litigation due to transgression of pollution control acts. 	Contractor.	Monitor daily.

Phase of development	CONSTRUCTION			
Impact / issue	Materials			
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
<p>Bulk storage of fuels and oils</p> <p>The contractors must provide and maintain a method statement for “Diesel tanks and refuelling procedures”.</p> <p>Bulk fuel storage tanks on the site shall 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.</p> <p>A Flammable Liquid License must be obtained for diesel volumes greater than 200 litres.</p> <p>As no application was lodged for this activity, it should be noted that Environmental Authorisation is required for the storage of Diesel and/or Petrol with volumes greater than 30 000 litres.</p> <p>Bulk fuel storage tanks shall 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 the storm water canal).</p> <p>Bulk fuel storage tanks shall 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.</p> <p>Bulk fuel storage should be covered during the rainy season.</p>	<ul style="list-style-type: none"> • Prevention of pollution of soil, surface and ground water resources in the immediate and surrounding environments. • Minimise chances of transgression of the acts controlling pollution. 	<ul style="list-style-type: none"> • No visible signs of pollution. • No litigation due to transgression of pollution control acts. • Method statement. 	Contractor.	Once off, as required.

Phase of development	CONSTRUCTION			
Impact / issue	Materials			
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
<p>Use of dangerous and toxic materials</p> <p>The contractor shall keep the necessary materials and equipment on site to deal with spills/ fire of the materials present should they occur.</p> <p>The contractor shall 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 EO.</p> <p>A record must be kept of all spills and the corrective action taken.</p>	<ul style="list-style-type: none"> Prevention of pollution of soil, surface and ground water resources in the immediate and surrounding environments. Minimise chances of transgression of the acts controlling pollution. 	<ul style="list-style-type: none"> No pollution of the environment. No litigation due to transgression of pollution control acts. 	Contractor.	As required.

Table 4: VLAKKELAND RESIDENTIAL DEVELOPMENT CONSTRUCTION PHASE EMP (Plant)

Phase of development	CONSTRUCTION			
Impact / issue	PLANT			
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
<p>Eating areas and camp followers</p> <p>The contractors must provide and maintain a method statement for "Crew camps and construction laydown areas".</p> <p>The Contractor shall, in conjunction with the EO, designate restricted eating areas for eating during normal working hours. Adequate closed refuse bins must be provided and cleaned on a daily basis.</p> <p>No fires are to be lit outside of a facility designed to contain fires. The adequacy and positioning of these structures must be determined in consultation with the EO and ECO.</p> <p>The feeding, or leaving of food, for stray or other animals in the area is strictly prohibited.</p> <p>Camp followers/informal traders must not be allowed to congregate on pavements or outside the construction site. However, at the contractors discretion facilities can be made available within the designated eating area.</p> <p>Litter (even if originating outside the camp) and concrete bags etc. must be picked up daily and put into suitably closed bins.</p>	<ul style="list-style-type: none"> Control potential influx of vermin and flies. Neat work place and hygienic environment. Minimise negative social impacts to local residents and businesses. 	<ul style="list-style-type: none"> No visual signs of vermin and flies. No complaints from I & AP's. 	Contractor, EO.	Once off, monitor daily.

Phase of development	CONSTRUCTION			
Impact / issue	PLANT			
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
<p>Toilets and ablution facilities</p> <p>The contractor will be responsible for providing all sanitary arrangements for his and the sub-contractors team. A minimum of one chemical toilet shall be provided per 15 persons.</p> <p>Sanitary arrangements shall be to the satisfaction of the ECO and the local authority. Toilets shall be of the chemical type. The contractor shall keep the toilets in a clean, neat and hygienic condition. The contractor shall supply toilet paper at all toilets at all times. Toilet paper dispensers shall be provided in all toilets.</p> <p>Toilets provided by the contractor must be easily accessible and a maximum of 150m from the works area to ensure they are utilised. All toilets will be located within the contractor's camp. Should toilets be needed elsewhere, their location must first be approved by the RE, EO or ECO.</p> <p>The contractor (who must use reputable toilet-servicing company) shall be responsible for the cleaning, maintenance and servicing of the toilets. The contractor (using reputable toilet-servicing company) shall ensure that all toilets are cleaned and emptied before the builders' or other public holidays.</p> <p>Toilets out on site must be secured to the ground and have a sufficient locking mechanism operational at all times.</p>	<ul style="list-style-type: none"> • Ensure proper sanitation is achieved which will encourage the workforce to utilise toilets provided and not the surrounding habitat. • Minimise potential of diseases on site. • Minimise potential to pollute soils, water resources and natural habitats. 	<ul style="list-style-type: none"> • Workforce use toilets provided. • No complaints received from I & AP's as well as members of the workforce. • No visible or measurable signs pollution of the environment (soils, ground and surface water). 	Contractor, RE or EO.	As and when required.

Phase of development	CONSTRUCTION				
Impact / issue	PLANT				
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION	
<p>Waste management</p> <p>Please refer to the waste minimization plan as part of the EMP</p> <p>Any illegal dumping of waste will not be tolerated.</p> <p>Proof of legal dumping must be able to be produced on request.</p> <p>All refuse bins must have a lid secured so that animals cannot gain access.</p> <p>Sufficient closed containers must be strategically located around the construction site to handle the amount of litter, wastes, rubbish, debris and builders wastes generated on the site.</p> <p>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.</p> <p>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 EO and ECO.</p> <p>Chemical containers and packaging brought onto the site must be removed for disposal at a suitable site.</p> <p>A skip, with a cover, must be used to contain refuse from campsite bins, rubble and other construction material.</p>	<ul style="list-style-type: none"> • Sustainable management of waste by recycling. • To keep the site neat and tidy. • Minimise litigation and complaints by I&AP's. • Reduce visual impact. • Control potential influx of vermin and flies thereby minimising the potential of diseases on site and the surrounding environment. • Minimise potential to pollute soils, water resources and natural habitats. 	<ul style="list-style-type: none"> • Disposal of rubble and refuse in an appropriate manner with no rubble and refuse lying on site. • Site is neat and tidy. • No complaints from surrounding residents and businesses. • Sufficient containers available on site. • No visible or measurable signs of pollution of the environment (soils, ground and surface water). • Method statement. 	<p>Contractor, EO.</p>	<p>Daily.</p>	
<p><i>Prepared by Guillaume Nel Environmental Consultants (GNEC) (as per DEADP Generic EMP)</i></p> <p>E-mail: guillaume@gnec.co.za</p> <p>Tel: (021) 975 4444 Fax: 086 6933 802 Cell: 072 1571 321</p>				<p>34</p>	

Phase of development	CONSTRUCTION			
Impact / issue	PLANT			
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
<p>Dust</p> <p>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.</p> <p>Potable water cannot (as far as possible) be used as a means of dust suppression, 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.</p> <p>The construction camp shall be watered during dry and windy conditions to control dust fallout.</p> <p>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.</p> <p>All vehicles transporting material that can be blown off (e.g. soil, rubble etc.) must be covered with a tarpaulin, and speed limits of 20 km/h must be adhered to.</p> <p>Excessive dust conditions shall be reported to the ECO.</p>	<ul style="list-style-type: none"> • Reduce dust fall out. • Reduce visual impact. • Minimise loss of valuable soil material. 	<ul style="list-style-type: none"> • No visible signs of dust. • No complaints from Interested and Affected Parties. • No incidences reported to ECO. • No visible evidence of dust contamination on the surrounding environment. • Method statement. • Baseline targets not exceeded during regular monitoring of dust counts. 	RE, Contractor, EO.	Monitored daily.
<p><i>Prepared by Guillaume Nel Environmental Consultants (GNEC) (as per DEADP Generic EMP)</i></p> <p>E-mail: guillaume@gnec.co.za</p> <p>Tel: (021) 975 4444 Fax: 086 6933 802 Cell: 072 1571 321</p>			35	

Phase of development	CONSTRUCTION			
Impact / issue	PLANT			
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
<p>Workshop equipment, maintenance and storage</p> <p>The contractors must provide and maintain a method statement for “workshop maintenance and cleaning of plant”.</p> <p>All maintenance and washing of vehicles and equipment shall take place in the workshop area that is equipped with a bund wall and grease trap oil separator. During servicing of vehicles or equipment, a suitable drip tray shall be used to prevent spills onto the soil. Leaking equipment shall be repaired immediately or be removed from site to facilitate repair.</p> <p>Workshop areas shall be monitored for oil and fuel spills and such spills shall be cleaned and remediate to the satisfaction of the EO or RE. Cleaning and remediation must be done with products that are in line with best environmental practice i.e. Sunisorb</p> <p>The Contractor shall be in possession of an emergency spill kit that must be complete and available at all times on site. The Contractor must ensure that senior and the other relevant members of the workforce are trained in dealing with spills by using emergency spill kits.</p> <p>All spills of hazardous substances must be reported to the ESO, EO, RE or ECO.</p> <p>The contractor must comply with the regulations of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993).</p>	<ul style="list-style-type: none"> • Prevent pollution of the environment. • Minimise chance of transgression of the acts controlling pollution. • Disposal of hazardous substances in an appropriate manner. 	<ul style="list-style-type: none"> • No pollution of the environment. • No litigation due to transgression of pollution control acts. • Method statement. 	RE, Contractor, EO.	Monitor daily.
<p><i>Prepared by Guillaume Nel Environmental Consultants (GNEC) (as per DEADP Generic EMP)</i></p> <p>E-mail: guillaume@gnec.co.za</p> <p>Tel: (021) 975 4444 Fax: 086 6933 802 Cell: 072 1571 321</p>			36	

Phase of development	CONSTRUCTION			
Impact / issue	PLANT			
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
<p>Noise</p> <p>All construction vehicles must be in a good working order to reduce possible noise pollution.</p> <p>Work hours during the construction phase shall be strictly enforced unless permission is given (07H00 – 18H00). Permission shall not be granted without consultation with the local residents and businesses by the EO.</p> <p>Noise reduction is essential and Contractors shall endeavour to limit unnecessary noise, especially loud talking, shouting or whistling, radios, sirens or hooters, motor revving, etc. The use of silent compressors is a specific requirement.</p> <p>Noisy activities shall take place only during working hours. The EO must inform the residents of houses and businesses adjacent to the development in writing 24 hours prior to any planned activities that will be unusually noisy or any other activities that could reasonably have an impact on the adjacent sites. These activities could include, but are not limited to use of pneumatic jack-hammers and compressors etc.</p> <p>Machinery and equipment on site must be maintained so as to avoid any unnecessary noises.</p>	<ul style="list-style-type: none"> Maintain noise levels below “disturbing” as defined in the National Noise Regulations. Minimise the nuisance factor of the development. 	<ul style="list-style-type: none"> No complaints from surrounding landowners or I&APs. 	Contractor, EO.	As and when required.

Table 5: VLAKKELAND RESIDENTIAL DEVELOPMENT CONSTRUCTION PHASE EMP (Construction)

Phase of development	CONSTRUCTION			
Impact / issue	CONSTRUCTION			
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
<p>Crew camps</p> <p>Accommodation for members of the workforce will not be permitted on site unless authorisation has been given in terms of the Environmental Authorisation issued for the site.</p> <p>Dedicated wash areas must be situated away from the storm water canal.</p> <p>The contractor's camp shall be monitored for dust fallout and dust suppression applied as required. This may include the laying of gravel, the use of grey water can be considered as an option if the required permits have been acquired.</p> <p>The contractor's camp, offices and storage facilities shall be located within the site boundaries.</p> <p>The contractor shall provide labourers to clean up the contractor's camp and construction site on a daily basis. These areas shall then be inspected by the contractor or his/her EO to ensure compliance with this requirement.</p> <p>The contractor shall be responsible for cleaning the contractor's camp and construction site of all structures, equipment, residual litter and building materials at the end of the construction period and, the topsoil restored in areas where landscaping is to take place.</p>	<ul style="list-style-type: none"> • Minimise water pollution. • Minimise dust fallout. • Minimise unwarranted environmental damage outside the footprint. • Maintain a clean and healthy working environment. • Minimise impact to surrounding environment. 	<ul style="list-style-type: none"> • No signs of water or soil pollution. • No complaints from surrounding landowners or I&APs. • No visible signs of litter. • Method statements. 	Contractor, EO, ESO.	Monitor daily.

<p>Fires</p> <p>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.</p> <p>Absolutely no burning of waste is permitted.</p> <p>Fires will only be allowed in facilities especially constructed for this purpose within fenced Contractor’s camps. Wood and/or charcoal are the only fuels permitted to be used for fires. The contractor must provide sufficient wood (fuel) for this purpose.</p> <p>Fires within the designated areas must be small in scale so as to prevent excessive smoke being released into the air.</p> <p>Fires in the designated areas must be small in scale so as to prevent excessive smoke being released into the atmosphere.</p> <p>Heavy smoke may not be released into the air.</p> <p>No felling of trees or wood collection is allowed from private or public property.</p>	<ul style="list-style-type: none"> • Minimise risk of veldt fires. • Minimise destruction of natural fauna and flora. • Maintain safety on site. 	<ul style="list-style-type: none"> • No veldt fires started by the contractor’s workforce. • No claims from landowners for damages due to veldt fires. • Method statement. 	<p>Contractor, EO, ESO.</p>	<p>Monitor daily.</p>
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<p>Erosion and sedimentation</p> <p>To reduce the loss of material by erosion, the contractor shall ensure that disturbance on site is kept to a minimum. The contractor shall be responsible for rehabilitating all eroded areas in such a way that the erosion potential is minimised after construction has been completed.</p> <p>All disturbed areas that will not be landscaped within the construction phase, must be mulched to encourage vegetation re-growth. Mulch used must be free from alien seed.</p> <p>These areas must be cordoned off so that vehicles or construction personnel cannot gain access to these areas.</p>	<ul style="list-style-type: none"> • Minimise erosion damage. • Minimise scarring of the soil surface and land features. • Minimise disturbance and loss of topsoil. • Re-growth of disturbed areas. 	<ul style="list-style-type: none"> • No erosion scars. • No loss of topsoil. • No interference with the natural flow of water. • No visible erosion scars once construction is completed. • The footprint has not exceeded the agreed boundaries. • All damaged areas successfully rehabilitated. 	<p>Contractor, EO, ESO.</p>	<p>As and when required.</p>
<p>Fauna</p> <p><u>All activities on site must comply with:</u></p> <p>The regulations of the Animal Protection Act, 1962 (Act No. 71 of 1962); and Marine Living Resources Act, 1998 (Act No. 18 of 1998).</p> <p>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 EO or ECO is not able to.</p>	<ul style="list-style-type: none"> • Minimise disturbance to animals. • Minimise interruption of breeding patterns of birds. • Minimise destruction of habitat. 	<ul style="list-style-type: none"> • No complaints from Nature Conservation. • No litigation concerning applicable animal protection acts. • No measurable or visible signs of habitat destruction. 	<p>RE, Contractor, EO, ESO.</p>	<p>Monitor daily.</p>
<p>Flora</p> <p>Locally indigenous plants must be used in the landscaping of the site.</p>	<ul style="list-style-type: none"> • Encourage natural habitat fauna. • Minimise scarring of 	<ul style="list-style-type: none"> • No exotic plants used for landscaping. 	<p>Contractor, EO, ESO, Landscape Architect.</p>	<p>As and when required.</p>

<p><u>Plants that are proclaimed as problem plants or noxious weeds must be excluded from the landscaping plan and these must be removed immediately, should they occur on site.</u> These plants, as well as any other problem plants within a specific region as stipulated by a qualified and experienced botanist, must be included in an alien management programme for the site. Eradication must occur every 6 months.</p> <p>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.</p> <p>Site camps to be established at least 200m from the closest “no-go” area.</p> <p><u>No-Go areas to be fenced off.</u></p> <p><u>Fines of R5000 will be payable for entering a no-go area.</u></p> <p>Once construction is complete, rehabilitation of un-built areas must be undertaken in order to restore the aesthetic & ecological value of the area. It is recommended that a qualified landscape architect, qualified botanist and the ECO be consulted with regard to the most appropriate rehabilitation vegetation and structures. Active re-vegetation must take place with locally indigenous vegetation under the supervision of the ECO.</p> <p>Only indigenous vegetation may be used as rehabilitation vegetation in the landscaping plan.</p> <p>All invasive alien vegetation shall be removed from the riparian zone and this area shall be rehabilitated using local indigenous species.</p> <p>All the plants that have been kept in the nursery must be replanted to the satisfaction of the Environmental</p>	<p>the soil surface and land features.</p> <ul style="list-style-type: none"> • Minimise disturbance and loss of topsoil. • Minimise risk of veldt fires. • Minimise risk of fauna and flora destruction. 	<ul style="list-style-type: none"> • No visible erosion scars once construction is completed. • The footprint has not exceeded the agreed boundaries. • All damaged areas successfully rehabilitated. • No veldt fires started by contractor’s work force. • No claims from landowners for damages due to veldt fires. • Method statement. 		
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<p>Management Department; a minimum of a one year maintenance period will be instituted on completion. This will include replanting of any areas in which none of the rehabilitation work has been successful.</p> <p>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).</p>				
<p>Heritage</p> <p>In terms of the National Heritage Act, 1999 (Act No. 25 of 1999), construction personnel must be alert and must inform the local Council should they come across any findings of heritage resources within 24 hours if the area has been removed.</p> <p>Should any archaeological artefacts be exposed during construction activities, work on the area where the artefacts were found shall cease immediately and the ECO shall be notified within 24 hours.</p> <p>Upon receipt of such notification, the ECO will arrange for the excavation to be examined by an Archaeologist.</p> <p>Under no circumstances shall archaeological artefacts be removed, destroyed or interfered.</p> <p>Any archaeological sites exposed during demolition or construction activities must not be disturbed prior to authorisation by the Heritage Western Cape and/or the South African Heritage Resources Agency on the appropriate provincial heritage resource agency.</p>	<ul style="list-style-type: none"> • Limit the destruction of the country's heritage resources. • The preservation and appropriate management of new archaeological finds should these be discovered during construction. 	<ul style="list-style-type: none"> • No destruction of or damage to known archaeological sites. 	<p>Contractor, RE, ESO, EO.</p>	<p>Monitor Daily.</p>
<p>No-go / sensitive areas</p> <p>All construction activities must remain within the boundaries of the development area, as demarcated at the start of construction. There must be no vehicular access OUTSIDE THE BOUNDARIES OF THE PROPOSED DEVELOPMENT.</p> <p>No machinery shall be used within the stream channel.</p>	<ul style="list-style-type: none"> • Minimise the potential for the spread of the of the construction footprint. • Reduce loss of fauna and flora habitat. • Minimise the potential 	<ul style="list-style-type: none"> • No sign of movement through "no go" areas. • Containment of footprint. 	<p>RE, Contractor, ESO, EO.</p>	<p>Monitor daily.</p>

<p>The construction footprint must be kept to a minimum by constructing boundaries and demarcated around areas not to be distributed thus reducing the infringement of the development on natural habitat.</p> <p>All sensitive areas as indicated in the EIA report must be fenced off by means of semi-permanent fencing and must be treated as “No-Go” areas.</p> <p>Trespassers will be fined should any movement in these areas occur</p>	<p>for loss of protected and or endangered fauna and flora species.</p>			
<p>Access route/haul roads</p> <p>Existing roads and services must be utilised thus reducing the infringement of the development on natural habitat.</p> <p>No unauthorised access is permitted. Any authorised clearing for access roads must be done under the supervision of the ECO.</p> <p>Any damaged or degradation will be investigated, the affected areas must be immediately rehabilitated.</p> <p>Access roads for earthmoving-equipment must be clearly designated and be positioned as close as possible to the proposed development site. No driving off from the marked roads is permitted and designated parking areas must be identified and demarcated with applicable signage.</p> <p>Neither the site nor its access roads must be allowed to be utilised for recreational activities, this includes but is not limited to quad bikes, 4x4’s and dirt bikes. Security personnel must be informed and ensure that this is enforced.</p>	<ul style="list-style-type: none"> • Minimise loss of topsoil and enhancement of erosion. • Minimise fauna and flora displacement by destruction of natural habitats. 	<ul style="list-style-type: none"> • No erosion on access roads after completion of construction. • No loss of topsoil due to runoff water on access roads. 	<p>Contractor, RE or EO.</p>	<p>As required, monitor daily.</p>

<p>Crime, safety and security</p> <p>No site staff, other than security personnel and skeleton staff shall be housed on site unless other wise stipulated in the Environmental authorisation. Security personnel and skeleton staff shall 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.</p> <p>A boundary fence will serve to prevent public access to the site, for public safety and security reasons. The access to the site must be controlled so as to restrict unauthorised personnel from entering the site. The workers on site must retain some means of identification. The ESO and the contractor are responsible for ensuring that only authorised personnel are on site at all times.</p> <p>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.</p> <p>The contractor shall ensure that all emergency procedures are in place prior to commencing work. Emergency procedures shall include (but not be limited to) fire, spills, contamination of the ground, accidents to employees, use of hazardous substances and materials, etc.</p> <p>The contractor shall 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.</p> <p>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.</p>	<ul style="list-style-type: none"> • Reduce the risk of potential incidences. • Minimise the potential impact on the environment. 	<ul style="list-style-type: none"> • No incidences reported. 	<p>RE, Contractor, ESO, EO.</p>	<p>Monitor daily.</p>
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<p>Fire</p> <p>NO open fires shall be allowed on site under any circumstances (the Forest Act, 1984 (Act No. 122 of 1984).</p> <p>The contractor shall have fire fighting equipment available at crew camps and on all vehicles working on site.</p>	<ul style="list-style-type: none"> • Minimise risk of veldt fires. • Minimise risk of fauna and flora destruction. 	<ul style="list-style-type: none"> • No veldt fires started by contractor's work force. • No claims from landowners for damages due to veldt fires. 	<p>Contractor, ESO.</p>	<p>Monitor daily.</p>
<p>Visual impact</p> <p>Shade cloth must be utilised to conceal and minimise the visual impact of contractor camps, lay down and storage areas.</p> <p>Landscaping must enhance the aesthetic appeal of the development.</p> <p>Rubble and litter must be removed every two weeks or more often as the need arises and be disposed of at a registered landfill.</p> <p>The visual impact of the double storey buildings along the edge of the Jan van Riebeeck Drive should be softened by the planting of a row of indigenous trees as per the recommendation of the Drakenstein Municipality's Town Planning department.</p>	<ul style="list-style-type: none"> • Minimise visual impact. 	<ul style="list-style-type: none"> • No complaints from I & AP's. 	<p>Contractor, landscape contractor, ESO.</p>	<p>Monitor daily.</p>

<p>Hydrology</p> <p>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. Storm water, wherever possible, should be allowed to soak into the land in the area on which the water fell e.g. retention ponds</p> <p>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) shall be responsible for all costs incurred by organisations called to assist in pollution control and/or to clean up polluted areas.</p> <p>The contractor shall ensure that excessive quantities of sand, silt and silt-laden water do not enter the storm water system.</p> <p>No wastewater may run freely into any of the surrounding streets or into the storm water canal. Runoff containing high sediment loads must not be released into the storm water canal.</p>	<ul style="list-style-type: none"> • Minimise pollution of soil, surface and ground water resources in the immediate and surrounding environments. • Minimise impeding the natural flow of water. • Minimise the impact on natural water flow dynamics. • Minimise scarring of the soil surface and land features. 	<ul style="list-style-type: none"> • No visible signs of pollution. • No signs of siltation of water courses. • No visible erosion scarring once construction is completed. • Minimum loss of topsoil. 	<p>RE, Contractor, EO.</p>	<p>As and when required, monitor daily.</p>
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<p>Soil and Ground water</p> <p>The tank must be constructed from PVC and be placed in an impermeable concrete tank to ensure no leakage occurs.</p> <p>Topsoil must 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 comprising the permanent works, pipeline trenches, stockpiles, access roads, construction camps and laydown areas.</p> <p>Topsoil must be deemed to be the top layer of soil containing organic material, nutrients and plant grass seed. For this reason it is an extremely valuable resource for the rehabilitation and vegetation of disturbed areas.</p> <p>At the beginning of the construction phase, topsoil removed for vegetation clearance must be stripped to a minimum depth of 300 mm and stockpiled on the demarcated topsoil stockpile areas.</p> <p>All topsoil must be removed and stockpiled on the site.</p> <p>However, the use of topsoil for rehabilitation contaminated by the seed of alien vegetation (e.g. Acacia Sp., etc.) must not be permitted unless a programme to germinate the seed and eradicate the seedlings is drawn up and approved, or some other mitigatory feature is found. This must be approved by the ECO.</p> <p>Single handling is recommended. Stock piles must not be higher than 2m to avoid compaction.</p> <p>Dust suppression is necessary for stockpiles older than a month – with either water or a biodegradable chemical binding agent.</p> <p>Backfill will require contouring to ensure that it blends in with the surrounding environment.</p> <p>Areas to be filled must be cleared of vegetation and the</p>	<ul style="list-style-type: none"> • Minimise scaring of the soil surface and land features. • Minimise disturbance and loss of soil. • Minimise construction footprint. • Minimise sedimentation of nearby drainage lines. • Maintain the integrity of topsoil's for future landscaping and rehabilitation. • Containment of invasive plant growth. 	<ul style="list-style-type: none"> • No visible erosion scars once construction is completed. • The footprint has not exceeded the agreed site in terms of EA etc. • Minimal invasive weed growth. • No signs of sedimentation and erosion. • Method statement. 	<p>Contractor.</p>	<p>Daily.</p>
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<p>small areas where the bases of large trees are located should be cleared of remnant roots and loose material.</p> <p>It is recommended that the subgrade throughout the cleared areas should then be compacted to at least 90% of mod AASHTO maximum dry density with a ten-tonne, smooth drum, vibratory roller.</p> <p>The material from the embankment walls can then be placed in layers not exceeding 250mm in thickness, moistened to within 2% of optimum moisture content and rotated, if necessary, to mix the soil and water, and then compacted to 98% of mod density.</p> <p>Nuclear densimeter (troxler) tests should be undertaken on a routine basis as the layers are placed and at the intervals prescribed in SABS 1200 D</p> <p>Mixtures of sandy and clayey soils should not be placed in the engineered fill.</p> <p>Silty or clayey soils and their slightly gravelly derivatives, and the cohesive coarse soils will not be suitable for use as fill, and this material and particularly mixes of the soil types must be spoiled.</p> <p>Residual and Malmesbury soil and weathered rock could be used in engineered fill where it should be compacted to 95% of mod density with a pad foot vibratory roller. It could also be used in the wide service trenches where a sufficiently large compactor can be used. These materials are also moisture sensitive, and mixtures of Malmesbury materials and other soils must be avoided.</p> <p>Clean sand for bedding, and sub base and base course for road layer works should be imported.</p> <p>The subgrade in the road bed should be compacted to at least 93% of mod density. The design of the roads and the road layer works should take cognisance of the very low saturated CBR's of the shallow soils in the Northern and Southwestern Areas.</p> <p>Subsurface drainage will be required next to and below the roads in the Southwestern Area, and particularly in</p>				<p>At an interval as directed by the Department of Environmental Affairs and Development Planning</p>
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<p>the seasonally wet parts. Excess soils from, for example, the road bed or service trenches should not be spoiled on the general site area otherwise the subgrade for the surface beds and possibly for footings will be adversely affected</p>				
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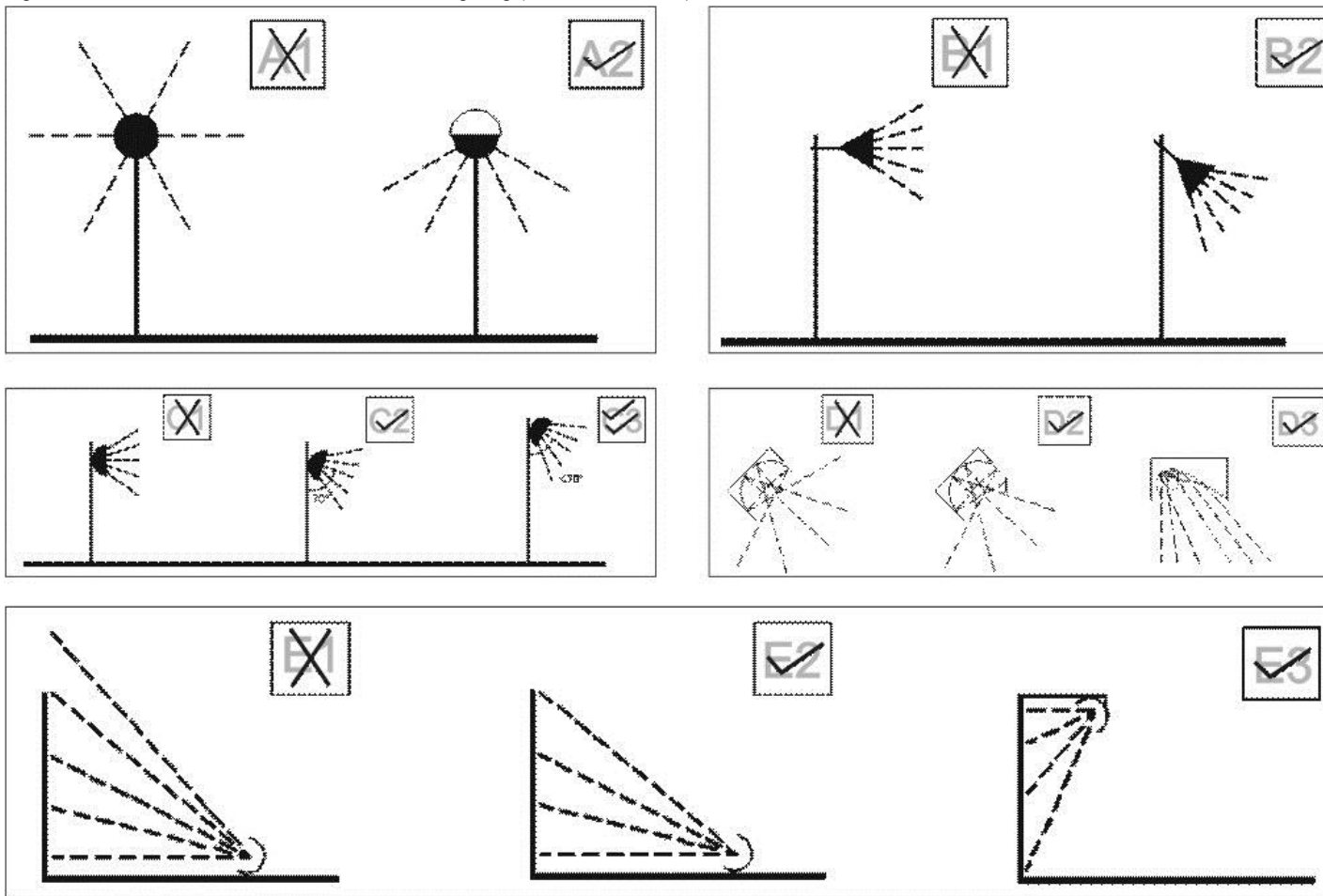
Table 6: Vlakkeland Residential Development **OPERATIONAL** PHASE EMP (General)

Phase of development	OPERATIONAL			
Impact / issue	General			
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
<p>Waste management</p> <p>Please refer to the waste minimization and management plan herewith attached.</p>	<ul style="list-style-type: none"> • Sustainable management of waste by recycling. • To keep the development neat and tidy. • Minimise litigation and complaints by I&AP's. • Reduce visual impact. • Control potential influx of vermin and flies thereby minimising the potential of diseases at the site and the surrounding environment. • Minimise potential to pollute soils, water resources and natural habitats. 	<ul style="list-style-type: none"> • Disposal of refuse in an appropriate manner with no refuse polluting the development. • Development is neat and tidy. • No complaints from surrounding residents and businesses. • Sufficient containers available on site. • No visible or measurable signs of pollution of the environment (soils, ground and surface water). 	Property Owners association and ECO.	6 Monthly.

Phase of development		OPERATIONAL			
Impact / issue		General			
MITIGATION MEASURE		MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
<p>Storm water Management</p> <p>Stormwater, wherever possible, must be allowed to soak into the land in the area on which the water has been discharged.</p> <p>The storm water system must be inspected and damaged areas must be repaired if required.</p> <p>No waste or refuse must be allowed to access the storm water infrastructure.</p> <p>Excessive quantities of silt laden runoff water must not be allowed to access the storm water system. In the event that silt runoff occurs off the development site, the cause of this must be investigated and suitable mitigation measures employed. This may include the vegetation of bare areas, installing flow diversion channels in consultation with an engineer, installing velocity reducing structures etc.</p> <p>For all maintenance undertaken reference must be made to recommendations in the engineer's reports and or the approved storm water management plan.</p> <p>All maintenance activities must be monitored to ensure that no environmental damage occurs. All damage must be mitigated immediately.</p>		<ul style="list-style-type: none"> Minimise pollution of soil, surface and ground water resources. Minimise the potential loss of topsoil. Minimise the potential of flooding of the development, or its neighbouring properties. 	<ul style="list-style-type: none"> No evidence of pollution at the discharge points. No evidence of silt build-up at the discharge points. No complaints from I & AP's. 	Property Owners association and ECO.	As and when required. Monitor seasonally.

Phase of development	OPERATIONAL			
Impact / issue	General			
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
<p>Atmospheric pollution</p> <p>Air pollution</p> <p>All forms of dust/air pollution must be managed in terms of the Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965), this includes the control of noxious and offensive gases, smoke, dust and vehicular emissions</p> <p>Under no circumstances may heavy smoke be released into the air.</p> <p>Light pollution</p> <ul style="list-style-type: none"> ▪ Light output is to be confined within property boundaries through using specifically designed luminaires such as full cut-off luminaires to minimise upward spread of light near to and above the horizontal (Figure – A); ▪ Spotlight luminaires to be tilted in order to direct the light to the intended spot, instead of allowing it to light areas outside its purpose (Figure – B Report); ▪ Outdoor spot lights to be mounted on the appropriate pole height. Higher mounting heights allow lower main beam angles which can reduce glare (Figure 2– C). <p>Noise pollution</p> <p>Noise levels shall be kept within acceptable limits, these are determined in terms of the relevant local by laws.</p>	<ul style="list-style-type: none"> • Reduce visual impact. • Minimise chances of transgression of the acts controlling pollution. 	<ul style="list-style-type: none"> • No visible signs of pollution. • No litigation due to transgression of pollution control acts. • No complaints from surrounding residents and businesses. 	<p>Property Owners association and ECO.</p>	<p>Monitor daily.</p>

Figure 2: Guidelines for the reduction of obtrusive lighting (Source: ILE, 2005)



<p>Safety and Security</p> <p>Boundary wall must be regularly inspected and maintained to prevent any damage.</p> <p>All fencing on site must be managed in terms of the Fence Act No. 31 of 1963</p> <p>All maintenance and repair work must be done in accordance with National Building Regulations and Standards Act 103 of 1977</p> <p>Maintenance work must not be the cause of environmental damage. Any environmental damage caused must be investigated and mitigated immediately.</p> <p>An emergency plan (including fire management) must be developed and implemented; the relevant authority must approve this plan. Ensure that all fire extinguishers are replaced on or before their expiry dates. Ensure that pump devices are in good working order.</p> <p>Adequate measures must be taken to ensure that no illegal occupancy of vacant buildings (including schools, public facilities and buildings in the business nodes) will occur.</p>	<ul style="list-style-type: none"> • Reduce the risk of potential incidences. • Minimise litigation and complaints by I&AP's. 	<ul style="list-style-type: none"> • No complaints from surrounding residents and businesses. 	<p>Property Owners association and ECO.</p>	<p>As and when required.</p>
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<p>Traffic management</p> <p>It must be ensured that a backlog of traffic does not develop at access points during peak hours, through the implementation of an efficient and effective access control systems.</p> <p>All traffic management must be done in accordance with the National Road Traffic Act No. 93 of 1996</p>	<ul style="list-style-type: none"> • Minimise chances of transgression of the acts controlling traffic. • Minimise traffic backlog. 	<ul style="list-style-type: none"> • No litigation due to transgression of traffic control acts. • No complaints from surrounding residents and businesses. 	<p>Property Owners association and ECO.</p>	<p>Monitored continually.</p>
<p>Landscape maintenance</p> <p>Where applicable landscaped areas must be maintained in terms of the general conditions set out in the approved landscape plan.</p> <p>All alien invasive plant species must be removed for disposal at a registered organic waste transfer facility.</p> <p><i>Inspection of all foundation trenches and DCP testing in the trenches to ensure that the structural design is in accordance with the ground conditions encountered.</i></p> <p><i>The ground should be shaped so that no ponding occurs against the houses.</i></p>	<ul style="list-style-type: none"> • Minimise chances of transgression of the acts. • Reduce visual impact. 	<ul style="list-style-type: none"> • No litigation due to transgression of relevant acts. • No complaints from surrounding residents and businesses. 	<p>Property Owners association and ECO.</p>	<p>As and when required.</p> <p>Monitor seasonally.</p>

<p>Infrastructure maintenance</p> <p>All buildings must be maintained in accordance with engineer's specifications.</p> <p>The sewage system (where applicable) must be inspected for leakages on a regular basis and any leakages must be attended to immediately</p> <p>In case of emergency sewage leaks, effluent must not be discharged into any water course or water body.</p> <p>All taps must be regularly inspected for leaks and washers or valves replaced as required.</p> <p>Inspect the development for burst, blocked or leaking water pipes and repair as required.</p>	<ul style="list-style-type: none"> • Reduce visual impact. • Minimise pollution of soil, surface and ground water resources. 	<ul style="list-style-type: none"> • No complaints from surrounding residents and businesses. • No pollution of the environment. 	<p>Property Owners association and ECO.</p>	<p>As and when required.</p> <p>Monitor as part of a monthly maintenance inspection/schedule.</p>
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Table 7: VLAKKELAND DEVELOPMENT OPERATIONAL PHASE EMP (EA conditions)

Phase of development	OPERATIONAL	EA reference number	16/3/1/2/B3/28/1006/13		
Impact / issue	EA Conditions	Ms. Anthea Shortles			
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION	
	•	•			
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Phase of development	OPERATIONAL	EA reference number	16/3/1/2/B3/28/1006/13		
Impact / issue	EA Conditions	Ms. Anthea Shortles			
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION	
	•	•			
	•	•			

2ND DRAFT

**WASTE, WATER USE AND ELECTRICITY CONSUMPTION MINIMIZATION AND
MANAGEMENT PLAN**

For the proposed

**VLAKKELAND RESIDENTIAL DEVELOPMENT ON ERF 8359,
RE/ERF 8370, ERF 8378, ERF 8399, ERF 8400, ERF 12628, ERF
12633 AND ERF 33027 IN PAARL, WESTERN CAPE.**

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Date: September 2014

REFERENCES

DEA&DP, 2003. A Waste Minimization Guideline Document for Environmental Impact Assessments (2003) by Common Ground in association with deVilliers Brownlie Associates.

National Environmental Management Act 107 of 1998 (NEMA)

Stellendale Village DRAFT Green Building Guidelines by Steadfast Greening, 2008

SECTION 1 - INTRODUCTION

1.1 INTRODUCTION

Please note that all changes to the 1st Draft EIR was made in Blue for ease of Reference and to assist with the review process of this EIR

Guillaume Nel Environmental Consultants (GNEC), as independent environmental consultants and impact assessors, has been appointed by the Western Cape Department of Housing, on behalf of Drakenstein Municipality, to facilitate the Integrated Environmental Management (IEM) procedure for the proposed residential development on Erf 8359, Re/Erf 8370, Erf 8378, Erf 8399, Erf 8400, Erf 12628, Erf 12633 and Erf 33027 (known as Vlakkeland) in Paarl, Western Cape.

The region of Paarl and Wellington suffers from a shortage of houses for the local community. Developable land in Paarl/Wellington area is scarce due to the sensitive nature of the natural environment in general, the heritage and visual sensitivity of most of the area as well as the good quality of most of the agricultural land in the area. Over population is therefore a major concern and this proposed development will provide the needed housing for the local community.

The proposed site is situated in the Paarl Valley between Paarl and Wellington in the Western Cape. The 105ha site is located south of Newton residential development and east of Mbekweni residential area. The western boundary of the site is bounded by Jan van Riebeeck Drive, Bo-Dal Road serves as the site's eastern boundary. Agricultural farm lands are situated east of Bo Dal Road and a heritage conservation site is situated to the south. The proposed site is zoned for agricultural use but it is currently standing mostly vacant and is an area prone to attract trouble makers. A group of informal farmers (mostly pigs and goats) have settled close to the western site boundary.

The municipality proposes to develop a residential development with approximately 3 260 units, consisting of a combination of subsidy housing, subsidy double storey housing an activity spine, GAP housing and GAP and rental apartments on the above mentioned property. It is proposed to allocate four erven for Primary Schools and two erven for Secondary Schools. Specific locations will be set out to accommodate Places of Worship, Creches, Pre-Primary Schools, Sport Fields and taxi bays. A conceptual open space network will run throughout the development. A Civic and Business Node will be created in the centre of the development, providing

a location for retail, offices, a Library, a Post Office and a Community Centre. A primary storm water drainage system with a large storm water retention facility will be constructed in the south eastern corner and alongside the southern border. This area will also serve as a sport facility, providing sport fields for the local community.

Access to the site will be taken from Jan van Riebeeck Drive (770m south of Mbekweni intersection west of the site)

Drakenstein Municipality, the developer and Vlakkeland Residential Development will use this WASTE, WATER USE AND ELECTRICITY CONSUMPTION MINIMIZATION AND MANAGEMENT PLAN to minimize and manage waste and wastage, electricity consumption and water use in the design, construction and operational phase of the proposed development as a tool in managing the impacts of the proposed development after environmental approval from the Department of Environmental Affairs and Development Planning (DEA&DP) in terms the Environmental Impact Assessment Regulations – National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), which replaced the regulations under the, Environment Conservation Act, 1989 (Act No. 73 of 1989) and has been effective as of 3 July 2006.

This document is based on the Waste Minimization Guideline Document on the DEA&DP website (by Common Ground in association with deVilliers Brownlie Associates) and the Stellendale Village DRAFT Green Building Guidelines by Steadfast Greening.

The regulation of activities that have a significant impact on the environment as well as the protection of the environment itself, have improved significantly in the last decade and a half with the promulgation of the Constitution, and general environmental legislation, such as the National Environmental Management Act (NEMA) and the National Water Act. One of the main impacts of human activities on the environment is that of waste disposal (Common Ground & deVilliers Brownlie Associates, 2003).

Waste may be in solid, liquid or gaseous form. It may be benign, toxic, or hazardous. The management of hazardous waste, with associated negative impacts on the environment, is generally covered by legislation. The longer term, cumulative impacts of relatively benign waste disposal is poorly addressed by our laws (DEA&DP Waste Minimization Guideline, 2003).

“Waste” in this document is primarily interpreted as solid waste. Waste minimisation per se is not specifically legislated in South Africa at present. Similarly, there are no legal instruments that can be used to enforce reduction in wastage of electricity and water although the National Water Act No 36 of 1998 prohibits wastage of water without specifying what wastage means and how this section will be enforced. However, there are a number of laws and overarching policies that are aimed at sustainable development and sound environmental management, and which are relevant to waste and wastage minimisation.

Wastage is defined in the Oxford Dictionary as...“expend or employ to no purpose or for inadequate result, use extravagantly or ineffectually, squander”. Part of the obligation to protect the environment would be to limit wastage of resources. Thus limiting wastage of water would fall within this obligation. So too would be limiting the wastage of electricity that results in pollution at the site of electricity generation (Common Ground & deVilliers Brownlie Associates, 2003).

SECTION 2 - WASTE REDUCTION

2.1 BACKGROUND TO WASTE REDUCTION

A key element of environmentally friendly buildings is to promote awareness and change behaviour around all aspects of waste management.

Waste minimisation can therefore be assessed as a component of waste management that aims to reduce the amount of waste, which has to be disposed of. In this regard waste minimisation is aimed at tackling the causes and sources of waste rather than just trying to address and mitigate the symptoms (e.g. through treatment). Waste management can be depicted as a hierarchy, as shown in Figure 1 below. In the hierarchy, source reduction options are considered as a priority, followed by re-use and recycling options. Treatment options are considered only when acceptable waste minimisation techniques have been investigated. As a “last resort” disposal should be considered.

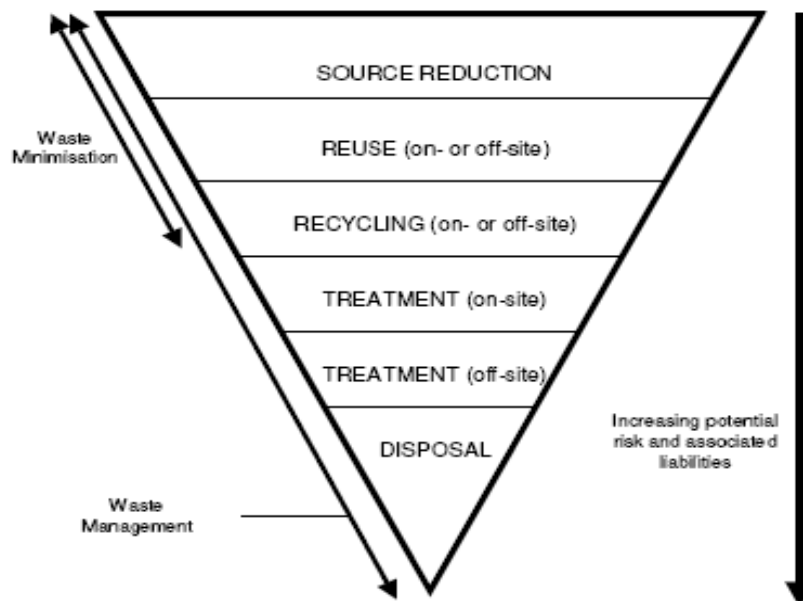


Figure 1 Waste Management Hierarchy (Common Ground & deVilliers Brownlie Associates, 2003).

Waste Management, therefore, involves interventions to minimize waste generation in the planning, operation, management and maintenance of the built environment, and includes waste prevention, waste reduction, waste re-use, and recycling.

A further aspect is minimizing the environmental and health impacts by reducing toxicity, and ensuring environmentally sound treatment and disposal of remaining waste. The ultimate is however to promote a zero waste concept where all the related materials can be used again over the longer term with life-cycle assessments, cradle to cradle.

Zero Waste is a goal, a process, a way of thinking that is different to the way we think about products and processes. Not only is Zero Waste about recycling and avoiding waste going to landfill, it also changes production and distribution systems to prevent waste from being manufactured in the first place. It is a way of changing how materials flow through society in such a way that, as in nature, they flow in a closed loop – resulting in efficient use of material and other resources, such as energy and water (Steadfast Greening, 2008).

Zero Waste therefore aims to:

- Prevent rather than manage waste.
- Turn resource that would normally be thrown away into economic value instead of loss.
- Support sustainable development.
- Follows natural processes where everything is recycled.
- Promote the efficient flow of energy and materials.

It is thus essential to ensure that waste avoidance is built into the process at a design phase, referring to the construction and maintenance of the building. This will be done through selection of the appropriate building materials and managing the construction process in a responsible manner.

Opportunities for the separation of waste at source must also be built into the design of the building to encourage people to recycle their waste.

2.2 BENIFITS OF WASTE REDUCTION

The benefits of waste reduction as described in the DEA&DP Waste Minimization Guideline (Common Ground & deVilliers Brownlie Associates, 2003) include the following benefits.

2.2.1 Financial benefits

- Reduced transportation costs for waste materials (less transportation because of less material wasted). This includes transportation to and from the site and disposal.
- Reduced disposal costs of waste materials (disposal costs are likely to rise significantly in the near future)
- Reduced purchase quantity and price of raw materials by waste minimisation.
- Reduced purchase price of new materials when considering reuse and recycling (depending on materials).
- Increased returns can be achieved by selling waste materials to be reused.

2.2.2 Environmental benefits

Some of the environmental benefits are:

- Reduced quantity of waste generated.
- Efficient use of waste generated.
- Minimised amounts of waste disposed of at landfills, which therefore extend the lifespan of landfills.
- Reduced environmental effects as a result of disposal, e.g. noise, pollution.
- Reduced transportation of waste to be disposed of (hence less noise, vehicle emission pollution, and energy used).

2.2.3 Social benefits

- Increased site safety.
- Increased work efficiency.
- Enhanced company image.
- Job creation through recycling initiatives.

2.3 GENERATED WASTE

2.3.1 Examples of waste generated during construction:

- Waste wood from cutting structural elements, broken structural elements and damaged elements from incorrect storage
- Damaged or off-cut steel components
- Off-cut electrical wiring and cabling
- Broken or off-cut tiles
- Packaging
- Off-cut and broken bricks
- Surplus material from cut and fill activities
- Spoil from cut and fill activities
- Off-cut, or broken conduit and plumbing
- Off-cut or damaged insulation elements
- Surplus paint and paint containers
- Broken or redundant plant and equipment
- Surplus concrete, cement and grouting
- General waste

SECTION 3 - WASTE MINIMIZATION PLAN

3.1 WASTE MINIMIZATION DURING CONSTRUCTION

Issue	Minimization Plan
General Considerations	
Material Selection	The developer will, for as far as it is economically feasible select: <ul style="list-style-type: none"> • materials for least waste generation during preparation and use during construction • materials used in the construction which are durable in order to minimise maintenance or replacement • standard materials to increase re-use/ recycling potential • materials which are sourced locally
Pre-Fabrication	The developer will, for as far as it is economically feasible make use of pre-fabricated components in order to minimise waste on site and permit re-use by the manufacturers of any waste generated during construction of the units.
Hazardous Substances	The developer will, for as far as it is economically feasible make use of non hazardous substances to replace hazardous substances such as replacing asbestos with fibre glass etc.
Ordering	The developer will strive to order materials "just-in-time" to avoid deterioration/ breakage during storage The developer will strive to (as far as reasonably possible) order materials only from suppliers which will take back any unused/ off-spec or broken materials favoured The developer will strive to (as far as reasonably and economically possible) order materials in bulk to reduce packaging but without over-ordering resulting in waste generation Suppliers which take back the packaging will be favoured by the developer.
Load and unloading of materials	The construction site staff will be trained to load and unload materials correctly to avoid breakage and wastage.
Storing of materials	Care will be taken to ensure that materials are stored appropriately according to supplier specifications to reduce the risk of damage or deterioration.
The use of temporary structures	The developer will attempt to keep temporary structures on site to a minimum. Where unavoidable the temporary structures used on this site, will be re-used on other sites.
General	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. Any illegal dumping of waste will not be tolerated.

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	<p>Proof of legal dumping must be able to be produced on request.</p> <p>Bins must be clearly marked for ease of management.</p> <p>All refuse bins must have a lid secured so that animals cannot gain access.</p> <p>The waste must be stored in dedicated areas and that where baboons are prevalent; "baboon proof" lids must be fitted.</p> <p>Under no circumstances must any waste be burnt.</p> <p>All waste must be managed in accordance with the MINIMUM REQUIREMENTS FOR WASTE DISPOSAL BY LANDFILL 2ND ED 1998.</p> <p>All waste must be disposed of at a registered site. It is the management bodies' responsibility to ensure that the contracted party responsible for waste disposal disposes of the waste at the correct facility.</p>
	<p>The use of building materials which result in least amount of waste generated (e.g. pre-fabrication as opposed to on-site construction/ fabrication) will be favoured by the developer as far as economically feasible.</p> <p>Materials will be re-used on site wherever possible.</p> <p>Off-cuts and equipment will be re-used on other jobs wherever possible.</p>

3.2 WASTE MINIMIZATION DURING OPERATION

Issue	Minimization Plan
General Considerations	
General	<p>Owners of properties will be encouraged to separate waste into recyclable and non-recyclable waste, and shall be separated as follows:</p> <p>Hazardous waste: including (but not limited to) old oil, paint, etc,</p> <p>General waste: including (but not limited to) domestic refuse, non- recyclable waste;</p> <p>Recyclable waste shall preferably be deposited in separate bins. The contractor is advised that "Collect-a-Can" collect tins, including paint tins, chemical tins, etc. and "Consol" collect glass for recycling.</p> <p>Bins must be clearly marked for ease of management.</p> <p>All refuse bins must have a lid secured so that animals cannot gain access. Sufficient closed containers must be strategically located around the development to handle the amount of litter, wastes, rubbish, debris generated by the development.</p> <p>Under no circumstances must any waste be burnt.</p> <p>All waste must be managed in accordance with the MINIMUM REQUIREMENTS FOR WASTE DISPOSAL BY LANDFILL 2ND ED 1998.</p> <p>All waste must be disposed of at a registered site. It is the management bodies' responsibility to ensure that the contracted party responsible for waste disposal disposes of the waste at the correct facility.</p>

SECTION 4 – WATER USE AND MANAGEMENT PLAN

4.1- WATER USE MINIMIZATION AND MANAGEMENT DURING CONSTRUCTION AND OPERATION

CONSTRUCTION PHASE	
Issue	Management Plan
General Considerations	
ABLUTIONS	The developer will investigate the reuse of water from wash basins on site.
CONCRETE AND CEMENT PREPARATION	The developer/contractor will order concrete and cement from supplier for as far as possible. The mixing area should contain any liquids to prevent contamination of soil and storm water
GENERAL CLEANSING OPERATIONS	All hoses will be fitted with trigger gun spray nozzles to limit wastage. Dry sweeping will be used (for as far as possible) in preference to washing of areas and equipment. Wherever possible biodegradable and non-toxic detergents, soaps and degreasers will be used. Regular Maintenance of equipment will be conducted in order to prevent wastage.

OPERATIONAL PHASE		
WATER LANDSCAPING	WISE	<p>The developer will focus on the use of indigenous water wise planting and irrigation methods, such as drip irrigation, which can drastically reduce garden water consumption.</p> <p>Drip nozzles will be used for as far as possible and should have a low level focused spray to reduce evaporation and focus water where it is needed.</p> <p>Should a timed irrigation systems for garden irrigation be used, the focus will be on use in those hours where less evaporation occurs (night or after sun set).</p> <p>Storm water catch pits for use in garden irrigation will be promoted.</p> <p>If biodegradable, non-toxic soaps, shampoos and detergents are used exclusively in the structure, these waste water streams can be directed to catch ponds for re-use as irrigation.</p>
WATER SOURCES		The capture and use of rainwater from gutters and roofs will be promoted amongst owners of the new erven.
ABLUTIONS		<p>New washbasin taps should be fitted with flow reduction devices or aerators.</p> <p>New toilets will be fitted with a dual flush systems.</p>

SECTION 5 – ELECTRICITY MANAGEMENT PLAN

5.1 ELECTRICITY CONSUMPTION REDUCTION OPERATION

OPERATIONAL PHASE	
General Considerations	
AIRCONDITIONING	Insulation in new homes to reduce the need for air-conditioning will be promoted. Natural air flow must be used in preference to air-conditioning wherever possible.
LIGHTING	Natural light will be used wherever possible during the day in preference to artificial light (trade off between using large windows for use of sunlight but this may require additional air-conditioning). Low voltage or compact fluorescent and/or High Pressure Sodium lights will be used in place of incandescent globes.
HEATING	The use of solar heating will be investigated and utilized as far as economically feasible.

ANNEXURE 1 DECLARATION OF UNDERSTANDING BY THE DEVELOPER

I, _____

Representing _____

Declare that I have read and understood the contents of the Environmental Management Plan for:

Contract _____

I also declare that I understand my responsibilities in terms of enforcing and implementing the Environmental Specifications for the aforementioned Contract.

Signed: _____

Place: _____

Date: _____

Witness 1: _____

Witness2: _____

ANNEXURE 2 DECLARATION OF UNDERSTANDING BY THE ENGINEER

I, _____

Representing _____

Declare that I have read and understood the contents of the Environmental Management Plan for:

Contract _____

I also declare that I understand my responsibilities in terms of enforcing and implementing the Environmental Specifications for the aforementioned Contract.

Signed: _____

Place: _____

Date: _____

Witness 1: _____

Witness2: _____

ANNEXURE 3 DECLARATION OF UNDERSTANDING BY THE CONTRACTOR

I, _____

Representing _____

Declare that I have read and understood the contents of the Environmental Management Plan for:

Contract _____

I also declare that I understand my responsibilities in terms of enforcing and implementing the Environmental Specifications for the aforementioned Contract.

Signed: _____

Place: _____

Date: _____

Witness 1: _____

Witness2: _____

ANNEXURE 4 INCIDENT AND ENVIRONMENTAL LOG

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